



**Eastern Ribbon Snake Survey
Report: REV 2**

Benton, Clinton, and Unity Township,
Maine

July 29, 2022

Prepared for:

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1.0 INTRODUCTION

Three Corners Solar, LLC (Three Corners) contracted Stantec Consulting Services Inc. (Stantec) to conduct field surveys to evaluate potential presence of the eastern ribbon snake (*Thamnophis sauritus*), a state-listed species of special concern, for the proposed Three Corners Solar Project, an approximately 926-acre solar development project proposed in Benton, Clinton, and Unity Township, Maine (Project, Appendix A: Figure 1). The field surveys were prompted by comments received from the Maine Department of Inland Fisheries and Wildlife (MDIFW) on the Project's recently submitted Site Location of Development Act permit application to the Maine Department of Environmental Protection (MDEP). In this letter, MDIFW recommended that surveys for eastern ribbon snake be conducted within the Project area, and buffers be established around observed locations.¹ This report was revised based on subsequent MDIFW and MDEP comments for the active review of Project's Site Location of Development Act permit application.²

Visual meander surveys were performed during May 2022 using a regional standardized protocol within the Project limits of work that intersect potentially suitable wetland and wetland ecotone habitat. Field survey methodology was developed based on email correspondence received on March 24, 2022, from MDIFW prior to initiating the field surveys. This report summarizes the methods and results of the eastern ribbon snake survey.

Upon the Project's receipt of anticipated regulatory approvals, construction could start as early as August 1, 2022, with completion anticipated for early 2024 based on this anticipated start date.

1.1 EASTERN RIBBON SNAKE ECOLOGY

The eastern ribbon snake is a slender, medium-sized (up to 3 feet in length), long-tailed semi-aquatic snake typically found near wetlands. Distinguishing physical characteristics across all age classes include a pale yellow or white spot or bar in front of the eye, three yellow stripes along a dark colored body, and typically mahogany color along the lower sides of the body. Suitable wetland habitat includes shallow and semi-permanent wetlands with abundant emergent and shrubby vegetation, including large vernal pools, beaver-impounded wetlands, shrub swamps, wet meadows, bogs, river and stream floodplains, and shorelines of lakes and ponds. Forested habitat adjacent to occupied wetlands is also utilized for overwintering. The species is active between the spring and fall, typically April 15 through October 15. The species is documented in southern and central areas of Maine and identified by MDIFW as a species of special concern. Those species listed as threatened and endangered are protected under the Maine Endangered Species Act.

¹ MDIFW letter dated March 17, 2022, in response to the Project's Site Location of Development application.

² MDIFW letter dated July 22, 2022, in response to the Project's ongoing Site Location of Development application review.



2.0 METHODS

Prior to conducting field surveys, Stantec consulted with MDIFW biologist Derek Yorks to identify areas containing potentially suitable eastern ribbon snake habitat to target for field surveys and confirm the appropriate field survey methodology. MDIFW provided Stantec with several approximate locations of potentially suitable wetland habitats located within or near the Project limits of work, which they identified through a preliminary desktop assessment. Stantec overlaid these locations in Geographic Information Systems (GIS) software, refined the boundaries based on the finer scale boundaries of wetlands delineated previously, and buffered the areas by 250 feet to identify potentially suitable eastern ribbon snake habitat within and within 250 feet of the Project proposed limits of work to target for field surveys. In addition, Stantec conducted an additional desktop assessment, which identified additional potentially suitable wetland habitats within the Project area for the field survey based upon the results of prior on-site ecological field surveys and a desktop review of aerial photography.

The field survey methodology was conducted based on the *Spotted Turtle Assessment Protocol* (dated March 7, 2018) developed by the Spotted Turtle Working Group.³ Although developed for spotted turtle, MDIFW confirmed that components of the survey methodology are appropriate to use for eastern ribbon snake surveys. The surveys were conducted by Matt Arsenault and Dan Nein of Stantec, both of whom have over 15 years of herpetofauna survey experience in New England and have recently conducted surveys for and observed eastern ribbon snakes in Maine and beyond.

Surveys for eastern ribbon snake consisted of Visual Rapid Assessment (VRA) within designated survey areas occurring within and within 250 feet of the Project's solar array and generator lead limits of work. The VRA consisted of actively searching for snakes through meander encounter surveys with use of binoculars as able to confirm species identification. The VRAs were conducted on calm days with wind speeds below 10 miles per hour on average, with sunny or partly cloudy conditions, and ambient daytime air temperatures of 50 degrees Fahrenheit (°F) or higher. Data from the VRA was recorded consistent with the Spotted Turtle Visual Rapid Assessment 2019 Field Form (2/14/2019). Six separate VRA events were conducted during the survey period. Representative photographs were taken to document existing conditions and any observations of state-listed snakes (Appendix B).

3.0 RESULTS AND DISCUSSION

Surveys were conducted in 14 areas within 250 feet of the Project's proposed limits of work that contain potentially suitable eastern ribbon snake habitat as identified by MDIFW and Stantec. Stantec performed six VRAs (three survey rounds each in the solar array and the generator lead corridor) on May 6, 9, 13, 24, 25, and 26, 2022. A total of 10 eastern ribbon snakes were observed in wetlands within 250 feet of the Project's limits of work: 3 near the solar array (wetland W-MR-01) and 7 near/within the generator lead corridor (wetlands W009, W050, W055, W057, and W059). Table 1 presents survey results. The figures in Appendix A provide locations of eastern ribbon snake observations, and VRA field forms are included in Appendix C.

³ Available online: http://www.northeastturtles.org/uploads/3/0/4/3/30433006/spotted_turtle_assessment_protocol_-_march7_2018.pdf



Table 1. Summary of Eastern Ribbon Snake VRA Survey Result

Date (Surveyor)	Weather	Time	Survey Areas	Observations / Comments
May 6, 2022 (D. Nein)	Mostly clear, high ~60 °F, winds ~5 mph	10:40–4:45	W-MR-01; uplands within 250 feet of wetlands	No eastern ribbon snake observations
May 9, 2022 (M. Arsenault)	Sunny, 50–60 °F, calm winds	8:05–4:10	W009, W027, W032, W043, W050, W051, W052, W056, W058, W059; uplands within 250 feet of wetlands	Three eastern ribbon snake observations (W050 and W059)
May 13, 2022 (M. Arsenault)	Sunny, 75–80 °F, winds calm <5 mph	8:00–2:05	W-MR-01; uplands within 250 feet of wetlands	One eastern ribbon snake observation (W-MR-01)
May 24, 2022 (D. Nein)	Mostly clear, high ~70 °F, winds ~5 mph	9:30–5:15	W-MR-01; uplands within 250 feet of wetlands	Two eastern ribbon snake observations (W-MR-01)
May 25, 2022 (D. Nein)	Mostly clear / partly cloudy, high ~70 °F, winds ~5 mph	11:00–5:15	W009, W020, W027, W032, W043; uplands within 250 feet of wetlands	Two eastern ribbon snake observations (W009)
May 26, 2022 (D. Nein)	Partly cloudy / overcast, high ~65 °F, winds ~5–10 mph	11:00–4:25	W027, W043, W051, W052, W055, W056, W057, W058; uplands within 250 feet of wetlands	Two eastern ribbon snake observations (W055 and W057)

Table 2 summarizes the characteristics of the 14 wetland habitat survey areas, and the survey areas are provided on the figures in Appendix A. It should be noted that the wetland identifiers used in Table 2 and the figures in Appendix A are based on the field delineation of jurisdictional wetlands relative to proposed Project layout and limits of work. In some cases, the Project limits of work intersect the same large contiguous wetland complex in more than one location, but those delineated areas may have a different assigned wetland identifier. For example, W043 and W050 on either side of Bog Road in Benton are considered the same wetland complex for the purposes of this report due to a hydrological connection via a perennial stream through a culvert under the road. Representative photographs, including areas identified as potentially suitable and non-suitable aquatic habitats, are included in Appendix B.

Following the field surveys, Stantec conducted an additional desktop analysis to identify the approximate extents of habitat areas assumed to be occupied by eastern ribbon snake within and proximal to (i.e., within 250 feet of) the Project proposed limits of work. This assessment considered the locations of the observed eastern ribbon snakes, wetland hydrological continuity, and the observed characteristics of the wetland habitats. Aerial imagery and field observations were used to delineate the approximate area of assumed occupied habitat. It should be noted that many of the observed ribbon snake occurrences are located within larger wetland complexes that contain a diversity of wetland community types and hydrology and not all of the associated wetland community types are considered suitable eastern ribbon snake habitat. The Project will implement protection measures through Best Management Practices (BMPs) to protect eastern ribbon snake. The figures in Appendix A illustrate the Project areas that are subject to the eastern ribbon snake BMPs and Section 4 summarizes the proposed measures.



Table 2. Summary of Wetlands Surveyed for Eastern Ribbon Snake

Figure Identifier	Wetland Classification(s) ¹	Dominant and Characteristic Vegetation	Observations / Comments
W009	PFO/PSS/PEM	<p>Trees: balsam fir (<i>Abies balsamea</i>), red maple (<i>Acer rubrum</i>), black ash, (<i>Fraxinus nigra</i>), yellow birch (<i>Betula alleghaniensis</i>), eastern arborvitae (<i>Thuja occidentalis</i>)</p> <p>Shrub/Saplings: balsam fir, speckled alder (<i>Alnus incana</i>), common winterberry (<i>Ilex verticillata</i>), broad-leaved meadowsweet (<i>Spiraea latifolia</i>), steeplebush (<i>Spiraea tomentosa</i>)</p> <p>Herbs: sensitive fern (<i>Onoclea sensibilis</i>), evergreen wood fern (<i>Dryopteris intermedia</i>), broad-leaf cat-tail (<i>Typha latifolia</i>), fowl manna grass (<i>Glyceria striata</i>), water-dragon (<i>Calla palustris</i>), common marsh bedstraw (<i>Galium palustre</i>), lamp rush (<i>Juncus effusus</i>), spotted touch-me-not (<i>Impatiens capensis</i>), bluejoint (<i>Calamagrostis canadensis</i>), interrupted fern (<i>Osmunda claytoniana</i>), three-seed sedge (<i>Carex trisperma</i>), late goldenrod, (<i>Solidago gigantea</i>), eastern marsh fern (<i>Thelypteris palustris</i>), cottongrass bulrush (<i>Scirpus cyperinus</i>), northern water-horehound (<i>Lycopus uniflorus</i>), European bur-reed (<i>Sparganium emersum</i>), three-leaf goldthread (<i>Coptis trifolia</i>), bristly dewberry (<i>Rubus hispidus</i>), wrinkle-leaf goldenrod (<i>Solidago rugosa</i>), royal fern (<i>Osmunda spectabilis</i>)</p>	<p>Large wetland complex of interspersed pockets of emergent, forest and dense shrub thickets, fringed by forested wetland. The wetland contains a stream that flows northerly across the western edge and contains a vernal pool. Eastern ribbon snakes observed in riparian area along western portion of wetland; potentially suitable habitat throughout. BMPs recommended.</p>
W020	PFO	<p>Trees: balsam fir, red maple, black ash</p> <p>Shrub/Saplings: common winterberry</p> <p>Herbs: cinnamon fern (<i>Osmundastrum cinnamomeum</i>), eastern marsh fern, eastern poison ivy (<i>Toxicodendron radicans</i>), stinging nettle (<i>Urtica dioica</i>)</p>	<p>Forested swale that extends across the site from south to north. The wetland contains a Significant Vernal Pool. No eastern ribbon snakes observed; however, potential suitable habitat present within generator lead corridor; therefore, BMPs recommended.</p>
W027	PSS/PFO	<p>Trees: red maple, balsam fir, yellow birch, eastern arborvitae</p> <p>Shrub/Saplings: red maple, balsam fir, yellow birch, eastern arborvitae, speckled alder</p> <p>Herbs: bluejoint, shallow sedge (<i>Carex lurida</i>), lakebank sedge (<i>Carex lacutris</i>), cinnamon fern, European bur-reed, stinging nettle, cut-leaf water-horehound (<i>Lycopus americanus</i>)</p>	<p>Wetland complex containing perennial stream with portion impounded by beaver. No eastern ribbon snakes observed; however, potential suitable habitat present within generator lead corridor; therefore, BMPs recommended.</p>
W032	PFO/PSS/PEM	<p>Trees: balsam fir, red maple, black ash, yellow birch, eastern arborvitae</p> <p>Shrub/Saplings: balsam fir, speckled alder, common winterberry</p> <p>Herbs: dwarf red raspberry (<i>Rubus pubescens</i>), three-seed sedge, northern water-horehound, sensitive fern, interrupted fern, woodland horsetail (<i>Equisetum sylvaticum</i>), fowl manna grass, swamp candles (<i>Lysimachia terrestris</i>), bluejoint, broad-leaf cat-tail, royal fern, broad-leaved meadowsweet</p>	<p>Large wetland that is a complex of interspersed pockets of emergent, forest and dense shrub thickets, fringed by forested wetland. The wetland begins along the west side of East Benton Road and extends westerly to the large wetland complex off-site. Also contains a vernal pool. No eastern ribbon snakes observed; however, potential suitable habitat present within generator lead corridor; therefore, BMPs recommended.</p>



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Figure Identifier	Wetland Classification(s) ¹	Dominant and Characteristic Vegetation	Observations / Comments
W043	PFO/PSS/PEM/PUB	<p>Trees: balsam fir, red maple, black ash, American elm (<i>Ulmus americana</i>), yellow birch, eastern arborvitae, gray birch (<i>Betula populifolia</i>)</p> <p>Shrub/Saplings: speckled alder, common winterberry, broad-leaved meadowsweet</p> <p>Herbs: sensitive fern, broad-leaf cat-tail, lakebank sedge, fowl manna grass, lamp rush, spotted touch-me-not, bluejoint, eastern poison ivy, interrupted fern, three-seed sedge, late goldenrod, steeplebush, eastern marsh fern, cottongrass bulrush, pickerelweed (<i>Pontederia cordata</i>), northern water-horehound, European bur-reed, common duckweed (<i>Lemna minor</i>), rice cut grass (<i>Leersia oryzoides</i>), bristly dewberry, wrinkle-leaf goldenrod, royal fern, three-way sedge (<i>Dulichium arundinaceum</i>), lesser bladder sedge (<i>Carex vesicaria</i>), shallow sedge, fringed sedge (<i>Carex crinita</i>)</p>	<p>Large and diverse wetland complex riparian to Fifteenmile Stream and another perennial stream; beaver activity present. It is connected to W050 via a stream at a culvert at Bog Road. These are large complexes of interspersed emergent and open water, forested patches, dense shrub thickets, and fringed by forested wetland. The wetland extends off-site to the east and west along Fifteenmile Stream. This wetland contains a vernal pool, south of Fifteenmile Stream. Eastern ribbon snake observed in wetland on north side of Bog Road (W050); wetlands connected via stream and under road culvert. BMPs recommended in areas of potentially suitable habitat due to hydrological continuity with observed eastern ribbon snake location.</p>
W050	PFO/PEM/PUB	<p>Trees: balsam fir, red maple, yellow birch, gray birch</p> <p>Shrub/Saplings: balsam fir, red maple, yellow birch, gray birch, speckled alder</p> <p>Herbs: broad-leaf cat-tail, bluejoint, sensitive fern, fringed sedge, lakebank sedge, royal fern</p>	<p>Wetland is located north of Bog Road and contains a stream and area of open water and emergent vegetation that extends off-site to the northeast. Beaver activity present and dam has created a flooded impoundment. Eastern ribbon snake observed and BMPs proposed.</p>
W051	PFO/PSS/PEM	<p>Trees: balsam fir, red maple, black ash, yellow birch, eastern arborvitae, gray birch</p> <p>Shrub/Saplings: speckled alder, common winterberry, broad-leaved meadowsweet</p> <p>Herbs: sensitive fern fowl manna grass, lamp rush, spotted touch-me-not, bluejoint, three-seed sedge, cottongrass bulrush, wrinkle-leaf goldenrod, nodding sedge (<i>Carex gynandra</i>)</p>	<p>This is a large wetland complex that is located north of Bog Road and extends off-site to the east and west. It is primarily forested on-site, however sections were recently part of an area involved in a timber harvest resulting in harvest roads and open patches within the wetland. Contains VP04. On aerial photos, it is observed off-site to continue southerly to where it connects to a perennial stream and ultimately Fifteenmile Stream. No eastern ribbon snakes observed; however, the northern portion of this wetland is potentially suitable for eastern ribbon snake and BMPs are recommended in those areas. Habitat proximal to work limits in the southern portion of this wetland is not considered suitable for eastern ribbon snake, therefore BMPs not recommended in this area.</p>
W052	PFO/PSS/PEM	<p>Trees: balsam fir, red maple</p> <p>Shrub/Saplings: speckled alder, broad-leaved meadowsweet</p> <p>Herbs: sensitive fern, bluejoint, dwarf red raspberry</p>	<p>This is a portion of a large wetland complex that is located north of Bog Road and extends off-site to the east and west. It is primarily forested on-site. No eastern ribbon snakes observed, BMPs not recommended as habitat proximal to work limits is not considered suitable for eastern ribbon snake.</p>
W055, W057	PFO/PEM/PUB	<p>Trees: balsam fir, red maple</p> <p>Shrub/Saplings: speckled alder, broad-leaved meadowsweet</p> <p>Herbs: bluejoint, dwarf red raspberry, cottongrass bulrush, cinnamon fern, broad-leaf cat-tail, woodland horsetail, sensitive fern</p>	<p>This wetland is a portion of a large wetland complex that extends off-site to the north. It is located south of Unity Road and adjacent to an aggregate base timber harvest road within a proposed access road area. Wetland transitions into an open emergent wetland with an active beaver impoundment. Two eastern ribbon snakes observed in open wetland portion. BMPs recommended.</p>
W056	PFO/PSS/PEM	<p>Trees: balsam fir, red maple</p> <p>Shrub/Saplings: speckled alder, broad-leaved meadowsweet, steeplebush</p> <p>Herbs: sensitive fern, bluejoint, ostrich fern (<i>Matteuccia struthiopteris</i>), lakebank sedge, uptight sedge (<i>Carex stricta</i>), cinnamon fern</p>	<p>Large wetland complex riparian to a perennial stream. Continues off-site southerly to where it connects to a beaver-influenced perennial stream before ultimately connecting with Fifteenmile Stream. These are large complexes of interspersed emergent and open water, forested patches, dense shrub thickets, and fringed by forested wetland. Wetland is hydrologically connected and exhibits similar habitat characteristics to observed eastern ribbon snake locations to the north and south. BMPs recommended.</p>



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Figure Identifier	Wetland Classification(s) ¹	Dominant and Characteristic Vegetation	Observations / Comments
W058, W059	PFO/PSS/PEM	<p>Trees: balsam fir, red maple, eastern arborvitae, gray birch</p> <p>Shrubs/Saplings: speckled alder, common winterberry, broad-leaved meadowsweet, steeplebush</p> <p>Herbs: sensitive fern, broad-leaf cat-tail, fowl manna grass, lamp rush, spotted touch-me-not, bluejoint, lakebank sedge, cottongrass bulrush,</p>	<p>Large wetland complex located south of Unity Road and extends off-site to the northeast and southwest (beaver-flooded emergent marshes). It is primarily forested on-site, however these large complexes are interspersed emergent and open water, forested patches, dense shrub thickets, and fringed by forested wetland. Eastern ribbon snake observed and BMPs recommended</p>
W-MR-01	PFO/PEM/PSS	<p>Trees: red maple, American larch (<i>Larix laricina</i>), eastern arborvitae, yellow birch, balsam fir</p> <p>Shrubs/Saplings: balsam fir, speckled alder, broad-leaved meadowsweet, common winterberry.</p> <p>Herbs: sensitive fern, cinnamon fern, lakebank sedge, eastern marsh fern, royal fern, bluejoint, interrupted fern, upright sedge, greater bladder sedge (<i>Carex intumescens</i>), woolly-fruit sedge (<i>Carex lasiocarpa</i>), hoary sedge (<i>Carex canescens</i>), cottongrass bulrush, broad-leaf cat-tail, Northwest Territory sedge (<i>Carex utriculata</i>), dwarf red raspberry</p>	<p>Large wetland complex interspersed emergent and open water, forested patches, dense shrub thickets, and fringed by forested wetland. Past timber harvest activities observed in portions of forested wetland. Beaver impoundments present in several locations have created aquatic and emergent wetland habitat suitable for eastern ribbon snake. Large red maple-lakebank sedge woodland fen predominates the south-central portion of wetland complex. Eastern ribbon snake observed in two locations. BMPs recommended in areas of potentially suitable eastern ribbon snake habitat.</p>

¹ Wetland classification follows Federal Geographic Data Committee. (2013): PFO = Palustrine Forested, PSS = Palustrine Scrub-Shrub, PEM = Palustrine Emergent, PUB = Palustrine Unconsolidated Bottom



4.0 BEST MANAGEMENT PRACTICES

The following BMPs have been developed based results of the 2022 field survey with consideration for MDIFW's March 17, 2022, letter, and Stantec's previous resource agency consultations to develop and implement listed-reptile protection measures at other land use and development projects. The following eastern ribbon snake protection measures are proposed for Project activities within and within 250 feet of wetland habitats with potential suitable eastern ribbon snake habitat and/or confirmed eastern ribbon snake occurrences documented during the May 2022 field surveys. The figures in Appendix A illustrate the Project areas subject to the proposed BMPs. The following pre-construction phase BMPs will be implemented by the Project.

Pre-construction phase

- Prepare eastern ribbon snake fact sheet and notification procedures for inclusion with the construction documents.
- Conduct eastern ribbon snake awareness contractor training to review identification and habitat preferences of eastern ribbon snake, notification procedures if observed, and BMPs to be implemented to protect the species.

4.1 SNAKE ACTIVE SEASON (APRIL 15–OCTOBER 15)

Civil construction (i.e., stumping, grubbing, grading, or filling) work will take place during the active season when snakes can actively avoid construction. The Project will implement the following within areas identified for snake BMPs during construction and operations phases.

Construction phase

- Conduct initial tree clearing during the snake active season, to the extent practicable.
- Conduct civil construction work (i.e., stumping, grubbing, grading, or filling) during the snake active season.
- In areas where construction matting will be used, place matting with gaps (bridge matting) at 30- to 50-foot intervals to allow snake passage underneath matting.
- Immediately prior to the start of civil construction, qualified and trained biological monitor(s) will conduct a sweep of the work area to observe and relocate eastern ribbon snakes from within the Project limit of work. If clearing and/or civil construction activities are occurring within eastern ribbon snake BMP areas at multiple locations, two biological monitors will be onsite during initial sweeps and snake exclusion fencing installation. Additionally, the biological monitoring will perform an evaluation of the silt fence with recommendations, as necessary, to support the functionality as a snake barrier.



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- For the solar array area, maintain a silt fence perimeter between the upland work limits and snake-occupied wetland habitat to minimize sedimentation into wetland habitat and discourage snake entry into the limit of work. The silt fence will extend at least 250 feet, to the extent practicable, beyond the work limits; the ends of the silt fence will be angled away from the work limits to deflect and redirect snakes and other small wildlife species traveling along the edge of the silt fence away from the work areas.
- For the Genlead area, maintain a silt fence perimeter between the utility pole installation work limits and snake-occupied wetland habitat to discourage snake entry into the limit of work. The silt fence will extend at least 250 feet, to the extent practicable and within the BMP implementation area, beyond the work limits; the ends of the silt fence will extend from the work limits to deflect and redirect snakes and other small wildlife species traveling along the edge of the silt fence away from the work areas. Prior to the start of access road establishment or improvement, qualified and trained biological monitor(s) will conduct a sweep of the work area to observe and relocate eastern ribbon snakes from within the Project limit of work. If access road establishment or improvement is occurring within eastern ribbon snake BMP areas at multiple locations, two biological monitors will be onsite during initial sweeps and snake exclusion fencing installation.
- Genlead access roads, once established, shall be inspected on-foot by a trained individual or a biological monitor prior to road being traversed by construction vehicles. Snake protection signage shall be placed along all access roads (new and existing) to serve as a reminder to construction traffic to maintain a low rate of speed and to look for any snakes that may enter the roadway. Any observed eastern ribbon snakes shall be removed from the roadway.
- Avoid use of plastic netting (e.g., monofilament mesh wattles) as erosion and sediment control measures. Plastic netting can be detrimental for snakes and other small wildlife species.
- Before the daily start of work, the trained contractor(s) is to conduct daily walkthrough of that day's anticipated work limits to observe and remove eastern ribbon snakes from within active work areas.
- The biological monitoring will conduct a weekly inspection of the work areas to document implementation and effectiveness of the BMP measures.
- Contractors are to notify the lead biological monitor of any potential eastern ribbon snake observation for reporting to MDIFW.

Operations and Maintenance phase:

- Within the fenced solar array areas, mowing will occur during the active season no more than twice per year as required to keep vegetation from shading the panels and to prevent safety concerns associated with vegetation contacting electrical equipment. Eastern ribbon snakes are known to stay within five-meters of water between May and September. As such, mowing of the fenced panel array area during the active season is not anticipated to result in an adverse impact to ribbon snakes.
- No use of herbicides for vegetation management within eastern ribbon snake BMP areas.



4.2 SNAKE INACTIVE SEASON (OCTOBER 16–APRIL 14)

Per MDIFW recommendations, the Project will conduct civil construction work (i.e., stumping, grubbing, grading, or filling) within and within 250 feet of eastern ribbon snake suitable/occupied habitat during the eastern ribbon snake active season when the snakes can actively avoid construction activities.

However, based on the current anticipated Project schedule (construction beginning early August 2022) and based on additional natural resources regulatory constraints (e.g., state/federally listed bats, wetlands), Three Corners anticipates that there will be Project activities conducted during the snake inactive season. The Project will implement the following within areas identified for snake BMPs during construction and operations phases:

Construction phase

- Conduct initial tree clearing during the snake active season to the extent practicable. Tree clearing during the inactive season will not include stumping or grubbing.

Operations phase

- Within the Genlead and shade management areas, vegetation maintenance will be conducted during the inactive season and by hand to the extent practicable. Mowing is allowed between November 1 and April 14.
- No use of herbicides for vegetation management within eastern ribbon snake BMP areas.

5.0 SUMMARY

Ten eastern ribbon snakes were observed at the Project during the May 2022 field surveys within suitable habitat of the following six wetlands: W009, W050, W055, W057, W059, and W-MR-01. These locations are derived from the field delineation of jurisdictional wetland boundaries as they intersect the Project's limit of work. In some cases, wetland areas surveyed are located within a large wetland complex of varying wetland types, not all of which are considered suitable habitat for the eastern ribbon snake.

To avoid and minimize impacts to eastern ribbon snake, the Project has developed BMPs for areas within 250 feet of and occupied wetlands relative to snake activity patterns and suitable wetland habitat usage patterns. The Project's commitment to perform civil construction activities within the solar array to the greatest extent possible within and within 250 feet of suitable/occupied wetlands during the snake active season and implement additional construction and operations and maintenance phase BMPs in these larger wetland areas will measurably minimize and avoid impacts to the species. These efforts are collectively expected to meet the no adverse environmental effect standard for the Project's application submitted under the Site Location Law and regulations.



APPENDICES



APPENDIX A FIGURES



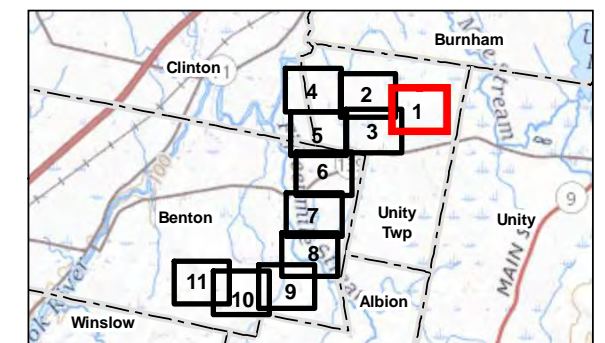
Legend

- Eastern Ribbon Snake Observation
 - Photo Point
 - Eastern Ribbon Snake Survey Area
 - Eastern Ribbon Snake BMP Implementation Area
 - ~ Delineated Intermittent Stream
 - ~ Delineated Perennial Stream
 - Delineated Wetland
 - Municipal Boundary
- Proposed Infrastructure**
- Pole Location
 - ~ Access Road
 - ~ Overhead Collection Line
 - ~ Underground Collection Line
 - ~ Overhead Transmission Line
 - Solar Panel Array
 - Fence
 - Substation
 - Project Area



0 500 Feet
 (At original document size of 11x17)
 1:6,000

- Notes**
1. Coordinate System: NAD 1983 UTM Zone 19N FT
 2. Data Sources: Longroad, Stantec, Boyle, MDIFW, LUPC, MEGIS
 3. Background: NAIP 2018



Project Location
 Benton, Clinton, Unity Twp, Maine

Prepared by GC on 2022-07-26
 Reviewed by EB on 2022-07-26

Client/Project
 Three Corners Solar Project

195601453

Figure No.

2

DRAFT

Title
 Eastern Ribbon Snake Survey Map
 Sheet 1 of 11



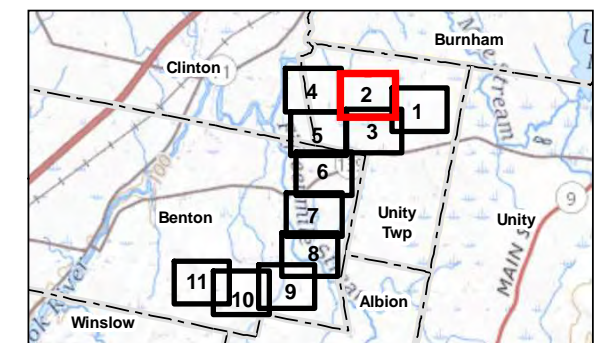
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- Eastern Ribbon Snake Observation
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 - Eastern Ribbon Snake BMP Implementation Area
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 - Access Road
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 - Underground Collection Line
 - Overhead Transmission Line
 - Solar Panel Array
 - Fence
 - Substation
 - Project Area



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- Notes**
1. Coordinate System: NAD 1983 UTM Zone 19N FT
 2. Data Sources: Longroad, Stantec, Boyle, MDIFW, LUPC, MEGIS
 3. Background: NAIP 2018



Project Location
 Benton, Clinton, Unity Twp, Maine

Prepared by GC on 2022-07-26
 Reviewed by EB on 2022-07-26

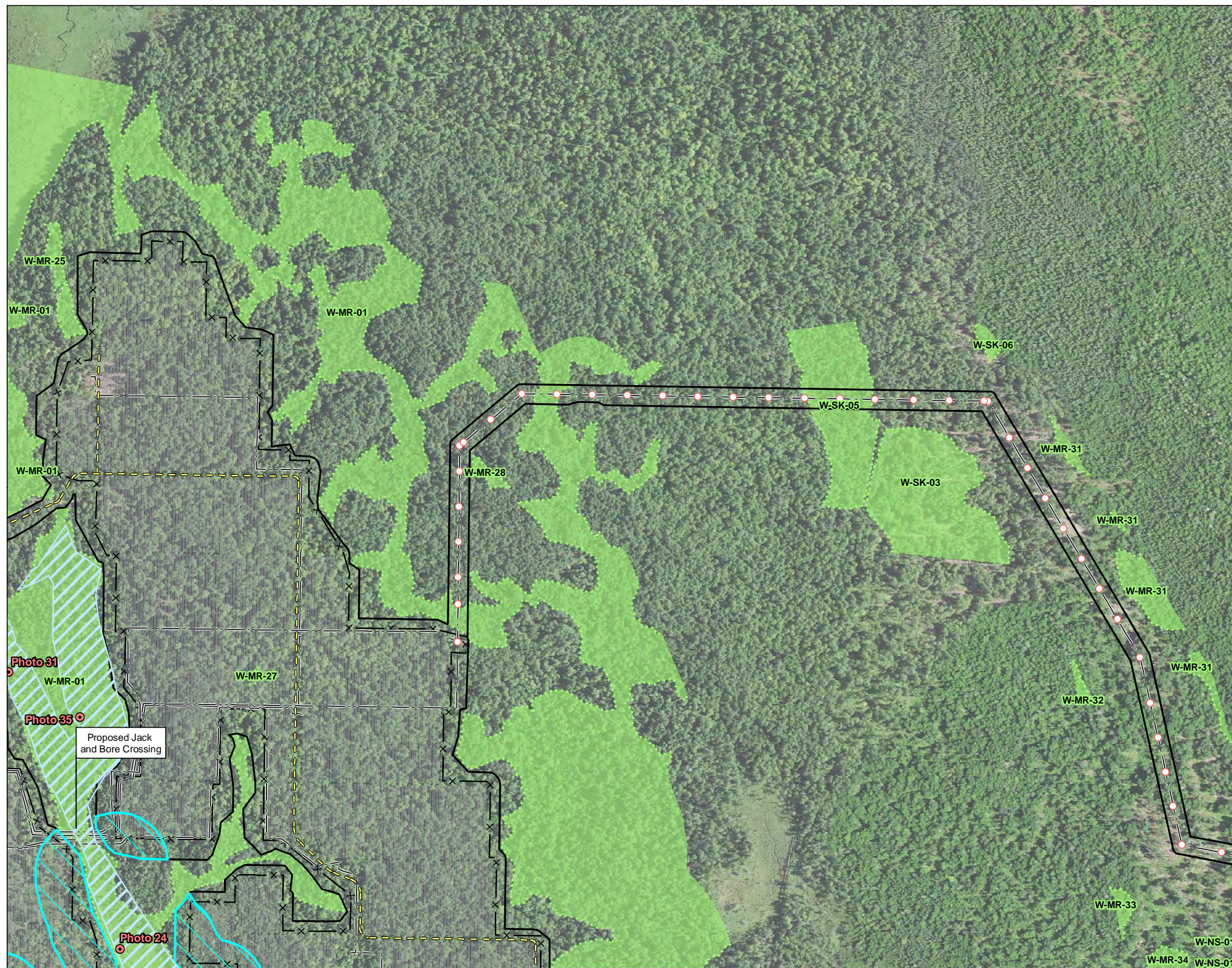
Client/Project
 Three Corners Solar Project

195601453

Figure No.
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Title
 Eastern Ribbon Snake Survey Map
 Sheet 2 of 11



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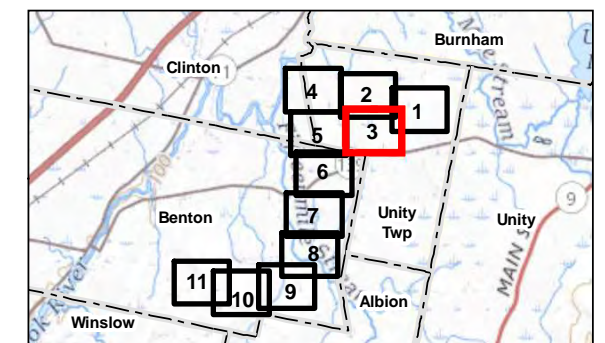
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 Benton, Clinton, Unity Twp, Maine

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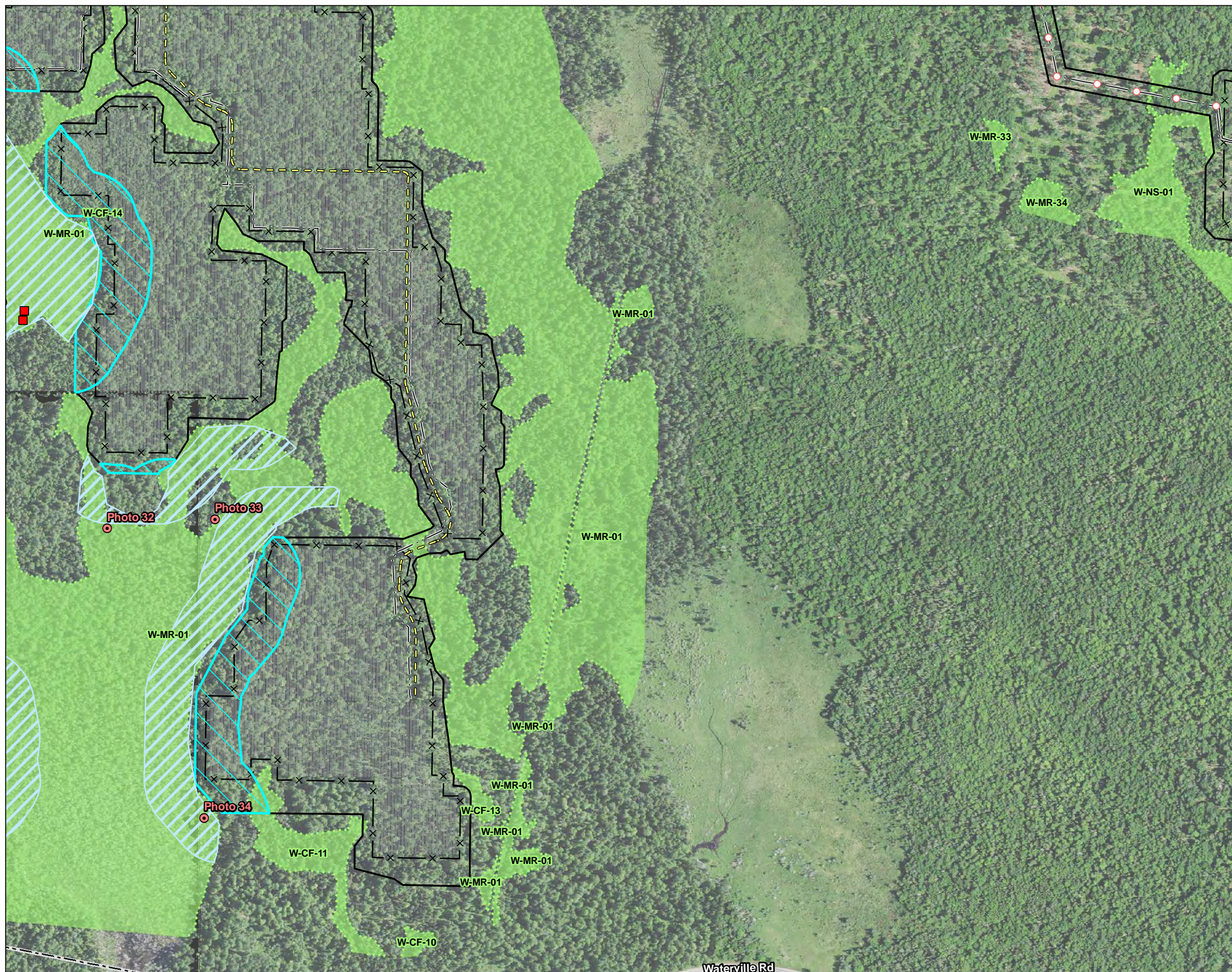
Client/Project
 Three Corners Solar Project

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Figure No.
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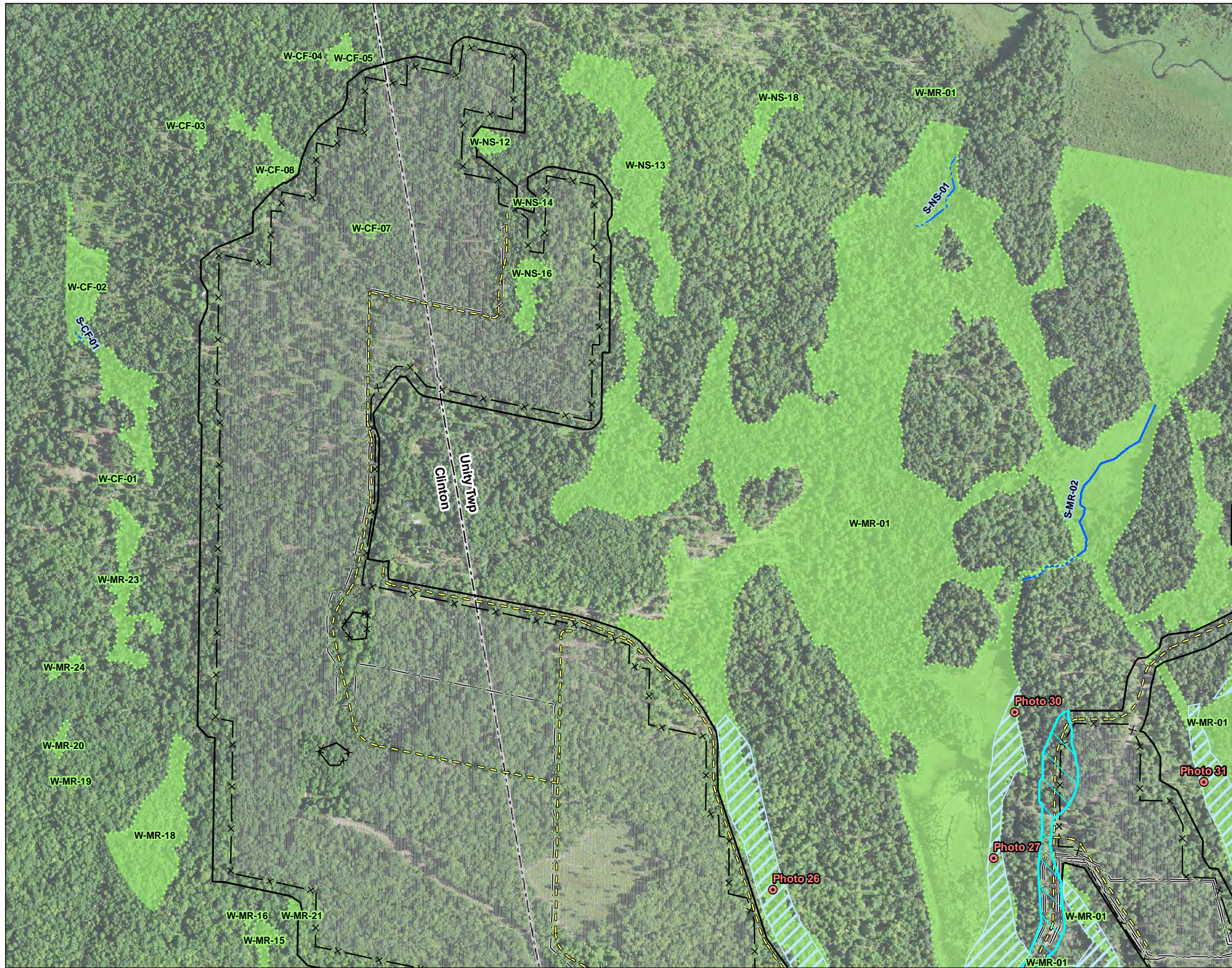
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Title
 Eastern Ribbon Snake Survey Map
 Sheet 3 of 11



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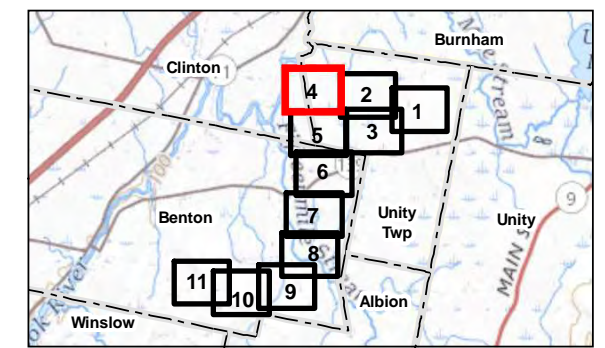
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 3. Background: NAIP 2018



Project Location
 Benton, Clinton, Unity Twp, Maine

Prepared by GC on 2022-07-26
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 Three Corners Solar Project

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Figure No.
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Title
 Eastern Ribbon Snake Survey Map
 Sheet 4 of 11

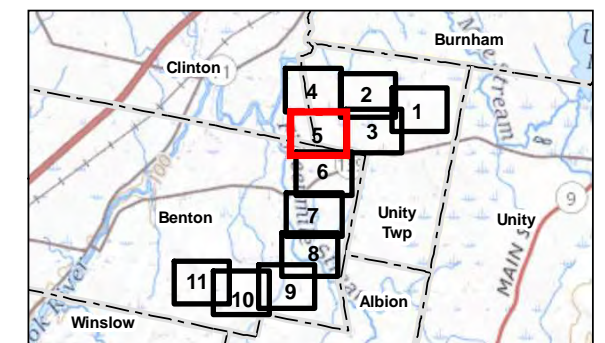
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 3. Background: NAIP 2018



Project Location
 Benton, Clinton, Unity Twp, Maine

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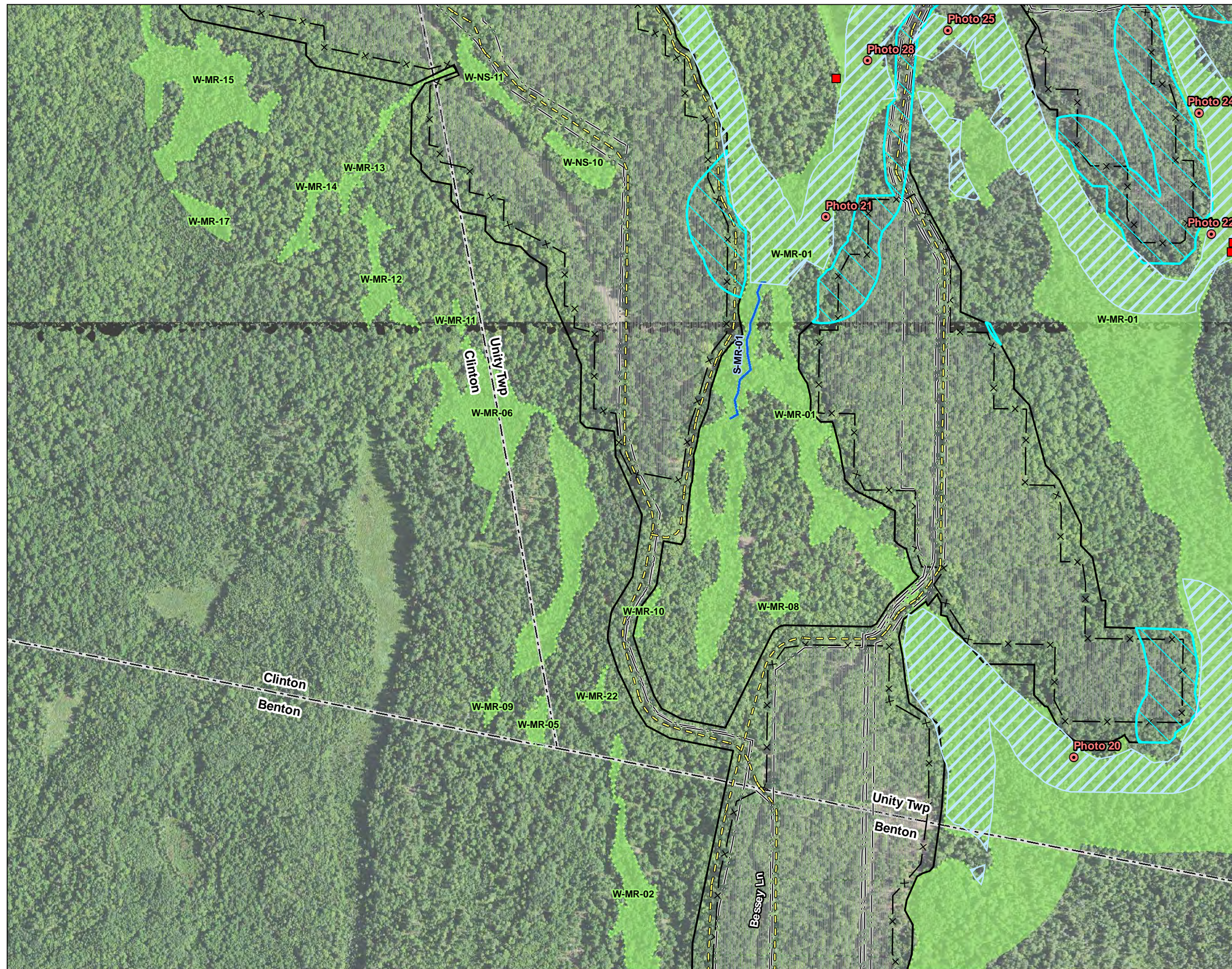
Client/Project
 Three Corners Solar Project

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Figure No.
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Title
 Eastern Ribbon Snake Survey Map
 Sheet 5 of 11



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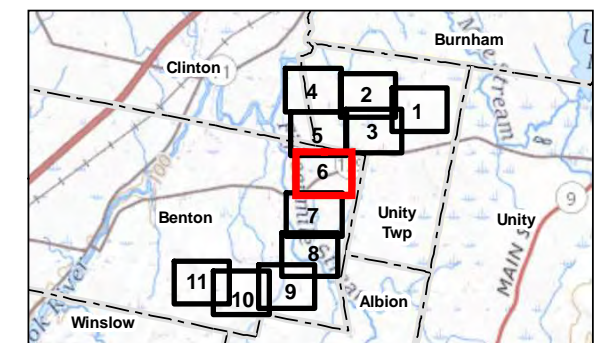
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 - Underground Collection Line
 - Overhead Transmission Line
 - Solar Panel Array
 - X Fence
 - X Substation
 - Project Area



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- Notes**
1. Coordinate System: NAD 1983 UTM Zone 19N FT
 2. Data Sources: Longroad, Stantec, Boyle, MDIFW, LUPC, MEGIS
 3. Background: NAIP 2018



Project Location
 Benton, Clinton, Unity Twp, Maine

Prepared by GC on 2022-07-26
 Reviewed by EB on 2022-07-26

Client/Project
 Three Corners Solar Project

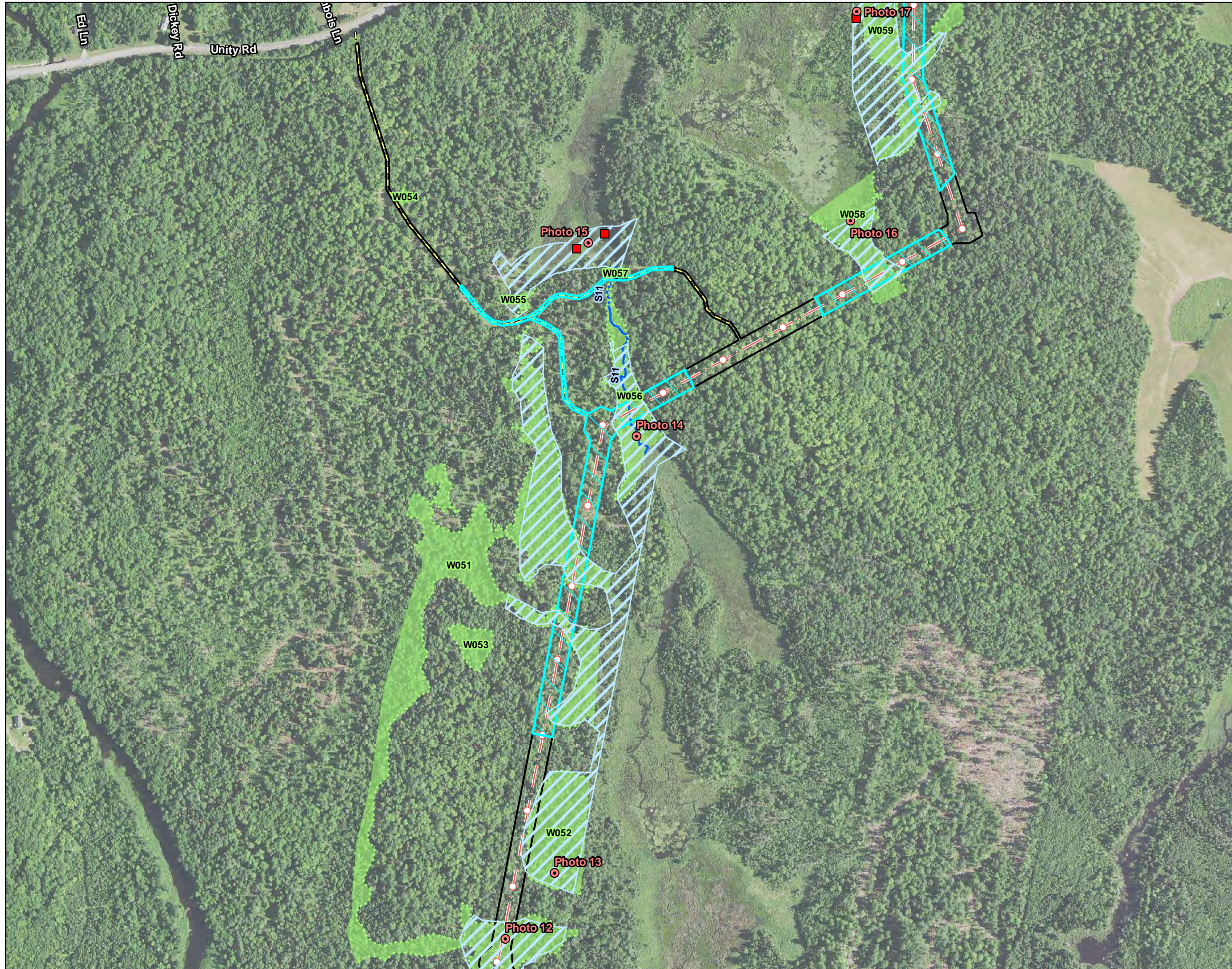
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Figure No.
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Title
 Eastern Ribbon Snake Survey Map
 Sheet 6 of 11





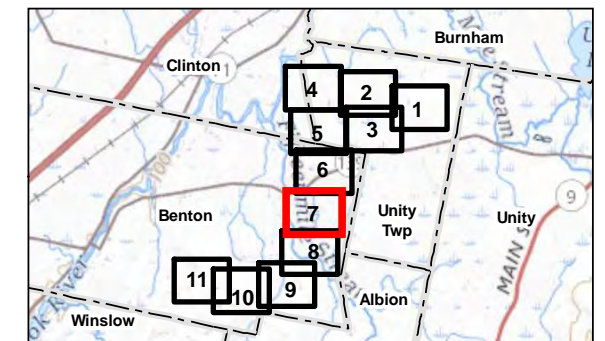
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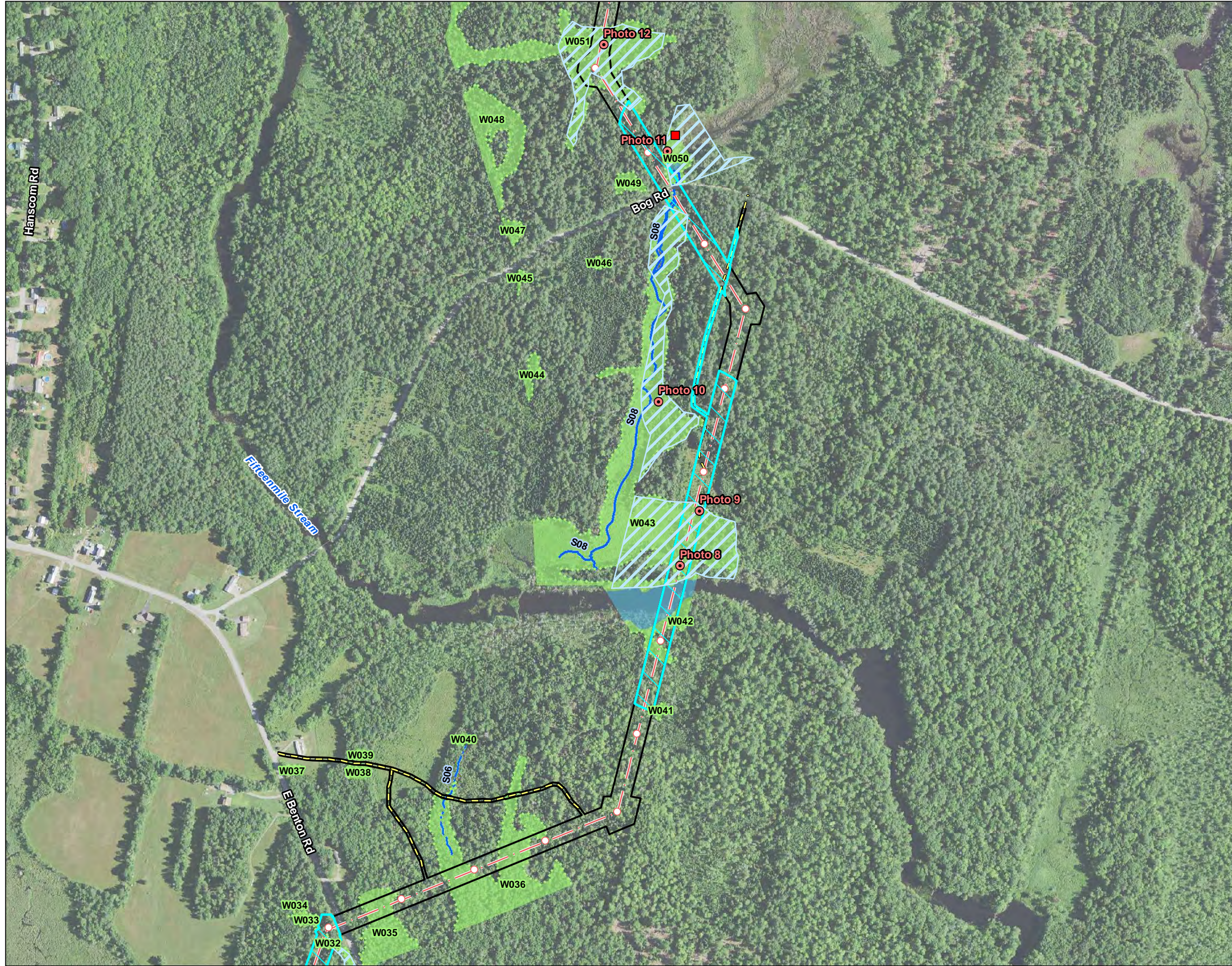


Project Location
 Benton, Clinton, Unity Twp, Maine
 Prepared by GC on 2022-07-26
 Reviewed by EB on 2022-07-26

Client/Project
 Three Corners Solar Project
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Figure No.
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Title
 Eastern Ribbon Snake Survey Map
 Sheet 7 of 11



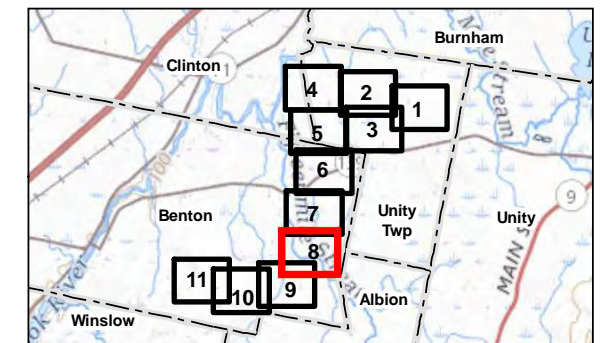
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- Notes**
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 3. Background: NAIP 2018



Project Location
 Benton, Clinton, Unity Twp, Maine

Prepared by GC on 2022-07-26
 Reviewed by EB on 2022-07-26

Client/Project
 Three Corners Solar Project

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Figure No.
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Title
 Eastern Ribbon Snake Survey Map
 Sheet 8 of 11

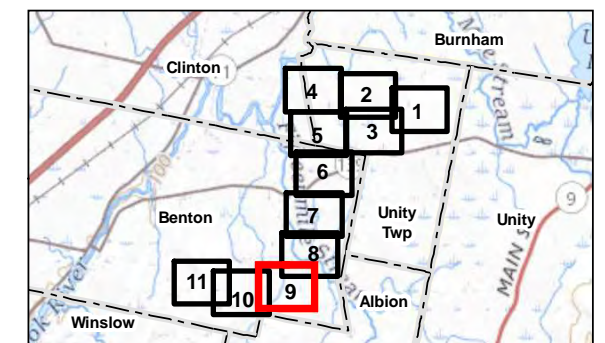
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 Benton, Clinton, Unity Twp, Maine

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Client/Project
 Three Corners Solar Project

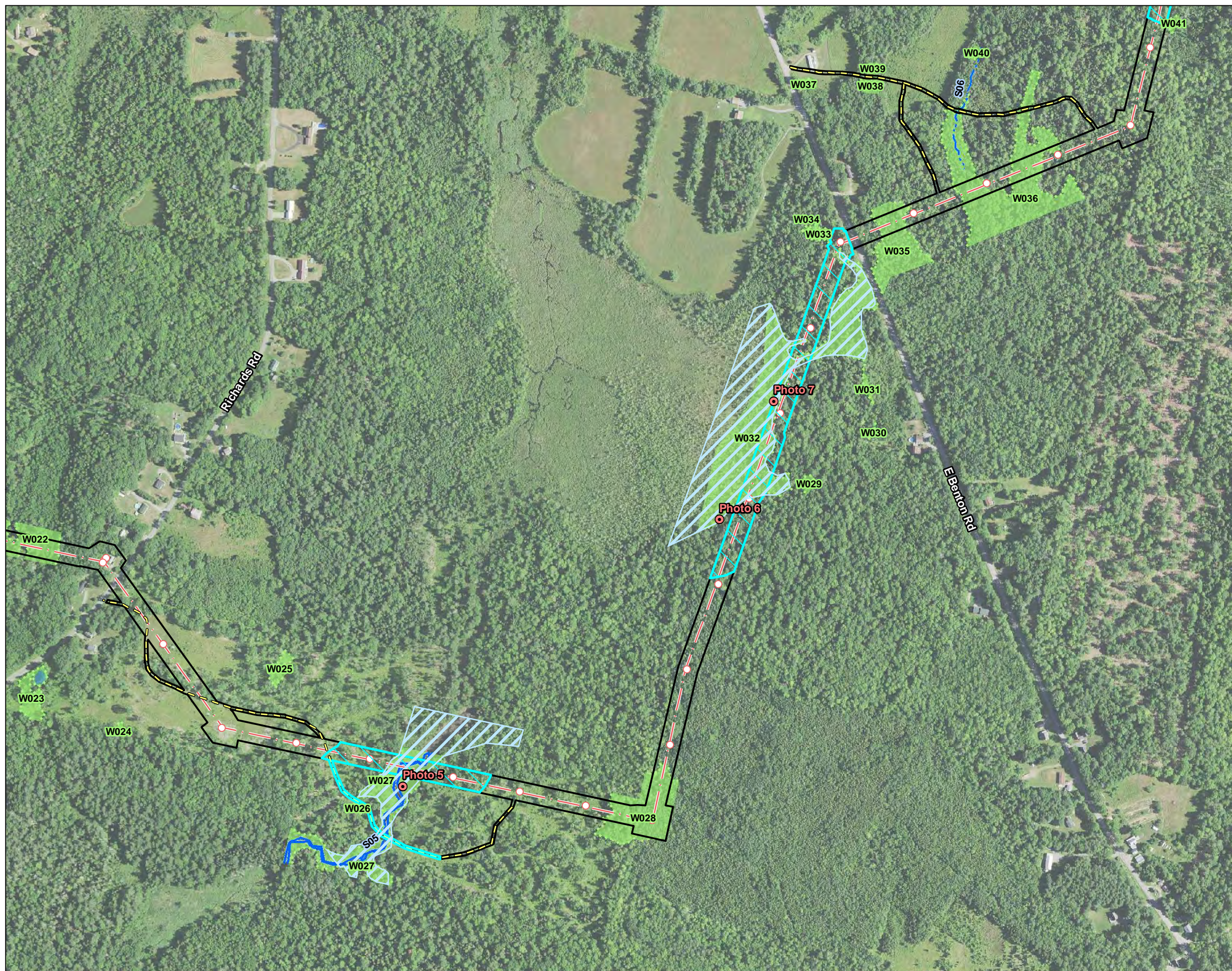
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Figure No.

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Title
 Eastern Ribbon Snake Survey Map
 Sheet 9 of 11



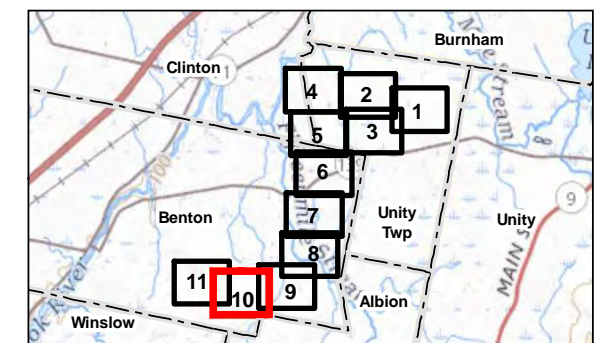
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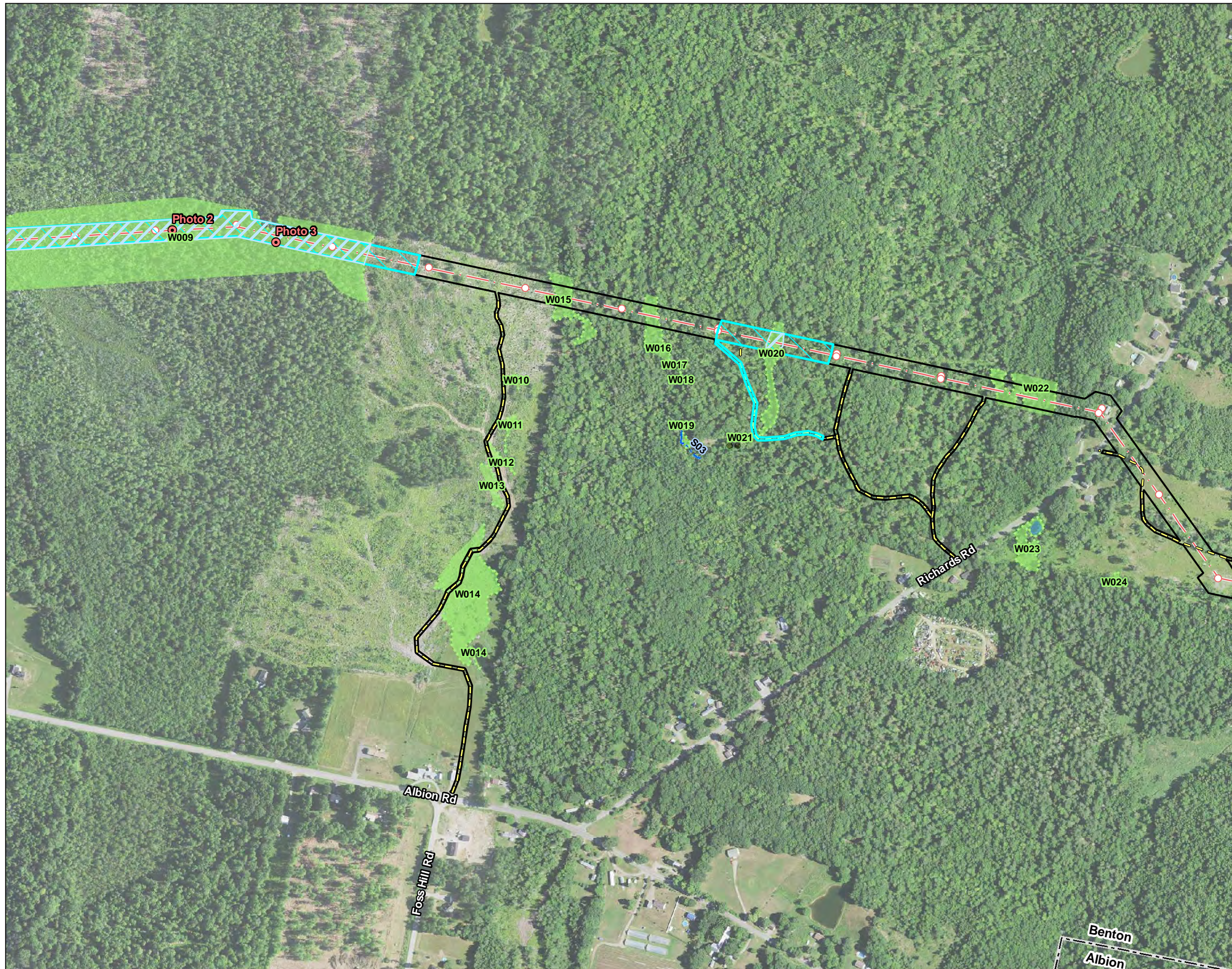
Client/Project
 Three Corners Solar Project

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Figure No.
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Title
 Eastern Ribbon Snake Survey Map
 Sheet 10 of 11



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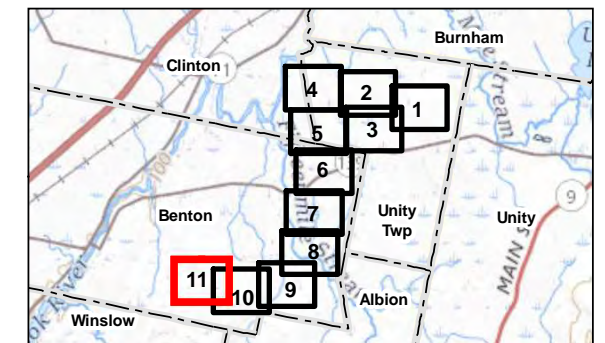
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Project Location
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 Three Corners Solar Project

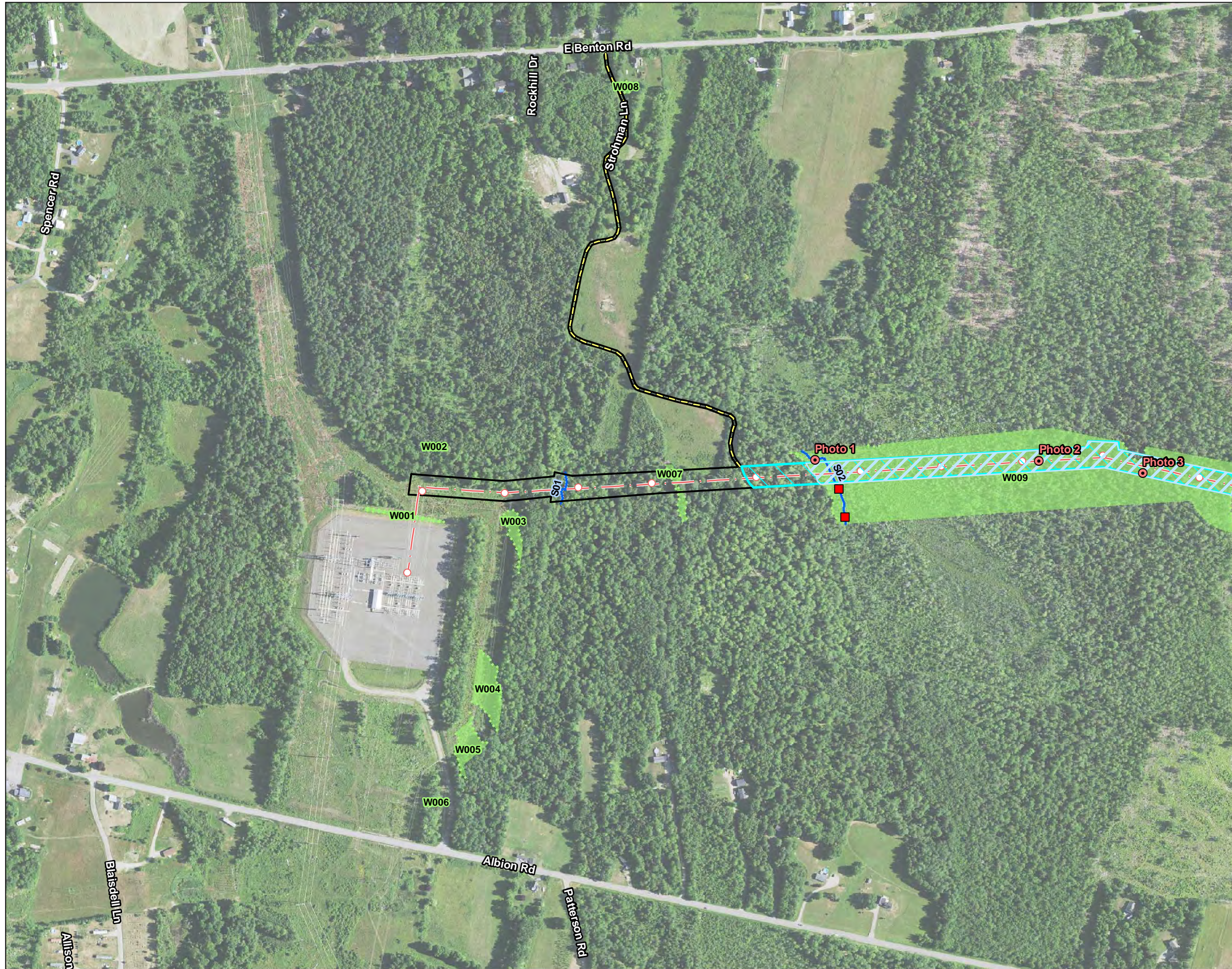
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Figure No.

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Title
 Eastern Ribbon Snake Survey Map
 Sheet 11 of 11



APPENDIX B REPRESENTATIVE PHOTOGRAPHS



Photo 1. Looking south across the generator lead limit of work at riparian area along western portion of acidic bog (W009). Eastern ribbon snakes observed along stream. Stantec. May 9, 2022.





Photo 2. Looking east near the middle of the acidic bog within generator lead limit of work (W009).
Stantec. May 25, 2022.



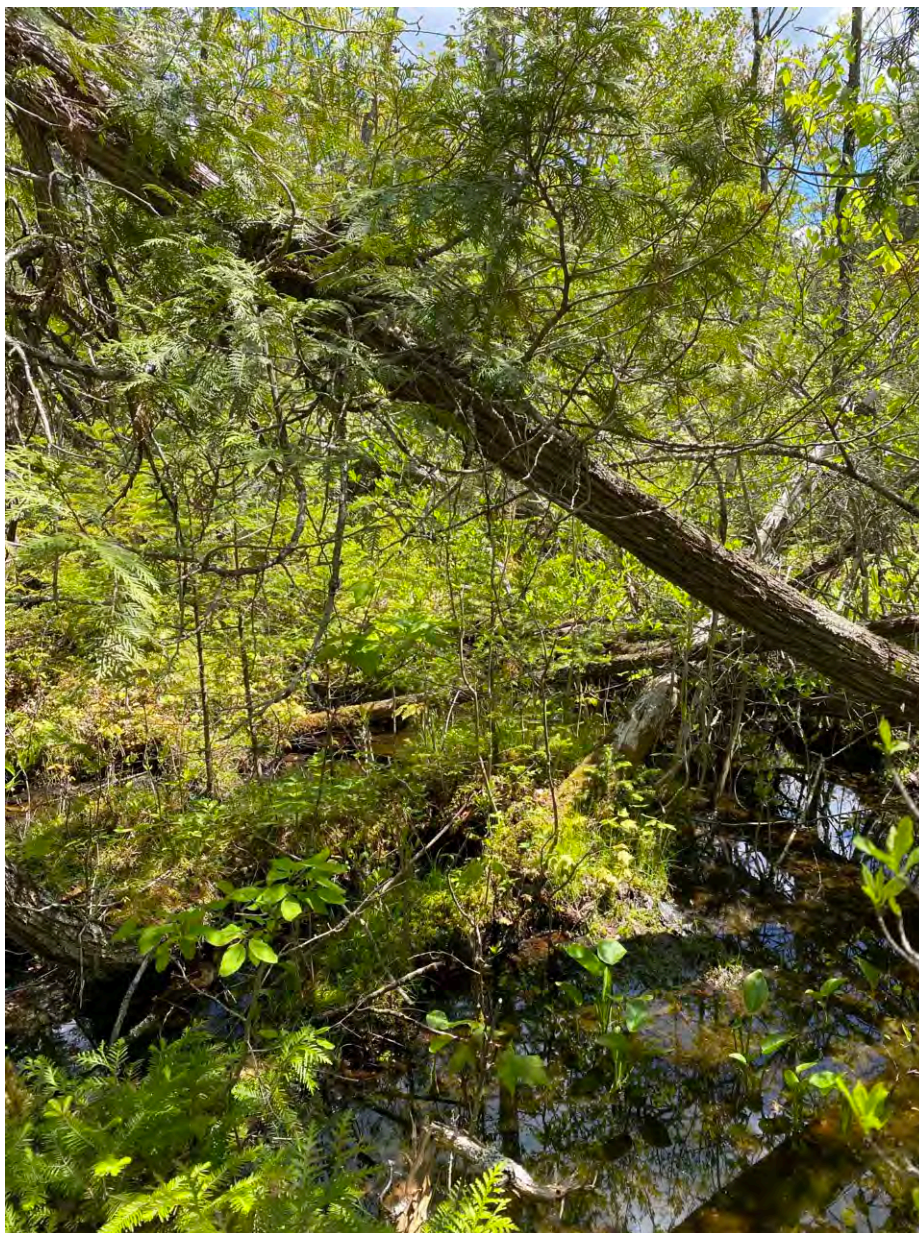


Photo 3. Looking north near the eastern portion of the acidic bog (W009) within generator lead limit of work. Areas of standing water present in the eastern portion. Stantec. May 25, 2022.



EASTERN RIBBON SNAKE SURVEY REPORT: REV 2



Photo 4. Eastern ribbon snake observed along stream located south of limit of work (W009). Stantec. May 25, 2022.



Photo 5. Looking south at scrub-shrub wetland W027 along stream. Stantec. May 9, 2022.



EASTERN RIBBON SNAKE SURVEY REPORT: REV 2



Photo 6. Looking north at forested wetland W32 along generator lead limit of work. Stantec. May 9, 2022



Photo 7. Looking southwest at forested wetland W32 along generator lead limit of work. Stantec. May 9, 2022.



EASTERN RIBBON SNAKE SURVEY REPORT: REV 2



Photo 8. Looking north at backwater forested wetland within limit of work (W043). Stantec. May 9, 2022.



Photo 9. Looking south within the limit of work at scrub shrub / forested wetland (W043) within generator lead limit of work. Stantec. May 9, 2022.



EASTERN RIBBON SNAKE SURVEY REPORT: REV 2



Photo 10. Looking south across flooded riparian area / emergent marsh (W043/W050) to the west of generator lead limit of work. Culvert under Bog Road connects W043 and W050. Stantec. May 26, 2022.



Photo 11. Looking northeast at beaver impoundment/marsh located north side of Bog Road and generator lead limit of work (W043). Eastern ribbon snake observed. Stantec. May 9, 2022.



EASTERN RIBBON SNAKE SURVEY REPORT: REV 2



Photo 12. Looking north at forested wetland W051 along generator lead. Stantec. May 9, 2022.



Photo 13. Looking north at forested wetland W055 along generator lead; not considered suitable eastern ribbon snake habitat. Stantec. May 9, 2022.



EASTERN RIBBON SNAKE SURVEY REPORT: REV 2



Photo 14. Looking southwest at emergent wetland W056 with potentially suitable eastern ribbon snake habitat. Stantec. May 9, 2022.



Photo 15. Looking north at beaver-impounded emergent marsh in wetland W055/W057. Stantec. May 26, 2022.



EASTERN RIBBON SNAKE SURVEY REPORT: REV 2



Photo 16. Looking north at scrub shrub / forested wetland in foreground (W058) adjacent to larger emergent marsh north of the generator lead limit of work where eastern ribbon snakes observed. Forested wetland south of this location intersects limit of work. Stantec. May 9, 2022.



Photo 17. Looking east across beaver impoundment affiliated with emergent marsh (W059) in Photo 10. Wetland located west of the generator lead limit of work. Stantec. May 9, 2022.



EASTERN RIBBON SNAKE SURVEY REPORT: REV 2



Photo 18. Looking southwest at emergent marsh (W059) affiliated with eastern ribbon snake observation located west of the generator lead. Narrow forested wetland present along fringes within the generator lead limit of work. Stantec May 9, 2022.



Photo 19. Looking south within forested wetland representative of conditions along eastern boundary of W059 within the limit of work. Stantec. May 9, 2022.



EASTERN RIBBON SNAKE SURVEY REPORT: REV 2



Photo 20. Representative forested wetland along the southwestern fringe of W-MR-01 located adjacent to the solar array. Considered unsuitable eastern ribbon snake habitat. Stantec. May 13, 2022.





Photo 21. Flooded forested wetland with past timber harvest located near the northern limit of the solar array (W-MR-01). Stantec. May 2022.



EASTERN RIBBON SNAKE SURVEY REPORT: REV 2



Photo 22. Looking east at beaver impounded emergent marsh (W-MR-01) located adjacent to solar array limit of work. Eastern ribbon snakes observed. Stantec. May 13, 2022.



Photo 23. Eastern ribbon snake observed swimming along shoreline adjacent to beaver dam / lodge in W-MR-01. Stantec. May 24, 2022.





Photo 24. Beaver flooded scrub shrub wetland (W-MR-01) located adjacent to solar array limit of work.
Stantec. May 13, 2022.





Photo 25. Representative forested wetland with past timber harvest located adjacent to and near the northern limit of the solar array limit of work (W-MR-01). Stantec. May 24, 2022.





Photo 26. Forested wetland located west of emergent marsh in Photos 27 and 28 affiliated with W-MR-01 and adjacent to northern portion of the solar array limit of work. Stantec. May 6, 2022.



EASTERN RIBBON SNAKE SURVEY REPORT: REV 2



Photo 27. Emergent marsh (W-MR-01) located near the northern limit of the solar array limit of work where eastern ribbon snake was observed. Stantec. May 13, 2022.



Photo 28. Beaver impoundment in wetland W-MR-01 at eastern ribbon snake observation. Stantec. May 13, 2022.





Photo 29. Eastern ribbon snake on edge of beaver impounded portion of wetland W-MR-01.
Stantec. May 13, 2022.





Photo 30. Looking north at emergent marsh (W-MR-01) located near the northern portion of the solar array limit of work. Stantec. May 6, 2022.





Photo 31. Representative forested wetland with past timber harvest located adjacent to and near the northern limit of the solar array limit of work. Stantec. May 6, 2022.



EASTERN RIBBON SNAKE SURVEY REPORT: REV 2



Photo 32. Looking south at emergent marsh and scrub shrub habitat with partially open canopy toward the southern central portion of W-MR-01 located adjacent to the solar array. Stantec. May 13, 2022.



Photo 33. Representative forested wetland along the southeastern fringe of W-MR-01 located adjacent to the solar array. Considered unsuitable eastern ribbon snake habitat. Stantec. May 24, 2022.





Photo 34. Looking south at scrub shrub and emergent marsh in W-MR-01 located to the south of the solar array limit of work. Stantec. May 24, 2022.



EASTERN RIBBON SNAKE SURVEY REPORT: REV 2



Photo 35. Representative forest wetland adjacent to solar array limit of work in W-MR-01 located north of eastern ribbon snakes observed in beaver impounded wetland in Photos 22 and 23.
Stantec May 13, 2022.



APPENDIX C VRA FIELD FORMS



Spotted Turtle Visual Rapid Assessment								Site Name: <u>Benton Solar</u>	
2019 FIELD FORM (2/24/2019)								Site Code: <u>ME</u>	
# Obs: <u>1</u>	Lead Obs: <u>Daniel Nein</u>	Date: <u>5/25/22</u>	Air Temp (C): <u>high ~70°</u>						
Ref Plot: <input type="checkbox"/> 1 <input type="checkbox"/> 2 <input type="checkbox"/> 3 <input type="checkbox"/> 4	Site visit: <input type="checkbox"/> 1 <input checked="" type="checkbox"/> 2 <input type="checkbox"/> 3		H2O Temp (C):						
Start Coord.(dd):			Start Time: <u>1100</u>						
End Coord.(dd):			End Time: <u>515</u>						
Time Constrained: <input type="checkbox"/> 1 <input type="checkbox"/> 2 <input type="checkbox"/> 3 <input checked="" type="checkbox"/> Uncstrnd→			GPS Track Info:		Sky: <input checked="" type="checkbox"/> Clr <input checked="" type="checkbox"/> PC <input type="checkbox"/> Ovc <input type="checkbox"/> Rn				
Wetland Area (ha):			Wetland Shape: <input type="checkbox"/> Circular <input checked="" type="checkbox"/> Linear <input checked="" type="checkbox"/> Amorphous		<u>Gen lead visit #2</u>				
Wetland Type (check all that apply): <input checked="" type="checkbox"/> VP <input checked="" type="checkbox"/> em <input checked="" type="checkbox"/> ss <input checked="" type="checkbox"/> d fo wet <input type="checkbox"/> pond <input type="checkbox"/> riv <input type="checkbox"/> ditch			Wetland Type (check all that apply): <input checked="" type="checkbox"/> beaver impound. <input checked="" type="checkbox"/> wetland ecotone <input type="checkbox"/> other:		<u>stream/riparian</u>				
THSA Info			Habitat						
ID#	Process Time	Obs	% cover (within 5m)				Dist Upl. (m)	Dominant Plant Species	
			Canopy	Shrub	Em Herb	Sub Herb			
<u>1</u>	<u>0</u>	<u>DN</u>	<u>10</u>	<u>25</u>	<u>50</u>	<u>10</u>	<u><1</u>	<u>Typ lat</u>	
<u>2</u>	<u>0</u>	<u>DN</u>	<u>10</u>	<u>25</u>	<u>50</u>	<u>10</u>	<u><1</u>	<u>Sag lat, Dul aru, Aln inc</u>	
Summary: Total <u>THSA</u> _____ Lead Obs Total: _____			Total time not surveying: <u>~45min</u>		Traps in H2O? <input type="checkbox"/> Y <input checked="" type="checkbox"/> N				
M: _____ F: _____ J: _____ U: _____ Land: _____ H2O: _____									
Other species observed:									
Comments: <u>E. ribbon snake VRA</u> <u>ID confirmed w/ binoculars</u>									

Spotted Turtle Visual Rapid Assessment								Site Name: <u>Benton Solar</u>	
2019 FIELD FORM (2/24/2019)								Site Code: <u>ME</u>	
# Obs: <u>1</u>	Lead Obs: <u>Daniel Nein</u>	Date: <u>5/26/22</u>	Air Temp (C): <u>high ~65°</u>						
Ref Plot: <input type="checkbox"/> 1 <input type="checkbox"/> 2 <input type="checkbox"/> 3 <input type="checkbox"/> 4	Site visit: <input type="checkbox"/> 1 <input type="checkbox"/> 2 <input checked="" type="checkbox"/> 3		H2O Temp (C):						
Start Coord.(dd):			Start Time: <u>1100</u>						
End Coord.(dd):			End Time: <u>425</u>						
Time Constrained: <input type="checkbox"/> 1 <input type="checkbox"/> 2 <input type="checkbox"/> 3 <input checked="" type="checkbox"/> Uncstrnd→			GPS Track Info:		Sky: <input type="checkbox"/> Clr <input checked="" type="checkbox"/> PC <input checked="" type="checkbox"/> Ovc <input type="checkbox"/> Rn				
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THSA Info			Habitat						
ID#	Process Time	Obs	% cover (within 5m)				Dist Upl. (m)	Dominant Plant Species	
			Canopy	Shrub	Em Herb	Sub Herb			
<u>1</u>	<u>0</u>	<u>DN</u>	<u>10</u>	<u>15</u>	<u>75</u>	<u>0</u>	<u>~5</u>	<u>Spi lat, One sen, Calcam</u>	
<u>2</u>	<u>0</u>	<u>DN</u>	<u>10</u>	<u>10</u>	<u>80</u>	<u>10</u>	<u>~2</u>	<u>Typ lat, Spi lat, Aln inc</u>	
Summary: Total <u>THSA</u> _____ Lead Obs Total: _____			Total time not surveying: <u>~45min</u>		Traps in H2O? <input type="checkbox"/> Y <input checked="" type="checkbox"/> N				
M: _____ F: _____ J: _____ U: _____ Land: _____ H2O: _____									
Other species observed:									
Comments: <u>E. ribbon snake VRA</u> <u>ID confirmed with binoculars; ID#2 potential-quick glance before snake retreated</u>									

Ribbon snake

Spotted Turtle Visual Rapid Assessment			Site Name: 3 corners					
2019 FIELD FORM (2/24/2019)			Site Code:					
# Obs: 1	Lead Obs: M. Arsenault	Date: 5/9/22	Air Temp (C): 60					
Ref Plot: <input type="checkbox"/> 1 <input type="checkbox"/> 2 <input type="checkbox"/> 3 <input type="checkbox"/> 4	T-14e	Site visit: <input checked="" type="checkbox"/> 1 <input type="checkbox"/> 2 <input type="checkbox"/> 3	H2O Temp (C):					
Start Coord.(dd):			Start Time: 8:05					
End Coord.(dd):			End Time: 4:10					
Time Constrained: <input type="checkbox"/> 1 <input type="checkbox"/> 2 <input type="checkbox"/> 3 <input checked="" type="checkbox"/> Uncstrnd→		GPS Track Info: Sky: <input checked="" type="checkbox"/> Clr <input type="checkbox"/> PC <input type="checkbox"/> Ovc <input type="checkbox"/> Rn						
Wetland Area (ha): Multiple sites		t-14e: multiple swcs						
Wetland Shape: <input type="checkbox"/> Circular <input type="checkbox"/> Linear <input type="checkbox"/> Amorphous								
Wetland Type (check all that apply): <input type="checkbox"/> VVP <input checked="" type="checkbox"/> Em <input type="checkbox"/> Sss <input type="checkbox"/> d fo wet <input type="checkbox"/> pond <input type="checkbox"/> riv <input type="checkbox"/> ditch								
<input type="checkbox"/> beaver impound. <input type="checkbox"/> wetland ecotone <input type="checkbox"/> other:								
Ribbon snake CGU Info			Habitat					
ID#	Process Time	Obs	% cover (within 5m)				Dist UpL (m)	Dominant Plant Species
			Canopy	Shrub	Em Herb	Sub Herb		
1	-	1		10	90		-4	Carex, Alnus, spruce
2	-	2		10	90		-2	Typha spires, C. frag
Summary: Total CGU: 3			Lead Obs Total: _____		Total time not surveying: 1 hr		Traps in H2O? <input checked="" type="checkbox"/> Y <input type="checkbox"/> N	
M: _____ F: _____ J: _____ U: 2			Land: H2O: 3					
Other species observed:			Green snake: 6				Green snake: 2	
Comments: #1 observed in sedge meadow / beaver pond north of Bog Rd #2 observed in PEAM/MB south of Rt. 139								

No photos, burrowed under hummocks before camera was reset. V. slender snake, w/ prominent yellow bands in PEAM/MB habitat strongly suggests ribbon snake

Ribbon snake

Spotted Turtle Visual Rapid Assessment			Site Name: 3 corners					
2019 FIELD FORM (2/24/2019)			Site Code:					
# Obs: 1	Lead Obs: M. Arsenault	Date: 5/13	Air Temp (C): 75-80					
Ref Plot: <input type="checkbox"/> 1 <input type="checkbox"/> 2 <input type="checkbox"/> 3 <input type="checkbox"/> 4	Arroyo	Site visit: <input type="checkbox"/> 1 <input checked="" type="checkbox"/> 2 <input type="checkbox"/> 3	H2O Temp (C):					
Start Coord.(dd):			Start Time: 8:00					
End Coord.(dd):			End Time: 2:05					
Time Constrained: <input type="checkbox"/> 1 <input type="checkbox"/> 2 <input type="checkbox"/> 3 <input type="checkbox"/> Uncstrnd→		GPS Track Info: Sky: <input type="checkbox"/> Clr <input type="checkbox"/> PC <input type="checkbox"/> Ovc <input type="checkbox"/> Rn						
Wetland Area (ha): Multiple swcs		Arroyo swcs: Multiple wetlands						
Wetland Shape: <input type="checkbox"/> Circular <input type="checkbox"/> Linear <input type="checkbox"/> Amorphous								
Wetland Type (check all that apply): <input type="checkbox"/> VVP <input checked="" type="checkbox"/> Em <input type="checkbox"/> Sss <input type="checkbox"/> d fo wet <input type="checkbox"/> pond <input type="checkbox"/> riv <input type="checkbox"/> ditch								
<input checked="" type="checkbox"/> beaver impound. <input type="checkbox"/> wetland ecotone <input type="checkbox"/> other:								
Ribbon snake CGU Info			Habitat					
ID#	Process Time	Obs	% cover (within 5m)				Dist UpL (m)	Dominant Plant Species
			Canopy	Shrub	Em Herb	Sub Herb		
1	-	1	10	20	20		3	Calceol, Scirpus
Summary: Total CGU: 1			Lead Obs Total: 1		Total time not surveying: 1		Traps in H2O? <input type="checkbox"/> Y <input checked="" type="checkbox"/> N	
M: _____ F: _____ J: _____ U: 1			Land: H2O: 1					
Other species observed:			Fawn					
Comments: #1 observed in beaver pond habitat on hummock + sedge in water								