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**VIA EMAIL**

April 24, 2025

Mr. Brent Hackworth  
The Highgates Group  
119 Glen Park Avenue  
Toronto, Ontario, Canada  
brent@highgates.com

**Subject: Kentucky Glade Cress Survey Report  
8000 Broad Run Road  
Jefferson County, Kentucky  
RES Project No.: 111811**

Dear Mr. Hackworth:

RES Kentucky, LLC is pleased to submit this Kentucky Glade Cress Survey Report in support of the proposed 8000 Broad Run Road project in Jefferson County, Kentucky. This report addresses the presence of, and potential impacts to, the federally protected Kentucky glade cress (*Leavenworthia exigua* var. *laciniata*) and includes: a summary of project background; a description of study methodology; a summary of study results, including a description of existing natural habitats and areas of potential Kentucky glade cress (KGC) at the project site; and study conclusions.

**Based on the flowering window surveys performed by RES in April 2021 and April 2025, identified no individuals of Kentucky glade cress are present on the property.**

**BACKGROUND**

The 192-acre project site has an address of 8000 Broad Run Road and is located on the west side of Broad Run Road, approximately 0.8 mile south of the Broad Run Road and Seatonville Road intersection (Figure 1). Habitat on site consists mostly of cropped field with medium-age woods in the eastern and western portions of the site and a utility easement in the eastern portion of the site.

KGC is an annual plant in the mustard family (*Brassicaceae*) that is known to occur in only two counties in Kentucky – Jefferson and Bullitt. KGC was proposed for listing as threatened by the U.S. Fish and Wildlife Service (USFWS) in 2013, and it was listed as a threatened species with designated critical habitat on June 5, 2014 (USFWS 2014a). In the initial Federal Register proposal to list the species, the USFWS gave this description of the plant (USFWS 2013):

Plants are about 5 to 10 cm in height with early leaves that are simple with a slender petiole (central stalk of the leaf) and mature leaves that are sharply lobed (appear as disconnected pieces along the main leaf vein), somewhat squarish at the ends and arranged as a rosette (circular cluster of leaves). The flowers are small (3 to 6 mm), white to lilac in color with four petals, green rather than lavender sepals (the outer of two floral leaves that make up the flower), and leafless stems. Leaves typically disappear by the time the plant is in fruit. The fruit is flat and pod-shaped.

In 2014, the USFWS designated six units of critical habitat for KGC (USFWS 2014b). The proposed project is located 3.5 miles north of Critical Habitat Unit 2 (Old Man's Run). Unit 2 consists of three subunits totaling 1,014 acres in Bullitt and Jefferson Counties, Kentucky. This critical habitat unit includes four element occurrences.

Threats to KGC are primarily due to habitat loss, modification, and degradation from direct and indirect human impacts. These impacts include residential and commercial development, construction or maintenance of roads and utility lines, conversion of natural habitats to lawns, grazing practices, forest encroachment, horseback riding and off-road vehicle use, and climate change (USFWS 2013). The species is also subject to several ongoing natural and man-made factors which could affect its continued existence, including its narrow range, specific habitat requirements, low populations counts within many occurrences, and presumed low genetic diversity within occurrences. Non-native invasive plant species including Japanese honeysuckle (*Lonicera japonica*), bush honeysuckle (*Lonicera maackii*), Chinese privet (*Ligustrum sinense*), sweet clover (*Melilotus* spp.), and fescue (*Schedonorus arundinaceus*) are also a threat to KGC (USFWS 2020), and Bradford pear (*Pyrus calleryana*) trees have been identified encroaching on cedar glade habitat.

In the critical habitat designation for KGC, the USFWS has defined primary constituent elements (PCEs) that are essential for the survival and reproduction of the species (USFWS 2014b). These include: 1) cedar glades and glade-like areas with areas of rock outcrop, gravel, or flagstone of Silurian dolomite or dolomitic limestone and/or shallow calcareous soils (1 to 5 cm); intact cyclic hydrologic regime (wet in late winter to early spring, and dry in the summer); full or nearly full sunlight; and an undisturbed seed bank; and 2) vegetated land around glades or glade like areas that extend up and downslope to natural or man-made breaks.

Common associate plants of KGC include false garlic (*Nothoscordum bivalve*), little skullcap (*Scutellaria parvula*), common goldstar (*Hypoxis hirsuta*), rosepink (*Sabatia angularis*), tinted woodland spurge (*Euphorbia commutata*), early buttercup (*Ranunculus fascicularis*), poverty dropseed (*Sporobolus vaginiflorus*), Eggleston's violet (*Viola septemloba* var. *egglestonii*), whitlowgrass (*Draba verna*), and Canadian bluets (*Houstonia canadensis*) (USFWS 2013, USFS 2020). Areas surrounding glade openings tend to have deeper soils that support plants of prairie or barren habitats such as little bluestem (*Schizachyrium scoparium*), hoary puccoon (*Lithospermum canescens*), birdfoot violet (*Viola pedata*), pale purple coneflower (*Echinacea pallida*), straggling St. John's-wort (*Hypericum dolabriforme*), glades spikerush (*Eleocharis bifida*), whorled rosinweed (*Silphium trifoliatum*), false aloe (*Manfreda virginica*), and tall gayfeather (*Liatris aspera*) (USFWS 2013, USFS 2020). KGC is often found in openings in cedar glade habitat populated with red cedar (*Juniperus virginiana*), although shading by cedars can out compete KGC.

Look-alike plants identified onsite include common whitlowgrass, hairy bittercress (*Cardamine hirsuta*), cutleaf toothwort (*Cardamine concatenata*), spring beauty (*Claytonia virginica*), and purple cress (*Cardamine douglassii*). These look-alikes are early-spring bloomers with four to eight white to pale pink or purplish petals.

## METHODOLOGY

The assessment included both in-house research and field evaluation. In-house research involved a review of existing mapping resources including the USGS topographic map, current and historical aerial photographs, geological maps, and topographic survey maps. The initial field assessment was completed on October 26 and 28, 2020 and only marginal habitat was observed on several areas of limestone rock outcrops in wooded portions of the site and in shallow soil areas in the utility easement. A flowering window survey was performed on April 5, 2021, which revisited all areas of marginal KGC habitat along the wooded rock outcrops, dirt road, and utility easement. An additional flowering survey window was performed on April 2, 2025 to revisit all previously identified areas of marginal habitat and assessed additional areas of potential habitat (Figure 1).

The KGC survey was conducted during the flowering season for this species and included a pedestrian survey to determine the presence of KGC individuals, and to confirm the presence of required KGC habitat components as well as potential associate species. The field survey was conducted by RES personnel Laura Darnell and Kaitlin Illick in 2021 and Zach Triplett and Rachael Peake in 2025. Because KGC is an annual species and its flowering time varies with weather and temperature during the winter and spring, a known occurrence of KGC at nearby McNeely Lake Park was visited prior to the survey. The survey was scheduled after flowers were observed at the McNeely Lake Park population to ensure that plants in Jefferson County were flowering during the survey. The KGC survey was conducted on April 5, 2022 and April 2, 2025. Photographs and detailed habitat descriptions were taken of each area that was surveyed.

## RESULTS

Habitat on site consists mostly of cropped field with medium-age woods in the eastern and western portion of the site and a utility easement in the eastern portion of the site (Figure 1). Marginal habitat for KGC is present on limestone rock outcrops in the eastern and western wooded area and disturbed marginal habitat for KGC is present in the utility easement and along the dirt roads throughout the site. Based on aerial photographs dating back to 1971, forest cover and agricultural land use has remained predominantly the same. Prior to 1971, the site was almost entirely agricultural land.

Please note that due to the timing of the survey, which is early in growing season for most plants in the region, many additional herbaceous plant species could not be identified at this time but are likely present. The results of the survey are described below in terms of major on-site habitats and the KGC survey.

### MAJOR HABITATS

Forest: Common species within the medium-age woods include sugar maple (*Acer saccharum*), white snake root (*Ageratina altissima*), pawpaw (*Asimina triloba*), trumpet creeper (*Campsis radicans*), shagbark hickory (*Carya ovata*), flowering dogwood (*Cornus florida*), winter creeper (*Euonymus fortunei*), American beech (*Fagus grandifolia*), green ash (*Fraxinus pennsylvanica*), spicebush (*Lindera benzoin*), bush honeysuckle, Japanese stiltgrass (*Microstegium vimineum*), black cherry (*Prunus serotina*), chinkapin oak (*Quercus muehlenbergii*), northern red oak (*Quercus rubra*), black locust (*Robinia pseudoacacia*), multiflora rose (*Rosa multiflora*), and poison ivy (*Toxicodendron radicans*).

Common species specifically located on the rock outcrops in the medium-age woods include garlic mustard (*Alliaria petiolata*), cutleaf toothwort, yellow fumewort (*Corydalis flavula*), hairy bittercress, false rue anemone (*Enemion biternatum*), bedstraw (*Galium aparine*), ground ivy (*Glechoma hederacea*), bush honeysuckle, mayapple (*Podophyllum peltatum*), and toadshade (*Trillium sessile*).

Cropped/Open Field: Common species within the field habitat include wild garlic (*Allium vineale*), broomsedge (*Andropogon virginicus*), shepherd's purse (*Capsella bursa-pastoris*), mouse-eared chickweed (*Cerastium fontanum*), common whitlowgrass, ground ivy, soybean (*Glycine max*), purple deadnettle (*Lamium purpureum*), yellow wood sorrel (*Oxalis stricta*), switchgrass (*Panicum virgatum*), Kentucky bluegrass (*Poa pratensis*), American pokeweed (*Phytolacca americana*), Allegheny blackberry (*Rubus allegheniensis*), nodding foxtail (*Setaria faberi*), yellow foxtail (*Setaria pumila*), and Johnson grass (*Sorghum halepense*).

## MARGINAL KENTUCKY GLADE CRESS HABITAT

Areas of potential KGC habitat were identified across the site during the initial field assessment on October 26 and 28, 2020, and during the flowering season survey on April 5, 2021. These areas were revisited during the flowering season survey on April 2, 2025. The site was reassessed for additional areas of potential habitat, and a survey for KGC individuals was conducted. A total of 29 areas were identified as potential KGC habitat and GPS points were taken at each (Figure 1). These areas of potential habitat were grouped by proximity and habitat type and labeled P1-P9 (Figure 1). **Areas of potential habitat identified at the site were deemed marginal, and no KGC individuals were identified.**

Forest Openings: Rock shelves with shallow soil are present at openings in the forest canopy. While this represents potential KGC habitat, shade and accumulation of leaf litter make KGC survival unlikely in these areas of marginal habitat. Areas of potential KGC habitat found in forest openings include P1, P7, P8, and P9 (Figure 1). Common species observed in the forest openings include cutleaf toothwort, purple cress, spring beauty, yellow fumewort, ferns, bush honeysuckle, and toadshade.

Utility Easement: A small amount of limestone glade habitat and bare soil is present in the utility easement. Areas of potential KGC habitat found in the utility easement onsite include P4, P5, and P6 (Figure 1). Common species observed in the utility easement include wild garlic, big bluestem (*Andropogon gerardii*), broomsedge, hairy bittercress, sedges (*Carex* spp.), mouse-eared chickweed, Queen Anne's lace (*Dacus carota*), purple deadnettle, yellow wood sorrel, butterweed (*Packera glabella*), tall fescue, green bulrush (*Scirpus atrovirens*), and old field aster (*Symphyotrichum pilosum*).

Dirt Roads: There are areas of rock and gravel under shallow soil that represent marginal KGC habitat present in the dirt roads throughout the site. Areas of potential KGC habitat found on the dirt roads onsite include P2 and P3 (Figure 1). Common species observed in the dirt roads include shepherd's purse, hairy bittercress, common whitlowgrass, purple dead nettle, American plantain (*Plantago rugelii*), annual bluegrass (*Poa annua*), common dandelion (*Taraxacum officinale*), and white clover (*Trifolium repens*).

## KENTUCKY GLADE CRESS PRESENCE

**No Kentucky glade cress individuals were identified within any of the marginal habitat areas or anywhere on the project site.**

## CONCLUSION

The property was surveyed for KGC during the flowering season of 2021 and 2025. A habitat assessment of the site had found that marginal habitat for KGC is present on limestone rock outcrops in the eastern and western wooded area and disturbed marginal habitat for KGC is present in the utility easement and along the dirt roads throughout the site. **These areas were surveyed for KGC during the flowering season and no KGC individuals were found. Therefore, the proposed project is not expected to have an adverse impact on KGC.**



We appreciate the opportunity to have assisted you with this survey. If you need additional information regarding this report or the overall survey, please contact Kaitlin Ilnick at (502) 625-3009.

Sincerely,

*Erin M Brennan*

Erin M. Brennan  
Ecologist II

*Kaitlin Ilnick*

Kaitlin J. Ilnick  
Advisory Services Lead

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Attachments:   References  
                      Figure  
                      Photographs

## REFERENCES

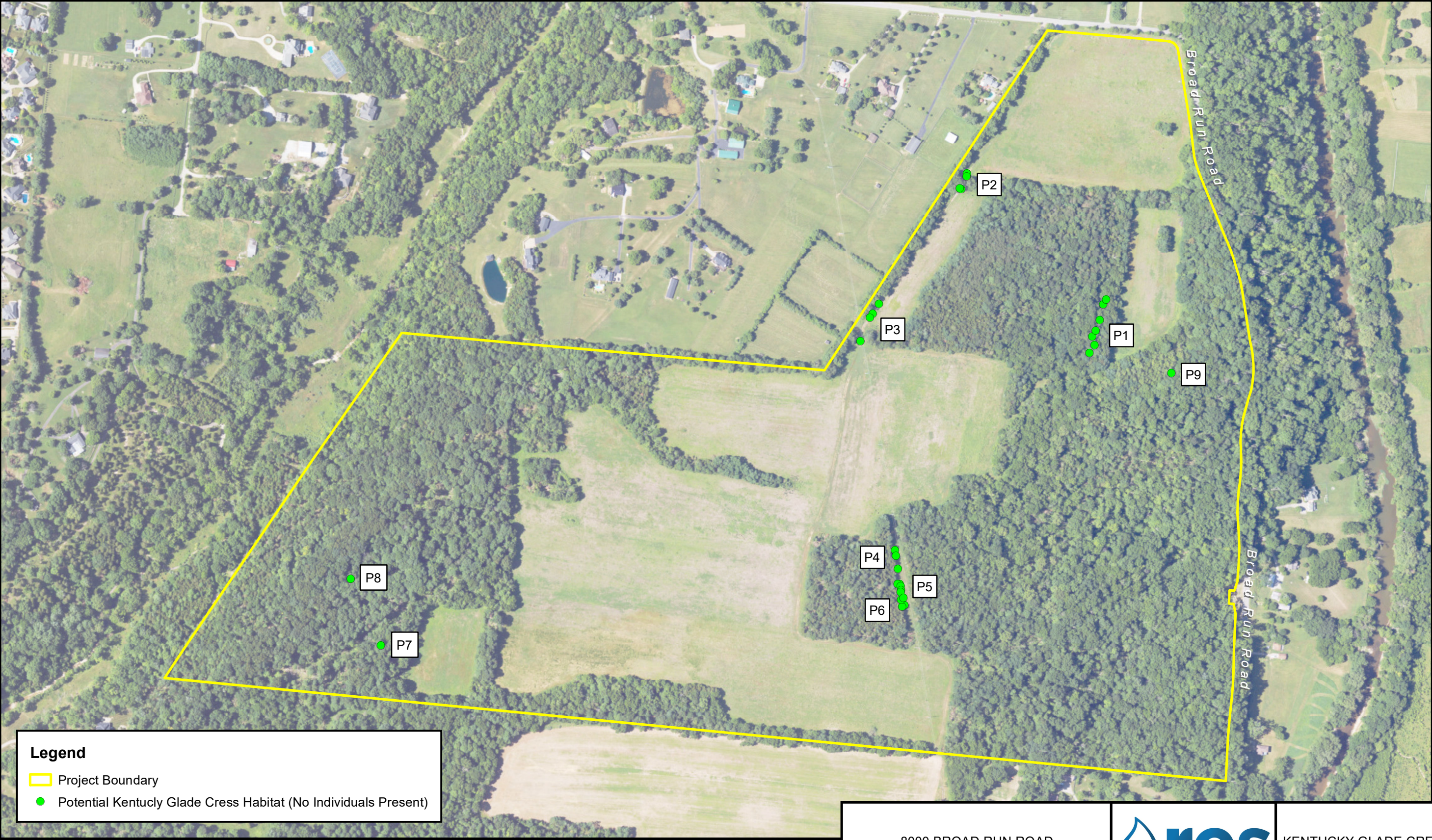
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- United States Fish and Wildlife Service (USFWS). 2013. Endangered and Threatened Wildlife and Plants; Proposed Threatened Status for *Leavenworthia exigua* var. *laciniata* (Kentucky Glade Cress). 78 FR(101):31498-31511.
- United States Fish and Wildlife Service (USFWS). 2014a. Endangered and Threatened Wildlife and Plants; Determination of Threatened Status for *Leavenworthia exigua* var. *laciniata* (Kentucky Glade Cress). 79 FR(87):25683-25688.
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- United States Fish and Wildlife Service. 2020. Species status assessment report for the Kentucky Glade Cress (*Leavenworthia exigua* var. *laciniata*), Version 1.0. August 2020. Atlanta, GA.

## FIGURE



Source: Aerial - (NAIP-FSA) from kygisserver.ky.gov ArcGIS services (2022).



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## PHOTOGRAPHS





Photograph 1: View of disturbed marginal habitat for Kentucky glade cress (KGC) in bare soil area in the utility easement. No KGC individuals were found. April 2, 2025.



Photograph 2: View of small patch of glade habitat for KGC in the utility easement. No KGC individuals were found. April 2, 2025.





Photograph 3: View of disturbed marginal habitat for KGC along the dirt road in the northern portion of site. No KGC individuals were found. April 2, 2025.



Photograph 4: View of marginal habitat for KGC along rock outcrops in the western wooded portion of the site. No KGC individuals were found. April 2, 2025.





Photograph 5: View of marginal habitat for KGC along rock outcrops in the western wooded portion of the site. No KGC individuals were found. April 2, 2025.



Photograph 6: View of marginal habitat for KGC along rock outcrops in the eastern wooded portion of the site. No KGC individuals were found. April 2, 2025.





Photograph 7: View of common whitlowgrass (*Draba verna*) identified onsite. This plant is a look-alike and associate of KGC, also found in glade habitat and areas of disturbance with shallow soils. April 5, 2025.



Photograph 8: View of cutleaf toothwort (*Cardamine concatenata*), an early-spring flowering plant identified at a limestone outcrop onsite. April 2, 2025.





Photograph 9: View of spring beauty (*Claytonia virginica*) identified onsite, an early spring-flowering plant also found in disturbed areas and roadsides. April 2, 2025.



Photograph 10: View of purple cress (*Cardamine douglassii*) an early-spring flowering plant identified at a limestone outcrop onsite. April 2, 2025.





Photograph 11: View of disturbed marginal habitat for KGC in bare soil area in the utility easement. No KGC individuals were found. April 5, 2021.



Photograph 12: View of small patch of glade habitat for KGC in the utility easement. No KGC individuals were found. April 5, 2021.





Photograph 13: View of disturbed marginal habitat for KGC along the dirt road in southeastern portion of site. No KGC individuals were found. April 5, 2021.



Photograph 14: View of disturbed marginal habitat for KGC along the dirt road in northern portion of site. No KGC individuals were found. April 5, 2021.





Photograph 15: View of marginal habitat for KGC along rock outcrops in the eastern wooded portion of the site. No KGC individuals were found. April 5, 2021.



Photograph 16: View of marginal habitat for KGC along rock outcrops in the western wooded portion of the site. No KGC individuals were found. April 5, 2021.