Appendix 12. Reports Submitted to USGS by States

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AGS surveys in New York 2022-2024

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New York Historical Locations

AGS is state historical in NY.

Known records from NY include two locations in central NY [redacted]

1970s or before:

-a specimen from what is now forested habitat in town of [redacted] in Orange County in Southern NY.

-a specimen from "[redacted] Essex County in the Adirondacks-the area is also mostly forested.

2022 Field Surveys

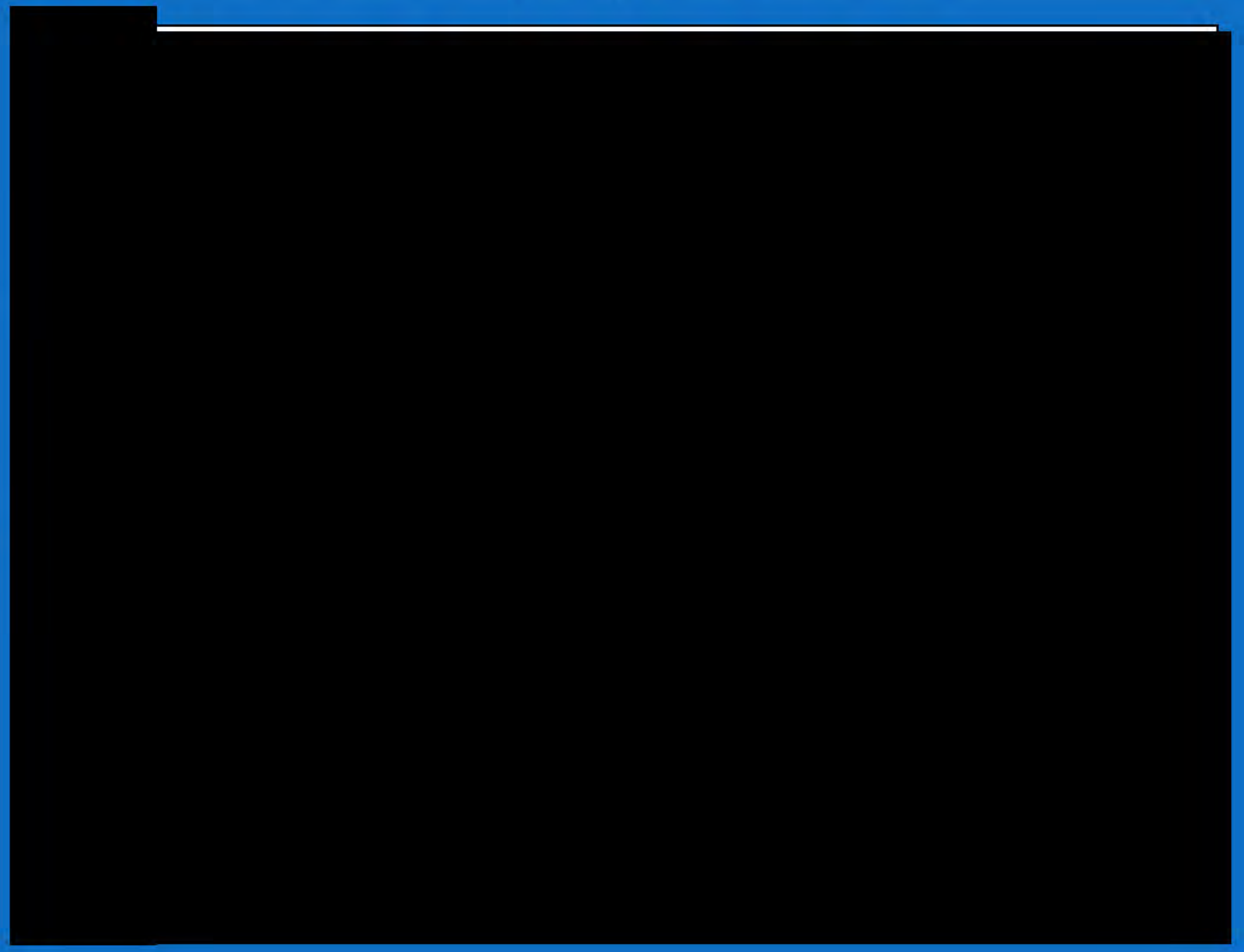
- Help from Betsy (PA) for when to start looking in NY-mid-April to early May
- Remote sensing near historical locations
- Trips to central and southern NY
- No longer suitable habitat in historical locations, but found promising sites nearby in Orange County

2023 Field Surveys

- Focused on revisits to two most promising sites in Orange County—visited twice
- Surveyed near [redacted], targeted open areas, mostly along [redacted]

New Strategy for Great Lakes populations

- Great Lakes populations use *Fragaria*
- Focused on alvar pavement grassland habitats near Lake Ontario



2024 Field Surveys

- Visited three properties with alvar pavement grassland in Great Lakes ecoregion
- Revisited two powerline corridors in Orange County-had cinquefoil and strawberry
- No AGS documented in 3 years of survey effort

Appalachian Grizzled Skipper (AGS) Surveys in New York 2022-2024

Erin L. White, NY Natural Heritage Program

Field Planning

Appalachian Grizzled Skipper (*Pyrgus centaureae wyandot)* has a conservation status rank of SH (state historical) in NY, with the last observation from the 1970s from the central portion of the state. Previously documented locations in New York include two locations near [redacted] from the 1970s, a specimen from 1942 from [redacted] Orange County near the Appalachian Trail, and a specimen from an unknown year from [redacted] Essex County (Figure 1).

Figure 1. Known historical locations for Appalachian Grizzled Skipper in NY.

In early 2022, I used criteria outlined in the project's "USGS guidance for remotely selecting sites for possible Appalachian Grizzled Skipper (AGS) colony locations" to identify sites for survey efforts in the spring of 2022. I planned to not only visit historical locations, but to also visit potential suitable habitat in nearby locations with a southeast to southwest aspect, open habitat, and proximity to some trees. I also reached out to Betsy Leppo, colleague from PA, for phenology information in her state to help determine timing for the NY surveys (as we did not have month and day information for specimens). We settled on a window to start looking in NY in mid-April to early May, depending on the weather any given year. I followed the project protocols for all surveys and the project data sheets provided.

2022 Surveys

In Orange County, the historic site is now forested, but I was able to survey three sites nearby on May 5, 2022 including [redacted], a powerline corridor on the [redacted] and a powerline corridor at [redacted] The county park had open grassland with bedstraw near woods, but the primary host plant,

Canada Cinquefoil (*Potentilla canadensis*), was not observed. I observed suitable habitat at the other two sites.

At the [redacted], there were patches of Canada Cinquefoil in bloom within open habitat and several early season butterflies were observed including Juvenal's (*Erynnis juvenalis*) and Horace's (*Erynnis horatius*) Duskywings and Cabbage White (*Pieris rapae*). [redacted] powerline corridor, there was also cinquefoil observed in bloom along with other floral resources and similar butterflies were observed.

[redacted]l powerline corridor, Orange County

I surveyed on May 11 in central NY in Tompkins County. [redacted], a historical location near [redacted] used to be open fields in the 1970s (when last observed), but has now succeeded into red pine and red maple-dominated young forest. No cinquefoil was observed in a small opening that remained. I did observe Cabbage White butterflies. The other historical site, [redacted]ll, was inaccessible due to private ownership and posted signs; however, I observed from roadsides that the habitat had also succeeded into shrubby and wooded habitat as well. I also explored other sites in the area on public land which showed promise in the remote sensing. [redacted] trail bisected open habitat near a game farm and riparian area; however, none of the food plant was observed. I also surveyed a portion of Buttermilk Falls State Park near a gas pipeline and this area had shrubs on half of the pipeline corridor, with mowed grass on the other half. Wild strawberry was observed in bloom, and no cinquefoil was observed, but the area is likely mowed frequently. A Pieris sp. butterfly was also observed.

2023 Surveys

In 2023, I made two trips to the most promising sites in Orange County during an early warm-up on April 14 and also on May 8. During the April visit, I did see common butterflies flying, but cinquefoil was not yet in bloom at the sites. At the [redacted], I spotted one unknown species (which may have been a duskywing) flying from a distance. At [redacted], I observed a Cabbage White.

On May 8, Canada Cinquefoil was in bloom at the sites. I observed three Cabbage Whites, an Eastern Tiger Swallowtail (*Papilio glaucus*), and what was likely a Pearl Crescent (*Phyciodes tharos*) at the Appalachian Trail corridor. I also observed a Cabbage White, 3-4 Juvenal's Duskywing, and another butterfly that was likely *Thorybes* sp. at the Sterling Forest site.

[redacted] Cinquefoil [redacted]

In addition, on May 12, I made an attempt to track down habitat near [redacted], Essex County to follow-up on the last historical specimen record. I concentrated efforts looking for open ice meadow habitat along the [redacted] as most of the area at [redacted]

[redacted] forested. I found two fishing accesses along the river. One had an island that was now covered in shrub and tree habitat with a Spring Azure (*Celastrina ladon*) observed. The other location was open with grasses and forbs, but no cinquefoil was observed.

2024 Surveys

I decided to explore a new strategy for the final year of surveys as project leader Nimish Vyas alerted me to the fact that AGS uses a different food plant in Michigan, Wild Strawberry (*Fragaria virginiana*). I talked with Dave Cuthrell to get a better sense of habitat at known AGS sites in MI, then NYNHP Ecologist Greg Edinger who pointed me toward comparable habitats for NY in the Great Lakes Ecoregion of NY in alvar pavement barrens. This community type includes barrens habitat with grasses growing over thin soils on limestone bedrock. Through further remote sensing, I found three locations in Jefferson County with potential to visit, two of which I needed to obtain permission to visit.

On May 7, I visited these three sites. My first stop was [redacted] which had extensive alvar grassland, shrubland, and wooded habitat. I observed a large amount of strawberry and saw several common butterflies including blues and *Vanessa* sp. I also visited another [redacted], with similar alvar pavement grassland habitat and some strawberry food plant was present along with several *Vanessa* sp. butterflies. [redacted] by NYS DEC, was a similar alvar pavement grassland with grasses, forbs, moss covered-rocks and some strawberry. I observed a *Vanessa* sp. and a small brown butterfly moving quickly.

I also returned to the most promising Orange County sites and documented both cinquefoil and strawberry in bloom on my visit (May 1). At [redacted], I observed common butterflies including a Red Admiral (*Vanessa atalanta*), Cabbage White, and individuals of uncertain ID moving quickly: 2 *Erynnis* sp., a sulphur, and 2 small orange butterflies. At Sterling Forest, I observed American Lady (*Vanessa virginiensis*), Cabbage White and a duskywing (likely either Horace or Juvenals).

Summary

I was not able to locate any extant occurrences for Appalachian Grizzled Skipper in NY as part of this project, so the species will remain an SH in NY. I was grateful for the opportunity to survey for the species in appropriate habitat, as for many of these sites (with the exception of the State Parks) I would not be able to survey based on other current project funding. I can keep the [redacted] site on my radar for future surveys on State Parks as part of our inventory work there, where habitat appears favorable for AGS.

Alvar pavement barrens habitat at [redacted]

Appalachian Grizzled Skipper *(Pyrgus centaureae wyandot)*

Results of the North Carolina survey, 2023-2024

J. Merrill Lynch

Consulting Biologist

15 May 2024

[redacted]

Introduction

The N.C. Natural Heritage Program conducted a survey for the Appalachian Grizzled Skipper during the 2023 and 2024 flight seasons (late March-early May). The survey focused on areas where the species had last been recorded in 2005-07 in the northwestern mountains of Ashe and Alleghany Counties, North Carolina. This report is a summary of the findings.

The Appalachian Grizzled Skipper (hereafter "AGS") is a small checkered-skipper that occurs mainly in the far northern parts of Canada and at scattered high elevation sites in the Rocky Mountains of the U.S. An isolated population in the Appalachians (subspecies *wyandot)* is rare and declining. It was last seen in North Carolina (the southernmost known location) during the years 2005, 2006, and 2007 in two areas, near [redacted] in Ashe County, and at the [redacted] near [redacted] Alleghany County. It has not been seen since then in North Carolina.

AGS has a single brood and is known to fly early, usually in early spring from late March to early May, with the flight period varying year to year and somewhat dependent on weather conditions. The weather in the mountains can be quite mercurial during that period, with night-time temperatures often dipping to 32 degrees Fahrenheit or lower and daytime temperatures often in the 50's.

The host plants for AGS are various cinquefoils *(Potentilla* spp.). *Potentilla canadensis* is often mentioned as the primary host species with *Fragaria virginiana* (wild strawberry) also mentioned as a possible secondary host. Both of these plants occur commonly in the mountains of Ashe and Alleghany Counties, usually in open, disturbed habitats such as woodland edges, along roads, around Christmas tree farms, hayfields, and other similar disturbed areas. Both of the original sites-[redacted]-had and still have populations of *Potentilla.* Both *Potentilla* and *Fragaria* also flower beginning in late March and continue until May, corresponding with the flight period of AGS.

The primary objective was to visit and concentrate survey efforts at the two original locations to evaluate current habitat conditions since it has been 16-18 years since AGS was last recorded at either location. There has not been a concerted effort to search for AGS at either of the two original locations.

In addition to those two sites, 7 additional sites in the vicinity of the original locations were visited. Some of these were identified through aerial photography as potential habitats and were owned by landowners receptive to surveys on their property.

Methods

2023 Surveys

Twenty surveys were conducted at nine locations between 23 March and 11 May 2023. 34 hours were spent walking in potential habitat. All of the surveys were conducted between 1000 and 1700 hours when ambient temperatures were between 62-75

degrees **F,** sky conditions clear to partly cloudy (0-50% cloud cover), and winds less than 15mph (usually 5-l0mph). Days that were most likely to have maximum butterfly activity during the survey period were chosen for the surveys. 8x32 close-focus binoculars were used to help survey distant patches of *Potentilla* and for butterfly identification. Original locations and other potential sites with suitable habitat nearby were visited at least twice, when possible, with visits spaced at about two-week intervals. This strategy was chosen to compensate for variability in the flight period duration and to help ensure that AGS was not missed because it might not be flying.

2024 Surveys

Four of the sites visited in 2023 were chosen for additional surveys in 2024. The same methods were used. Three additional sites not previously visited were selected for surveys in 2024 based on characteristics of occupied habitat in Virginia. The two original (active) [redacted], Ashe County and [redacted] Alleghany County were visited multiple times along with two sites at the [redacted], Ashe County, also visited in 2023, and two new sites: [redacted], Ashe County, and [redacted], Wilkes County. A total of 12 surveys were conducted from 16 April-1 May at the six sites plus a visit to a currently active Appalachian Grizzled Skipper (AGS) site located in Allegheny County, Virginia, on 15 April (with staff from the Virginia Natural Heritage Program).

Following is a brief description of the eleven sites surveyed in North Carolina in 2023 and 2024, starting with the original sites that once had AGS populations.

1. [redacted], Ashe County (ORIGINAL SITE)

   Survey dates: 2023: 27 March; 6, 19, and 29 April

   2024: 16, 18, 25, and 29 April

   Elevation: 3,000-3,100'

   Coordinates: [redacted]

   Hours spent surveying on foot: 6 (2023); 6 (2024)

The site is a former Christmas tree plantation that is now fallow open land. This is one of the original AGS sites where a population was known to occur from 2005-2008. AGS was identified and photographed by a local butterfly enthusiast, [redacted]. He reported the observations and guided a number of butterfly experts to the site.

[redacted] visited the site during the 2023 Natural Heritage Program survey. He remarked that the site is largely unchanged during more than 15 years since his original discovery, except that the Christmas trees have been harvested and about half of the original open acreage has been converted to a hayfield (removing the *Potentilla* from this portion). But there is a large population of *Potentilla* remaining on the remaining half, and the adjoining dry upland oak/mixed hardwood forest remains

[redacted]

uncut and undeveloped. This is remarkable, because much of the vicinity that was undeveloped pasture and woodland fifteen years ago has subsequently been subdivided and developed for single homes.

An equal amount of survey time was devoted in April 2024.

2. [redacted], Alleghany County (ORIGINAL SITE)

Survey dates: 2023: 4, 20 April

2024: 17 April, 1 May

Elevation: 3,200-3,800'

Coordinates: [redacted]

Hours spent surveying on foot: 4.5 (2023); 4 (2024)

This is the other original AGS site where a single AGS was found and photographed in 2005. It has not been recorded here since.

This site is a non-maintained gravel road that was originally constructed as access to a housing development that subsequently failed. The land was purchased by the State as a natural area. The road goes through mature upland oak/mixed hardwoods/white pine forest to the summit [redacted]. There are scattered road cuts and open areas that have thin and gravelly soils containing patches of *Potentilla*.

It should be noted that access to this site requires permission from an adjoining landowner and key code for a locked gate. The access road extends from the end of [redacted] manages the [redacted]. The superintendent secured permission to access this road.

3. [redacted], Ashe County

Survey dates: 2023: 23, 24 March; 5, 19 April

Elevation: 3,000-3,200'

Coordinates: [redacted]

Hours spent surveying on foot: 5

This is a privately-owned tract located about 2 air-miles NW of [redacted]. It was selected by the NC Natural Heritage Program because of potential habitat, proximity to the [redacted], and landowner permission.

[redacted]

This tract consists of an active Christmas tree farm (bisected by a number of access roads) and adjoining upland woodland margins containing patches of *Potentilla.*

4. [redacted], Alleghany County

Survey dates: 2023: 27 March; 20 April

Elevation: 3,000-3,120'

Coordinates: [redacted]

Hours spent surveying on foot: 1.5

This is a privately-owned tract located only about 0.25-mile east of [redacted] site. It was selected by the NC Natural Heritage Program because of the presence of potential habitat, proximity to [redacted], and landowner permission.

This site has similar topography and vegetation [redacted]. A road runs along the edge of the tract with some rocky outcrops and thin soils containing scattered patches of *Potentilla.*

5. [redacted], Alleghany County

Survey date: 2023: 4 April

Elevation: 2,700'

Coordinates: [redacted]

Hours spent surveying on foot: 0.75

This privately-owned tract was selected by the NC Natural Heritage Program because of its proximity to [redacted] and landowner permission. It is located approximately 1.5 air-miles [redacted].

The property is mainly open land with a small pond and some upland woodland edge. There is very little *Potentilla* on the tract and very little potential habitat.

6. [redacted], Alleghany County

Survey date: 2023: 20 April

Elevation: 3,200-3,600'

Coordinates: [redacted]

Hours spent surveying on foot: 1.5

This site lies adjacent to the [redacted] and is owned by the National Park Service (NPS). It is about 1.5 air-miles [redacted] site and is at a similar elevation with similar topography. The site was chosen because it is public conservation land, is close [redacted], and has potential habitat.

[redacted]

The site contains a number of overgrown roads constructed years ago for a failed development before NPS acquired it. There are scattered open areas and road cuts but very little *Potentilla,* possibly because the area surveyed has more mesic vegetation and a denser herbaceous layer.

7. [redacted], Ashe County

Survey date: 2023: 6 April

Elevation: 3,000-3,320'

Coordinates: [redacted]

Hours spent surveying on foot: 1

This site is located approximately [redacted], so generally between the two locations. The site was chosen because it is a protected nature preserve ([redacted], has some potential habitat, and is buffered from agricultural areas.

The area surveyed is along an old road that was created for a housing development that failed. [redacted] subsequently purchased the land for preservation. The road has several fairly extensive road cuts and disturbed open edges which contain small patches of *Potentilla. Potentilla* is not as common here as predicted, perhaps because of the relatively high-pH amphibolite rock that dominates the mountains in this area. The road is surrounded by extensive hardwood-dominated forest with very few rock outcrops or thin soil areas.

8. [redacted] Ashe County

Survey dates: 2023: 30 March; 21 April; 5 May

2024: 19, 25, and 29 April

Elevation: 3,800-4,400'

Coordinates: [redacted]

Hours spent surveying on foot: 8.5 (2023); 10 (2024)

[redacted] located in the [redacted] of Ashe County near the Virginia state line. It is about 22 air-miles [redacted] site and about [redacted]. This site was chosen because it is part of a large, protected conservation landscape, has extensive open lands with numerous thin soil areas, rock outcrops, and roadcuts, and an abundant population of *Potentilla.* The site is managed as game land by the NC Wildlife Resources Commission but was formerly privately owned and managed as a Christmas tree operation.

This site has a higher elevation than the other survey sites (except for [redacted], which is similar) and therefore AGS would be expected to have a slightly later flight period here. The habitat is disturbed by past grazing and Christmas tree farms but is currently being managed for wildlife enhancement. This site, along with the other [redacted], has by far

[redacted]

the largest populations of *Potentilla* observed during this survey. The population contains many thousands of plants over more than a mile of semi-continuous habitat.

[redacted]

9. [redacted] County

Survey dates: 2023: 21 April; 11 May

2024: 25 April 2024

Elevation: 4,000-4,920'

Coordinates: [redacted]

Hours spent surveying on foot: 5.25 (2023); 1 (2024)

This site is located about 1.5 air-miles east of the [redacted] site and is separated from that site by several drainages and extensive high-elevation northern hardwood forest. This area was selected for the same reasons as the other [redacted] site: extensive potential habitat, abundant *Potentilla* populations, and protection from development (State-owned conservation land).

This site is on a higher elevation ridge that is otherwise similar to the other [redacted] There are many old roads that were put in to access various Christmas tree fields when it was in private ownership. *Potent/lla* occurs along many of these roads and also in thin soil areas and rocky outcrops away from roads. Much of the area is open grassland. Scattered shrubs and small trees are starting to encroach from downslope forest.

[redacted]

The survey effort was reduced in 2024 because the host plant, while abundant, was not yet in bloom and there were very few nectar sources available. Along a ridge crest, it is more subject to wind and adverse weather conditions. Woodland edge is also some distance downslope, which increases exposure to weather. Therefore, it is probably a marginal site at best for AGS.

10. [redacted] Ashe County, NC

Survey Date: 2024: 18 April

Elevation: 3000-3200'

Coordinates: [redacted]

Hours spent surveying on foot: 2

This is a new site not surveyed in 2023. It was selected because of its proximity to the [redacted]) with the same private landowner and similar habitat. This site is a mixture of fallow fields, actively managed Christmas tree plantations, and woodland. *Potentilla* is patchy but quite common and was blooming during the visit, along with wild strawberry.

[redacted]

[redacted]

11. [redacted], Wilkes County, NC

Survey Date: 23 April 2024

Elevation: 2200-2500'

Coordinates: [redacted]

Hours spent surveying on foot: 5

This is a new site not surveyed in 2023. It was selected because it is readily accessible public land, contains dry oak-hickory habitat with scattered openings, an abundance of *Potentilla,* and some similarities to the extant site in Allegheny County, Virginia. The survey was conducted by slowly driving a 3-mile-long gravel road that runs along the ridgeline of [redacted] a fairly constant elevation with scattered clearings and woodland openings. At different points along the road, particularly around the clearings and woodland edges, the road was surveyed on foot.

This site is about one thousand feet lower in elevation than the other North Carolina sites surveyed. However, it has habitat and elevation similarities to the active AGS site in Virginia (ca. 125 air-miles NE) which is even lower in elevation, around 1800'.

Results and Discussion

AGS was not found at any North Carolina survey site during 2023 or 2024 despite intensive searching.

Possible reasons that AGS was not found include: [redacted]

AGS has not been seen in North Carolina since the original sightings during 2005-2008. Some have suggested that most butterfly enthusiasts aren't looking during March-April, which may be true, but there are naturalists who are active in the mountains during this period and who post their observations on various social media sites. No AGS observations have been reported.

The Appalachian population of AGS has experienced very serious declines in the past several decades. They have disappeared from a number of sites in states to the north where they were once common.

The host plant for AGS is very common and widespread, which makes it difficult to develop a search image to help narrow down potential habitat. One can literally find *Potentilla* almost anywhere in the North Carolina mountains in a wide range of elevations, topography, soil types, and geology. The species is quite adaptable and can be found wherever relatively thin soils occur on and around rock outcrops, road banks, open fields, Christmas tree farms, wood margins, and other natural and artificial open habitats. This makes it very difficult to pinpoint specific places to search.

[redacted]

Prior to the second year of the survey, sites in Virginia with known colonies of AGS were visited to provide clues that could help narrow down search parameters for AGS.

After returning from the Virginia site with a different idea of "ideal" habitat (assuming the Virginia site represents typical habitat for AGS), the focus on lower elevation sites that have south- or west-facing hillsides that are gently sloping (more foothill-like), became a target. [redacted] fit the new criteria but other public lands along the foothills of [redacted], such as the [redacted], also in Wilkes County and not far away, might be a good place to look in future searches, particularly in areas that have been logged or managed by regular prescribed burning.

Places containing populations of both *Potentilla* and bird's foot violet that are at around the 2000-2500' elevation and contain dry oak-hickory-pine habitat with some disturbance such as roads, wildlife food plots, and other clearings/edges would be good places to look. This recommendation is completely based on the assumption that the Virginia site represents more typical habitat for AGS. It is quite obvious given the ubiquitous distribution and abundance of *Potentilla* that there is some other parameter that is the limiting factor. Maybe disturbance, such as clearings, exposed soil along road banks, etc., and/or frequent fire, is an important factor. If the Virginia site is more typical, that raises the question about whether the two active (formerly) NC sites-[redacted] in Ashe County and [redacted] in Alleghany County-are outliers and not really representative. Although this is pure conjecture, it is something worth thinking about.

Appendix.

Appalachian Grizzled Skipper Occupied Habitat in Virginia

Allegheny County Virginia habitat

On April 15, 2024, a special trip to Allegheny County, Virginia was conducted by arrangement with staff from the Virginia Natural Heritage Program. The purpose of this field trip was to observe an extant population of AGS to make comparisons with the North Carolina sites, i.e., to develop a "search image" to better understand the habitat parameters of an existing population **in** order to assist with the search for possible sites in North Carolina.

This trip was very informative **in** helping to understand the type of habitat AGS is associated with, at least **in** Virginia, and to inform where one might look for the species in North Carolina. A total of 12 AGS individuals were seen at 4 locations on the Virginia private property, each within a quarter to a half-mile of each other.

Allegheny County Virginia roadside

The Virginia populations were located on south- or west-facing gentle slopes at around 1800' elevation in very xeric, oak-hickory-pine habitat that had been logged in some areas, burned by prescribed fire in other areas, or in clearings maintained for wildlife management purposes by the landowner. As with the North Carolina sites, *Potentilla* was common throughout, along roadsides and other disturbed openings, but there were some striking differences. The first was the abundance of bird's foot violet, which was common and in flower, and often intermixed with the *Potentilla.* Bird's foot violet is only known from one very small patch at any of the NC sites. In Virginia, AGS was seen nectaring on the bird's foot violet flowers almost exclusively. In general, the habitat was much drier, and the soil was very gravelly/shalely with many places almost devoid of vegetation. Essentially, none of the NC sites are this dry and most have a much thicker ground cover of grasses, herbs, and other plants. The lichen *Cladonia* was also present throughout the Virginia sites; this lichen occupies dry, sterile areas and is very scarce or absent at the NC sites. The elevation of 1800' was much lower than the NC locations, most of which are located between 3000-4000'. The [redacted] site that was sampled in 2024 was chosen partially because at 2200-2500', it is much closer in elevation to occupied habitat in Virginia. Even considering the fact that the Virginia site is about 125 miles north of the NC sites, the difference in elevation is striking.

Ohio AGS Survey 2022 Report.

Eileen Wyza

Ohio Department of Natural Resources, Division of Wildlife

May 2, 2022/Ohio/Athens, Site 1 for OH

Site habitat description and additional notes. Continue on back if needed.

This is a historical site for the Appalachian grizzled skipper in Ohio and is the location of the last known population for the species in the state. The last grizzled skipper was seen in the early 2000s. From 2007-2013, a highway bypass [redacted] s built through the National forest, and at its closest is approximately 500m from this historical site.

[redacted]

erial image of the survey path with the highway ypass shown. This path runs perpendicular to Wayne ational Forest's [redacted]

The historical site is a pipeline now owned by the Ohio Department of Transportation. The pipeline clearing is occasionally bush hogged but surrounded by hardwood forest and steep barren hillsides in an elevated region of the state. During the survey, an abundance of dwarf cinquefoil was found along the pipeline clearing, but it is unknown if Ohio Appalachian grizzled skippers host on dwarf cinquefoil or wild strawberry (like the MI populations). Canada cinquefoil is also present in the area. Early woodland flowers were blooming, including several violet species and phlox.

There are minimal threats to this area. [redacted] circumvents the pipeline, but the area is gated off, and this appears to successfully deter usage by pedestrians. The management regime for the area has not changed; however, if management practices do shift in the future, it is possible that the area will progress through succession and no longer meet the Appalachian grizzled skipper's habitat requirements.

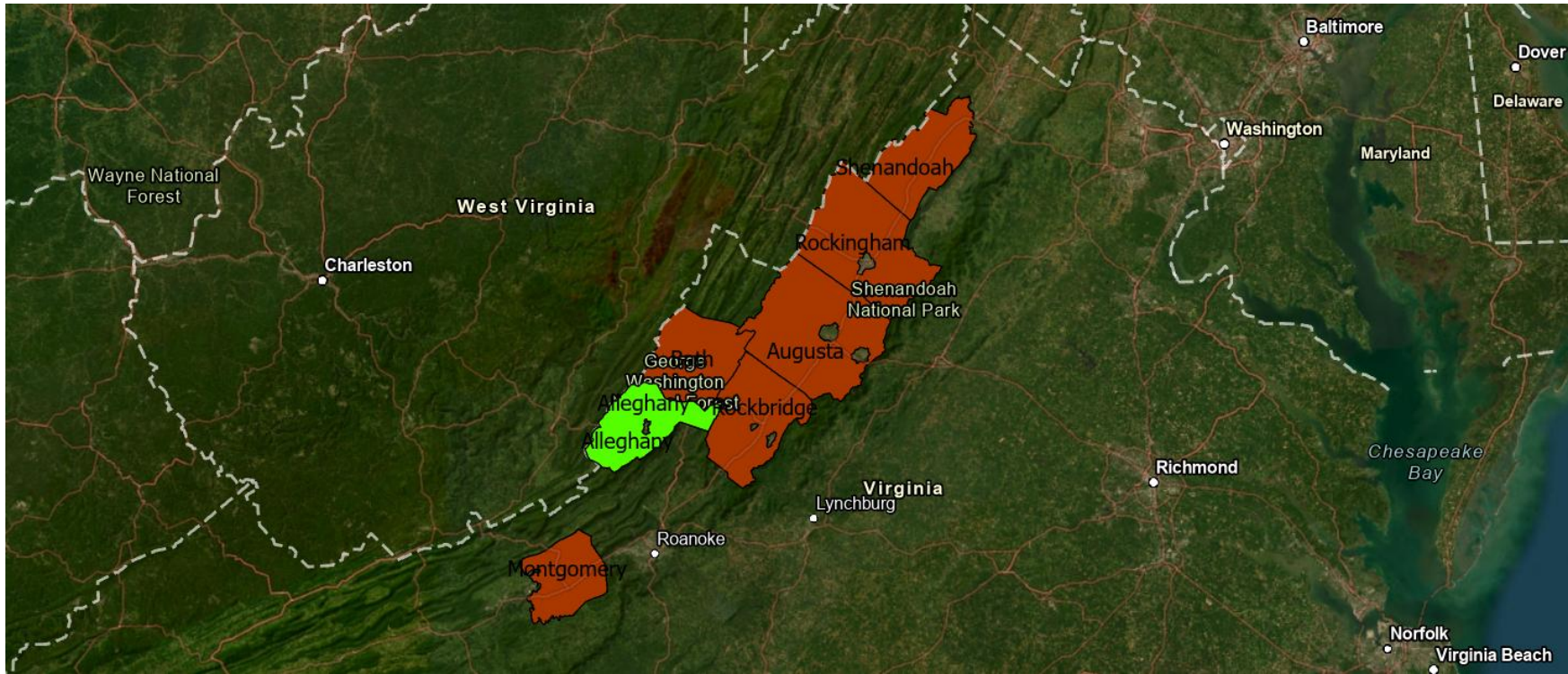
Virginia DCR 2023 Appalachian Grizzled Skipper Surveys

Leah R. Card and Ellison C. Orcutt

Virginia Department of Conservation and Recreation
Division of Natural Heritage

Virginia DCR 2023 Appalachian Grizzled Skipper Surveys

- 50 total surveys at 19 sites from April 4-May17
- 3 Active and 16 remotely selected sites
- 7 Counties in Western VA: Alleghany, Augusta, Bath, Montgomery, Rockbridge, Rockingham, Shenandoah
- AGS found at 2 Active and 1 adjacent sites in Alleghany Co. in April
- For Negative Surveys, at least 7 remotely selected sites appeared to be suitable, 4 sites were ok, and 5 sites not suitable



Active site – [redacted] – Private Land – Alleghany Co.

- April 4 - 16 individuals – Feeding – Patrolling/Perching – Mating
- 65-80F – Sunny to partly cloudy – calm to light winds
- Plenty of Dwarf cinquefoil and violets, shale barren previously burned and road edges
- May 17 – 3 surveys – no AGS

[redacted]/Powerline/Gasline – Alleghany Co.

- April 11/12 – 7 surveys – no AGS
- April 19 – 5 surveys – 1 individual AGS observed/genetic sample in Gasline ROW
  - 68F, sunny, plenty of dwarf cinquefoil and violets in clearings, shale and steep
- April 25 – 3 Surveys – 1 AGS
  - 62F, mostly cloudy, dwarf cinquefoil and violets along old road
- May 17 – 3 surveys – no AGS

Appalachian Grizzled Skipper Notes from 2023-2024 USGS Surveys

Andrew J. Rapp
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600 E. Main Street, 16th floor
Richmond, Virginia 23219

Appalachian Grizzled Skipper is known historically from 16 cities and counties in Virginia. Currently, there are extant populations in one of these 16 counties. Alleghany County holds the only remaining populations known in the state. The current stronghold for the species is at a site named [redacted]n, a private property managed for wildlife by the landowner. This landowner has to this point been very open to recommendations by the Virginia Natural Heritage Program on ways to best manage their property to continue the persistence of the skipper. Without their continued cooperation, this population would likely become reduced or eventually extirpated with continued succession. 16 individuals were encountered across the property on April 4th, 2023. Up to 13 individuals were seen on April 15th, 2024.

The secondary site is the [redacted]. This site historically had more Appalachian Grizzled Skippers, but the succession of habitat has greatly reduced the suitable habitat to very small slivers along old fire roads. The US Forest Service manages the [redacted], and coordination with them to clear more habitat for their waning population needs to be restarted. The management area is predominantly shale substrate which produces very low-quality timber making it hard to bring in a timber crew to remove large patches of forest. The stronghold of this metapopulation is a small gasline partially owned by US Forest Service and partially owned by a private landowner. The Forest Service section has become overgrown with pines and pushed out any possible Appalachian Grizzled Skipper. Possibly due to aspect or slope of the private section, Appalachian Grizzled Skippers have persisted along this gasline and would likely repopulate the [redacted] if habitat were to be opened. This year the gasline had five individuals on April 24th, 2024. At least one individual was seen within the [redacted] in 2024 by amateur lepidopterists, but none were seen by our team in subsequent surveys. The population persists in the [redacted] but with such low counts and continued loss in habitat it is uncertain how much longer it will hold on.

There are many historic sites that no longer have Appalachian Grizzled Skipper but most notably [redacted] in Rockbridge County was extant as recently as 1999. [redacted]s on U.S. Forest Service land and is similar to the [redacted] with many historic timber harvest and artificial openings. Over time this property grew up and

pushed out all the suitable habitat for Appalachian Grizzled Skipper. The powerline cut has become grassy which has shaded out lots of the *Potentilla* and made it unsuitable. This site like so many others has lost its Appalachian Grizzled Skipper population due to lack of disturbance or clearing. For Appalachian Grizzled Skipper to survive, clearing and disturbance needs to regularly occur or happen in cycles in adjacent properties to constantly provide suitable habitat allowing dispersal and recruitment.

Our strategy to find suitable habitat to survey is reviewing satellite imagery for powerlines, gaslines, and eroded shale road banks in regions with shale substrate. Additionally, a habitat model created by the program informed areas to prioritize for survey. A serious issue for so many pollinators is not only the lack of early succession high flower diversity sites, but also the introduction of invasive species which aggressively dominate powerline and gasline cuts. Energy companies also spray herbicides along powerline cuts to reduce the management needs which can be dangerous for pollinators. Management of rights-of-way to maintain their open and early successional nature but not negatively impact the forage and structure needs for the skipper is challenging.

Virginia's extant AGS and most, if not all, of the historic locations occur on shale substrates, in forest openings like road cuts, timber clear cuts or shale barrens. The key components when in the field looking for a suitable site is looking for the presence of the hostplant *Potentilla canadensis*. *P. canadensis* can be ubiquitous on the landscape so keying into other factors like its favorite nectar species, *Viola pedata,* can help narrow field survey priorities. In addition, common components of the micro-habitat of AGS sites is the presence of bare soils, sparse clumps of native grasses and often, reindeer lichen (fungi in the genera *Cladonia* or *Cladina*), which thrives in the low competition, poor growing conditions of these shale openings. The variables are present at all our extant sites and usually indicate a healthy early successional shale barren system. Once taller grasses and other successional plants start to grow at a site the Reindeer Lichen, *Viola pedata,* and *Potentilla canadensis* quickly get shaded out. These three things can exist in the presence of blue grass patches, but the grass seems to deter the usage of a site by Appalachian Grizzled Skippers. AGS seem to want as open of a site as possible like other *Pyrgus* species to easily move far distances.

North Carolina's recent history with Appalachian Grizzled Skipper sightings in Ashe and Alleghany County were around Christmas Tree farms and recent clear cuts. Virginia has similar habitats in Grayson County in particular Christmas Tree farms that have not been surveyed. This is an area that could use further survey to try to find new sites in the state in a previously unsurveyed area.

Appalachian Grizzled Skipper like other *Pyrgus* are highly dispersive. It is likely individuals can disperse miles away from an initial host site looking for new habitat. Dispersal is certainly the main reason the species has persisted as long as it has in the state with regular timber and forestry work occurring in Alleghany providing new locations for the species every few years to inhabit.

An important step to ensuring the persistence of the species is for the U.S. Forest Service to enact management initiatives to improve and add habitat in the [redacted] or other regional shale dominant properties.

West Virginia 2023 Rare Butterfly Monitoring

Appalachian Grizzled Skipper 2023 Survey Report

Presentation by Jakob Goldner

West Virginia Division of Natural Resources, Wildlife Resources Section

Rare Butterfly Monitoring – Appalachian Grizzled Skipper

- Counted adults in April
  - Team of 3 observers saw 11 adults on 5 April, 2023
  - Team of 9 observers saw 7 adults on 12 April, 2023
  - 5 in 2022
  - 4 in 2021 < Dust issue from road repair
  - 7 in 2020
  - 8 in 2019
  - 47 in 2017
- Monitored through timber sale 13 April through 12 June, 2023.
- Unable to locate caterpillars or feeding damage on host plants on 7 August, 2023

Plans for 2024

- AGS population estimate
  - Mark-recapture over 3 days
- Survey habitat and explore potential sites for establishment of new colonies
- Identify at least 1 potential reintroduction site
- Develop site management plan in cooperation with USFS

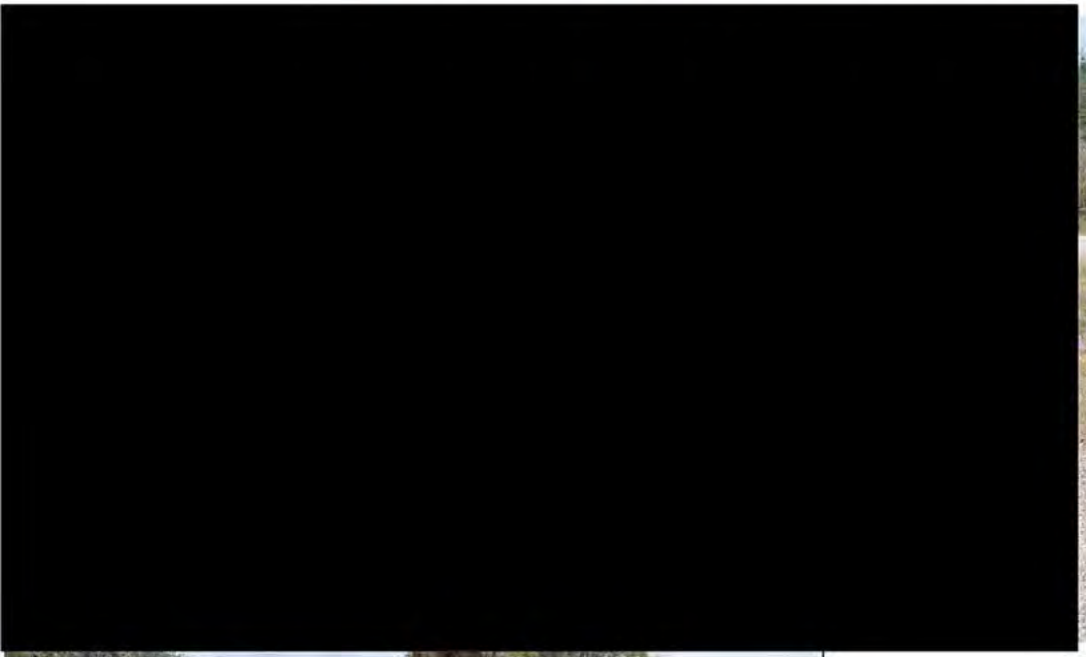
Rare Butterfly Monitoring – Appalachian Grizzled Skipper

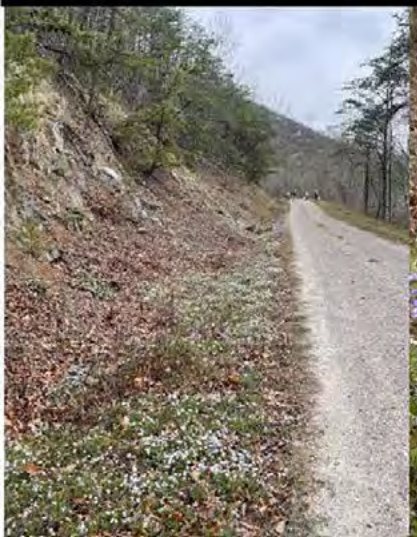
2024 Survey Report

Presentation by Jakob Goldner

West Virginia Division of Natural Resources,
Wildlife Resources Section

West Virginia Site Overview





Clearcut Update

- Clearcut in early 2023, upslope of known site
- Initial concerns about road dust were avoided
- Clearcut may have supplemented habitat, but none located there yet

Monitoring History

- Counted adults in April
  - 11 in 2023
  - 5 in 2022
  - 4 in 2021 < Dust issue from road repair
  - 7 in 2020
  - 8 in 2019
  - 47 in 2017

2024 Monitoring

- April 15-17 (first sighting April 2)
- 3 Days of mark-recapture surveys
  - 2 “bouts” of surveying each day
  - Initially tried gluing 2 mm x 2 mm paper tags
  - Switched to unique dot patterns on wings
  - Finally switched to writing letters directly on wings with sharpie

Day	Bout	New AGS	Recaptured AGS	Total
April 15	1	18	0	18
April 15	2	13	3	16
April 16	1	11	4	15
April 16	2	4	1	5
April 17	1	7	1	8
April 17	2	4	4	8

- Total individual AGS: 57
- Used Schnabel method to estimate population
  - Estimate: 149
  - Lower confidence interval: 91
  - Upper confidence interval: 329

2024 Additional Survey

- Surveyed additional site near the mark-recapture location (~1km distant), on 1 May
- Located 10 individuals
- Bonus relocation of individual from 17 April (14 days prior), very close to initial capture site