

# **Inventory of Butterflies at Badlands National Park, South Dakota**



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Cover photo – Photo shows site #3 at Sage Creek Wilderness Area south of Roberts Prairie Dog Town Overlook  
Left photo inset – Juniper Hairstreak      Right photo inset – Little Wood-Satyr

## INTRODUCTION

A butterfly study was conducted at Badlands National Park (BNP) during the flight season in 2004. The purpose of the survey was to document species diversity and determine the presence or absence of three species listed by the U.S. Forest Service as sensitive species: Regal Fritillary (*Speyeria idalia*), Ottoe Skipper (*Hesperia ottoe*), and Arogos Skipper (*Atrytone arogos*). A brief synopsis of these three species is included in Appendix A. This study also provides recommendations to resource personnel so land management practices can be developed that will promote and/or enhance the existence of native butterfly species.

There are approximately 14,500 species of butterflies worldwide, with almost 700 of them occurring in the United States and Canada (Scott 1986). One hundred seventy-seven species have been reported for South Dakota, of which 50, 127, and 59 are documented for Jackson, Pennington, and Shannon counties, respectively (Marrone 2002). In Ode and Backlund (1999), a biological inventory of the Badlands Bombing Range located in northeastern Shannon County, this author reported thirty-six butterfly species, including the Regal Fritillary.

## METHODS

Four sampling periods (early June, late June, early August, and late August) were selected to maximize the number of butterfly species encountered as well as coincide with the flight periods of the three target species. A standardized data form was used to record butterfly species on each site. Information regarding number per species, sex, condition of individuals, nectar sources, and behavioral aspects was recorded. Additional data was also collected on temperature, time of day, habitat type(s), and weather conditions.

The census method known as a “checklist count”, as noted by Royer *et al.* (1998), was used because of its effectiveness in confirming the presence of as many butterfly species as possible in a relative short period of time and effort. This casual or random technique for observing butterflies allows the surveyor to select likely concentration sites such as nectar sources, larval host sites, and potential habitat for specific species and avoid large areas with high densities of non-native plant species.

Baited butterfly traps, often referred to *Agrias* traps due to their success in capturing that genus in tropical environments, were also used to sample butterfly species found in wooded areas. The trap design is similar to that sold by BioQuip Products, Gardena, CA. Each trap consists of a 36-inch high nylon mesh cylinder with 15 inch diameter metal rings at top and bottom. The top is covered with heavy-duty cloth. A 3.5-inch mesh trap lip attached at the bottom to an inner metal ring provides an eight-inch opening. A 16-inch square plywood base supports the bait container and provides a landing platform for incoming butterflies. The platform is attached to the cylinder with nylon cord that allows an entry opening of approximately two inches in height. Traps were suspended from large cottonwood, green ash, or Russian olive trees approximately five feet above ground level. Bait used was a mixture of molasses, apple cider, brown sugar, stale beer, and ripened bananas.

Common and scientific names of butterflies used in this report follow the book, *Field Guide to South Dakota Butterflies* by this author. Common names of plants were taken from the publication (Larson and Johnson, 1999).

## STUDY AREA

Badlands National Park (BNP), located in portions of Jackson, Pennington, and Shannon counties of South Dakota, encompasses 242,756 acres that contain predominantly badlands erosion features and mixed-grass prairie interspersed by swales, draws, and drainage's containing trees and shrubs. For a more detailed account of the regions climate, geology, soils, and vegetation, refer to USGS-NPS Vegetation Mapping Program, Badlands National Park, South Dakota by Von Loh, *et al.*

Upon consulting with BNP natural resource personnel, reviewing past collection records, and conducting a preliminary survey for potential habitats during the first visit, nine study sites were selected (Figures 1 and 2). Location and description of each site is presented in Table 1. During each sampling period, each site was searched for 15 minutes to 2.5 hours by walking through favorable habitat for butterflies. Length of time spent was determined by success of finding butterflies and size of the site.

## RESULTS AND DISCUSSION

A list of butterflies and the numbers observed at each site during each visit are presented in Tables 2-5. A total of 41 butterfly species, including four new county records, were encountered during the survey (Table 6). Voucher specimens were collected for selected species and have been deposited at the BNP museum. None of the three "species of concern" were found. However, the Regal Fritillary has been reported for BNP in the past.

Five butterfly species, the Clouded Sulphur, Melissa Blue, Edwards' Fritillary, Western Branded Skipper, and Leonard's Skipper, occurred at all sites and were the five most abundant species observed during the survey.

Five butterfly species not previously known from BNP were documented during this survey. The most interesting was the capture of a California Tortoiseshell in a baited butterfly trap at site #5. Only two other records are known for this species in South Dakota. In Far Western United States, the California Tortoiseshell periodically undergoes massive population outbreaks, which may account for strays in South Dakota. Another noteworthy find was the capture of a single female Uncas Skipper at site #1. Populations of this prairie butterfly seem to be on the decline due to loss of habitat.

Due to the variability in the size of each area sampled and the length of time spent at each site, caution should be used when making comparisons between sites. In general, butterfly diversity (number of species per site) was greatest where at least a portion of the site contained a water source such a spring or stream and native prairie with an abundance of native flowering forbs (nectar sources for butterflies). These areas are sites #3, 5, 6, and 8. Some larval host plants and nectar sources noted for these sites include sideoats and blue gramma grasses, cottonwood, green ash, Rocky mountain juniper, Russian olive, yucca, stemless hymenoxys, western wallflower, wild parsley, rubber rabbitbrush, dotted gayfeather, goldenrod, and thistles.

Past collecting and/or observation data on the butterfly fauna of BNP is limited. This author, along with Paul Opler and Ray Stanford, visited BNP during late May of 1989 and reported 21 species, including six new county records (Table 7).

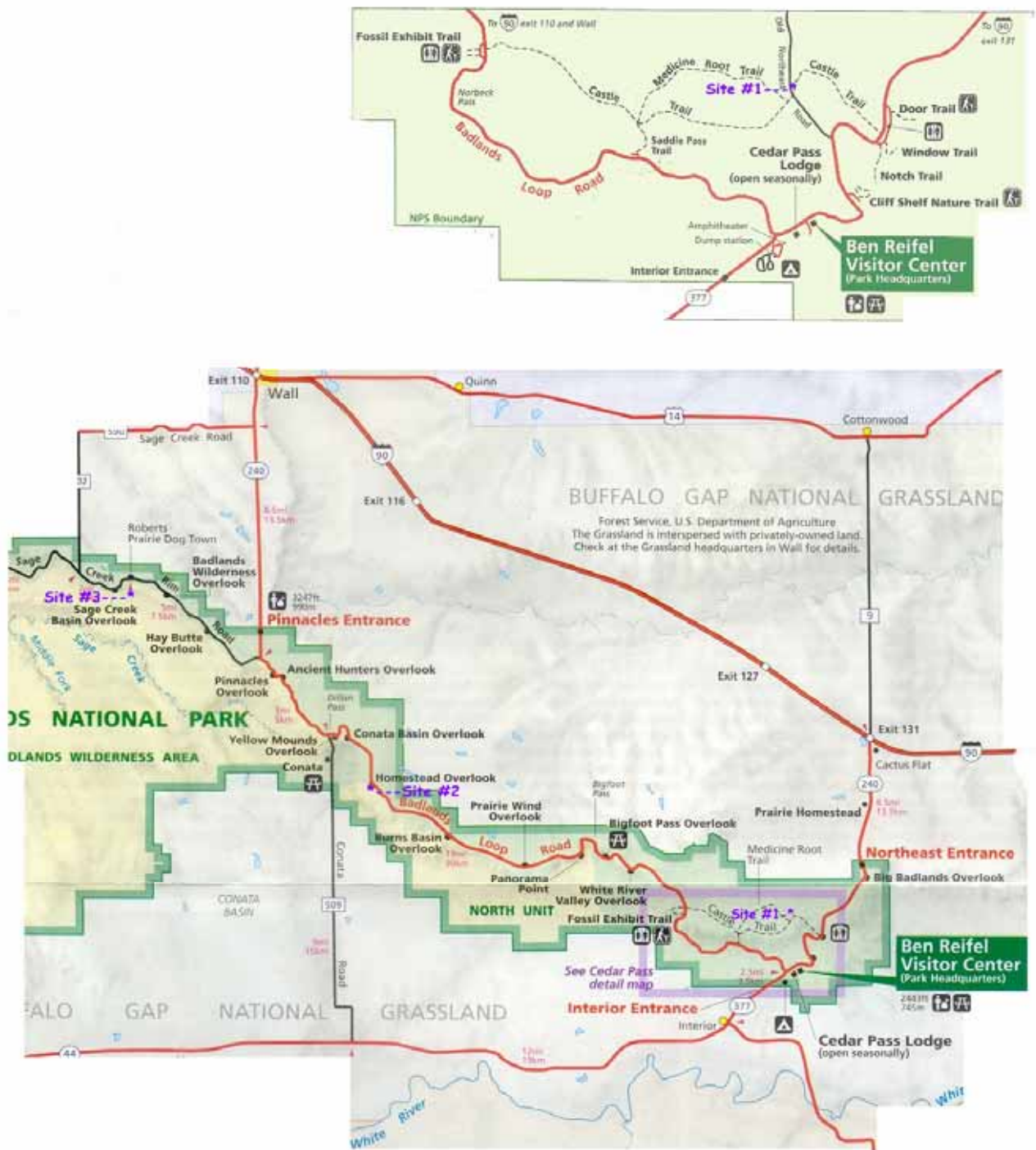


Figure 1. Location of butterfly sites number 1-3 at Badlands National Park.

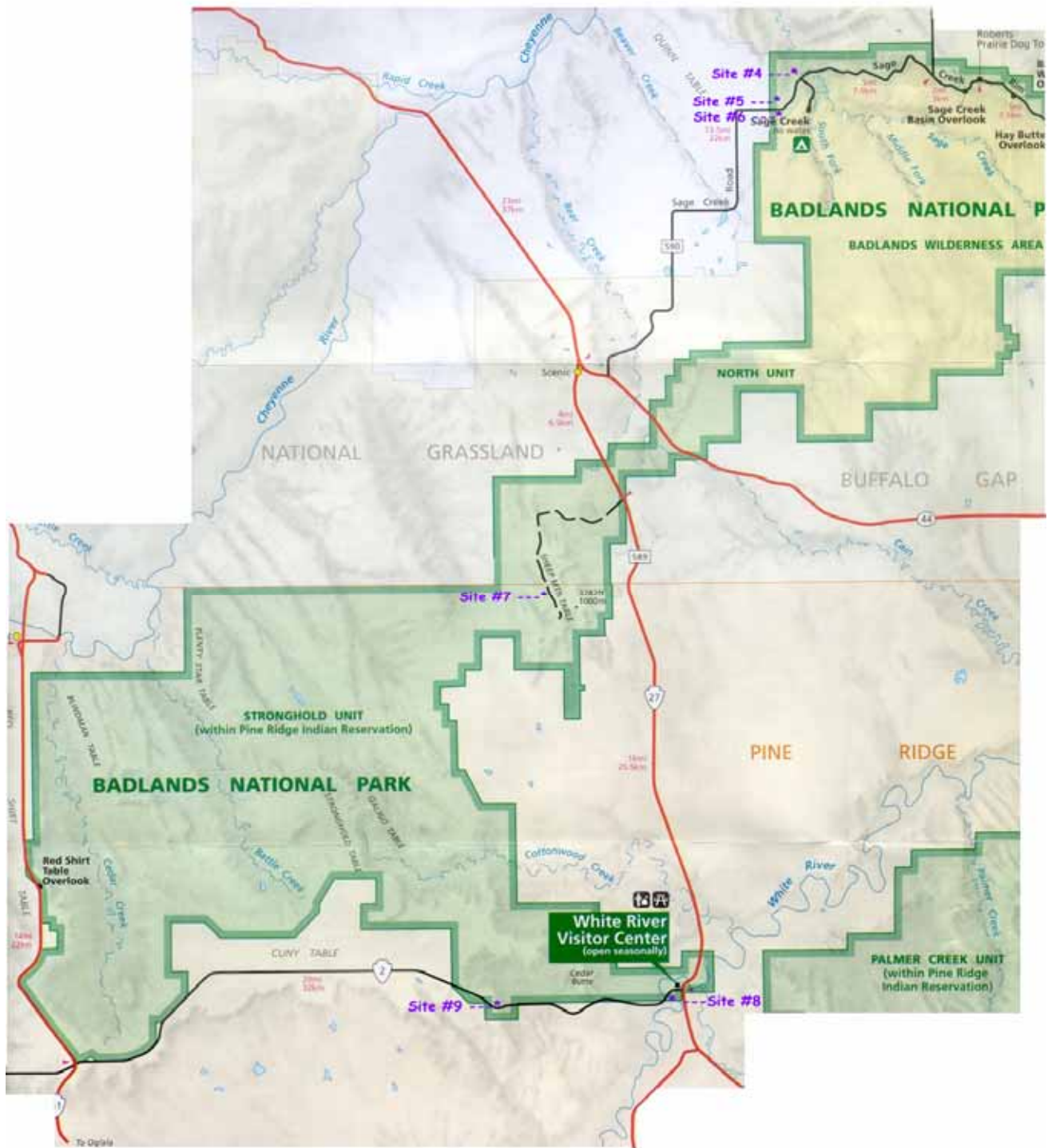


Figure 2. Location of butterfly sites number 4-9 at Badlands National Park.



**Table 1. Location and description of butterfly collection sites at Badland National Park.**

| <b>SITE NUMBER</b> | <b>COUNTY</b> | <b>NAME AND LOCATION</b>                                                   | <b>DESCRIPTION</b>                                                                                                                                                                                                     | <b>COMMENTS</b>                                                                                                                                                                                         |
|--------------------|---------------|----------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1                  | Jackson       | Old Northeast Trail<br>T3S,R18E,S22,SE1/4                                  | Mixed-grass prairie and badlands formations with dry wetland areas.                                                                                                                                                    | Nectar sources include common milkweed, thistle, gray ragwort, fewflower buckwheat, and dotted gayfeather.                                                                                              |
| 2                  | Pennington    | Homestead Overlook<br>T2S,R16E,S35,SW1/4                                   | Rolling hills and rocky ridge with short and mixed-grass prairies and abundance of yucca. Portion of area east of road had been controlled burned in 2003 and small area on west side was accidentally burned in 2004. | Invasion of smooth brome grass is a serious threat to native forbs. Nectar sources include wavyleaf thistle, and dotted gayfeather.                                                                     |
| 3                  | Pennington    | Sage Creek Basin<br>south of Roberts<br>Prairie Dog Town<br>T2S,R15E,S3,10 | Rolling hills (some barren) with woody draws containing green ash, cottonwood, Rocky Mountain juniper, and western snowberry.                                                                                          | Forbs include an abundance of western wallflower on grassy hill slopes. Other nectar sources and larval hosts include wild mustard, thistles, yucca, dotted gayfeather, broom snakeweed, and goldenrod. |
| 4                  | Pennington    | Sage Creek<br>T1S,R14E,S34,SE1/4                                           | Sage Creek bottomland and woody spring fed draw with several small active beaver dams to the west.                                                                                                                     | Nectar sources and larval hostplants include yucca, vetches, yellow sweetclover, western snowberry, scarlet globemallow, dotted gayfeather, broom snakeweed, and goldenrod.                             |
| 5                  | Pennington    | North CCC Spring<br>T2S,R14E,S3                                            | Spring area with woody draw containing green ash, American elm, cottonwood, chokecherry, willow, Rocky Mountain juniper, western snowberry, and poison ivy.                                                            | Trampling of spring bed by bison threatens water source. Nectar sources include dotted gayfeather and goldenrod.                                                                                        |

**Table 1. (continued).**

| SITE NUMBER | COUNTY     | NAME AND LOCATION                           | DESCRIPTION                                                                                                                                                                                                                                                                          | COMMENTS                                                                                                                                                                                                                                                                                                                      |
|-------------|------------|---------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 6           | Pennington | CCC Spring<br>T2S,R14E,S10                  | Large spring area and woody draws with green ash, cottonwood, Rocky Mountain juniper, Russian olive, willow, chokecherry, and western snowberry,                                                                                                                                     | Small amount of Canada thistle on ridge slope. Forbs include gayfeather, goldenrod, and scarlet globemallow.                                                                                                                                                                                                                  |
| 7           | Shannon    | Sheep Mountain Spring<br>T43N,R44W,S28,N1/2 | Rugged badland draw with small spring near mile marker #6. Trees and shrubs include Rocky Mountain juniper, green ash, chokecherry, willow, skunk brush, and western snowberry.                                                                                                      | Other plants observed were sage, rabbitbrush, globemallow, sunflower, bush morningglory, gumweed, thistle, yucca, yellow sweetclover, dotted gayfeather, broom snakeweed, land pricklypear.                                                                                                                                   |
| 8           | Shannon    | White River<br>T41N,R44W,S24,S1/2           | Southwest of visitor's center and south of White River bridge. White River bottomland and nearby breaks with sandy, gravelly soils. Trees and shrubs observed were willow, cottonwood, Russian olive, green ash, skunk brush, buffaloberry, currant, and western snowberry.          | Forbs include yellow sweetclover, shell-leaf penstemon, salsify, mustard, milkweed, yucca, rabbitbrush, scarlet globemallow, sunflower, spiderwort, western wallflower, creeping jenny, pepperweed, and gayfeather.                                                                                                           |
| 9           | Shannon    | Fog Creek<br>T41N,R44W,S20                  | Fog Creek bottom with large wetland created by several beaver dams and adjacent draws to the west, including small spring along roadside. Trees and shrubs in area were willow, cottonwood, dogwood, Rocky Mountain juniper, green ash, choke cherry, American elm, and skunk brush. | Forbs observed were sweetclover, butte candle, coneflowers, primrose, western wallflower, little bluestem, buffalograss, spiderwort, rabbitbrush, milkweed, Lambert's crazyweed. Creek bottom plants were violets, cattails, white crazyweed, gumbo lily, gumweed, gayfeather, Canada thistle, goldenrod, and broom snakeweed |

**Table 2. List of butterflies found on nine survey sites at Badlands National Park during June 2-4, 2004.**

| COMMON NAME              | SURVEY SITE NUMBER |   |     |    |   |     |   |     |   | TOTAL | COMMENTS                                                                     |
|--------------------------|--------------------|---|-----|----|---|-----|---|-----|---|-------|------------------------------------------------------------------------------|
|                          | 1                  | 2 | 3   | 4  | 5 | 6   | 7 | 8   | 9 |       |                                                                              |
| Two-tailed Swallowtail   | 3                  |   |     |    |   |     |   |     | 1 | 4     |                                                                              |
| Olympia Marble           |                    |   | 5   | 2  |   |     |   |     |   | 7     |                                                                              |
| Orange Sulphur           |                    |   |     | 1  |   |     | 1 |     |   | 2     |                                                                              |
| Juniper Hairstreak       |                    |   |     | 2  | 3 | 12  | 2 |     |   | 19    | nectaring on yellow sweetclover                                              |
| Gray Hairstreak          |                    |   |     |    |   | 1   |   |     |   | 1     | nectaring on wavy-leaf thistle                                               |
| Melissa Blue             |                    |   | 5   | 3  |   | 4   |   | 1   | 5 | 18    |                                                                              |
| Variegated Fritillary    |                    |   |     | 1  |   | 1   |   |     | 1 | 3     |                                                                              |
| Edwards' Fritillary      |                    | 5 | 40+ | 15 | 9 | 10+ | 5 | 10+ | 6 | 100+  | common, nectaring on wavy-leaf thistle, Russian olive and western wallflower |
| Pearl Crescent           |                    |   |     | 1  |   | 2   |   |     |   | 3     | nectaring on Russian olive                                                   |
| Milbert's Tortoiseshell  |                    |   |     |    |   | 1   |   |     |   | 1     |                                                                              |
| Red Admiral              |                    |   |     |    | 1 | 3   |   |     |   | 4     | nectaring on Russian olive                                                   |
| Painted Lady             |                    |   |     |    |   | 4   |   |     |   | 4     | nectaring on Russian olive                                                   |
| Weidemeyer's Admiral     |                    |   |     |    | 1 |     |   |     |   | 1     |                                                                              |
| Silver-spotted Skipper   |                    |   |     |    |   | 2   |   |     |   | 2     | nectaring on Russian olive                                                   |
| Common Checkered Skipper |                    |   |     |    |   | 1   |   |     |   | 1     |                                                                              |
| Common Sootywing         |                    |   | 1   |    |   | 1   |   |     |   | 2     | nectaring on wild mustard                                                    |
| Dusted Skipper           |                    |   |     |    |   |     |   |     | 1 | 1     |                                                                              |
| Strecker's Giant Skipper |                    |   | 1   |    |   |     |   | 1   |   | 2     |                                                                              |

**Table 3. List of butterflies found on nine survey sites at Badlands National Park during June 28 and 29, 2004.**

| COMMON NAME               | SURVEY SITE NUMBER |    |   |   |    |     |   |   |   | TOTAL | COMMENTS                                       |
|---------------------------|--------------------|----|---|---|----|-----|---|---|---|-------|------------------------------------------------|
|                           | 1                  | 2* | 3 | 4 | 5  | 6   | 7 | 8 | 9 |       |                                                |
| Eastern Tiger Swallowtail |                    |    |   | 1 |    |     |   |   |   | 1     |                                                |
| Clouded Sulphur           | 3                  |    | 6 | 3 | 1  | 2   |   | 1 | 4 | 20    |                                                |
| Orange Sulphur            |                    |    | 1 | 1 |    |     |   |   |   | 2     |                                                |
| Gray Copper               |                    |    |   |   |    |     |   |   | 2 | 2     |                                                |
| Acadian Hairstreak        |                    |    |   |   |    |     |   |   | 1 | 1     | fresh female, county record                    |
| Juniper Hairstreak        |                    |    | 6 |   |    |     | 1 |   |   | 7     | nectaring on white locoweed                    |
| Melissa Blue              |                    |    | 4 | 1 |    |     |   | 1 | 1 | 7     |                                                |
| Variegated Fritillary     |                    |    | 2 | 1 |    |     |   |   |   | 3     |                                                |
| Manitoba Fritillary       |                    |    |   |   |    |     | 1 |   |   | 1     | fresh male                                     |
| Edwards' Fritillary       |                    |    | 1 |   | 1  |     |   | 1 |   | 3     |                                                |
| Gorgone Checkerspot       |                    |    | 1 |   |    |     |   |   |   | 1     | observed on hilltop                            |
| Silvery Checkerspot       |                    |    |   |   |    |     |   | 1 |   | 1     | fresh male, county record                      |
| Pearl Crescent            |                    |    |   |   |    | 1   |   | 2 |   | 3     |                                                |
| Question Mark             |                    |    |   |   |    |     |   | 1 |   | 1     | captured in baited butterfly trap              |
| Mourning Cloak            |                    |    |   |   | 1  |     |   | 1 |   | 2     | captured in baited butterfly trap              |
| Red Admiral               |                    |    |   |   | 1  | 2   | 2 | 2 |   | 7     | captured most in baited butterfly traps        |
| Painted Lady              |                    |    | 1 |   |    |     |   |   |   | 1     |                                                |
| Hackberry Emperor         |                    |    |   |   | 1  |     |   | 1 |   | 2     | captured in baited butterfly trap              |
| Little Wood-Satyr         |                    |    |   |   | 10 | 20+ |   |   |   | 30+   | captured 3 in baited butterfly trap at site #5 |
| Common Wood-Nymph         |                    |    |   |   |    |     |   | 1 |   | 1     | fresh male                                     |
| Common Checkered Skipper  |                    |    | 1 |   |    | 1   |   |   |   | 2     |                                                |

\*No butterflies observed at this site on June 28.

**Table 4. List of butterflies found on nine survey sites at Badlands National Park during August 2, 2004.**

| COMMON NAME              | SURVEY SITE NUMBER |    |    |   |     |   |    |    |    | TOTAL | COMMENTS                                         |
|--------------------------|--------------------|----|----|---|-----|---|----|----|----|-------|--------------------------------------------------|
|                          | 1                  | 2* | 3* | 4 | 5   | 6 | 7* | 8* | 9* |       |                                                  |
| Cabbage Butterfly        |                    |    |    |   | 2   |   |    |    |    | 2     |                                                  |
| Clouded Sulphur          | 3                  |    |    | 1 |     |   |    |    |    | 4     |                                                  |
| Orange Sulphur           | 4                  |    |    | 6 | 3   |   |    |    |    | 13    |                                                  |
| Purplish Copper          |                    |    |    |   | 1   |   |    |    |    | 1     |                                                  |
| Juniper Hairstreak       |                    |    |    |   |     | 1 |    |    |    | 1     | nectaring on goldenrod                           |
| Gray Hairstreak          |                    |    |    |   |     | 1 |    |    |    | 1     | nectaring on wooly vervain                       |
| Reakirt's Blue           |                    |    |    |   |     | 1 |    |    |    | 1     |                                                  |
| Melissa Blue             | 5                  |    |    | 3 | 2   |   |    |    |    | 10    |                                                  |
| Pearl Crescent           |                    |    |    | 4 |     |   |    |    |    | 4     |                                                  |
| California Tortoiseshell |                    |    |    |   | 1   |   |    |    |    | 1     | captured in baited butterfly trap, county record |
| Weidemeyer's Admiral     |                    |    |    |   | 3   |   |    |    |    | 3     |                                                  |
| Hackberry Emperor        |                    |    |    |   | 2   |   |    |    |    | 2     | captured in baited butterfly trap                |
| Common Wood-Nymph        | 1                  |    |    |   | 1   |   |    |    |    | 2     | worn condition                                   |
| Common Checkered Skipper | 2                  |    |    | 3 | 10+ | 6 |    |    |    | 21+   | common at site #5                                |

\* Did not survey these areas during this period due to adverse weather.

**Table 5. List of butterflies found on nine survey sites at Badlands National Park during August 30 and 31, 2004.**

| COMMON NAME              | SURVEY SITE NUMBER |   |     |   |     |     |   |   |     | TOTAL | COMMENTS                                                        |
|--------------------------|--------------------|---|-----|---|-----|-----|---|---|-----|-------|-----------------------------------------------------------------|
|                          | 1                  | 2 | 3   | 4 | 5   | 6   | 7 | 8 | 9   |       |                                                                 |
| Western White            | 1                  |   | 1   |   |     |     |   | 2 |     | 4     | male in fresh condition                                         |
| Clouded Sulphur          | 2                  | 1 | 3   | 2 | 1   | 1   | 2 | 4 | 2   | 18    |                                                                 |
| Orange Sulphur           | 1                  |   | 1   | 2 |     | 1   | 2 | 3 | 3   | 13    |                                                                 |
| Reakirt's Blue           |                    |   | 1   |   |     |     |   |   |     | 1     |                                                                 |
| Melissa Blue             | 3                  | 2 | 15+ | 2 |     |     | 1 | 1 | 4   | 28    |                                                                 |
| Lupine Blue              | 2                  |   | 3   |   |     |     |   |   |     | 5     |                                                                 |
| Edwards' Fritillary      |                    |   | 1   |   | 1   |     |   |   |     | 2     | worn condition                                                  |
| Pearl Crescent           |                    |   | 6   |   |     | 1   | 4 | 6 | 2   | 19    |                                                                 |
| Viceroy                  |                    |   |     | 1 |     |     |   |   | 1   | 2     |                                                                 |
| Common Checkered Skipper | 2                  |   | 6   | 2 | 2   |     |   | 2 | 3   | 17    |                                                                 |
| Least Skipper            |                    |   |     |   | 2   |     |   |   | 2   | 4     | fresh condition                                                 |
| Uncas Skipper            | 1                  |   |     |   |     |     |   |   |     | 1     | female in slightly worn condition                               |
| Western Branded Skipper  | 6                  | 2 | 10+ | 6 | 10+ | 10+ | 2 | 1 | 6   | 53    | common and in fresh condition, county record at sites #8 and #9 |
| Leonard's Skipper        | 10+                | 6 | 10+ | 6 | 10+ | 10+ | 4 | 3 | 10+ | 69+   | common and in fresh condition                                   |

**Table 6.** Number of butterflies found on nine sites at Badlands National Park during June 2-4, June 28 and 29, August 2, and August 30 and 31.

| COMMON NAME               | SITE NUMBER |          |           |           |           |           |           |           |           | TOTAL |
|---------------------------|-------------|----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-------|
|                           | 1           | 2        | 3         | 4         | 5         | 6         | 7         | 8         | 9         |       |
| Eastern Tiger Swallowtail |             |          |           | 1         |           |           |           |           |           | 1     |
| Two-tailed Swallowtail    | 3           |          |           |           |           |           |           |           | 1         | 4     |
| Western White             | 1           |          | 1         |           |           |           |           | 2         |           | 4     |
| Cabbage White             |             |          |           |           | 2         |           |           |           |           | 2     |
| Olympia Marble            |             |          | 5         | 2         |           |           |           |           |           | 7     |
| Clouded Sulphur           | 8           | 1        | 9         | 6         | 2         | 3         | 2         | 5         | 6         | 42    |
| Orange Sulphur            | 5           |          | 2         | 10        | 3         | 1         | 3         | 3         | 3         | 30    |
| Gray Copper               |             |          |           |           |           |           |           |           | 2         | 2     |
| Purplish Copper           |             |          |           |           | 1         |           |           |           |           | 1     |
| Acadian Hairstreak        |             |          |           |           |           |           |           |           | 1         | 1     |
| Juniper Hairstreak        |             |          | 6         | 2         | 3         | 13        | 3         |           |           | 27    |
| Gray Hairstreak           |             |          |           |           |           | 2         |           |           |           | 2     |
| Reakirt's Blue            |             |          | 1         |           |           | 1         |           |           |           | 2     |
| Melissa Blue              | 8           | 2        | 24+       | 11        | 2         | 4         | 1         | 3         | 10        | 63+   |
| Lupine Blue               | 2           |          | 3         |           |           |           |           |           |           | 5     |
| Variegated Fritillary     |             |          | 2         | 2         |           | 1         |           |           | 1         | 6     |
| Manitoba Fritillary       |             |          |           |           |           |           | 1         |           |           | 1     |
| Edwards' Fritillary       |             | 5        | 42+       | 15        | 11        | 10+       | 5         | 11+       | 6         | 105+  |
| Gorgone Checkerspot       |             |          | 1         |           |           |           |           |           |           | 1     |
| Silvery Checkerspot       |             |          |           |           |           |           |           | 1         |           | 1     |
| Pearl Crescent            |             |          | 6         | 5         |           | 4         | 4         | 8         | 2         | 29    |
| Question Mark             |             |          |           |           |           |           |           | 1         |           | 1     |
| California Tortoiseshell  |             |          |           |           | 1         |           |           |           |           | 1     |
| Mourning Cloak            |             |          |           |           |           |           |           | 1         |           | 1     |
| Milbert's Tortoiseshell   |             |          |           |           |           | 1         |           |           |           | 1     |
| Red Admiral               |             |          |           |           | 2         | 5         | 2         | 2         |           | 11    |
| Painted Lady              |             |          | 1         |           |           | 4         |           |           |           | 5     |
| Viceroy                   |             |          |           | 1         |           |           |           |           | 1         | 2     |
| Weidemeyer's Admiral      |             |          |           |           | 4         |           |           |           |           | 4     |
| Hackberry Emperor         |             |          |           |           | 3         |           |           | 1         |           | 4     |
| Little Wood-Satyr         |             |          |           |           | 10        | 20+       |           |           |           | 30+   |
| Common Wood-Nymph         | 1           |          |           |           | 1         |           |           | 1         |           | 3     |
| Silver-spotted Skipper    |             |          |           |           |           | 2         |           |           |           | 2     |
| Common Checkered Skipper  | 4           |          | 7         | 5         | 12+       | 8         |           | 2         | 3         | 41+   |
| Common Sootywing          |             |          | 1         |           |           | 1         |           |           |           | 2     |
| Least Skipper             |             |          |           |           | 2         |           |           |           | 2         | 4     |
| Uncas Skipper             | 1           |          |           |           |           |           |           |           |           | 1     |
| Western Branded Skipper   | 6           | 2        | 10+       | 6         | 10+       | 2         | 1         | 6         |           | 43+   |
| Leonard's Skipper         | 10+         | 6        | 10+       | 6         | 10+       | 10+       | 4         | 3         | 10+       | 69+   |
| Dusted Skipper            |             |          |           |           |           |           |           |           | 1         | 1     |
| Strecker's Giant Skipper  |             |          | 1         |           |           |           |           | 1         |           | 2     |
| <b>TOTAL SPECIES/SITE</b> | <b>11</b>   | <b>5</b> | <b>18</b> | <b>13</b> | <b>18</b> | <b>18</b> | <b>10</b> | <b>17</b> | <b>14</b> |       |

**Table 7. List of butterflies found at Badlands National Park by county and observer.**

a--present survey, b--Spring 1989 survey by G. Marrone, P. Opler, and R. Stanford,  
 c--M. Lutz and J. Zarki, d--J. Weidmann, e--R. Langston (1997 Season Summary).  
 (a\*) – indicates a voucher specimen deposited at BNP museum.

| SPECIES                   | JACKSON | PENNINGTON | SHANNON          |
|---------------------------|---------|------------|------------------|
| Anise Swallowtail         |         | c          |                  |
| Eastern Tiger Swallowtail |         | a,c,d      |                  |
| Two-tailed Swallowtail    | a,c     | c,         | a                |
| Checkered White           | b,c     | c,d        |                  |
| Western White             | a,c     | c          | a                |
| Cabbage White             | c       | a,c,d      |                  |
| Olympia Marble            | c       | a*,b,c     | b                |
| Clouded Sulphur           | a,b,c   | a,b        | a,b              |
| Orange Sulphur            | a,c     | a,c,d,     | a                |
| Dog Face                  |         | c          |                  |
| Sleepy Orange             |         | e          |                  |
| Dainty Sulphur            | c       | c          |                  |
| Gray Copper               |         | c,d        | a                |
| Bronze Copper             |         | d          |                  |
| Ruddy Copper              |         | c          |                  |
| Purplish Copper           |         | a*         |                  |
| Coral Hairstreak          |         | c          | m                |
| Acadian Hairstreak        |         |            | a*-county record |
| Striped Hairstreak        |         | c,d        |                  |
| Juniper Hairstreak        | b       | a,b,c,d    | a,b              |
| Gray Hairstreak           | c       | a*,c       | b                |
| Reakirt's Blue            |         | a*,c       |                  |
| Eastern Tailed-Blue       | c       | d          |                  |
| Spring Azure              |         |            | b                |
| Silvery Blue              | b       | b          | b                |
| Melissa Blue              | a,b,c   | a,b,c,d    | a,b              |
| Lupine Blue               | a*,b,c  | a*,b       |                  |
| Variegated Fritillary     | b,c     | a,b,c      | a                |
| Great Spangled Fritillary | c       |            |                  |
| Manitoba Fritillary       |         |            | a*               |
| Regal Fritillary          | c       | d          |                  |
| Edwards' Fritillary       | a,c     | a,b,c,d    | a                |
| Gorgone Checkerspot       |         | a,c        |                  |
| Silvery Checkerspot       |         |            | a*-county record |
| Sagebrush Checkerspot     | c       |            |                  |
| Pearl Crescent            | c       | a,b,c,d    | a,b              |
| Question Mark             |         | c          | a                |

**Table 7. (continued).**

| SPECIES                  | JACKSON | PENNINGTON       | SHANNON          |
|--------------------------|---------|------------------|------------------|
| California Tortoiseshell |         | a*-county record |                  |
| Mourning Cloak           | c       | a,c              | a,b              |
| Milbert's Tortoiseshell  | c       | a                |                  |
| Red Admiral              | a,b,c   | a,b,c,d          | a,b              |
| American Lady            |         | d                |                  |
| Painted Lady             | c       | a,b,c            | b                |
| West Coast Lady          | c       |                  |                  |
| Viceroy                  |         | a,c              | a                |
| Weidemeyer's Admiral     |         | a*,c,d           |                  |
| Goatweed Butterfly       |         |                  | c                |
| Hackberry Emperor        |         | a,c              | a*               |
| Little Wood-Satyr        |         | a,c              |                  |
| Prairie Ringlet          | c       | b,d              |                  |
| Common Wood-Nymph        | a       | a,c              | a                |
| Monarch                  |         | a,c,d            |                  |
| Silver-spotted Skipper   |         | a,c,d            | b                |
| Perius Duskywing         | c       |                  |                  |
| Common Checkered Skipper | a,b,c   | a,b,c,d          | a                |
| Common Sootywing         | c       | a,b,c,d          | b                |
| Least Skipper            |         | a                | a,c              |
| Uncas Skipper            | a*      |                  |                  |
| Western Branded Skipper  | a*      | a                | a*-county record |
| Leonard's Skipper        | a*      | a,c              | a*,c             |
| Pahaska Skipper          |         | c,d              |                  |
| Sachem                   | c       |                  |                  |
| Tawny-edged Skipper      |         | d                |                  |
| Delaware Skipper         |         | c                |                  |
| Hobomok Skipper          |         | c                |                  |
| Kiowah Skipper           |         | c                |                  |
| Dusted Skipper           |         | b                | a*,b             |
| Common Roadside Skipper  |         | b                |                  |
| Strecker's Giant Skipper |         | a*               | a                |

Marilyn Lutz and Joe Zarki, both past employees of BNP, conducted Fourth of July Butterfly Counts during 1991-94. These counts covered an area around Sage Creek Wilderness Area in Pennington County. Their observations are reported in two publications - the Xerces Society's (1991 and 1992) and the North American Butterfly Association (1993 and 1994). Many of their other butterfly sightings were from Cedar Pass NPS housing area located in Jackson County near the Park headquarters (M. Lutz, pers. comm.).

A small collection of butterflies taken at BNP by Lutz and Zarki are located in the BNP museum. This author viewed the collection and found several misidentifications. These misidentified specimens include a female Purplish Copper, *Lycaena helloides*, mislabeled as an American Copper, *Lycaena phlaeas*; two male specimens of Edwards' Fritillary, *Speyeria edwardsii*, mislabeled as Coronis Fritillary, *Speyeria coronis*; and a female Manitoba Fritillary, *Speyeria aphrodite manitoba*, mislabeled as Atlantis Fritillary, *Speyeria atlantis*.

In 1998, Jerome Weidmann conducted the Fourth of July Butterfly Count. He covered only a portion of the original survey area but added three new species to the BNP list. Several butterfly records for BNP are also mentioned in the annual Season Summary of the Lepidopterists' Society and are included in this report.

Presently, sixty-nine butterfly species are documented for BNP (Table 7). A list of their common and scientific names is found in Appendix B. Twelve butterfly species found in areas adjacent to BNP that may eventually be found to occur within the Park boundaries are listed in Appendix C.

## RECOMMENDATIONS

1. Protect and/or enhance native prairie habitats important to butterflies. **Management for prairie ecosystem biodiversity would greatly benefit all native butterfly species.** Moffat and McPhillips (1993) discuss several management methods, including controlled burns, mowing, and grazing, specific for prairie endemic butterfly species that would be applicable to BNP.
2. Control the encroachment of non-native grasses into native prairie habitats, especially smooth brome grass and crested wheatgrass.
3. Protect spring sources and their associated habitats from excessive bison trampling with construction of fenced exclosures.
4. Periodically (at least once in every 4 years) monitor butterfly abundance and diversity.
5. Comments and recommendations specific to each of the nine survey sites include:

**(A). Site #1 (Castle Trail and Old Northeast Road junction)** – This large area, with its mixture of short and mixed-grass prairie and small badlands formations, was the only site where the Uncas Skipper was found. Canada thistle and efforts to control this invasive exotic plant may threaten the area.



Figure 3. Photo of site #1 taken on eastern side of Old Northeast Road showing dry “wetland” area.

**(B). Site #2 (Homestead Overlook Area)** – This area of rolling gravelly hills with short and mid-grass prairie has an abundance of yucca, the larval hostplant for the Strecker’s Giant Skipper. A controlled burn in 2003 and a small man-caused accidental fire in 2004 may help prevent invasion of smooth brome grass into this area.



Figure 4. Photo of site #2 showing abundance of yucca.

**(C). Site #3 (Sage Creek Basin south of Roberts Prairie Dog Town)** – Eighteen butterfly species were observed on this site which consisted of two large buttes, a woody draw, and short to mid-grass native prairie with abundant flowering forbs. This unique undisturbed site is within the Badlands Wilderness Area.



Figure 5. Photo of Sage Creek Basin south of Roberts Prairie Dog Town showing woody draws in the background.

**(D). Site #4 (Sage Creek)** – (Photo not available) – This site includes a small portion of Sage Creek bottomland just north of the entrance to Sage Creek Campground and two small, spring-fed woody draws that had several beaver dams. Beaver were present until late summer when ponds dried up.

**(E). Site #5 (North CCC Spring)** – (Photo not available) – Eighteen butterfly species were found at this site, including the California Tortoiseshell. This site has a large spring area in a woody draw. Bison have trampled much of the area around the spring source and may eventually cause the spring to become less active. Area should be fenced to exclude the bison. Canada thistle has invaded a portion of the spring area.

**(F). Site #6 (CCC Spring)** –Eighteen butterfly species were found at this large wooded area containing several springs. A small area of one spring source was fenced to exclude bison. Canada thistle has invaded much of the wet areas.



Figure 6. Photo shows large wooded area at CCC Spring with bison at water tank.

**(G). Site #7 (Sheep Mountain Table and Spring)** – This large flat butte with its rugged badlands and cedar covered draws is the only site where the Manitoba Fritillary was found during this survey. The small spring near mile marker #6 made up the main portion of this survey site.



Figure 7. Photo showing location of spring (just over lip of draw in foreground) near mile marker #6 on top of Sheep Mountain Table.

**(H). Site #8 (White River)** –The Edward’s Fritillary was common at this site in early June; many nectaring on Russian olive found along the banks of the river.



Figure 8. Photo showing portion of White River bottomland at site #8.

**(I). Site #9 (Fog Creek)** –This unique site, with its beaver created wetlands and adjacent mid to short-grass prairies, was home of three butterfly species not found at other areas. The larvae of the Gray Copper feeds on curly dock while the Acadian Hairstreak feeds on willow; both plants common to the wetland area. The Dusted Skipper prefers mid-grass prairies where larvae feed on little bluestem. Canada thistle threatens large portions of the wetland area.



Figure 9. Photo of large wetland created by beaver dams at Fog Creek site.

## **ACKNOWLEDGMENTS**

This project was supported by funds provided by the National Park Service, Badlands National Park and the Badlands Natural History Association. I would like to thank Eddie Childers, wildlife biologist and Julie Johndreau, education specialist, at Badlands National Park, for suggestions for collection sites and assistance in the field.

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**Von Loh, J., D.Cogan, D. Faber-Langendoen, D. Crawford, and M.J. Pucherelli. 1999.** USGS-NPS Vegetation Mapping Program, Badlands National Park, South Dakota. Technical Memorandum No. 8260-00-02, U.S. Dept. of Interior, Denver, CO.

**Appendix A.** A brief synopsis of each target species is included:

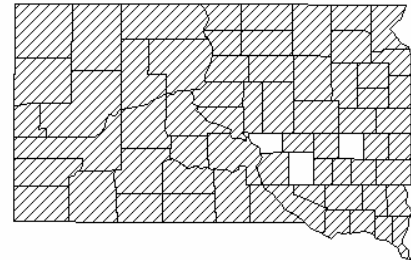
## **Regal Fritillary**

*Speyeria idalia*

**Description:** Wingspan: 2.9-3.8 inches. Females are larger and darker than males. The upperside of the forewing is reddish orange with black and white spots. Hindwings are velvety black with two rows of spots; both rows of spots are cream-colored in the female, outer row rust-orange in the male. The underside of the hindwing is brown with large silver spots.

**Similar Species:** Only large fritillary in South Dakota with black hindwings.

**Distribution and Habitat:** Historical range extended from New England to North Carolina and westward to eastern Colorado, Wyoming, and southeastern Montana. No longer occurs in much of New England and rapidly declining over much of its range except the prairie states. Common in northeastern South Dakota in tall-grass prairie sites near marshes, undisturbed mixed-grass prairie areas along Missouri River breaks, and the Fort Pierre National Grassland. Generally restricted to areas of the state where sufficient native grasslands exist.



**Early Stages:** The caterpillar is yellowish brown with black markings and yellowish bands; black dorsal spines have silvery white bases.

**Larval Host Plants:** Various species of violets, including prairie violet and Nuttall's violet.

**Adult Energy Sources:** Nectar from a wide variety of flowers, including purple coneflower, gayfeather, hoary vervain, thistles, wild bergamot, alfalfa, and milkweeds. Whorled milkweed, near Oahe Dam in Stanley County, was noted to be a favored nectar source in 1983.

**Flight Period:** One brood, with flight dates ranging from June 12 to September 16. Males appear in mid-June and fly until August; female flight period is early July to mid-September. After hatching, the unfed caterpillar overwinters on the ground beneath leaves.

**General Comments:** Population size seems to fluctuate from year to year. Large tracts of native prairie with abundant wildflowers, such as Samuel Ordway Prairie managed by The Nature Conservancy near Leola, S.D., are needed to protect this species from further decline. The South Dakota Natural Heritage Program is currently monitoring this species.

**Special References:** Kelly, L., and D.M. Debinski. 1998. Relationship of host plant density to size and abundance of the Regal Fritillary *Speyeria idalia* Drury (Nymphalidae). J. Lepid. Soc. 52(3):262-276.

Royer, R.A., and G.M. Marrone. 1992. Conservation status of the Regal Fritillary (*Speyeria idalia*) in North and South Dakota. A report to the U.S. Dept. of Interior, U.S. Fish and Wildlife Service, Denver, CO.

## Appendix A. (continued).

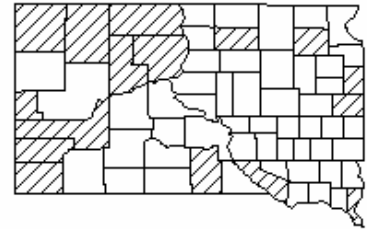
### Ottoe Skipper

*Hesperia ottoe*

**Description:** Wingspan: 1.20-1.55 inches. Uppersides are bright orange. Males have narrow diffuse dark borders and a black stigma in the forewing that contains gray-brown scales. The female has wider more diffuse dark borders and several yellowish white spots in the forewing. The underside of the hindwing is pale orange with no markings in the male and occasionally a faint row of spots in the female.

**Similar Species:** Pawnee Skipper flies in August-September, and the male has yellow scales in the stigma. Dakota Skipper is smaller with darker undersides.

**Distribution and Habitat:** Very local and generally uncommon to rare throughout South Dakota and its entire range. Found in scattered, relatively undisturbed, mixed-grass to tall-grass prairie sites such as the area below Fort Randall Dam, Charles Mix County, and the Crystal Springs Preserve, managed by The Nature Conservancy, near Clear Lake, Deuel County.



**Early Stages:** The caterpillar is greenish brown; head dark brown.

**Larval Host Plants:** Native prairie grasses, including little bluestem, big bluestem, and sideoats grama.

**Adult Energy Sources:** Nectar from many flowers, but especially those of coneflowers, gayfeathers, asters, milkweeds, alfalfa, leadplant, black-eyed Susan, and sunflowers.

**Flight Period:** One brood from late June to August with peak flight in mid-July; dates extend from June 23 to August 4. Overwinters as a partially grown caterpillar in a leaf shelter.

**General Comments:** Males perch on tall flowers such as purple coneflowers and thistles to watch for females. The South Dakota Natural Heritage Program monitors the Ottoe Skipper. Native prairie sites with abundant nectar sources need protection in order for this species to survive.

## Appendix A. (continued).

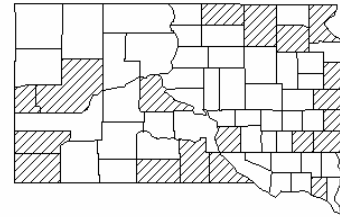
### Arogos Skipper

*Atrytone arogos*

**Description:** Wingspan: 1.10-1.25 inches. Uppersides are yellow-orange with wide dark borders. The female has broader dark wing margins that diffuse into, and nearly cover over, the orange in the hindwing. Males lack a stigma. The underside of the hindwing is golden yellow with pale veins.

**Similar Species:** Delaware Skipper is brighter orange and has a more distinct border and dark veins.

**Distribution and Habitat:** Local and occasionally common throughout South Dakota but may be absent from northwestern corner. Found in relatively undisturbed prairies and grasslands such as Mirror Lake Game Production Area, Lawrence County, and South Scalp Creek Recreation Area, near Fort Randall Dam, Gregory County.



**Early Stages:** The caterpillar is light green with a dark green dorsal stripe; head gray with orange streaks.

**Larval Host Plants:** Big bluestem and little bluestem. Caterpillars feed on leaves and live in nests constructed of two leaves sewn together with silk.

**Adult Energy Sources:** Purple coneflower, prairie coneflower, blackeyed Susan, and thistles.

**Flight Period:** One brood with peak flight in July; dates extend from June 25 to July 26. Overwinters as a partially grown caterpillar in a leaf cocoon about three feet above the ground.

**General Comments:** Males perch near host plants in mid-afternoon to watch for females. The South Dakota Natural Heritage Program is currently monitoring this species.

**Special References:** Royer, R.A., and G.M. Marrone. 1992. Conservation status of the Arogos Skipper (*Atrytone arogos*) in North and South Dakota. A report to the U.S. Dept. of the Interior, U.S. Fish and Wildlife Service, Denver, CO.

found at Badlands National Park.

| COMMON NAME               | SCIENTIFIC NAME                    |
|---------------------------|------------------------------------|
| Anise Swallowtail         | <i>Papilio zelicaon nitra</i>      |
| Eastern Tiger Swallowtail | <i>Papilio glaucus</i>             |
| Two-tailed Swallowtail    | <i>Papilio multicaudatus</i>       |
| Checkered White           | <i>Pontia protodice</i>            |
| Western White             | <i>Pontia occidentalis</i>         |
| Cabbage White             | <i>Pieris rapae</i>                |
| Olympia Marble            | <i>Euchloe olympia</i>             |
| Clouded Sulphur           | <i>Colias philodice</i>            |
| Orange Sulphur            | <i>Coilas eurytheme</i>            |
| Dogface                   | <i>Zerene cesonia</i>              |
| Sleepy Orange             | <i>Eurema nicippe</i>              |
| Dainty Sulphur            | <i>Nathalis iole</i>               |
| Gray Copper               | <i>Lycaena dione</i>               |
| Bronze Copper             | <i>Lycaena hyllus</i>              |
| Ruddy Copper              | <i>Lycaena rubidus longi</i>       |
| Purplish Copper           | <i>Lycaena helloides</i>           |
| Coral Hairstreak          | <i>Satyrium titus</i>              |
| Acadian Hairstreak        | <i>Satyrium acadium</i>            |
| Striped Hairstreak        | <i>Satyrium liparops aliparops</i> |
| Juniper Hairstreak        | <i>Callophrys gryneus siva</i>     |
| Gray Hairstreak           | <i>Strymon melinus franki</i>      |
| Reakirts' Blue            | <i>Hemiargus isola</i>             |
| Eastern Tailed-Blue       | <i>Everes comyntas</i>             |
| Spring Azure              | <i>Celastrina ladon sidara</i>     |
| Silvery Blue              | <i>Glaucopsyche lygdamus oro</i>   |
| Melissa Blue              | <i>Lycaeides melissa</i>           |
| Lupine Blue               | <i>Icaricia lupini</i>             |
| Variegated Fritillary     | <i>Euptoieta claudia</i>           |
| Great Spangled Fritillary | <i>Speyeria cybele</i>             |
| Manitoba Fritillary       | <i>Speyeria aphrodite manitoba</i> |
| Regal Fritillary          | <i>Speyeria idalia</i>             |
| Edwards' Fritillary       | <i>Speyeria edwardsii</i>          |
| Gorgone Checkerspot       | <i>Chlosyne gorgone carlota</i>    |
| Pearl Crescent            | <i>Phyciodes tharos</i>            |
| Silvery Checkerspot       | <i>Chlosyne nycteis</i>            |
| Sagebrush Checkerspot     | <i>Chlosyne acastus</i>            |
| Pearl Crescent            | <i>Phyciodes tharos</i>            |
| Mourning Cloak            | <i>Nymphalis antiopa</i>           |
| Milbert's Tortoiseshell   | <i>Nymphalis milberti</i>          |
| Red Admiral               | <i>Vanessa atalanta rubria</i>     |

**Appendix B. (continued).**

| COMMON NAME              | SCIENTIFIC NAME                          |
|--------------------------|------------------------------------------|
| American Lady            | <i>Vanessa virginiensis</i>              |
| Painted Lady             | <i>Vanessa cardui</i>                    |
| West Coast Lady          | <i>Vanessa annabella</i>                 |
| Viceroy                  | <i>Limenitis archippus</i>               |
| Weidemeyer's Admiral     | <i>Limenitis weidemeyerii oberfoelli</i> |
| Goatweed Butterfly       | <i>Anaea andria</i>                      |
| Hackberry Emperor        | <i>Asterocampa celtis celtis</i>         |
| Little Wood-Satyr        | <i>Megisto cymela</i>                    |
| Prairie Ringlet          | <i>Coenonympha tullia benjamini</i>      |
| Common Wood-Nymph        | <i>Cercyonis pegala nephele</i>          |
| Monarch                  | <i>Danaus plexippus</i>                  |
| Silver-spotted Skipper   | <i>Epargyreus clarus</i>                 |
| Persius Duskywing        | <i>Erynnis persius fredericki</i>        |
| Common Checkered Skipper | <i>Pyrgus communis</i>                   |
| Common Sootywing         | <i>Pholisora catullus</i>                |
| Least Skipper            | <i>Ancyloxypha numitor</i>               |
| Uncas Skipper            | <i>Hesperia uncas</i>                    |
| Western Branded Skipper  | <i>Hesperia colorado idaho</i>           |
| Leonard's Skipper        | <i>Hesperia leonardus pawnee</i>         |
| Pahaska Skipper          | <i>Hesperia pahaska</i>                  |
| Sachem                   | <i>Atalopedes campestris</i>             |
| Tawny-edged Skipper      | <i>Polites themistocles</i>              |
| Delaware Skipper         | <i>Anatrytone logan lagus</i>            |
| Hobomok Skipper          | <i>Poanes hobomok</i>                    |
| Kiowah Skipper           | <i>Euphyes vestris kiowah</i>            |
| Dusted Skipper           | <i>Atrytonopsis hianna</i>               |
| Common Roadside Skipper  | <i>Amblyscirtes vialis</i>               |
| Strecker's Giant Skipper | <i>Megathymus streckeri leussleri</i>    |

**Appendix C.** Butterflies found in counties adjacent to Badlands National Park that may occur within the Park boundaries.

| COMMON NAME               | SCIENTIFIC NAME                   | COUNTY WHERE PRESENTLY FOUND |
|---------------------------|-----------------------------------|------------------------------|
| Black Swallowtail         | <i>Papilio polyxenes asterius</i> | Bennett, eastern Pennington  |
| Old World Swallowtail     | <i>Papilio machaon bairdii</i>    | eastern Pennington, Shannon  |
| Queen Alexandra's Sulphur | <i>Colias alexandra</i>           | Jackson                      |
| Northern Crescent         | <i>Phyciodes cocyta</i>           | Jackson                      |
| Gray Comma                | <i>Polygonia progne</i>           | Shannon                      |
| Mountain Emperor          | <i>Asterocampa antonia</i>        | Shannon                      |
| Uhler's Arctic            | <i>Oeneis uhleri varuna</i>       | Shannon                      |
| Small Checkered Skipper   | <i>Pyrgus scriptura</i>           | Jackson                      |
| Rhesus Skipper            | <i>Polites rhesus</i>             | Bennett, Jackson             |
| Crossline Skipper         | <i>Polites origenes rhena</i>     | Shannon                      |
| Long Dash                 | <i>Polites mystic dacotah</i>     | Mellette, Shannon            |
| Oslar's Roadside Skipper  | <i>Amblyscirtes oslari</i>        | Mellette, Shannon            |