Dakota Skipper Conservation Guidelines

Hesperia dacotae (Skinner)

(Lepidoptera: Hesperiidae)

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U.S. Fish and Wildlife Service
Twin Cities Field Office

For further information or to comment on these conservation guidelines, contact Phil Delphey, U.S. Fish and Wildlife Service, Bloomington, Minnesota. This document is also available on the internet at http://midwest.fws.gov/endangered/insects/dask-cons-guid.pdf.

RECOMMENDED CONSERVATION MEASURES

Dakota skipper is currently distributed among a number of patches of suitable habitat. The structure and viability of these populations may depend on the size of the habitat patches, the quality of habitat within the patches, connectivity among the patches (e.g., see Schmitt 2003:56), and habitat management within patches. We recommend considering these and the following factors when planning for the conservation of any Dakota skipper population.

Prescribed Fire

- Divide the Dakota skipper habitat at the site into as many burn units as feasible.
- Use the maximum length fire return interval that is adequate to maintain or restore high-quality native prairie habitat on each unit. Allow at least 3 years to elapse without fire (i.e., minimum 4-year rotations) before re-burning any area. Longer intervals may be necessary where Dakota skipper populations are small and/or isolated.
- Never attempt to burn an entire Dakota skipper habitat patch in any single year.
- Allow fires to burn in a patchy ("fingering") pattern within units – i.e., do not make a concerted effort to burn 'every square inch' and leave fire "skips" unburned. Burning under cool or damp conditions may increase survival of insects present in the litter layer within the burned unit (Panzer 2003).
- Consider the use of proactive techniques to increase the patchiness of fires, especially if habitats that would serve as sources of recolonizing adults are small or greater than 0.5 km from the burn area.
- Conduct pre-burn surveys and evaluate other applicable information to understand the distribution and relative abundance of Dakota skippers within and among burn units. Poor weather or other conditions (e.g., persistent high winds) may reduce the likelihood of adequate survey conditions during the flight period in any given year. Therefore, it may be prudent to plan surveys for at least two consecutive years before a planned burn.
- Spring burns should be conducted as early as possible to limit larval mortality – in southwest Minnesota, for example, burns on or before May 1 may be early enough to ensure that Dakota skipper larvae have not yet emerged from their buried shelters. Dakota skipper larvae are less vulnerable to fire before they have resumed activity in the spring and after they have ceased activity in the fall (i.e., when they are in shelters at or below the ground surface). Moreover, late spring burns may delay flowering of early and midsummer blooming forbs, thereby limiting nectar sources for Dakota skippers during their flight period (Dana 1991:56). Fall burns, however, may result in higher soil temperatures than early spring burns and greater mortality of larvae, even after they have retreated for the season to shelters at or below the ground surface. In addition, the removal of plant material by fall burns may expose larvae to greater temperature extremes during winter, which may reduce their survival.

- If fires may need to be conducted in late spring to address a particular management need (e.g., control of smooth brome, *Bromus inermis*), other precautionary measures will be especially important. These include the division of occupied Dakota skipper habitat into multiple burn units, ensuring that fires stay within planned burn areas, maximizing the number of years between fires, and reducing fuel loads (e.g., haying) in Dakota skipper habitat in units where frequent or intense fire is not necessary.
- If a site is managed with prescribed fire, subdivide Dakota skipper habitat into rotational burn units (see above) even if all burning will likely be done when Dakota skippers are in sub-surface shelters. Other species of butterflies that rely on native prairie (e.g., Iowa skipper, *Atrytone arogos iowa*, and Poweshiek skipperling, *Oarisma poweshiek)* may still be vulnerable to high fire mortality even during early spring fires because these species' diapausing (dormant) larvae are present above the ground surface (e.g., in the foliage). Moreover, subsurface temperatures may reach lethal levels where fuel loads are especially high (see below).
- If you plan to change the configuration of burn units or make other changes to your prescribed fire plan, review the location and timing of recent burns to understand the potential effects of these previous fires on the current abundance and distribution of Dakota skippers on the management area.
- Be sure to consider any other rare, prairie-dependent species present on sites when designing burn plans.
- Plan for escape of fires out of burn units if that is a reasonable possibility. That is, plan for the contingency that a prescribed fire will escape a burn unit and burn one or more additional units that contain Dakota skipper habitat. If this is reasonably likely, determine how the Dakota skipper population would persist despite such a scenario.
- High fuel levels increase the likelihood that fires will kill Dakota skippers, even during early spring burns when larvae are still in their subsurface shelters. Therefore, consider reducing fuel levels (e.g., by haying the previous fall) before conducting burns where fuel levels seem to be high.

Haying

The guidelines below also apply to mechanical collection of native prairie seed.

- Hay or mow after mid-August to reduce the likelihood of removing or destroying Dakota skipper eggs and to avoid removing nectar sources during the flight period. In general, hay or mow as late as feasible after mid-August to reduce the likelihood of adverse effects to any life stage.
- Leave at least 20 cm (8 inches) of stubble to provide habitat for over-wintering larvae. The ideal time to mow may be after Dakota skipper larvae have entered diapause (i.e., have become dormant in preparation for winter). The senescence of native warm-season grasses may be a good indication that Dakota skippers have entered diapause. Mowing

early in the spring during the time that burning should be conducted (see above) would also reduce the likelihood of adverse effects to Dakota skipper.

- As with annual burning, annual haying may reduce plant diversity in tallgrass prairie. Therefore, hay in alternate years or subdivide the habitat into multiple units and leave at least some of the units unhayed each year. Resting hay units may also reduce the impacts of any adverse effects that may occur from haying that is conducted early enough to adversely affect Dakota skippers or other species dependent on native prairie (e.g., Ottoe skipper, *H. ottoe*).

Grazing

- Beyond a certain level, grazing is likely to adversely affect Dakota skipper populations in proportion to its intensity because it removes nectar sources and degrades native prairie plant communities (e.g., increases coverage of invasive/non-native species), leading to a reduction in larval food plants. Therefore, limit the duration and intensity of grazing for the conservation of the Dakota skipper and the native prairie ecosystem.
- Avoid grazing regimes that remove a significant proportion of floral nectar resources during the flight period. To protect nectar resources and vegetation for egg deposition and larval food (warm season grasses) in South Dakota, "it may only be feasible to graze dry-mesic prairie slopes in the spring (April – May) before the growth of warm season grasses and forbs begins, with a minimum one-year rest period between rotations" (Skadsen 2003).
- As with haying, Skadsen (2003) also recommends that grazing never reduce stubble heights below 20 cm (8 inches) in tallgrass prairie.
- Do not graze Dakota skipper habitats for the entire season – include at least one period of rest during the growing season and do not graze a site during the same time each year.
- Purple coneflower and other important nectar species *may* be good indicators of grazing effects. For example, declines in purple coneflower may be indicative of current or pending adverse effects to Dakota skippers due to reduction in nectar sources and general degradation of the prairie plant community.
- Adverse effects may occur at lower grazing intensities in the wet-mesic prairies that Dakota skippers inhabit in parts of North Dakota and Manitoba than in the dry-mesic habitat type. Virtually all of the sites with the wet-mesic habitat type at which Dakota skippers still occur are managed with fall or late-summer haying. To ensure the persistence of Dakota skippers at these sites, they should not be grazed unless grazing methods are carefully developed that are shown to not threaten the Dakota skipper populations at these sites.

Habitat Preservation

- Whenever feasible, avoid any destruction or conversion of Dakota skipper habitats to other uses. Successful restoration of Dakota skipper habitat has not been demonstrated and butterfly species diversity is lower on restored than on remnant prairies (Shepherd and Debinski 2005). Therefore, there is no evidence to support a presumption that destroyed Dakota skipper habitat could be restored through planting or other means. Nevertheless, degraded Dakota skipper habitats may be recoverable, especially if the adverse management has not been especially intense or is recent. For example, good quality Dakota skipper habitat that is intensively grazed for one year may be likely to recover if more appropriate management is resumed and if a source population is nearby or if the species persisted on a portion of the site.

Habitat Restoration

- Restoration of destroyed (e.g., plowed) or severely degraded Dakota skipper habitat should be considered experimental and would have to take place near a remnant prairie inhabited by Dakota skippers (e.g., 250 - 500 m away) to have any chance for colonization of the restored habitat. Sites adjacent to occupied habitats or connected to occupied habitats by suitable habitat corridors would be best for any restoration experiments. Techniques to attempt restoration could consist of a variety of activities (e.g., rest from grazing, tree or brush removal, planting native species, etc.), depending on the site conditions and land-use history. Restoration experiments that involve reintroduction of native plant species should be designed to mimic the floral diversity of Dakota skipper's native prairie habitats and should emphasize Dakota skipper nectar and larval food sources, as appropriate (see Cochrane and Delphey 2002).
- Road rights-of-way containing native prairie habitat may serve as corridors for grassland butterflies (Ries & Debinski 2001), but the cooperation of the highway managers is very important to prevent untimely mowing or spraying of these areas.
- If Dakota skippers are extirpated from a site or likely once occurred there, manage the site to favor the recolonization of the species, especially if it has retained significant characteristics of Dakota skipper habitat. Depending on the quality of the habitat, recolonization may be feasible if source sites are nearby or if artificial reintroduction may become an alternative in the future. If recolonization is possible, monitor the site during the flight period to detect any Dakota skippers.

Control of Weeds and Invasive Species

- Avoid broadcast applications of pesticides or herbicides that may be harmful to Dakota skippers or their nectar plants in Dakota skipper habitat.
- Ensure that field crews recognize target weeds to avoid adverse effects to important native species.

- Manage sites to minimize the likelihood of invasion by weeds. Control methods that are necessary after invasion may have unintended consequences to Dakota skipper or other native species.

Coordinated Management

- Conduct surveys or review available data to delineate local populations and habitat. This would enable coordination and management of populations that may cross one or more management units or ownerships.
- Coordinate management activities with property owners and managers of nearby Dakota skipper habitats. For example, plan burns and other temporarily adverse management activities during years when nearby habitats will not be burned.

Survey Habitats and Monitor for Dakota Skippers

- Effective management of sites to conserve Dakota skippers depends on knowledge of the local distribution and relative abundance of Dakota skippers. Employ qualified persons to survey known and potential habitats and to monitor Dakota skipper populations. This is especially important when first devising management plans, changing management plans, and for ongoing evaluation of the effects of management on Dakota skipper populations.

Maintain Genetic Diversity of Populations

- Dakota skipper populations show signs of inbreeding (Britten & Glasford 2002). Manage Dakota skipper habitat to maximize genetically effective population sizes – i.e., the number of individuals reproducing each year. For example, do not disturb habitats during the Dakota skipper flight period, connect isolated populations, expand suitable habitat patches, etc. Consider how various management practices may affect the number of breeding adults in both the short- and long-term. For example, activities that kill Dakota skippers during larval or pupal stages will also affect the number of breeding adults.

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