Poweshiek skipperling
(Oarisma poweshiek)

5-Year Review:
Summary and Evaluation

Photo: Kelly Nail, USFWS

U.S. Fish and Wildlife Service, Midwest Region
Minnesota-Wisconsin Ecological Services Field Office
Bloomington, Minnesota

5-YEAR REVIEW

Poweshiek skipperling- *Oarisma poweshiek*

1.0 GENERAL INFORMATION

1.1 Reviewers

Lead Regional Office: Region 3, Laura Ragan (612) 713-5157

Lead Field Office: Minnesota-Wisconsin Field Office, Kelly Nail (952) 252-0092, ext. 205

Cooperating Field Offices:
Illinois/Iowa Field Office, Kristen Lundh, (309) 757-5800, ext. 215
Indiana Field Office, Lori Pruitt, (812) 334-4261, ext. 213
Michigan Field Office, Tameka Dandridge, (517) 351-8315
South Dakota Field Office, Charlene Bessken, (605) 224-8693, ext. 231

Cooperating Regional Offices:
Region 6, Craig Hansen, (303) 236-4749

1.2 Methodology used to complete the review:

Public notice was given in the Federal Register (83 FR 18075) requesting new scientific or commercial data and information that may have a bearing on the Poweshiek skipperling classification of endangered status. Pertinent data was obtained from peer reviewed literature, recent reports of prairie butterfly surveys and *ex situ* (captive rearing) work, information presented at meetings or webinars by researchers, and from data submitted by U.S. Fish and Wildlife Service Field Offices and State and Provincial natural resource agencies within the range of the species. This 5-year review was completed by Kelly Nail, Fish and Wildlife Biologist with the Minnesota-Wisconsin Ecological Services Field Office. The focus of this 5-year review is to summarize new information regarding the status of the Poweshiek skipperling, in accordance with section 4(c)(2) of the Endangered Species Act of 1973, as amended (Act).

1.3 Background:

1.3.1 FR Notice citation announcing initiation of this review:

83 FR 18075 (April 25, 2018) – Endangered and Threatened Wildlife and Plants; Initiation of 5-Year Status Reviews of Five Listed Animal Species: Dakota skipper (*Hesperia dacotae*), Higgin's eye pearlymussel (*Lampsilis higginsii*), Hine's emerald dragonfly (*Somatochlora hineana*), Niangua darter (*Etheostoma nianguae*), and Poweshiek skipperling (*Oarisma poweshiek*).

1.3.2 Listing history

Original Listing
FR notice: 83 FR 18075
Date listed: October 24, 2014
Entity listed: Poweshiek skipperling (*Oarisma poweshiek*); Species
Classification: Endangered

1.3.3 Associated rulemakings: Critical habitat final rule published on October 1, 2015 (80 FR 59247)

1.3.4 Review History: This document is the first 5-year review for the Poweshiek skipperling.

1.3.5 Species' Recovery Priority Number at start of 5-year review: 5. The "5" indicates that this species faces a high degree of threat due to the sharp and widespread declines that have resulted in the existence of only a few small populations; an ongoing threat of wildfire to the species in Canada; and a suspected unspecified threat or threats that have led to population declines and that may continue to affect remaining populations. Recovery potential is low because biological and ecological limiting factors are poorly understood. While habitat management is being conducted and the species' persistence is a high priority, threats to the species are poorly understood and at least in the near term, the species may require intensive management. While we have gained knowledge of experimental techniques, including captive rearing, there are still low numbers of Poweshiek skipperling individuals to work with in the wild.

1.3.6 Recovery Plan: None

2.0 REVIEW ANALYSIS

2.1 Application of the 1996 Distinct Population Segment (DPS) policy

2.1.1 Is the species under review a vertebrate? No

2.2 Recovery Criteria

2.2.1 Does the species have a final, approved recovery plan containing objective, measurable criteria? No

2.3 Updated Information and Current Species Status

2.3.1 Biology and Habitat

2.3.1.1 New information on the species' biology and life history:

Host Plant Research:
Since listing, work has been done to determine host plant preference, particularly since this knowledge is important in increasing captive-reared larval survival. In 2016, two host plants (prairie dropseed [*Sporobolus heterolepis*] and Pennsylvania sedge [*Carex pensylvanica*]) were offered to larvae from Michigan, and almost two thirds of the larvae did not eat and died (Runquist and Nordmeyer 2017, p. 26). Neither of these plants are present at the sites in Michigan. In an attempt to better determine host plant preference, in 2018 larvae were offered mat muhly grass (*Muhlenbergia richardsonis*), a species that Poweshiek has been observed ovipositing on at the Michigan sites (Runquist et al. 2019, p. 14). However, this was unsuccessful, with Poweshiek choosing to eat prairie dropseed (if given a choice) or eventually being moved to prairie dropseed (because no eating had occurred for 72 hours when only given mat muhly grass; Runquist et al. 2019, p. 15).

In 2017, Poweshiek skipperlings were observed ovipositing in Michigan on four different plant species (*M. richardsonis*, *M. glomerata* [marsh muhly], *C. sterilis* [dioecious sedge], and *Dasiphora fruticosa* [shrubby cinquefoil]), the latter three of which had no observed Poweshiek oviposition at the time of listing and had not previously been suggested as potential host plants (Belitz et al. 2019, p. 646). A recent observational study in Manitoba showed that Poweshiek skipperlings were observed ovipositing and then feeding on big bluestem (*Andropogon gerardii*), little bluestem (*Schizachyrium scoparium*), prairie dropseed, and mat muhly grasses (and moving between these nearby host plant species as larvae; Westwood and Henault 2019, unpaginated).

Phenology:
Advanced phenology (larvae developing faster than in natural conditions, leading to decreased overwintering survival) was a problem that arose in captive-reared larvae at the Minnesota Zoo and Assiniboine Park Zoo in the summer of 2016 (Runquist and Nordmeyer 2017, p. 26), potentially due to different microclimatic conditions in captivity relative to what the larvae would have experienced in the field. In 2016, the Minnesota Zoo allowed a subset of the early-developing larvae to develop into adults in an attempt to breed them, but this attempt was unsuccessful (Runquist and Nordmeyer 2017, pp. 28-31). The advanced phenology and decreased survival led to equipment upgrades (chilled water tables and two growth chambers) in 2017 to better mimic microclimate at the Michigan and Manitoba sites, as recorded by data loggers in the field (Runquist and Nordmeyer 2018, pp. 18-21; APZ 2018, p. 1). Advanced phenology has not appeared to be a problem for captive-reared individuals since these upgrades have been put in place.

Surrogate Species Work:
Work is being done on a surrogate species, the Garita skipperling (*Oarisma garita*), to better ascertain the most successful methods of rearing, breeding, and overwintering (APZ 2018, pp. 8-14; Runquist et al. 2019, pp. 17-20). The field skipper (*Atalopedes campestris*) is being used as a surrogate in toxicity studies to better understand the impacts of pesticides on Poweshiek skipperling (Runquist 2019, unpaginated). Additional work was also done with both the field skipper and the Dakota skipper (*Hesperia dacotae*) on the impacts of bifenthrin on survivorship, and results are forthcoming (Runquist 2019, unpaginated).

Pesticide Field Sampling and Landscape Analyses:
Pesticide sampling has been done at both occupied and previously occupied (but now unoccupied) sites in Michigan, Manitoba, Minnesota, and South Dakota (Warner and Grantham 2019, unpaginated; Runquist 2019, unpaginated). Researchers sampled for a suite of 214 pesticides in sedge leaves, grass leaves, duff, and floral nectar sources. Certain pesticides were detected at both Michigan and Manitoba sites at low concentration levels. In Michigan, a greater number of pesticides were detected at the now unoccupied sites than at the currently occupied sites. It is difficult to ascertain the impact of these low level pesticides on Poweshiek skipperlings because of limited research on Poweshiek skipperling or similar species. There are additional results pending.

Landscape GIS analyses of Michigan Poweshiek skipperling sites and the areas upwind revealed that unoccupied sites were surrounded by more agriculture than currently occupied sites (52% agricultural foot print vs. 17%), although this trend was reversed at Manitoba sites (7% vs. 13%; Warner and Grantham 2019, unpaginated).

Habitat Modeling:
There has been work done to better understand Poweshiek skipperling habitat through modeling, including habitat suitability modeling in both Michigan and Manitoba (Pogue et al. 2016, entire; Westwood et al. 2019, unpaginated). In Michigan, Poweshiek skipperling habitat suitability generally increases along with increasing prairie fen area and increasing surrounding natural land cover, and decreases with increasing surrounding road density and surrounding developed land cover (Pogue et al. 2016, pp. 365-366). In Manitoba, the strongest covariate predictors associated with probability of Poweshiek skipperling occurrence were soil drainage type (highest probability of occurrence in soil that is poorly drained with water table at or near the surface), patch size (highest probability around 1000 hectare (2471 acre) size of continuous land use patch), and land use category (highest occurrence in grasslands and roads and trails [typically bordered by undisturbed grassland, which is a potential reason this differs from road density findings in Michigan]; Westwood et al. 2019, unpaginated).

2.3.1.2 Abundance, population trends (e.g. increasing, decreasing, stable), demographic features (e.g., age structure, sex ratio, family size, birth rate, age at mortality, mortality rate, etc.), or demographic trends:

Field work in 2018 in Powehiek skipperling sites in Michigan fens showed twice as many males as females (Belitz et al. 2019, p. 245). The number of populations has declined since listing. See section *2.3.1.5* and Figures 1 and 2 for more information on population trends.

2.3.1.3 Genetics, genetic variation, or trends in genetic variation (e.g., loss of genetic variation, genetic drift, inbreeding, etc.):

Preliminary results of a genetics study were discussed in the final rule; the study has since been published (Saarinen et al. 2016, entire). Some of the study populations have since been lost. To our knowledge, there is no other new information on Poweshiek skipperling genetics since listing.

2.3.1.4 Taxonomic classification or changes in nomenclature:
There has been no change in taxonomic classification or changes in nomenclature for the species since the final rule was published in 2014.

2.3.1.5 Spatial distribution, trends in spatial distribution (e.g. increasingly fragmented, increased numbers of corridors, etc.), or historic range (e.g. corrections to the historical range, change in distribution of the species' within its historical range, etc.):

Summary
Out of the 298 historically documented Poweshiek skipperling sites, there are currently 7 sites where the species is considered present[1] (at the time of listing, 12 sites were considered to have Poweshiek skipperling present).

<u>Michigan</u>
All six sites where the Poweshiek skipperling was considered extirpated at the time of listing are still considered extirpated. Additionally, Liberty Fen (Grand River Fen) is now considered extirpated (unknown at the time of listing), as no

[1] We updated the years used for the status definitions from the listing rule (79 FR 63671); six years were added to the definitions since six years have passed since they were developed (in the proposed listing rule). We consider the Poweshiek skipperling to be "present" (extant) at sites where the species was detected during the most recent survey, if the survey was conducted in 2008 or more recently and there is no evidence to suggest the species is now extirpated from the site. A status of "unknown" is assigned if the species was found in 1999 or more recently, but not in the most recent one to two sequential survey year(s) since 1999 and there is no evidence to suggest the species is now extirpated from the site. A species is considered to be "possibly extirpated" at sites where it was detected at least once prior to 1999, but not in the most recent one to two sequential survey years(s). "Possibly extirpated" is also assigned as a status to sites where Poweshiek skipperling was found prior to 1999 and no surveys have been conducted in 1999 or more recently. In order to be considered "extirpated" a site must have had at least three sequential years of negative surveys, because of the difficulty of detecting these species. A species is also considered "extirpated" at sites where habitat for the species is no longer present.

Poweshiek were sighted in four consecutive seasons (from 2013 to 2016). Bullard Lake is also now considered extirpated (unknown at the time of listing), as no Poweshiek have been sighted in four consecutive surveys (2008, 2009, 2014, and 2015).

There are four sites that were considered present at the time of listing, but have since changed status. Liberty Bowl Fen is now considered possibly extirpated, as the last sighting was in 1996. Park Lydon, Goose Creek Grasslands (also known as Little Goose Lake Fen), and Snyder Lake are all now considered unknown, each with two negative surveys since the time of listing.

Five Michigan sites are currently classified as present, out of the nine that had present status at the time of listing. However, the numbers of individuals detected at these remaining present sites have decreased since listing, with high daily counts of 1, 2, and 9 individuals in 2018 at Halstead Lake Fen, Holly Fen (Brandt Road), and Buckhorn Lake (Big Valley), respectively. The stronghold of Long Lake Fen (2 sites, including the Eaton Road site) has not had a high daily count above 49 since listing, with a high daily count of 28 in 2018 (compared to multiple counts in the hundreds in the five years preceding listing). Similarly, numbers are down for the maximum number of Poweshiek skipperlings observed per minute at these sites relative to the recent years before listing (Figure 1). Belitz and colleagues (2019, p. 645) estimated the adult Poweshiek abundance in Michigan prairie fens to be 231 (95% CI 160-332).

Furthermore, no additional sites have been found, even though a habitat model identified approximately 33 sites that may have significant potential to be inhabited by Poweshiek skipperling. Of the potential sites surveyed thus far, no new Poweshiek skipperling sites have been found (MNFI 2017, unpublished).

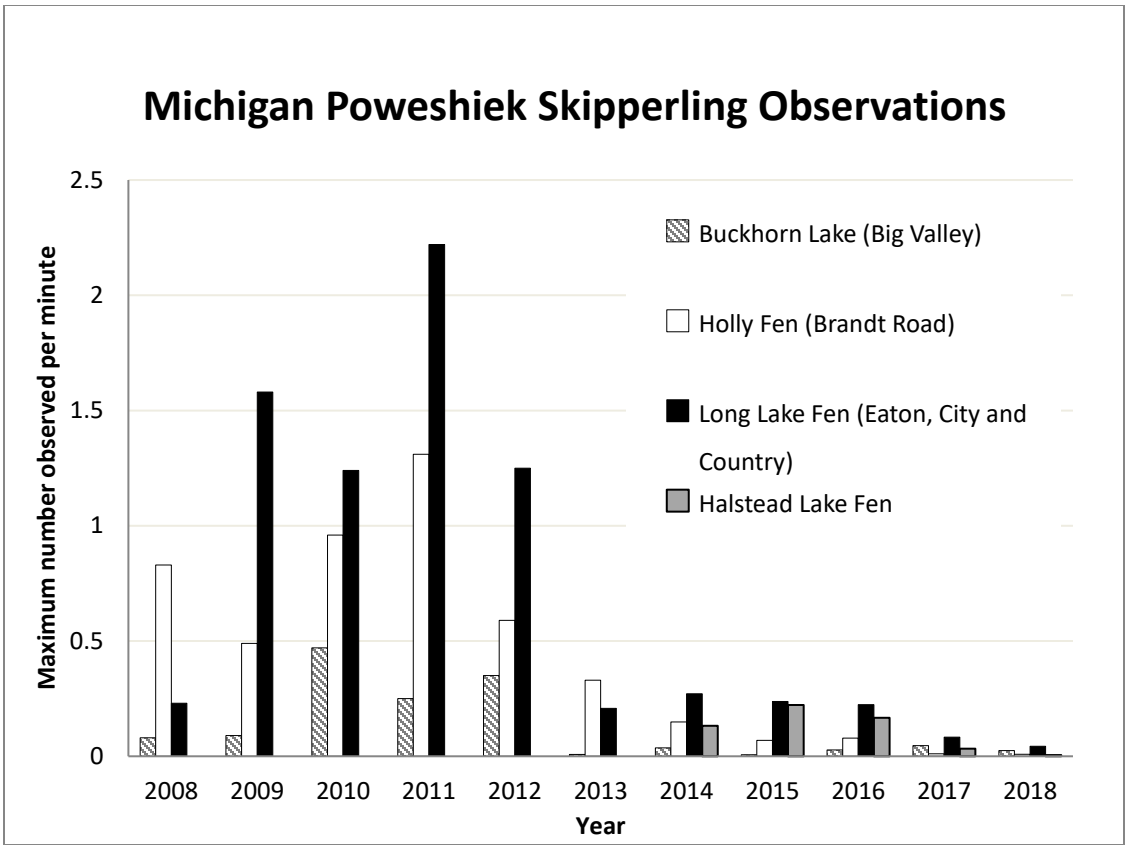

Figure 1. Maximum number of Poweshiek skipperling individuals observed per minute by year for the Michigan sites where the species is currently considered present. Note that the Eaton Road site is grouped within the Long Lake Fen.

Manitoba

One prairie complex in Manitoba is still considered present since the time of listing. Since listing, surveys have detected between 5 and 72 total Poweshiek skipperlings in Manitoba per year (Westwood, pers. comm. 2013; Pearn et al. 2014, p. 1; The Nature Conservancy Canada, unpubl. data 2018; Figure 2). Poor survey conditions in 2016 likely affected the low number of Poweshiek skipperlings observed that year (The Nature Conservancy Canada 2017, unpubl. data).

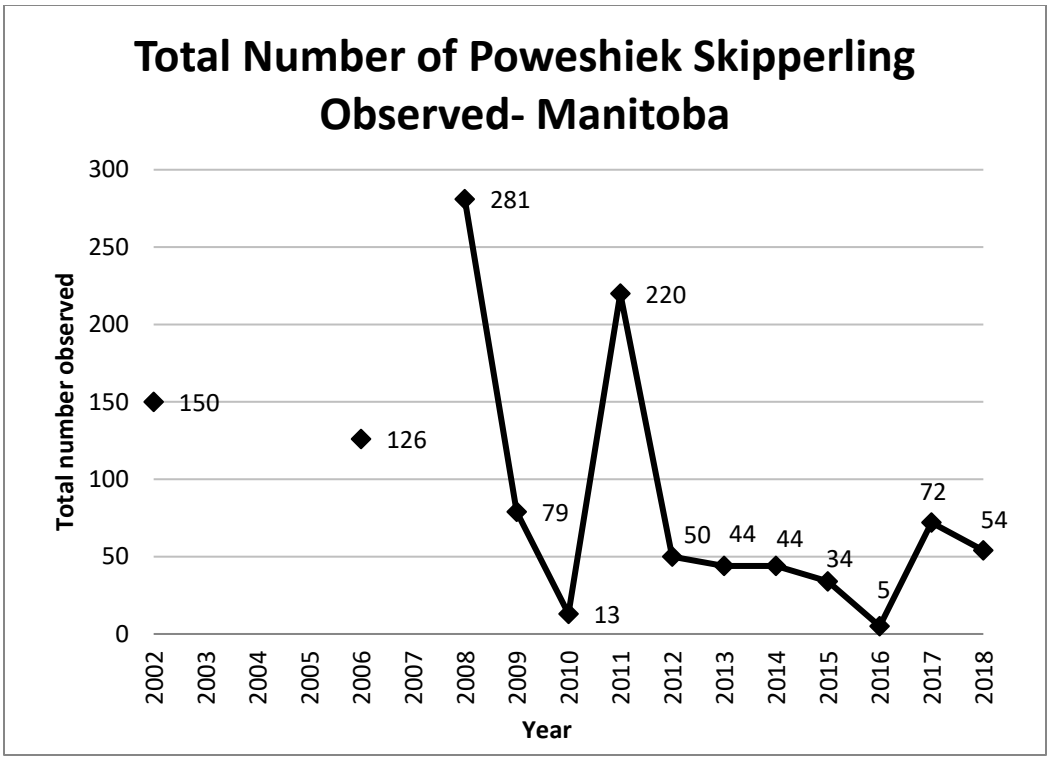

Figure 2. Total number of Poweshiek skipperling individuals seen per year in Manitoba.

Wisconsin

At the time of listing, there were three sites with unknown occupancy and one site where Poweshiek skipperling were present. The three sites with previously unknown occupancy are now all considered extirpated. The site with Poweshiek skipperling presence, Puchyan Prairie, is still considered to be present. Since 2012, no more than three Poweshiek skipperlings have been observed in a given year at that site. In both 2017 and 2018, there was one individual sighted, however no photo documentation confirms these sightings.

Minnesota

Poweshiek skipperling was once widespread and abundant in Minnesota; however there have been no confirmed sightings of the species in the state since 2007 (U.S. Fish and Wildlife Service 2019, unpub. data). One unconfirmed sighting in 2013 occurred at a prairie complex owned and managed primarily by the Minnesota Department of Natural Resources (MNDNR) in the Chicog Wildlife Management Area (WMA). This area has had recent adult observations over multiple years (2004-2007, and unconfirmed in 2013). Follow-up surveys since in 2014 and 2016 resulted in no detections of the species at Chicog WMA (MNDNR 2017, unpub. data).

Indiana, Illinois, Iowa, North Dakota, and South Dakota
Since the time of listing, there have been no sightings in Indiana, Illinois, Iowa, North Dakota, and South Dakota. There are no sites where the Poweshiek skipperling is currently considered present in those states.

2.3.1.6 Habitat or ecosystem conditions (e.g., amount, distribution, and suitability of the habitat or ecosystem):
Since listing, some sites (including all Michigan sites) have had encroachment of invasive species, although see section 2.3.2.5 for information on habitat restoration, including invasive species control measures. There is also information in section 2.3.2.5 on habitat acquisition.

2.3.2 New Information on threats, conservation measures, and regulatory mechanisms since the time of listing

2.3.2.1 Present or threatened destruction, modification or curtailment of its habitat or range:
No new information since listing.

2.3.2.2 Overutilization for commercial, recreational, scientific, or educational purposes:
In 2017, butterfly photographers were at extant sites in Michigan attempting to get photographs of the Poweshiek skipperling. This led to trampling and potential destruction of habitat. In order to prevent future occurrences, signage was installed to stop entrance into these sensitive habitats. No further trampling from photographers has since been noted.

2.3.2.3 Disease or predation:
No new information.

2.3.2.4 Inadequacy of existing regulatory mechanisms:
No new information, although see section 2.3.2.2. for information on new regulations regarding entrance to Poweshiek skipperling sites.

2.3.2.5 Other natural or manmade factors affecting its continued existence:

Conservation Work
Conservation work has been an active area for the Poweshiek skipperling over the past five years. Major activities that have taken place include:

Ex Situ Feasibility Assessment and Planning Workshop:
This workshop took place in 2015 and was led by the Conservation Breeding Specialist Group using the IUCN guidelines to create an adaptive management framework for captive propagation work (Delphey et al. 2016, entire; Smith et al. 2016, entire). This plan has since been put into action and is in year 3 of the field season (see Captive Propagation Work section below).

Captive Propagation Work:
Implementation of the plan to head start Poweshiek skipperling began in 2016, with our first successful releases back to the wild occurring in 2018 (Smith et al. 2016). Two butterflies (from 5 eggs) were released in Michigan and 6 butterflies (from 55 eggs) were released in Manitoba (note that most of the mortality occurred via low hatch rates, as only 16 eggs hatched). There were adult releases in 2019, with 14 adult skipperlings released in Michigan (from 54 eggs) and 13 released in Manitoba (111 eggs total, 56 hatched). In 2019, 153 eggs were collected from Michigan sites and 120 eggs from Manitoba to be reared at the Minnesota Zoo and Assiniboine Park Zoo, respectively (C. Nordmeyer, Minnesota Zoo, and L. Burns, Assiniboine Park Zoo, pers. comm. 24 July 2019). The head starting work at these zoos has not only provided adults to release back to their natal sites, but has also provided us important biological insights (see section 2.3.1.1 New information on the species' biology and life history).

Habitat Acquisition:
In 2018, Springfield Township (Michigan) was awarded Great Lakes Restoration Initiative (GLRI) grant money to partially fund the fee title purchase of approximately 55 acres of land from a willing seller, and associated land acquisition costs, for a critically important tract of land containing designated critical habitat and high quality wetland and upland areas adjacent to occupied Poweshiek skipperling habitat. This parcel has since been incorporated as part of Springfield Township's Shiawassee Basin Preserve.

Habitat Restoration:
In Michigan, within and around Poweshiek skipperling critical habitat, management over the past five years has included chemical and mechanical removal of invasive plants, including buckthorn, narrow leaved cattail, and phragmites. Burning has occurred at sites classified as potential and dispersal habitat (Losey 2017, unpaginated).

Outreach:
Outreach has focused on informing the public about the decline of the Poweshiek skipperling and increasing awareness and support for conservation activities, including captive propagation work and securing Poweshiek skipperling sites. Signage and closure of Poweshiek skipperling sites has occurred to deter photographers and butterfly collectors from disturbing a number of the sensitive Michigan sites.

Funding:
Partners have secured various sources of funds for Poweshiek skipperling conservation work, including but not limited to funds from Legislative-Citizen Commission on Minnesota Resources (LCCMR), GLRI, Association of Zoos and Aquariums (AZA), USFWS station funds, and National Geographic Society's "Species on the Brink" fund.

2.4 Synthesis

Sites where Poweshiek skipperling are currently present have seen a 41.7% decrease (from 12 to 7) since the time they were listed as endangered in 2014. Even with extensive survey efforts, Poweshiek skipperling numbers continue to be low at the remaining sites and they have not been found at any additional sites. With the majority of Poweshiek skipperling individuals concentrated at two locations (Michigan and Manitoba), the species is highly vulnerable to extirpation from a catastrophic event. Population numbers are low at all sites, making them vulnerable to stochastic events. Work is being done by a coalition of partners to conserve this butterfly, including habitat restoration and acquisition, captive propagation head starting efforts, pesticide sampling, and outreach. However, even with this conservation work, the threats for Poweshiek skipperling have not been ameliorated. These threats include habitat degradation through invasive species and lack of disturbance, pesticides, the effects of climate change, altered hydrology, and the negative impacts of low population sizes.

Due to the continued decrease of Poweshiek skipperling population numbers and because threats persist for the remaining populations, we have concluded that there is no information to indicate that the species status should change from endangered.

3.0 RESULTS

3.1 Recommended Classification:

____ Downlist to Threatened
____ Uplist to Endangered
____ Delist
__X__ No change is needed

4.0 RECOMMENDATIONS FOR FUTURE ACTIONS

Due to the species highly imperiled status, the top priority is to increase the number of individuals at existing sites as quickly as possible (in order to maintain the remaining genetic diversity and to buffer against demographic stochasticity) and then increase the number of populations. Many of the below actions will contribute to those immediate-term goals.

Continue research to better understand key life history traits of Poweshiek skipperling, including host plant preference, ideal growing conditions (e.g., humidity and temperature), and dispersal ability.

Understand key sources of mortality, which may include natural enemies, pesticides, drought conditions, and management practices

Continue to develop and refine the technology and protocols for head starting immature Poweshiek skipperling butterflies with partners for future reintroductions. Continue captive breeding trials using a surrogate species and develop breeding methods for Poweshiek skipperling.

Maintain and increase suitable habitat for Poweshiek skipperling, including increasing habitat connectivity.

Continue work on pesticide sampling, pesticide toxicity, and landscape-level analyses.

Monitor invasive species and continue to investigate invasive species control measures.

Prioritize sites for land acquisition and acquire suitable additional suitable habitat for Poweshiek skipperling.

Identify and strategically implement new and current conservation actions.

Determine what factors influence adult movement and Poweshiek skipperling responses to prairie fen management (burning, herbicide applications to control invasive plants), including what limits dispersal within portions of larger prairie fens.

Conduct research to better understand hydrology at Poweshiek skipperling sites, including obtaining further information on groundwater flow and identification of recharge areas.

Develop a recovery plan for the species.

5.0 REFERENCES

[APZ] Assiniboine Park Zoo. 2018. Canadian Poweshiek Skipperling Head-start Program. Report on USFWS Grant Award F16AP00967. Assiniboine Park Zoo, Winnipeg, MB. 14 pp.

[APZ] Assiniboine Park Zoo. 2019. Grassland Butterfly Conservation Program. Assiniboine Park Zoo, Winnipeg, MB. 30 pp.

Belitz, M.W., M.J. Monfils, D.L. Cuthrell, and A.K. Monfils. 2019. Life History and Ecology of the Federally Endangered Poweshiek Skipperling *Oarisma poweshiek* in Michigan Prairie Fens. Journal of Insect Conservation. 23: 635-649.

Delphey, P., E. Runquist, T. Harris, C. Nordmeyer, T. Smith, K. Traylor-Holzer, and P.S. Miller. 2016. Poweshiek Skipperling and Dakota Skipper: Ex Situ Feasibility Assessment and Planning Workshop. MN: IUCN/SSC Conservation Breeding Specialist Group. Apple Valley, MN. 128 pp.

Henault, J., and R. Westwood. 2019. Adult Oviposition and Nectar Feeding in Critical Habitat of the Endangered Poweshiek Skipperling (*Oarisma poweshiek*) in Manitoba. The University of Winnipeg. February 12, 2019. Online presentation.

Losey, M. 2017. Managing Poweshiek Habitat in Springfield TWP- Chemical Control and Mechanical Removal. January 31, 2017. PowerPoint Presentation at Poweshiek Winter Meeting.

Pogue, C.D., M.J. Monfils, D.L. Cuthrell, B.W. Heumann, and A.K. Monfils. 2016. Habitat Suitability Modeling of the Federally Endangered Poweshiek Skipperling in Michigan. Journal of Fish and Wildlife Management. 7: 359-368.

Runquist, E. 2019. Pesticides Exposure Research. Minnesota Zoo. Apple Valley, MN. February 15, 2019. Online Presentation.

Runquist, E., and C. Nordmeyer. 2017. Prairie Butterfly Conservation Program Annual Report – 2016. Minnesota Zoo, Apple Valley, MN. 42 pp.

Runquist, E., and C. Nordmeyer. 2018. Prairie Butterfly Conservation Program – 2017 Annual Report. Minnesota Zoo, Apple Valley, MN. 44 pp.

Runquist, E., C. Nordmeyer, and E. Royer. 2019. Minnesota Zoo Prairie Butterfly Conservation Program – 2018 Annual Report. Minnesota Zoo, Apple Valley, MN. 50 pp.

Saarinen, E.V., P.F. Reilly, and J.D. Austin. 2016. Conservation genetics of an endangered grassland butterfly (*Oarisma poweshiek*) reveals historically high gene flow despite recent and rapid range loss. Insect Conservation and Diversity. doi: 10.1111/icad.12192

Smith, T., D. Cuthrell, E. Runquist, P. Delphey, R. Dana, C. Nordmeyer, K.R. Nail, S. Borkin, T. Dandridge, T. Harris, and B. Hosler. 2016. Plan for the Controlled Propagation, Augmentation,

and Reintroduction of Poweshiek Skipperling (*Oarisma poweshiek*): A Cooperative Interagency Plan. U. S. Fish and Wildlife Service. Bloomington, MN. 59pp.

Warner, S., and M. Grantham. 2019. Pesticide Risk Assessments: Translating Science into Real-World and Practical Decisions. U.S. Fish and Wildlife Service and Nature Conservancy Canada. February 15, 2019. Online Presentation.

Westwood A., Westwood R., Hooshmandi M, Pearson K, LaFrance K, and Murray C. 2019. The Importance of Accuracy when Management is Urgent: A Field Validated Species Distribution Model for the Critically Endangered Poweshiek Skipperling in Canada. The University of Winnipeg. February 12, 2019. Online presentation.

6.0

U.S. FISH AND WILDLIFE SERVICE
5-YEAR REVIEW of Poweshiek skipperling (*Oarisma poweshiek*)

Current Classification: Endangered

Recommendation resulting from the 5-Year Review:

____ Downlist to Threatened
____ Uplist to Endangered
____ Delist
_X__ No change needed

Appropriate Listing/Reclassification Priority Number, if applicable:

Review Conducted By: Kelly Nail, Fish and Wildlife Biologist

FIELD OFFICE APPROVAL:

Lead Field Supervisor, Fish and Wildlife Service

Approve NICHOLAS UTRUP Digitally signed by NICHOLAS UTRUP Date: 2019.09.30 11:35:03 -05'00' Date _____

REGIONAL OFFICE APPROVAL:

Lead Assistant Regional Director, Fish and Wildlife Service

Approve LORI NORDSTROM Digitally signed by LORI NORDSTROM Date: 2019.09.30 15:30:44 -05'00' Date _____