Summary of the Hine's Emerald Dragonfly Critical Habitat Designation

The U.S. Fish and Wildlife Service is designating critical habitat for the Hine's emerald dragonfly (*Somatochlora hineana*) in Illinois, Michigan, and Wisconsin. The Hine's emerald dragonfly is listed as endangered under the Endangered Species Act of 1973, as amended.

Background

Natural History

Adult Hine's emerald dragonflies have bright emerald-green eyes and metallic green bodies with yellow stripes on the sides. The body is about 2½ inches long with a wingspan of 3½ inches. Hine's emerald dragonflies use a variety of habitats - most are wetland systems. The dragonfly breeds in marshes and sedge meadows that are underlain by dolomite bedrock (magnesia-rich sedimentary rock resembling limestone) and fed by calcareous (calcium carbonate, calcium or limestone) groundwater seeps. Eggs are laid in shallow water and immature dragonflies, called larvae, hatch the following spring. Larvae are aquatic, living in rivulets and seepage areas within wetland systems for 3 to 5 years, eating smaller insects and shedding their skin many times. Larvae then crawl out of the water and shed their skin a final time, emerging as flying adults. Adults can live at least 14 days and may live 4 to 6 weeks. During that time they use wetlands as well as a mixture of adjacent uplands.

Threats

Actions that threaten the continued existence of the Hine's emerald dragonfly are those that destroy, degrade, alter, and fragment habitat.

Direct loss of habitat from urban development, new landfills, and new pipelines decreases the area of suitable habitat and can fragment existing dragonfly populations. Quarrying can also destroy Hine's habitat because this species is closely associated with surface dolomite deposits which have commercial value.

Contamination from landfills, transportation, agriculture, and habitat-altering chemical applications may degrade habitat. The species' long aquatic larval stage (3 to 5 years) makes it vulnerable to ground and surface water contamination.

Natural succession and encroachment of invasive species negatively impacts the species habitat. Natural succession may result from releases of nutrients and road salt into surface waters or connected groundwater, and invasive species may be introduced through human activities in the habitat.

Increased deposition of sediment harms areas within wetlands where Hine's emerald dragonflies breed. Activities that may cause excessive sedimentation include livestock grazing, road construction, stream channel alteration, timber harvest, all terrain vehicle

use, horseback riding, feral pig grazing, rail lines and other disturbances to the watershed and floodplain.

Alteration of water quantity and quality in wetland systems can impact Hine's breeding habitat. Activities that change water quality and quantity include groundwater extraction; alteration of surface and subsurface areas within groundwater recharge areas; and release of chemicals, biological pollutants, or heated effluents into the surface water or groundwater recharge area.

Hine's emerald dragonfly breeding habitat can also be harmed by alteration of channels in wetland systems. Channels within wetlands could be harmed or altered by all terrain vehicle use, horseback riding, feral pigs, channelization, beaver dams, impoundment, road and bridge construction, mining, and loss of emergent vegetation. These activities may lead to changes in water flow velocity, temperature, and quantity.

Activities that fragment habitat are harmful because they affect the ability of adults to forage or disperse to new areas. This, in turn, may result in reduced fitness and genetic exchange within populations as well as direct mortality of individuals. Activities that fragment habitat include road construction, destruction or fill of wetlands, and high-speed railroad and vehicular traffic.

Critical Habitat

Critical habitat is a tool within the Endangered Species Act that identifies areas that are important to the conservation and recovery of a listed species. Within areas that are designated as critical habitat, federal agencies are required to do a special review of activities that they intend to carry out, fund, or permit. Their activities cannot destroy or adversely modify the important components of critical habitat. However, a critical habitat designation does not affect actions that do not involve a federal agency. For example, the designation of critical habitat does not affect a landowner undertaking a project on private land that does not involve federal funding or require a federal permit or authorization.

Designation of critical habitat can help focus conservation activities for a listed species by identifying areas that contain the physical and biological features that are essential for the conservation of that species. Also, designation of critical habitat alerts the public as well as land-managing agencies to the importance of these areas, but the Endangered Species Act only imposes additional restrictions on the actions of federal agencies.

When deciding what areas to designate as critical habitat, the Service looks at the physical and biological features that are necessary for the species to survive. These required features are called "primary constituent elements." Primary constituent elements include space for individual and population growth, and for normal behavior; space for food, water, air, light, minerals, or other nutritional or physiological requirements; cover or shelter; sites for breeding, reproduction, or rearing of offspring; and habitat that is protected from disturbance or is representative of the historic geographical and ecological distributions of a species.

The Critical Habitat Designation for Hine's Emerald Dragonfly

The essential primary constituent elements for Hine's emerald dragonfly egg laying and larval development are found in wetlands with organic soils overlying dolomite bedrock. Those wetlands have shallow calcareous water from intermittent seeps and springs, emergent herbaceous and woody vegetation, crayfish burrows (that provide refuges for larva), and a sufficient prey base of aquatic insects and other invertebrates.

The essential primary constituent elements for Hine's emerald dragonfly adults are found in natural plant communities in or near the breeding/larval wetlands that have a sufficient prey base of small insect species. Those natural plant communities include fen, marsh, sedge meadow, dolomite prairie, the fringe (up to 328 feet) of shrubby and forested areas bordering those wetlands and open corridors (non-forested) that adults use for movement and dispersal.

The Service is designating critical habitat within 22 units encompassing approximately 13,221 acres in eight counties in Illinois, Michigan, and Wisconsin. Within the critical habitat units, only the areas that contain the primary constituent elements of Hine's emerald dragonfly habitat are designated as critical habitat. These units occur in the following states and counties:

> Illinois: Seven units encompassing 2,995 acres in Cook, DuPage, and Will counties.
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> Michigan: Four units encompassing 1,385 acres in Alpena, Mackinac, and Presque Isle counties.
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> Wisconsin: Eleven units consisting of 8,841 acres in Door and Ozaukee counties.

Improved mapping technology enabled the Service to eliminate homes, roads, airport runways, and other human-made structures as well as lawns, agricultural fields, and closed-canopy forests from the critical habitat units. Mapping is still not precise enough to exclude all such areas so some of these features may remain within the designated areas. However, even if such areas fall within the boundaries of designated critical habitat, they are still not considered actual critical habitat under the provisions of the Endangered Species Act.

Exclusions

The Service excluded 28 units from the final critical habitat designation. Fourteen units in Missouri and two units in Michigan were excluded because public land managers are currently implementing conservation actions for the Hine's emerald dragonfly under existing land management plans. Because they are implementing those conservation efforts, benefits of designating critical habitat for the Hine's emerald dragonfly on these public lands are small in comparison to the benefits of excluding those areas from the final designation. Exclusions will continue to enhance the partnership efforts with the Forest Service and the Missouri Department of Conservation that are focused on conservation of the species on those lands.

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The 12 remaining units in Missouri are on private lands; the Service excluded private lands in Missouri because the Missouri Department of Conservation has implemented successful conservation efforts on some of those lands and has plans for implementing further conservation actions on remaining lands. The existing partnerships between the Missouri Department of Conservation and property owners could dissolve current and future conservation efforts that could be negatively impacted if critical habitat were designated. Maintaining those working partnerships is important to recovering the Hine's emerald dragonfly.

Economic Analysis

When specifying an area as critical habitat, the ESA requires the Service to consider economic and other relevant impacts of the designation. Estimated costs associated with conservation activities for the endangered Hine's emerald dragonfly (*Somatochlora hineana*) in areas proposed as critical habitat for the species may range from $16.8 to $47.9 million over the next 20 years, according to an economic analysis released by the Service. Most of the costs linked to conservation of the Hine's emerald dragonfly are associated with the residential and commercial development industry.

Additional Information

The U.S. Fish and Wildlife Service posts information about the Hine's emerald dragonfly at http://www.fws.gov/midwest/Endangered. You may also contact the Chicago, Illinois Ecological Services Field Office at 1250 S. Grove, Suite 103, Barrington, Illinois 60010, (telephone (847) 381-2253; facsimile (847) 381-2285).