

Cooperative Recovery in Chicago for the Hine's Emerald Dragonfly

by Kris Lah and Kim Mitchell

“The Hine's Emerald Dragonfly Work Group has been a remarkable success, despite the complexity of its task. Local, state, federal, and private involvement, each with its own mandate, makes this team approach pretty difficult. I think the success of this partnership demonstrates two things. First, the power of the ESA and other conservation laws: the ESA brought everyone to the table and forced them to “play.” Second, individuals in organizations really matter. People set the tone and attitude of their organization.”

– Dr. Hugh Britten, Geneticist at the University of South Dakota

Hine's emerald dragonfly. Photo Credit: P. Burton

A plan to extend Interstate 355, a 20-mile (32-kilometer) highway running through the Chicago metro area, provided the impetus for the formation of the Hine's Emerald Dragonfly Work Group—a group representing 17 different entities with a shared interest in conserving the Hine's emerald dragonfly (*Somatochlora hineana*) in the face of the unavoidable.

A new 1.25-mile (2-kilometer) bridge in the western suburbs of Chicago – part of the I-355 extension – crosses the lower Des Plaines River Valley, which is a habitat area essential to the recovery

of this federally endangered species. The wetlands here are some of the few places remaining in the world where the dragonfly occurs.

The U.S. Fish and Wildlife Service (Service) worked closely with the Illinois State Toll Highway Authority and the Corps of Engineers during the planning of the new six-lane bridge to find ways to mitigate potential impacts to the Hine's and its habitat. The Highway Authority incorporated a number of conservation measures into the project design, including the creation of the Hine's Emerald Dragonfly Work Group.

The Work Group – with participants from federal and state agencies, academia, and local municipalities—identified conservation measures to be carried out before and during bridge construction, including habitat restorations, genetics research, and captive rearing for introduction into restored habitat. Since breeding habitat is the main limiting factor for the Hine's, the Work Group also worked to create this type of habitat—a recovery task never attempted before.

Hine's emerald dragonflies lay their eggs in small, temporary streams, or rivulets, near fens and sedge meadows,

where the hatching larvae then spend three to five years maturing before emerging as adult dragonflies. These specific wetland types are fed by calcareous groundwater associated with dolomitic (limestone-like) bedrock. Adult dragonflies feed on smaller insects along shrub and forest edges near the wetlands.

The Work Group selected three sites in neighboring Cook, DuPage, and Will Counties to restore for breeding, larval, and adult foraging habitat. The sites, all in County Forest Preserve Districts, include groundwater seeps and springs that issue from bluffs and flow into breeding habitat in wetlands of the Des Plaines River Valley.

Restoration efforts included the removal of invasive shrubs and trees over a 60-acre (24-hectare) area where they had overtaken floodplain marshes. Buckthorn and other shrubs were removed from the understory of an extensive area, creating open woodland on top of the bluffs. As native understory vegetation recovers, more water will infiltrate to feed the seeps and springs below, resulting in a more reliable water source for breeding habitat.

Clearing the thick groves of woody plants has created areas for adult Hine's to feed, and has opened corridors allowing them to move between the marshes and uplands. Additionally, removing dense understory has made the rivulets accessible for female Hine's to lay eggs. More subtle changes have also occurred as habitat features essential to Hine's survival developed during the months and years following the invasive plant removal: a moderated groundwater flow, year-round seeps and rivulets, crayfish burrows and emergent marsh vegetation.

At Keepataw Woods in Will County, partners hand dug new channels to

move flow from seeps away from bluffs and into interior wetlands. The hand-dug streamlets provide more circuitous courses allowing the spring water to warm to temperatures suitable for dragonfly larvae and crayfish. Crayfish burrows, necessary refuges from drought and during winter for dragonfly larva now occupy most of the restored wetland sites.

An old fish farm at Waterfall Glen Forest Preserve in DuPage County was the site for a second breeding habitat restoration project. The Work Group took advantage of existing artesian wells at the fish farm. Dr. Daniel Soluk, from the University of South Dakota, and his graduate students regulated groundwater flow from these wells to create rivulets. Rock basins were installed to catch outfall from the wells, allowing the water to warm. From these basins, water overflows and forms small streamlets, 6 to 12

Members of the Hine's Emerald Dragonfly Work Group did more than administer agreements and collaborate on restoration plans. They directly contributed to the effort by digging channels from existing seeps to create new breeding habitat and expand the productive area at Keepataw Woods. By the end of the summer, the area around the hand-dug rivulets were revegetated with 12,160 plugs of various wetland plants. Photo credit: Brian Smith, AECOM



inches (15 to 30 centimeters) wide and a few inches deep. The streamlets flow through planted wet prairie and then into existing marsh. Similar to the other restorations, dense thickets of invasive shrubs were cleared from adjacent uplands and replanted to create open woodland.

Caged dragonfly larvae, reared in captivity, were placed in rivulets within the created systems to compare growth rates to larvae in natural systems. Data collected on the captive larvae and created systems have been used to adapt management of the created systems. Adult Hine's have been documented throughout the newly created habitats, and eventually, captive-reared larvae may be released in the new streamlets.

In cooperation with the Work Group, contractors created a berm to prevent the newly restored breeding habitat from flooding. They also repaired the artesian well, installed plumbing, and engineered the creation of ponds to maintain the appropriate water temperatures and hydroperiod for breeding habitat.

Efforts to help mitigate bridge construction have been successful because the Work Group encouraged the involvement of multiple stakeholders in the process. The Highway Authority's commitment to conserving Hine's was essential, as was the Forest Preserve Districts willingness to assume management responsibility post-project.

Kris Lah, the Endangered Species Coordinator in the Service's Chicago Field Office, can be reached at kristopher_lah@fws.gov or 847-366-2347. Kim Mitchell, the Ecological Services Outreach Coordinator in the Service's Midwest Regional Office, can be reached at kim_mitchell@fws.gov or 612-713-5337.