

## **2006 Private Stewardship Grant Program Proposal**

**Title:** Holaday Fen Restoration: Habitat Enhancement for State-listed and Conserved Fen Species

**Objectives:** Begin restoration steps to secure high conservation value species on this 82-acre fen and upland property.

**Duration:** Restoration activities will begin in the Spring 2007 and will continue through the Fall 2007.

**Cost Summary:** I am requesting \$18,125 from the Private Stewardship Grant program to assist in implementing restoration efforts on our property. The total project cost is estimated to be \$20,875. I will provide \$2,000 and the contractor will provide \$750 toward the project cost (13% of project total) as cash matching and in-kind services.

**Contact Information:**

A. Scott Holaday  
Dept. of Biological Sciences  
Texas Tech University  
Lubbock, TX 79409-3131  
806-742-2657  
FAX: 806-742-2963  
scott.holaday@ttu.edu

## **Project Description**

### **General Overview of the Property and Its History of Ownership:**

The 82-acre property is located in the SE1/4 of section 28, T32N, R2E, Green Township, Marshall County, IN, but it is not a typical Midwestern “80”, being nearly square (Fig. 1). This shape is due to the fact that it is composed of one and a third “lots” that were established by the original survey of 1832/33, honoring a Native American reserve boundary that forms the western boundary of the property.

The property lies in a shallow valley of the upper reaches of Eddy Creek (Fig. 1). This creek was channeled at some time in the early part of the 1900’s along with the main inlet and outlet of the 3-acre, natural lake that occurs in the southwestern portion of the property. A tributary of Eddy Creek enters from the east and was apparently channeled in the early 1960’s. The first surveyors (1832/33) had noted all of these streams and the lake.

The Eddy Creek Ditch enters the property at the southeastern corner, flowing mostly north/northwest for ~240 m and then west for ~300 m to join with the outlet of the lake. It then proceeds northwest and west, exiting the property at the northwest portion of the west woodland. Low hills occur in the western and northwestern portions of the property, while some upland occurs in the southeastern portion, as well. The rest of the site is mostly fen of varying degrees of wetness.

From the records of the Marshall County Land Transfer books and a former local title company, I have been able to establish the chronology of ownership starting with the original owners in 1850. I have not been able to determine the exact time when the fen portions of the property were used, at least to some extent, for agricultural purposes. However, land sales records suggest that most buyers in the late 1800’s focused on obtaining the high ground in the western and northwestern portions of the present property and did not consider the fens to be of agronomic value. A homestead was established on high ground in the southeastern portion of the property, possibly as early as the 1890’s or as late as 1907 when the entire property came into the ownership of the Bixel family that held it until the mid to late 1990’s. An elderly gentleman who lives 2 km south of the property and who knew the Bixel children in the 1920’s told the owner that from the early 1900’s to possibly as late as the early 1960’s, the property supported a dairy operation. Rumor has it that the operation was stopped because of frequent rattlesnake attacks on the cows. Some foundations of the home and outbuildings can still be found in the second-growth woodland in the southeastern corner. The buildings were razed prior to 1962, since they are not shown on the USGS map dated 1962, and they are not present in an aerial photo dated July 4, 1965. This 1965 photo also does not show any signs of large areas of improved pasture. It is my opinion that the property did not receive extensive human disturbance since the 1960’s.

Twenty some years ago, beaver entered the property and built several dams on Eddy Creek. One large dam in the northern section of the property flooded the creek all of the way up to the lake and into the adjacent property to the south, nearly tripling the size of the lake. The dams and beaver were removed around 2000. The lack of easy access to most of the property by vehicle has probably helped to minimize disturbance and inhibit development once agricultural activities ceased.

### **My Conservation Interests and the Acquisition of the Property:**

Although I am a professor of plant physiology (photosynthesis and environmental stress physiology), I have always had a strong interest in trees and forestry since before the age of 5. I have a BS and MS degree in forestry and a PhD in botany. Also, having spent my summers on Lake Maxinkuckee ~13 km to the west of the fen property, I developed a strong interest in aquatic systems. For example, my dissertation research involved a study of the photosynthesis of an invasive, submersed aquatic plant species. These interests and my thorough botanical training have developed my strong passion for the conservation and restoration of natural plant communities and a desire to acquire land to restore and protect the natural vegetation, admittedly focusing on forests.

In the summer of 2003, I no longer had room to plant more trees on the 43 acres that I owned near Lake Maxinkuckee, and began looking for more land to grow trees. Although the fen property was not perfect for this purpose, its combination of many different plant communities, a good stand of timber on its west side, and some open uplands for tree planting made it irresistible. Also, it provided an opportunity to preserve an undeveloped, natural lake, an uncommon opportunity in northern Indiana, today. I purchased the 82 acres on March 15, 2004, but it was not until the following summer when a local botanist and I completed an initial survey that I became aware of the true floristic value of the property.

After multiple visits from Indiana DNR and local botanists, as well as myself, the latest botanical inventory has identified 219 native species and a resultant native floristic quality index of 82.5. This index is remarkably high, indicating unusual diversity in this rare ecological community. (Please see attached memo from Lee Casebere, Assistant Director of the Division of Nature Preserves, Indiana DNR).

### **My Plans for the Property**

1. Practice sustainable forestry for the wooded uplands, reforesting open areas and attempting to maintain the species composition now present in the only "old-growth" woodland on the west side of the property.
2. Secure the different fen communities now present from invasive, non-native species
3. Within the limits of the present hydrology, promote the natural propagation and spread of the state-listed plant and animal species.

4. Establish native fen plant communities in areas now dominated by reed canary grass (*Phalaris arundinacea*).

5. Reintroduce *Larix laricina* and its associated species in a few localities where there is some indication of its former presence.

I will not erect any buildings on the property and plan to take steps to ensure that future owners or my heirs cannot erect any buildings.

### Current Plant Communities and their Status

#### Upland Communities:

The southern side of the valley and a small “island” in the fen form upland in the southeastern part of the 82 acres (Fig. 1). The west woodland is located on two low hills. To the north of the west woodland across a narrow section of the fen containing Eddy Creek is the northwest woodland on another “island” in the fen. All of the soils of the uplands are well-drained sandy loams or loamy sands with considerable gravel (Wawasee and Oshtemo series). The woodlands in the southeast and the northwest are second-growth stands containing considerable *Prunus serotina* with some excellent young *Juglans nigra*, *Quercus velutina*, *Carya* species, and *Q. rubra*. These areas also contain non-native *Lonicera*, *Elaeagnus umbellata*, and *Rosa multiflora*, along with some non-native *Morus alba* and *Alliaria petiolata*. I have begun initial measures to control these species in the upland areas.

The west woodland is a nearly even-aged stand of large *Q. velutina*, *Q. alba*, and *P. serotina*, with one *Fagus grandifolia* and a clone of *Asimina*. Only a few *R. multiflora* occur here along with patches of *A. petiolata*. Some selective cutting was performed ~35 years ago, but it did not cause large openings in the canopy.

#### Organic Soil Communities:

The remainder of the property contains mostly Houghton organic soils, but a small section along the east side of the lake is considered organic soil that developed over marl (Edwards series), and the narrow section on the west side of the lake and east of the woodland is considered organic soil over sand (Adrian series). Considering that organic soils occur on the north-facing slopes of the southeastern uplands and form low hills in the fen, the area must have received more water and was wetter prior to settlement than today. The organic soils contain a variety of plant communities based primarily on differences in water content of the soil. The major ones are listed below.

Shore Community of the Lake - For approximately 10 m from the lake, the shore community is recovering from the flooding caused by the beavers. Water draining from the fen on the east side enters the lake at several points and has a pH of 6.5. The community contains *Juncus* and *Eleocharis* species, as well as *Selaginella*, *Lobelia kalmii*, and *Hypericum boreale*. Some *Salix* seedlings and patches of *Phalaris arundinacea* are beginning to appear in this community.

**Sedge Meadows** - Three large areas of sedge meadow dominated by *Carex stricta* occur on the property. These areas appear to be wetter than the surrounding land, having standing water from late autumn into the spring or early summer and during wet periods in the summer. The exception occurs on portions of the north-facing slope of the uplands along the southern boundary. The southern meadow occurs from east of the lake to the lower slopes of the southeastern upland. It contains *Valeriana*, *Cacalia*, *Satureja*, *Gentiana*, *Pedicularis*, *Triglochin*, *Lobelia kalmii*, a large patch of *Liatris*, a few *Cornus stolonifera* plants, and several species of *Solidago*. The central meadow occurs to the north of the east-west portion of Eddy Creek Ditch. In its eastern portion occurs *Carex bebbii*. The northern meadow occurs along a drain from the low area to the north of the property where at least two substantial seeps are located. Plants of note in this meadow are *Menyanthes trifoliata*, *Pedicularis*, and *Parnasia glauca*. All of these meadows also contain considerable stands of *Potentilla fruticosa* and scattered *Rhus vernix*. A shrub zone consisting largely of *Cornus obliqua* and *C. racemosa*, with some *Salix bebbiana* and *Viburnum lentago*, borders these meadows. In some locations, the border is composed almost exclusively of stunted *Rosa palustris*. Along the north and west edge of the central sedge meadow occur scattered clones of *Betula pumila*, one clone even forming an island in the wet meadow. *Phalaris arundinacea* is encroaching upon these meadows from their borders and is developing patches within them, as well.

**Raised Organic Soils** - Apparently, ground water once rose to the surface at certain points in the fen and developed mounds of peat covered in sedges (as surmised from the early survey notes). These mounds are essentially dry, today. They occur in the northeastern portion of the property, just west of Eddy Creek Ditch after it enters the property, and to the southwest of the northwestern hill. *Cornus* and *Salix* shrubs and *Prunus serotina* dominate these sites, with some young *Ulmus americana*, *Juglans nigra*, *Acer saccharinum*, and *Quercus macrocarpa* present, as well. *A. petiolata* can be found in these areas in addition to *Phalaris arundinacea* and *Rosa multiflora*.

**Pure Reed Canary Grass (*Phalaris arundinacea*) Sites** - Nearly pure stands of reed canary grass, *Phalaris arundinacea*, occur along most of Eddy Creek Ditch. A pure stand extends all of the way to the west woodland from the creek just north of the lake. On the other side (east side) of the creek, this stand extends for 20-30 m into a developing sedge and grass meadow that had been flooded by the beavers. A second large stand occurs to the north of the creek as it leaves the property. The third pure stand occurs in a swale between the creek and the upland on the east side of the property. Although these are the major populations of the species, it should be noted that *Phalaris arundinacea* is abundant in the understory of many of the shrub zones that border the sedge meadows and that occur on the raised organic soils. It is also present in patches from 1 m to as much as 10 m in diameter in sedge areas.

## **General Restoration Plan**

The restoration management plan is based on a delineation of the different plant communities to be maintained. This delineation is being developed using floristic and

hydrologic information and will be plotted on the most recent aerial photograph of the property.

I will be responsible for developing and maintaining the access trail suitable for ATVs. By the summer of 2006, this trail will be completed from the road to the northwest corner of the property following the spoil bank of Eddy Creek Ditch. One bridge across the creek already exists and a second one will be constructed. With assistance from local ecological consultants, I will monitor changes in species composition during my mid-summer visit to Indiana. I will conduct certain localized herbicide applications or mechanical removal of plants missed in earlier control efforts, while continuing my present work to control invasive, non-native shrub and tree species in the uplands. Any growing and planting of woody species, such as *Betula pumila*, will be done by me.

**Table 1. State-Listed and Locally Rare Species Identified on Holaday Fen**

Scientific Name	Common Name	C Value	SRANK
<i>Rana pipiens</i>	Northern Leopard Frog	n/a	S2
<i>Emydoidea blandingii</i>	Blanding's Turtle	n/a	S2
<i>Pandion haliaetus</i>	Osprey	n/a	S1
<i>Sistrurus catenatus</i> <i>catenatus</i>	Eastern Massasauga	n/a	S2
<i>Selaginella apoda</i>	Marsh Club Moss	10	S1
<i>Carex bebbii</i>	Bebb's Oval Sedge	6	S2
<i>Satureja arkansana</i>		10	S1
<i>Valeriana ciliata</i>	Common Valerian	10	S1
<i>Triglochin palustris</i>		10	S2
<i>Stellaria longifolia</i>		8	
<i>Solidago uliginosa</i>		10	
<i>Solidago patula</i>		9	
<i>Solidago ohioensis</i>		9	
<i>Salix bebbiana</i>	Beaked Willow	8	
<i>Rhynchospora alba</i>	White Beak Rush	10	
<i>Potentilla fruticosa</i>	Shrubby Cinquefoil	10	
<i>Rhus vernix</i>	Poison Sumac	10	
<i>Polygonum sagittatum</i>	Arrow-Leaved Tear Thumb	8	
<i>Phlox maculata</i>	Sweet William Flox	10	
<i>Pedicularis lanceolata</i>	Fen Betony	9	
<i>Parnassia glauca</i>	Grass of Parnassus	10	
<i>Panicum lindheimeri</i>	Smooth Wooly Panic Grass	9	
<i>Onoclea sensibilis</i>	Sensitive Fern	8	
<i>Najas guadalupensis</i>	S. Naiad	8	
<i>Muhlenbergia glomerata</i>	Marsh Wild Timothy	10	
<i>Menyanthes trifoliata</i> <i>minor</i>	Buckbean	10	
<i>Lysimachia quadriflora</i>	Narrow-Leaved	9	

	Loosestrife		
Lobelia kalmii	Bog Lobelia	10	
Lathyrus palustris	Marsh Vetchling	8	
Juncus brachycephalus	Short headed Rush	9	
Ilex verticillata	Winterberry	9	
Hypoxis hirsuta	Yellow star Grass	9	
Hypericum virginicum	St. John's Wort	10	
Hierochloe odorata	Sweet grass	9	
Helianthus giganteus	Tall Sunflower	9	
Gentiana procera	Small Fringed Gentian	9	
Galium tinctorium	Stiff bedstraw	8	
Galium labradoricum	Bog Bedstraw	10	
Galium asprellum	Rough Bedstraw	10	
Eleocharis rostellata	Wicket Spike Rush	10	
Eleocharis intermedia	Matted Spike Rush	8	
Dryopteris spinulosa	Spinulose Shield Fern	8	
Dryopteris cristata	Crested Wood Fern	10	
Decodon verticillatus	Swamp Loosestrife	8	
Cladium mariscoides	Twig Rush	10	
Cirsium muticum	Swamp Thistle	10	
Cicuta bulbifera	Bulbet-Bearing Water Hemlock	8	
Chelone glabra	Turtlehead	8	
Carex utriculata	Common Yellow Lake Sedge	10	
Carex tetanica	Common Stiff Sedge	9	
Carex sterilis	Fen Star Sedge	10	
Carex lurida		8	
Carex leptalea	Slender Sedge	10	
Carex Interior	Prairie Star Sedge	10	
Carex buxbaumii	Dark-Scaled Sedge	9	
Campanula uliginosa	Marsh Bellflower	10	
Campanula aparinoides	Marsh Bellflower	8	
Cacalia plantaginea	Prairie Indian Plantain	10	
Bromus ciliatus	Fringed Brome	10	
Bidens coronata	Tall Swamp Marigold	9	
Betula pumila	Dwarf Birch	10	

C-values are "coefficients of conservatism," and are taken from Plants of the Chicago Region by Swink and Wilhelm. C-values range from 1-10, with 10 being the most conservative, and are used to determine the likelihood that a particular species was historically found in a given area.

## Project Statement of Work

### Exotic Species Control

Chemical applications of Glypro and Reward will be used to control the listed exotic and invasive species (reed canary grass, garlic mustard, honeysuckle, multiflora rose,) in and around the fen and adjacent upland. Applications will be made at the appropriate time of year for each of the target species. Low concentration of glyphosphate will be used particularly on the reed canary grass. Caution will be taken in areas directly adjacent to high quality plants by utilizing backpack sprayers to perform the applications. In addition, restoration ecologists may utilize the grass-specific herbicide, Sethoxydim, by Vantage that has been shown to kill reed canary grass without damaging sedges (<http://www.ipaw.org/herbicides.htm>). Sethoxydim will not be used where it could contact standing or flowing water. In areas where large monocultures of exotic species exist, larger equipment will be used to apply the chemical with greater efficiency. Larger stems will be removed with a chain saw if needed. The stumps will be treated with herbicide directly to minimize re-sprouting. Treated trees will either be left standing or felled.

### Controlled Burn

Approximately 12 acres of fen will be burned. Site conditions, permit and an approved burn plan will ultimately guide the exact acreage to be burned.

JFNew, a local environmental restoration firm, will manage the prescription fire in accordance with the rules and requirements established by the Fish and Wildlife Service. This firm maintains a crew of 15 “red card” certified wildland firefighters under the oversight of a certified “burn boss.” This crew regularly conducts prescribed burns on state and federal lands and scrupulously adheres to all appropriate safety and regulatory procedures.

### Evaluation

In general, we will evaluate the success of the project by photographing the treatment areas before and after the restoration. We will also make an overall assessment of the effectiveness of chemical treatments, with a goal of 75% reduction in the treated areas. Species inventories of both native and non-native species have been taken, with estimated ground cover taken of any large populations, and will be compared post-treatment. Photographs will also be taken before and during the restoration to evaluate the site as it develops over time.

The burn areas will be photographically monitored before, during and after the fire and a precise estimate of the actual acreage burned will be recorded.

### **Project Goals and Milestones**

Planned restoration efforts will begin in February 2007 and will last until November, 2007 (Table 2).

**Table 2. Project Schedule**

Task	Feb 2007	Mar 2007	April 2007	May 2007	Jun. 2007	July 2007	Aug 2007	Sept 2007	Oct 2007	Nov. 2007
Woody species removal	X									
Herbaceous Invasive Control			X	X				X	X	
Controlled burn		X								
Monitoring	X	X	X	X				X	X	X

## Project Budget

Table 3. Project Budget

Task	Holiday (in-kind)	Contractor (in kind)	Holiday (cash)	Federal Share	Total
Project Management/ Burn Permit				\$1,625	\$1,625
Project Labor	\$1,000	\$250	\$1,000	\$14,750	\$17,000
Supplies/Materials/ Equipment		\$500		\$1,750	\$2,250
<b>Total</b>	<b>\$1,000</b>	<b>\$750</b>	<b>\$1,000</b>	<b>\$18,125</b>	<b>\$20,875</b>

**To:** Mr. Peter Fasbender  
U.S. Fish & Wildlife Service  
1 Federal Drive  
Bishop Wipple Federal Building  
Fort Snelling, MN 55111

**From:** Lee Casebere  
Division of Nature Preserves  
402 W. Washington St., Rm. W-267  
Indianapolis, IN 46204

Private Stewardship Grant Program application

January 16, 2006

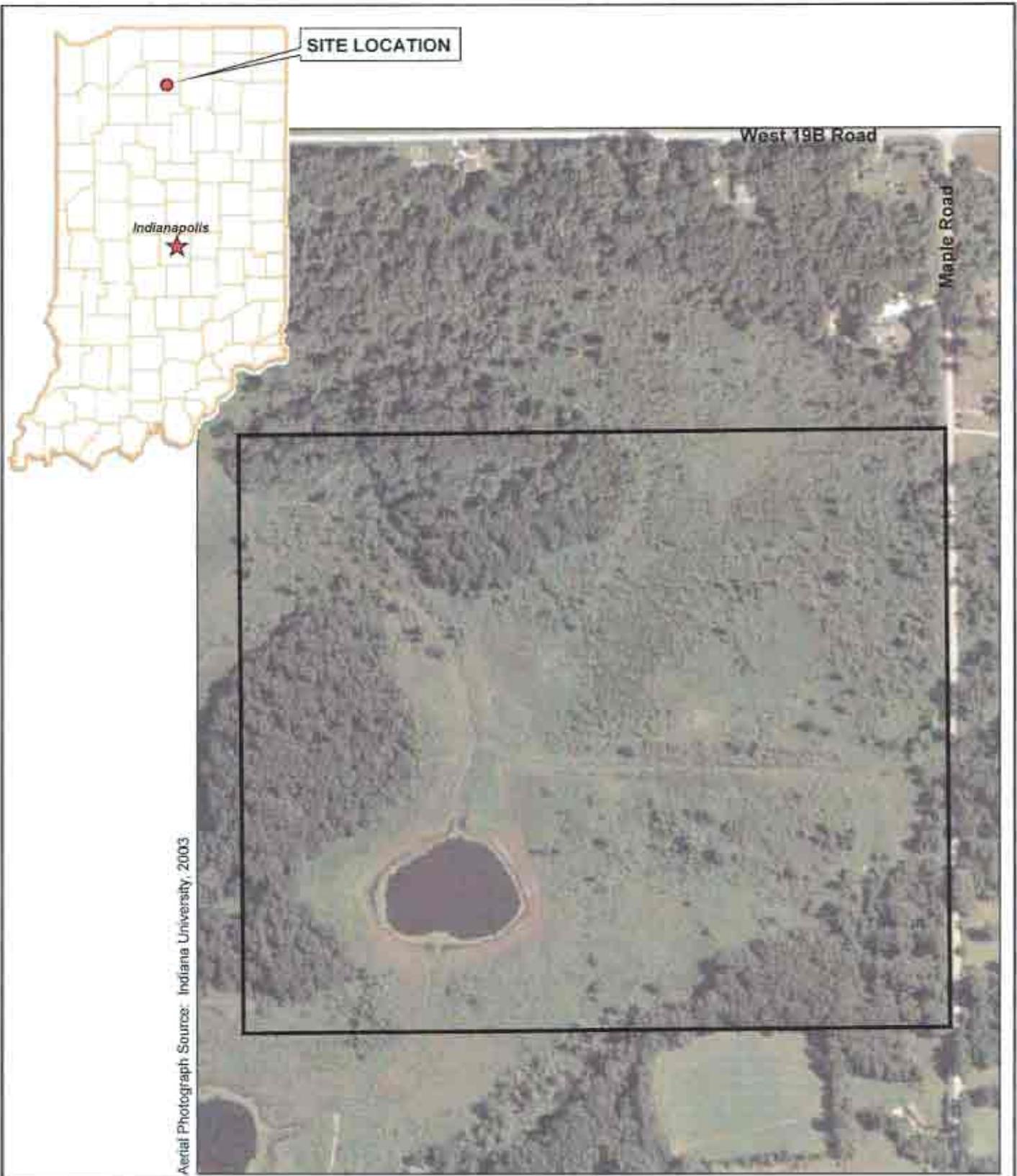
I am writing to express support for a Private Stewardship Grant Program application being submitted by J.F. New & Associates on behalf of landowner Scott Holaday. This pertains to a property located in Marshall County, Indiana southeast of the town of Culver.

Although he normally lives in Texas, I had the pleasure of meeting Mr. Holaday in July 2005 at the wetland property he owns in Indiana. Through the course of the summer, I visited his property several times. There are spring-fed fen habitats in several places on his property. Fens are a rare wetland community in Indiana, one that is becoming increasingly threatened by wetland destruction, plant succession, and invasive species. The natural quality of the wetlands at this site has been compromised by land use practices of previous owners. The most notable problems are attributable to drainage attempts in the wetland and from invasive species.

In spite of the problems, this site still has a high degree of natural quality with some parts of it exhibiting very high quality. Numerous conservative and habitat restricted plant species live there, including several species listed as rare, threatened or endangered in Indiana. The Massasauga Rattlesnake, a state endangered species, reportedly lives on the property.

One very exciting thing about this property is that Mr. Holaday, a rather recent owner of it, is excited about natural areas, and wants to do the right things to restore the site to a better natural condition. I whole-heartedly support grant funding for this site. The property well deserves the attention given to it by this proud new landowner. The grant will help him to make it better through invasive species control and other habitat restoration efforts.

I hope you will look favorably upon this grant application. Let me know if can be of further assistance. My phone number is 317-232-4053; my e-mail is:  
[Lcasebere@dnr.in.gov](mailto:Lcasebere@dnr.in.gov)



**Figure 1: Holaday Fen  
Marshall County, Indiana**



Scale: 1" = 400'



708 Roosevelt Road, Walkerton, IN 46574  
 Phone 574-586-3400 / Fax 574-586-3448  
[www.jfnew.com](http://www.jfnew.com)