

BIOLOGICAL RESOURCES

Wildlife

The French Creek watershed contains a wealth of wildlife resources, both aquatic and terrestrial. There is an abundance of species of special concern, considered rare, threatened, or endangered in the state and in the nation, and also numerous game and non-game species. This amazing biodiversity leads to an enormous array of wildlife viewing and outdoor recreation opportunities. Perhaps more importantly, is the significance and importance this exceptional biodiversity places on conservation initiatives in the French Creek watershed.

Terrestrial

Mammals

There are 63 extant species of mammals in the Commonwealth with another 10 species considered either uncertain or extirpated within Pennsylvania (Merritt, 1987). Fifty species of mammals have ranges that overlap with the French Creek watershed (Appendix F). No rare, threatened, or endangered mammals are listed for the French Creek watershed, although a few have general ranges that include the watershed. There have been unconfirmed reports of river otters (*Lutra canadensis*) seen on French Creek. These individuals, once common in the watershed, may be making their way back to French Creek due to reintroduction efforts in western New York and on the Allegheny River in Pennsylvania.

Many of the mammals once common in the watershed and in other areas of the state have been lost due to the decline of large expanses of forested areas, these include the marten (*Martes americana*), fisher (*Martes pennanti*), and mountain lion (*Felis concolor*). The white-tailed deer (*Odocoileus virginianus*), eastern chipmunk (*Tamias striatus*), woodchuck (*Marmota monax*), striped skunk (*Mephitis mephitis*), porcupine (*Erethizon dorsatum*), eastern cottontail rabbit (*Sylvilagus floridanus*), short-tailed shrew (*Blarina brevicauda*), little brown bat (*Myotis lucifugus*), raccoon (*Procyon lotor*), muskrat (*Ondatra zibethica*), opossum (*Didelphis marsupialis*), and beaver (*Castor canadensis*), are some of the more common mammals found in the French Creek watershed (French Creek Project, web).

Birds

There are at least 379 bird species that nest, winter, or migrate throughout Pennsylvania. Many of these can be found in the French Creek watershed for at least part of the year. French Creek is located near the convergence of major migratory routes for songbirds and waterfowl that are traveling to the Atlantic coast and the Mississippi River and Gulf of Mexico from areas in the northeast U.S. and Canada during the fall and back to northern areas in the spring. Its location along these migratory routes and its diversity of habitats, including a wealth of wetlands, lakes, and streams, affords year-round birding opportunities in the French Creek watershed.

The Audubon Society has designated four Important Bird Areas within the French Creek watershed:

- Cussewago Bottom

- Hemlock Hill Research Area
- U.S. Fish & Wildlife Service Erie National Wildlife Refuge
- Conneaut Marsh

The Audubon Society defines an IBA as:

A site of special significance to breeding or non-breeding birds, which, on some basis, can be distinguished from surrounding areas. (Boundaries may be natural, such as watersheds, or man-made, such as roads and property boundaries.) In general, an IBA should exist as an actual or potential protected area, or it should have the potential to be managed in some way for the benefit of birds and other wildlife. There is no minimum or maximum size for an IBA, but whenever possible, an IBA should be large enough to supply all or most of the requirements of the birds during the season for which it is important.

The Cussewago Bottom IBA is an area of riparian and bottomland habitats running along Cussewago Creek from Meadville to the headwaters of the stream. It is comprised of public State Game Lands #152 and #269 and privately owned land. Habitat includes high-quality wetlands, bottom land and hardwood forest (Crossley, 1999). More than 200 species of birds probably occur on this IBA on a regular basis, including nesting bald eagles.

The Hemlock Hill Research Area IBA is a privately owned site adjacent to the Erie National Wildlife Refuge in Crawford County. It is comprised of habitat ranging from mixed woodlands to open fields in varying successional stages. It has been designated an IBA due to ongoing ornithological research at the site as well as the diverse avifauna ranging from Carolinian to Boreal species that are found there (Crossley, 1999).

The Erie National Wildlife Refuge in Crawford County was established in 1959 primarily as waterfowl habitat and has been designated an IBA. This refuge has a variety of habitats ranging from mixed forest to fields with large areas of wetlands. Muddy Creek flows through a portion of the refuge. Over 236 species of birds have been recorded from the site, with at least 112 species breeding there (Crossley, 1999). There are large numbers of migratory waterfowl, songbirds, and shorebirds that inhabit the refuge during various times of the year. Nesting bald eagles are also in the area.

Conneaut (Geneva) Marsh is the final IBA in the French Creek watershed. The largest marsh system in Pennsylvania, Conneaut Marsh is owned entirely by the PA Game Commission. It is one of the most important IBAs in the state for wetland species. The habitat varies from forested wetland to scrub-shrub wetland to open, emergent marsh wetlands. It supports large numbers of waterfowl, shorebirds, and songbirds that prefer wetland habitats. The state endangered black tern, American bittern, and least bittern nest in Conneaut Marsh, as well as bald eagles.

Reptiles and Amphibians

Studies of the amphibians and reptiles in the Erie County portions of the French Creek watershed documented 26 species during 1994-1995, including ten salamanders, eight toads and frogs, two turtles and six snake species (McKinstry *et al.*, 1999). The most abundant species were green

frogs (*Rana clamitans*), dusky salamanders (*Desmognathus spp.*), and eastern American toads (*Bufo americanus*). Twenty additional species were historically recorded from the French Creek watershed and were not found during the 1994-1995 sampling.

Game Species

There are many game species in the French Creek watershed. Some of the more important game species include the white-tailed deer, wild turkey (*Meleagris gallopavo*), ruffed grouse (*Bonasa umbellus*), eastern cottontail, numerous waterfowl species, introduced ring-necked pheasant (*Phasianus colchicus*), and squirrels. Popular furbearing species include coyote (*Canis latrans*), red fox (*Vulpes vulpes*), gray fox (*Urocyon cinereoargenteus*), beaver, muskrat, mink (*Mustela vison*), and raccoon.

Aquatic

Fish

French Creek has gained national attention for its diversity of aquatic life. Eighty-eight species of fish have been recorded in the French Creek drainage prior to 1999. This is more species than any other comparably sized stream in Pennsylvania and anywhere north and east of Pennsylvania (Stauffer, 2000). In 2000, another species, the pugnose minnow (*Opsopoeodus emiliae*), was documented by the PA Fish & Boat Commission and verified by Penn State University fish biologists. These species totals probably closely represent the ichthyofauna present in French Creek prior to European settlement. A complete list of the fishes of the French Creek drainage including sub-basin distributions is given in Appendix G.

Biodiversity in French Creek is perhaps best represented by a group of fish known as darters. There are 15 species of darters in the French Creek watershed (Table 5) with as many as 13 collected from a single riffle area by researchers. Eight of the 15 French Creek darter species are listed as threatened or endangered in Pennsylvania.

Table 5. Darter Species of the French Creek Watershed

Common Name	Scientific Name	Known Range	PA Status
eastern sand darter	<i>Ammocrypta pellucida</i>	French Creek	endangered
greenside darter	<i>Etheostoma blennioides</i>	French, Sugar, Cussewago, LeBoeuf, Woodcock, Muddy, West Branch, South Branch	stable
rainbow darter	<i>Etheostoma caeruleum</i>	French, Sugar, LeBoeuf, Woodcock, Muddy, West Branch, South Branch	stable
bluebreast darter	<i>Etheostoma camurum</i>	French Creek	threatened
Iowa darter	<i>Etheostoma exile</i>	Lake Pleasant, LeBoeuf	endangered
fantail darter	<i>Etheostoma flabellare</i>	French, Sugar, Cussewago, LeBoeuf, Woodcock, Muddy, West Branch, South Branch	stable

spotted darter	<i>Etheostoma maculatum</i>	French Creek (PA & NY)	threatened
Johnny darter	<i>Etheostoma nigrum</i>	French, Sugar, Cussewago, LeBoeuf, Muddy, West Branch, South Branch	stable
Tippecanoe darter	<i>Etheostoma tippecanoe</i>	French Creek	threatened
variegated darter	<i>Etheostoma variatum</i>	French, Muddy, West Branch, South Branch	stable
banded darter	<i>Etheostoma zonale</i>	French, Sugar, Cussewago, LeBoeuf, Woodcock, Muddy, West Branch, South Branch	stable
logperch	<i>Percina caprodes</i>	French, Cussewago, LeBoeuf, West branch, South Branch	stable
gilt darter	<i>Percina evides</i>	French Creek	threatened
longhead darter	<i>Percina macrocephala</i>	French Creek	threatened
blackside darter	<i>Percina maculata</i>	French, Sugar, Cussewago, LeBoeuf, Muddy, West Branch, South Branch	stable
Source: WPC files			

These small fish, ranging from about 1.5 inches to 7 inches in length, are related to perch and walleye. Darters get their name from their behavior of darting around the stream bottom in search of prey or to avoid predators. They live primarily in riffles and runs of streams with high water quality; although some can be found in lakes. For the most part they lack swim bladders, which allows them to rest on the bottom.

Darters are an important indicator of water quality because they do not migrate from one season to the next and remain relatively stationary in stream systems (White and Stauffer, 1992). Darters rely on high dissolved oxygen, low temperatures, and low bed siltation rates, making them highly susceptible to environmental threats like those associated with improper agricultural practices (McAlpine, 1999). While acceptable water quality and substrate conditions exist in many sections of French Creek, other areas are threatened by improper agricultural, forestry, and development practices that contribute excessive nutrients and siltation to the stream.

French Creek's fishes also include several gamefish species. Anglers flock to the French Creek watershed's streams, lakes, and reservoirs for walleye, smallmouth and largemouth bass, muskellunge, northern pike, several panfish species, and trout, largely stocked by the PFBC (Table 6).

Table 6. 2000 Trout Stockings by the PFBC in the French Creek Watershed

Waterway	Preseason			In-season		
	Brook	Brown	Rainbow	Brook	Brown	Rainbow
Conneauttee Creek	0	150	150	0	0	600
S. Br. French Creek	0	3300	3300	0	2450	2450

Lake Pleasant	0	840	3360	0	1080	9720
Muddy Creek	560	420	420	440	330	330
Woodcock Creek (1)	750	1000	750	570	760	570
Woodcock Creek (2)	450	600	450	660	880	660
Mill Creek	0	200	200	0	0	0
North Deer Creek (1)	0	150	150	0	0	0
North Deer Creek (2)	0	550	550	0	400	400
Prather Creek	650	650	0	500	500	0
Sugar Creek (1)	0	1440	960	0	1080	720
Sugar Creek (2)	0	2850	2850	0	4000	4000
E. Br. Sugar Creek (1)	0	150	150	0	150	150
E. Br. Sugar Creek (2)	0	1550	1550	0	1150	1150
Little Sugar Creek (1)	0	850	850	0	650	650
Little Sugar Creek (2)	0	2200	2200	0	1650	1650
Source: PFBC files						

Freshwater Mussels

French Creek is probably most noted for its freshwater mussel species. Twenty-nine out of Pennsylvania's approximate 65 species of freshwater mussels have been recorded from the French Creek drainage (Table 7). Twenty-seven of these have been recorded from the main stem of French Creek. Of these totals, 27 species are still known to have surviving populations in the watershed as a whole, with 26 of these still existing in the main stem. This represents a significant percentage of Pennsylvania's mussel resources given that continuing research indicates that 17 of the original 65 species have now been extirpated from the Commonwealth. Therefore, 57% of Pennsylvania's surviving mussel species inhabit the French Creek drainage (Western Pennsylvania Conservancy, 1999). French Creek contains the highest freshwater mussel diversity of any stream in Pennsylvania, as well as anywhere to the north and east in the United States.

Table 7. Freshwater Mussel Species Recorded from the French Creek Watershed

Common Name	Scientific Name	G Rank	S Rank	U.S. Status	PA/PBS Status
mucket	<i>Actinonaias ligamentina</i>	G5	S4		
elktoe	<i>Alasmodonta marginata</i>	G4	S4		
three-ridge	<i>Amblema plicata</i>	G5	S2S3		PT
cylindrical papershell	<i>Anodontoides ferussacianus</i>	G5	S2S3		PE
purple wartyback ¹	<i>Cyclonaias tuberculata</i>	G5	SX		PX
spike	<i>Elliptio dilatata</i>	G5	S4		
northern riffleshell	<i>Epioblasma torulosa rangiana</i>	G2T2	S1S2	LE	LE
snuffbox	<i>Epioblasma triquetra</i>	G3	S1		PE
long-solid	<i>Fusconaia subrotunda</i>	G3	S1		PE
plain pocketbook	<i>Lampsilis cardium</i>	G5	S4		

wavy-rayed lampmussel	<i>Lampsilis fasciola</i>	G4	S4		
pocketbook	<i>Lampsilis ovata</i>	G5	S3S4		
fatmucket	<i>Lampsilis siliquoidea</i>	G5	S4		
white heelsplitter	<i>Lasmigona complanata</i>	G5	S1		PE
creek heelsplitter	<i>Lasmigona compressa</i>	G5	S2S3		PE
fluted-shell	<i>Lasmigona costata</i>	G5	S4		
eastern pondmussel ²	<i>Ligumia nasuta</i>	G4G5	S1		
black sandshell	<i>Ligumia recta</i>	G5	S3S4		
clubshell	<i>Pleurobema clava</i>	G2	S1S2	LE	LE
round pigtoe	<i>Pleurobema coccineum</i>	G4	S2		PE
kidneyshell	<i>Ptychobranhus fasciolaris</i>	G4	S4		
giant floater	<i>Pyganodon grandis</i>	G5	S4		
rabbitsfoot	<i>Quadrula cylindrica</i>	G3	S1		PE
salamander mussel	<i>Simpsonaias ambigua</i>	G3	S1?		CU
squawfoot	<i>Strophitus undulatus</i>	G5	S4S5		
lilliput ³	<i>Toxolasma parvus</i>	G5	S1		PE
paper pondshell	<i>Utterbackia imbecillis</i>	G5	S3S4		
rayed bean mussel	<i>Villosa fabalis</i>	G1G2	S1S2		PE
rainbow mussel	<i>Villosa iris</i>	G5	S1		PE

Notes:

¹ The only species apparently extirpated from the French Creek watershed. Once recorded from French Creek proper in the lower reaches.

² This species is believed to have been introduced to the French Creek drainage, probably through the introduction of certain fish carrying larval mussels.

³ Historically recorded from a tributary to French Creek. Although not recently verified, this species probably still exists.

Key:

G Rank – Global Rank, is a relative scale of global rarity on a scale of G1 (critically imperiled) to G5 (secure, common). PA Natural Diversity Inventory.

S Rank – State Rank, is a relative scale of rarity in PA on a scale of S1 (critically imperiled) to S5 (secure, common). PA Natural Diversity Inventory.

SX – extirpated in PA.

U.S. Status – U.S. Endangered Species Act status (USFWS). **LE** = Listed as Endangered.

PA/PBS Status – Pennsylvania Status (PFBC)/Pennsylvania Biological Survey recommended status. **LE** = Listed as Endangered. **PE** = PBS recommended for Endangered. **PT** = PBS recommended for Threatened. **CU** = PBS Condition Undetermined. **PX** = PBS Extirpated in PA.

Source: WPC and PNDI-west files

The unique and complex lifestyle of freshwater mussels makes them extremely vulnerable to pollution and habitat degradation. These organisms lead a relatively sessile existence as adults. They burrow into the stream bottom with a muscular foot and rarely move more than a few hundred feet during their lifetimes, which can sometimes be 50 or more years. They siphon water into their bodies using incurrent and excurrent siphons. The water then passes through

their gills where oxygen is extracted for breathing and then through their gut where microorganisms and other material are filtered for food.

Pollutants in the water can be taken up in the mussels' body tissue making many species extremely susceptible. Siltation caused by excessive erosion can smother entire mussel beds. In addition, excessive nutrients can deplete the oxygen levels in the water. All of these conditions are potential threats in the French Creek watershed as improper agricultural practices contribute nutrients, sediments, and pesticides to the water, improper timbering increases nutrient runoff and erosion, and riparian areas continue to be lost to timbering, agriculture, and development. Freshwater mussels are also extremely susceptible to chlorine commonly used in treating wastewater and discharged into the stream.

Despite these threats, only one species of freshwater mussel has been lost from the watershed in recent times. However, reductions in freshwater mussel density and diversity have been noted downstream of urban areas like Meadville (Western Pennsylvania Conservancy, 1993) and near the mouth of French Creek at Franklin (Western Pennsylvania Conservancy, 1994). More research is needed to fully understand species distributions, habitat availability, and existing threats.

Macroinvertebrates

Aquatic insects and other macroinvertebrates are commonly used as indicators of water quality. Many studies by PA Department of Environmental Protection, U. S. Army Corps of Engineers, U. S. Geological Survey, university researchers, and other organizations have sampled the aquatic macroinvertebrates in areas of the French Creek watershed. The Nature Conservancy has also monitored aquatic macroinvertebrates in the New York headwaters of French Creek.

The most comprehensive macroinvertebrate sampling to date has been done through the DEP's Unassessed Waters Program. State water pollution biologists perform qualitative sampling of macroinvertebrates and identify specimens to the family level in the field. A high of 25 families have been found at several of over 250 sampling sites throughout the watershed.

Between 1987 and 1999 the USACE studied adult aquatic insects at the Corps' 16 flood control structures in Ohio, West Virginia, and Pennsylvania. They sampled the inflows, outflows, and tributaries to each of the impoundments using light traps. Included in the study were the Union City Reservoir Dam and Woodcock Creek Lake within the French Creek drainage. Nine insect orders were documented: mayflies (Ephemeroptera), damselflies (Odonata), stoneflies (Plecoptera), true bugs (Hemiptera), dobsonflies (Megaloptera), beetles (Coleoptera), caddisflies (Trichoptera), moths (Lepidoptera), and true flies (Diptera), with caddisflies being the most important in terms of numbers and diversity of species collected and the only order for which lower taxa information was provided in this summary report (Fowles, 2000). The most important note from this study was that the West Branch of French Creek had the highest diversity (49 taxa) of caddisflies out of all streams sampled in Ohio, West Virginia, and Pennsylvania. In addition, a caddisfly belonging to the Genus *Cernotina* was collected from the inflow of Union City Reservoir and represents the first record of this genus in Pennsylvania (Fowles, 2000).

In general, aquatic insects and other macroinvertebrates densities and diversity in the French Creek watershed appear to be very good. Some areas where impairments have been noted due to several possible factors have shown depressed densities or diversity or both. Often, when pollution impacts sensitive macroinvertebrate species, an increase in tolerant species will be noted due to a lack of competition for resources. Benthic (bottom dwelling) macroinvertebrates are often the first to show signs of problems with water quality and should be monitored carefully and comprehensively throughout the watershed. Many fish and other higher aquatic organisms rely on macroinvertebrates for food and the macroinvertebrates themselves play an important role in breaking down organic material to add energy to the aquatic food web.

One of the major obstacles in assessing macroinvertebrate information for French Creek is the lack of genus and species level identification at sampling sites. Often, aquatic macroinvertebrates are identified to the order and family, but due to the time and/or expense required to perform genus or species level identification, this information is typically missing.

Others

French Creek is also home to a unique, fully aquatic salamander, the eastern hellbender (*Cryptobranchus alleganiensis*). As Pennsylvania's largest amphibian, the eastern hellbender can grow to a length of 29 inches, weigh five pounds, and live for nearly 30 years. The eastern hellbender is found in larger streams and rivers where substantial rocks and logs allow it to hide during the daytime and feed at night. It has declined through much of its historical range due to acid mine drainage, industrial pollution, and excessive siltation (French Creek Project, web). It is still found in the Ohio River and Susquehanna River basins, with a viable population existing in French Creek.

A new non-native aquatic organism to the French Creek watershed was discovered in October 2000. The zebra mussel (*Dreissena polymorpha*), a freshwater bivalve, made its first documented appearance in an inland Pennsylvania lake when it was discovered in Edinboro Lake in Erie County. The zebra mussel is a pervasive exotic species that first came to North American waters from Europe in international shipping ballast water. It was introduced to the Great Lakes in the mid-1980's where it quickly increased in numbers to the point of clogging power plant, industrial and public drinking water intakes, fouling boat hauls, and disrupting the aquatic ecosystem of the Great Lakes.

The zebra mussel is transported between waterways in live wells and bilge pumps of boats, in scuba equipment, and in bait bucket water among other ways. Once established in high numbers, they filter large quantities of water and strip lakes of microorganisms, which normally provide food for native organisms. Zebra mussels attach themselves to native mussel shells and other benthic substrates and impact the native mussel's ability to filter, move, and open and close its shell. Severe freshwater mussel kills have occurred in Lake Erie for these reasons. Once established, there is no proven way to rid the waterway of this organism. To date, the zebra mussel has been unsuccessful at establishing itself in the flowing streams of lake outlets. If it is able to establish itself in French Creek through Conneauttee Creek (the outflow of Edinboro Lake), it could prove devastating to the native mussels of the French Creek watershed.

Another introduced mollusk in the French Creek watershed in the Asian clam (*Corbicula fluminea*). This widespread and common species was discovered in Conneaut Outlet in the 1990's after surveys showed no sign of it in the 1980's. The Asian clam occurred above the Conneaut Lake Borough sewage treatment plant and researchers speculate that chlorination by the sewage treatment plant discharge may have kept it from moving downstream (personal communication). However, due to the existence of the federally endangered clubshell mussel in Conneaut Outlet, the USFWS stopped the sewage treatment plant from discharging chlorine. No surveys have been conducted to determine the current range of the Asian clam in Conneaut Outlet. More recently, the Asian clam has been discovered in the West Branch of French Creek (Wellington, 2001).

Vegetation

The French Creek watershed lies almost entirely within the region that historically would have been comprised of Northern Hardwood Forest communities. Dominant species would have included sugar maples (*Acer saccharum*), yellow birch (*Betula alleghaniensis*), American beech (*Fagus grandifolia*), and eastern hemlock (*Tsuga canadensis*) interspersed with white pine (*Pinus strobus*), oaks (*Quercus spp.*), and other maples. This was especially true of upland areas in northern sections of the watershed. Eastern hemlock and white pine dominated the wetter, lowland areas. Oak, particularly white oak (*Quercus alba*), dominated the floodplain of the southern parts of the watershed.

Prior to European settlement, the area was almost entirely forested with some open prairie-like areas in the southern oak-forest sections of the watershed. Periods of intense timbering and clearing the land for agricultural purposes have left the French Creek watershed with a diverse array of plant communities. Within this mosaic of different land uses exists farmland habitat, grassland habitat, old-field habitat, and a variety of wetland habitats in addition to brushy and forested areas.

Currently in a period of agricultural decline, many pieces of land, particularly on the ridge tops, are reverting back to forest. These woodland patches are primarily a mixed oak community. The regeneration of forested areas expands the threats of improper timbering practices impacting the French Creek watershed. Of particular importance are areas of mature floodplain forest in riparian areas throughout the watershed. These areas are currently being targeted by timbering operations and are afforded little protection through wetland or riparian regulations.

Invasive exotic plant species like purple loosestrife, hybrid cattails, and common reed are threats to the native vegetation especially in wetland areas throughout the watershed. These plants thrive in disturbed areas and once established, can quickly out-compete native plants. Native aquatic plant communities are also at risk from the introduction of invasive Eurasian watermilfoil to lakes and streams in the watershed. This plant, found in many French Creek lakes, is a continuing threat to those lakes that contain many rare, threatened, and endangered native aquatic plants. Spread primarily by pieces attached to boat hulls, trailers, and propellers, once introduced, this plant can spread rapidly and out-compete native flora.

Pennsylvania Natural Diversity Inventory

The Pennsylvania Natural Diversity Inventory is a partnership between PA Department of Conservation and Natural Resources, TNC, and Western Pennsylvania Conservancy. The Pennsylvania Natural Diversity Inventory is a program that tracks occurrences of rare, threatened, or endangered species (species of special concern), and unique natural communities and habitats throughout Pennsylvania. These species, natural communities, and unique habitats are referred to as elements. In western Pennsylvania, it is the responsibility of WPC to track PNDI element occurrences. A total of 158 PNDI elements are reported from the French Creek watershed and buffered locations are shown in Figure 20 (Western Pennsylvania Conservancy, 2001). These include nine bird species, 19 fish species, one reptile species, three insect species, 17 unionid species, nine natural communities, three unique habitats, and 97 plant species. A summary of PNDI data identifying features by sub-watershed within the French Creek drainage is contained in Appendix H.

Freshwater Mussel Species of Special Concern

Two of the mussels found in French Creek are presently listed as Endangered under the U.S. Endangered Species Act and the PA Fish Code, the northern riffleshell and the clubshell mussels. Thirteen other mussel species are considered rare, threatened, or endangered in Pennsylvania according to the Pennsylvania Biological Survey (Table 8). One species, the purple wartyback, is considered extirpated from Pennsylvania, but was recorded from French Creek in the early 1900's.

Fish Species of Special Concern

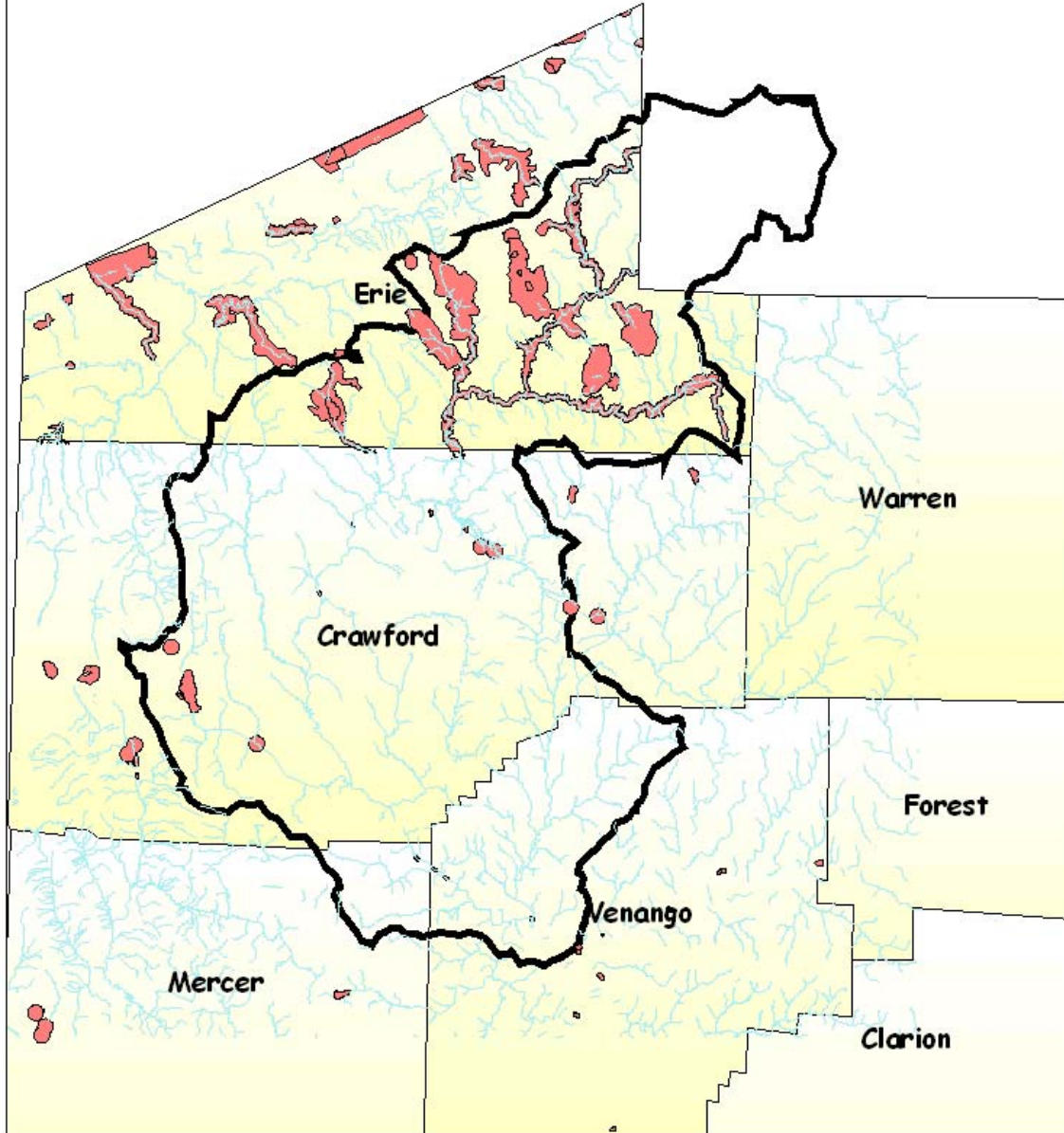
Eight of the 15 species of darters found in the French Creek watershed are considered threatened or endangered in the Commonwealth (Table 5). The state endangered spotted darter is found as far north as the New York headwater portions of the watershed.





There are three special concern species of lamprey in the French Creek watershed. These ancient fish resemble eels and are related to the parasitic sea lampreys that have invaded the Great Lakes, but do not represent the same threat to fishes that the sea lamprey does. The mountain brook lamprey, Ohio lamprey, and American brook lamprey (*Lampetra appendix*), are all threatened in Pennsylvania.

There are three madtom species within the French Creek watershed that are considered threatened or candidate for listing. Related to catfish, madtoms have been documented as far south as the Mercer County portions of French Creek. The mountain madtom (*Noturus eleutherus*), and northern madtom (*Noturus stigmosus*), are threatened in Pennsylvania and the brindled madtom (*Noturus miurus*), is a candidate species.

There are six other fish species of special concern documented from the French Creek watershed. Some of these species were documented in the early 1900's and have not recently been verified. All other fish species of concern have been verified since at least 1985. The longnose gar (*Lepisosteus osseus*) was last documented from Conneaut Lake in 1938. The blackchin shiner

Figure 20. Occurances of Species and Natural Communities of Special Concern in French Creek Watershed



-  Occurance of Elements
-  French Creek Watershed
-  Counties
-  Rivers and Streams



(*Notropis heterodon*) was last documented from Conneaut Lake in 1938 and Lake Pleasant in 1995. The blacknose shiner (*Notropis heterolepis*) is considered to be extirpated from Pennsylvania. It was last recorded from French Creek in 1935 and Conneaut Lake in 1938. The gravel chub (*Erimystax X-punctatus*) was last recorded from Sugar Creek in 1939 but was recorded in the lower reaches of French Creek during the 1980's. The redbfin shiner (*Lythrurus umbratilis*) was last recorded in the Erie County headwaters of Cussewago Creek in 1938, but recorded in the Crawford County sections of the stream in the 1980's. The warmouth (*Lepomis gulosus*) was last recorded in Lake Pleasant in 1971 and Trout Run in 1982.

Other Species of Special Concern

There are three insect species of concern found within the French Creek watershed that are tracked by PNDI. The bog copper butterfly (*Lycaena epixanthe*) was last recorded in the Hubbel Run watershed in 1985 and the blue-nosed damer (*Nasiaeschna pentacantha*), a dragonfly, was last recorded from Mercer County sections of the watershed in 1957. The spring blue damer (*Aeshna mutata*) was recorded from the Conneaut Outlet as recently as 1995.

One reptile, blanding's turtle (*Emydoidea blandingii*) is considered extirpated in Pennsylvania but was recorded from Conneaut Lake in 1904. That record might represent the movement of turtles from Lake Erie into the French Creek drainage via man-made canal systems.

Nine bird species of concern are recorded from the French Creek watershed. The American bittern, as a nesting species, was historically recorded from Lake Pleasant and Conneaut Lake in 1890. It was then again recorded from Conneaut Lake in 1982 but no recent sightings of this bird have been confirmed for Lake Pleasant. The expansive marshes associated with these lakes provide breeding habitat for this bird. The least bittern was last recorded from Conneaut Lake in 1982, and was seen at Lake Pleasant in 2000, but nesting behavior could not be verified.

Bald eagles are considered endangered in Pennsylvania, even though they have been downgraded to threatened nationwide, and their numbers are increasing in the French Creek watershed. These birds have been gone from Erie County since 1956 when the last nest was cut down on Presque Isle to make room for a marina. Since 1999, bald eagles have returned and nested on French Creek, north of the Union City Dam. There are a number of bald eagle nests in Crawford County portions of the watershed. Bald eagles currently nest on Sugar Lake and in the Conneaut Marsh along the Conneaut Outlet. In 2000, a new nest was discovered near the Seneca Division of the Erie National Wildlife Refuge in Crawford County.

The Pennsylvania Endangered black tern nests in Conneaut Outlet and was last recorded in 1983. Other birds found in Conneaut Marsh include the sedge wren (*Cistothorus platensis*), Pennsylvania Threatened, and the marsh wren (*Cistothorus palustris*), a candidate for listing. The sedge wren has not been observed since 1928 but the marsh wren was observed as recently as 1982. There is also a historic record for the short-eared owl (*Asio flammeus*), a Pennsylvania Endangered bird, from McMichael Run, Crawford County in 1906.

The French Creek watershed is home to 97 vascular plant species of concern. Many of these are fully aquatic or wetland species associated with calcareous, alkaline water chemistry. Much of

Pennsylvania does not have soils or bedrock with high natural buffering capacity like the French Creek basin does. The overall alkaline water quality in the watershed's lakes, streams, and wetlands has allowed unique, alkaline-loving plant communities to thrive. Many of these species are found at very few locations in the state outside of the French Creek basin.

Common groups of plant species of concern in the French Creek watershed include asters, native water-milfoils, sedges, pondweeds, and wild orchids. The latter group is an especially important group of wetland flowers found in several of the alkaline fen wetlands throughout the watershed. Wild orchids range from extremely conspicuous, such as the showy-lady's slipper (*Cypripedium reginae*), to small, inconspicuous flowers of the leafy white orchids (*Platanthera dilatata*), and leafy northern green orchids (*Platanthera hyperborea*).

Natural Communities and Habitats of Special Concern

In addition to species of concern, PNDI also tracks important natural communities and habitats. These are referred to as landscape element occurrences. A natural community is a group of different species that is adapted to living together under certain conditions or in certain habitats. The habitats found in the French Creek watershed are unique geologic or hydrologic features like:

- calcareous glacial lake
- high-gradient clearwater creek
- medium-gradient clearwater river

and the important natural communities found in the French Creek watershed are:

- eastern hemlock mixed mesic hardwood forest
- basin graminoid-forb fen
- calcareous marsh
- hillside graminoid-forb fen
- northern Appalachian calcareous seep
- glacial bog
- poor fen
- robust emergent marsh
- shrub fen

These landscape element occurrences are found in the French Creek watershed because of the unique soil types and hydrologic regimes, which resulted from the region's glacial history. They are considered rare because the exact conditions that allow them to exist occur nowhere else in Pennsylvania.

Important Habitats

Many important habitats have been discussed. These include IBAs, wetlands, glacial lakes, preserved natural areas (i.e. Erie National Wildlife Refuge, State Game Lands, State Forests, TNC owned lands, WPC owned lands), and French Creek. The French Creek watershed is a vast

system of inter-related habitats. Especially important is the riparian habitat along the streams and lakes in the watershed. Not only does this provide habitat for numerous species, but it also provides protection to the wetland and aquatic habitats that it buffers. There are ranges of habitats from recently mined, highly disturbed areas through early-succession grasslands, mid-succession shrublands, and patches of late succession, mature forests. All of these different habitats that comprise the French Creek watershed account for the diversity of natural resources found within the basin.