Fish Passage At Springville Dam

A Review of Fisheries Issues

NYS -DEC Bureau of Fisheries
Region 9 Fisheries Management Office
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Introduction

This document reviews issues related to fish passage over Springville Dam and in particular, those associated with passage of lake-run steelhead trout to the upper Cattaraugus Creek system.

Cattaraugus Creek flows from its headwaters at Java Lake in Wyoming County for 65 miles to Lake Erie. The stream has a drainage area of approximately 280 square miles. Springville Dam, a 40 foot high, 338 foot long structure built in 1922, is located 34 miles above the mouth and is impassable to fish. The dam has not generated electricity since 1998 and is currently maintained by Erie County as a recreational park. The US Army Corps of Engineers in partnership with NYS-DEC is currently evaluating the feasibility of fish passage at Springville Dam.

During the last 20 years a high quality lake-run steelhead fishery has developed in Cattaraugus Creek from the mouth to Springville Dam (hereafter referred to as *lower Cattaraugus Creek*). This fishery is supported by the stocking of steelhead smolts, although an estimated 25% of adult fish returning to the creek are of wild origin (Mikol 1976, Goehle 1998). Due to heavy siltation and high summer water temperatures, little successful spawning occurs in the main stream. Approximately 27 miles of tributary below Springville Dam provide steelhead spawning and nursery habitat (Table 1).

Public access for angling on the lower 34 miles of Cattaraugus Creek is limited (Table 1, Figure 1). Most of the lower 20 miles of the stream are within the Seneca Nation of Indians (SNI) Cattaraugus Reservation where fishing by non-Native Americans requires a SNI fishing license. Approximately 4 miles of public fishing rights easements (PFR) exist along lower Cattaraugus Creek and eight miles of the main stream and the South Branch are under NYSDEC jurisdiction (Zoar Valley Multiple Use Area). Access to the creek within the Zoar Valley MUA is considered challenging since much of it flows within a deeply incised gorge (Table 1, Figure 1). Lower Cattaraugus Creek is turbid during much of the time steelhead are in the stream (September-May) due to the abundance of clay soils and highly unstable, erodible banks.

From Springville Dam upstream (hereafter referred to as *upper Cattaraugus Creek*), NYSDEC maintains 34 miles of PFR easements (Table 2, Figure 2). From river mile (RM) 46, near the mouth of Elton Creek upstream to Java Lake, the creek runs clear most of the year, providing ideal trout angling conditions. NYSDEC annually stocks 18.2 miles (RM 40 to RM 58) along the main branch of upper Cattaraugus Creek and 6.2 miles of Elton Creek with yearling and two year old brown trout. Approximately 17 miles of the main stream and an additional 27 miles of several tributaries support abundant, fishable populations of wild, resident brown and rainbow trout. Relict populations of native brook trout occur in 15 headwater stream sections (Figure 3). At least 30 additional miles of smaller tributaries provide spawning and nursery habitat for wild trout populations (Table 2, Figure 3).

Sportfisheries

Lower Cattaraugus Creek

The sportfishery below Springville Dam is supported by lake-run steelhead, brown trout and a few chinook salmon (chinook salmon are no longer stocked in Lake Erie). Sportfisheries also exist for smallmouth bass, walleye and channel catfish. Other fishes such as rainbow smelt, suckers, redhorse, carp, minnows, dace, shiners, darters, white perch, yellow perch and bullhead are found below the dam, mainly in the lower 5 miles (Table 3). Steelhead support the most popular tributary sportfishery and have brought it international recognition (Markham 2006). Steelhead enter Cattaraugus Creek in early September and leave as late as June, providing a fishery lasting almost ten months. The peak of the fishery occurs in October and November, usually in the lower sections of the stream on the SNI lands. Steelhead migrate upstream 34 miles to Springville Dam (the first barrier impassable to fish) and many spawn in smaller tributaries. The lower creek is annually stocked with 90,000 “Washington strain” steelhead yearlings but studies indicate that naturally produced fish comprise about 25% of the adults returning to the creek (Mikol 1976, Goehle 1998). Angler effort compiled from recent creel surveys (2003-2005) showed that Cattaraugus Creek received the most angling effort for salmonids in both sampling years (27,649 and 56,574 angler trips, respectively) of any New York, Lake Erie tributary. Catch rates of salmonids were also very high at 0.41 fish/hour in 2003-04 and 0.56 fish/hour in 2004-05. Estimated total catch ranged from 30,303 to 55,112 trout and salmon (Markham 2006).

Several tributaries of Cattaraugus Creek below Springville Dam have abundant juvenile steelhead (Table 1). High densities of age 0 through age 3 steelhead/rainbows are found in Spooner Brook (NYSDEC, Lake Erie Fisheries Unit file data). It is unclear whether these age-2 and age-3 fish are steelhead that remain in the tributaries for additional years before dropping into Lake Erie, or if they are the resident strain, spending their entire life cycle in the stream. Similar populations occur in other Lake Erie tributaries as well (Eighteen Mile Creek, Canadaway Creek, Chautauqua Creek, Twenty Mile Creek).

Upper Cattaraugus Creek

In the first 15 miles above Springville Dam, the predominant fish species are white sucker, northern hog sucker, river chub, common shiner, creek chub, longnose dace, blacknose dace, central stoneroller and stonecat (Table 4). A few stocked brown trout, wild brown trout and wild rainbow trout are found in this section, although their numbers are limited by warm summer water temperatures (Region 9 fisheries file data).

From Elton Creek (RM 46) upstream to East Arcade (RM 58), Cattaraugus Creek supports a fishery for wild rainbow trout (360 adults/mile), wild brown trout (280 adults/mile) and stocked brown trout (Evans 2006). Other fish species present in this section include white sucker, northern hog sucker, blacknose dace, longnose dace, redside dace, central stoneroller, rainbow darter, fantail darter, common shiner, bluntnose minnow, mottled sculpin and green sunfish (Table 4) (Evans 2006). In the remaining 7 miles upstream to Java Lake some wild brown trout are found with the same general fish assemblage found in the previous section and a few warmwater species that have moved downstream from Java Lake (Table 4) (Region 9 fisheries file data). Little or no successful trout spawning occurs in the main stem of Cattaraugus Creek due to excessive siltation. Wild trout occurring there are likely migrants from tributaries.

Fishing pressure on the stocked portion of upper Cattaraugus Creek (18.2 miles) is considered high with an estimated 880 hours/acre of angling (15,488 angler trips). Thirty-nine percent of this effort occurred in April (Evans 1998). Pressure on the four unstocked wild trout tributaries was lower, ranging from 282 hours/acre on Clear Creek (Arcade) to 135 hours/acre on McKinstry Creek. Total estimated angler effort for the four streams was 2,865 angler trips (Cornett 2006).

Brown trout have been stocked in the upper Cattaraugus Creek system since the early 1900s. They were established in many tributary streams such as Lime Lake Outlet and Clear Creek by 1928 (New York State Conservation Department 1929). Rainbow trout stocking records in the Wyoming County portion of Cattaraugus Creek and Cheney Brook in the Clear Creek watershed go back as far as 1882 . Wild rainbow trout were well established in Elton Creek by 1928. These strains were similar to the short-lived strain of rainbow trout currently found in the upper Cattaraugus Creek system and reach a maximum age of four years and a maximum size of 9-12 inches (New York State Conservation Department 1929). Wild brown trout in upper Cattaraugus Creek live six years or more and may reach a maximum size of 24 inches, although fish greater than 18 inches are rare (Cornett 2006). In the tributary streams that have been extensively studied (Clear Creek, Lime Lake Outlet, Hosmer Brook and McKinstry Creek), trout populations are at or near carrying capacity for trout (Cornett 2006).

Fish Community Changes

If steelhead pass upstream of Springville Dam they would have access to more than 75 additional miles of fishable stream and over 50 miles of high quality spawning and nursery habitat currently containing "resident" wild brown and rainbow trout populations (Table 2). Brown trout, native to Europe but introduced to watersheds across New York State, is the most widespread of the two species in the upper Cattaraugus Creek system. Rainbow trout, native to the Pacific Coast drainages from California to Alaska, occur in two life-history forms, the resident (non-migratory) rainbow trout and the potamodromous (lake-run) steelhead. Both forms *(Oncorhynchus mykiss*) are indistinguishable from each other physically and perhaps even genetically in their early life (Behnke 2002). The origin of the upper Cattaraugus Creek/resident rainbow trout strain remains unclear due to early mixing of hatchery stocks (Behnke 2002). The only salmonid native to the Cattaraugus Creek system is the brook trout. It inhabits 15 small streams in the system and in only one stream, Spring Brook (Springville), are they the lone salmonid. Spring Brook has a barrier that would block migration of steelhead and other fish species.

Resident Brook, Brown and Rainbow Trout

Studies examining interactions between resident, wild brown trout, brook trout and introduced steelhead in the Great Lakes have provided interesting and sometimes conflicting results (Nuhfer et al. 2005, Kocik and Taylor 1996, Kocik and Taylor 1991, Ziegler 1988, Hearn 1987, Kruger 1985, Kruger et al. 1985). In the early 1990s, steelhead gained access to Whiteman's Creek, a 4th order tributary of the Grand River in Ontario where an abundant wild brown trout population existed. At the time of the steelhead introduction a study of regulation changes on the brown trout fishery was underway. Sampling in 1994 in the "no regulation change" and "regulation change" sections of the river showed that even with steelhead spawning, brown trout populations increased over pre-steelhead values. Anecdotal evidence since 1994 showed 2-3 times more steelhead present with no declines in brown trout numbers (Jim Bowlby and Larry Halyk, Ontario Ministry of Natural Resources, unpublished data). Although brown trout populations have not declined in Whiteman's Creek, the abundance of yearling steelhead has forced anglers to change their angling techniques to avoid catching young steelhead. Also, a significant fishery for wild resident (non-migratory) rainbow trout reaching large size (10-22 inches) has developed in the Grand River, downstream of Whiteman's Creek, perhaps as result of the steelhead spawning in that stream (Larry Halyk, Ontario Ministry of Natural Resources personal communication).

Significant declines in the brown trout fishery in the Pere Marquette River (MI) were associated with competition between steelhead parr and brown trout (Kruger et al. 1985). A Michigan DNR research study by Ziegler (1988) found that diets and habitat use of juvenile rainbow and brown trout were similar when found together in a stream, but this overlap did not appear to affect growth of young-of-year of either species. Differences in abundance of brown trout over 8 inches in allopatric (separate) versus sympatric (shared) populations lead researchers to conclude that competition with steelhead adversely affected the abundance of resident brown trout. Kocik and Taylor (1991) studied the survival and growth of age-0 brown trout with and without age-0 steelhead in an artificial stream and found that interactions with steelhead did not have negative effects on brown trout survival or growth. This study was conducted at lower densities than what is normally found in Great Lakes tributaries. Competition was minimal or nonexistent when populations were limited by processes other than competition (Hearn 1987).

No apparent impacts of age-0 steelhead on age-0 brown trout were found in Gilchrist Creek, Michigan (Kocik and Taylor 1996). Habitat use at age 0 was similar for both species but there was some vertical habitat separation with young steelhead higher in the water column and brown trout remaining near the bottom. Researchers hypothesized that the larger size of brown trout young-of-year, due to earlier hatching, may have permitted them to compete with the steelhead progeny. The study concluded that the two species may coexist in low gradient rivers similar to Gilchrist Creek but may not in higher gradient systems.

An ongoing study at the Hunt Creek Fisheries Research Station in Michigan, located near the Gilchrist Creek system showed different results (Nuhfer et al. 2005). Researchers stocked adult steelhead in a section of Hunt Creek previously inhabited by an abundant wild brown trout population and a small wild brook trout population to measure the effects of steelhead on the resident trout populations. Extensive flow, temperature and trout population data were collected prior to (1995-1997) and after (1998-2005) steelhead introductions. After steelhead were stocked in Hunt Creek the abundance of yearling and older wild brown trout declined by half. Annual survival of age-0 brown trout declined 23-36% while there was no change in survival of older brown trout. In a reference stream (where no steelhead were introduced), there was no change in brown trout abundance or survival. The mean length of age-2 and age-3 brown trout increased after steelhead were stocked. This may have been due to the increased number of young-of-year rainbow trout available as forage for the larger brown trout (Cornett 2006).

Wild brook trout abundance also declined in Hunt Creek after introduction of steelhead, but their abundance also declined in the reference stream where steelhead were not present (Nuhfer et al. 2005). Interestingly, the fall abundance of young-of-year brown trout did not decline, indicating steelhead did not impair brown trout spawning success. Apparently, poor over-winter survival to age 1, perhaps from poor condition, lead to lower abundance. The researchers further concluded there was likely some mortality to brown trout eggs or sac fry by steelhead redd superimposition, but they found less than 10% of brown trout redds were affected (Nuhfer et al. 2005). Some investigators have suggested that dense populations of large spawning steelhead could reduce the abundance of brown trout where available spawning areas are limited by dislodging or damaging early life stages during digging of their redds (Seelbach 1986; Kocik and Taylor 1991). Redd superimposition by rainbow trout reduced brown trout spawning success by 94% in an experimental section of a New Zealand stream (Hayes 1987).

Additional insights into interactions between wild brown trout and rainbow trout (resident strain) were observed in upper Cattaraugus Creek tributaries during extensive evaluations of a nine-inch minimum size limit. In Clear Creek, wild brown trout abundance remained stable from 1990 to 2002 while wild rainbow trout abundance increased from less than 30 adults/mile to over 460 adults/mile (Cornett 2006). Brown trout populations in these streams may have remained stable because of increased predation on age-0 rainbow trout and differential habitat selection (Pomeroy 1993, Cornett 2006).

In the Smoky Mountains of North Carolina and Tennessee, studies showed that introduced rainbow trout displaced wild brook trout from extensive areas of their original range (Larson and Moore 1985, Moore et al. 1983). No quantitative studies have been carried out in the upper Cattaraugus Creek tributaries where populations of rainbow trout and brook trout coexist to evaluate interactions between these species. Whether steelhead would negatively impact wild brook trout populations in the upper Cattaraugus Creek watershed is unknown. Only one brook trout stream (Spring Brook, Springville) in the upper Cattaraugus Creek system is isolated from resident brown and rainbow trout populations and this stream has a natural barrier to prevent upstream migrations by steelhead.

Information is lacking regarding interactions between steelhead and resident rainbow trout in the Great Lakes Region but Bjornn (1978) evaluated impacts of stocking steelhead into Big Springs Creek in Idaho. He found that 13 years after steelhead had been stocked, resident rainbow trout abundance was reduced by approximately 60%. The causal agent for this reduction may have been out-migration of resident rainbows greater than age 1 due to intraspecific (within species) competition. Juvenile steelhead and resident rainbows shared virtually identical habitat requirements and in coastal Washington streams with established steelhead populations, resident rainbow populations were rare or non-existent (Hunter 1989). Steelhead progeny seemed to out-compete resident rainbow trout but no competitive criteria were identified.

The steelhead's higher fecundity may assist it in competitive interactions with resident rainbow trout. Barnhart (1991) reported that a 20 inch female steelhead produced 3,500 eggs while a 10 inch resident rainbow trout may only produce 500 eggs. Depending on the densities of both steelhead and resident spawners, steelhead may out-produce resident rainbows by 85%. The sheer numbers of steelhead progeny produced could provide an advantage over the resident rainbow trout. Steelhead populations are very productive at low spawner abundance where there is little or no density-dependent competition for food and space by juveniles (Ward 2006).

Steelhead have a highly diverse life history with the number of years spent in their natal streams varying from one to five years based on available food and space (Ward 2006). If some steelhead progeny in the upper Cattaraugus system do not migrate to Lake Erie, these fish might provide a fishery similar the Grand River, Ontario where rainbow trout up to 22 inches were caught through the summer months (Larry Halyk, Ontario Ministry of Natural Resources, personal communication). Some of the steelhead/rainbow trout now produced in streams such as Spooner Brook, Chautauqua Creek and 20 Mile Creek stay in those streams until they are age 3 (9-11 inches) providing a sportfishery comparable to that found in the upper Cattaraugus during this extended residence time. In 2002, a survey of wild resident rainbow trout in Clear Creek showed that of the rainbow trout age 1 and older, 82% were yearlings, 13% were two year olds and 5% were three year olds (Cornett 2006). Age distributions for Clear Creek (upper Cattaraugus Creek) and Spooner Brook (lower Cattaraugus Creek) were similar.

Projected Wild Steelhead Reproduction

While it is difficult to project wild steelhead production in the upper Cattaraugus Creek system if steelhead passage occurred at Springville Dam, expansion of known production levels from Spooner Brook (lower Cattaraugus Creek) could provide some insight into potential production. The estimated number of young-of-year produced in Spooner Brook in 2001 was 4,261/mile (Lake Erie Fisheries Unit, file data). Expansion of that value by the estimated number of tributary miles above Springville Dam (57 miles), resulted in the production of 240,000 wild, young-of-year steelhead in the upper Cattaraugus Creek system. High numbers of steelhead young-of-year can be produced even at low spawner abundance but numbers of young-of-year steelhead produced may not translate directly into numbers of steelhead smolts produced or numbers of returning adults at maturity (Ward 2006).

Sea Lamprey

Sea lamprey entered Lake Erie in the 1920s with the opening of the Welland Canal but were not considered a major fisheries concern until restoration of native lake trout began in the late 1970s. Control of lamprey spawning in Great Lakes tributaries remains the primary focus of the Great Lakes Fishery Commission with expenditures on Cattaraugus Creek alone exceeding $200,000 per treatment. Cattaraugus Creek is one of the largest producers of sea lamprey on Lake Erie. Treatment of this stream from Springville Dam downstream occurs on a three-year cycle and requires almost a week to complete due to its large drainage area. Springville Dam stops the migration of lamprey from entering the upper watershed where 30+ miles of prime lamprey spawning and rearing habitat exist. Removal of this barrier would open access to these areas, making lamprey treatment difficult if not impossible and adding millions of dollars to the treatment costs. Fish ladders can be easily modified to prohibit passage of lamprey while allowing other fish species such as steelhead to pass upstream. An example of such a lamprey barrier exists on Spooner Brook just downstream from County Route 39 in Erie County. Flows directed through the fish ladder could be used to attract lamprey into assessment traps for subsequent estimation of population size. The Springville Dam trap catch was the primary tool for determining relative abundance of lamprey in Lake Erie until the power house was shut down in 1998, terminating attraction flows. The establishment of a fish ladder with attraction flows would restore and perhaps improve upon this valuable assessment tool.

Other Fish Species

Limited information exists regarding the impact of steelhead on fish species other than salmonids. It is unlikely that the seasonal occupation of upper Cattaraugus Creek by steelhead, which do not feed extensively during spawning runs, would significantly impact other fish species. Indirect affects associated with a reduction in resident trout may occur. Some species currently restricted to the lower creek may migrate upstream, thereby enhancing the systems fish community connectivity.

Fish Diseases

Several harmful fish diseases have been verified from the Great Lakes and fish passage may permit upstream transport of these diseases. Great Lakes Fish Health Committee "program pathogens"; heterosporosis, bacterial kidney disease (BKD) and infectious pancreatic necrosis (IPN) have been found in the Great Lakes but not in the inland trout populations of New York State. Of the aforementioned diseases, IPN is of greatest concern and has routinely and consistently been isolated from Lake Erie steelhead during Pennsylvania hatchery brood stock collections. Nuhfer et al (2005) in the study of steelhead introductions into Hunt Creek, found that steelhead carried BKD into the formerly uninfected system.

Contaminants

There are currently no health advisories that apply specifically to consuming fish from Lake Erie or Cattaraugus Creek below Springville Dam.

Economic Considerations

The economic impact of lower Cattaraugus Creek's steelhead fishery has not been directly measured but can be estimated from comparable steelhead fisheries in Ohio and Pennsylvania. A Sea Grant study of anglers fishing Ohio tributaries from October 2002 through April 2003 determined that the average angler spent $26 per trip (Kelch et al. 2004). Assuming that angler expenses per trip in Ohio were similar to angler expenses in New York, the estimated expenditures for lower Cattaraugus Creek in 2004-05 totaled $1.47 million (56,574 trips X $26/trip). Estimates from Pennsylvania creel surveys using the IMPLAN model (Murray and Shields 2004) showed that out-of-county residents spent $61.27/trip while local anglers spent $6.60/trip. Assuming that angler expenses per trip in New York were similar to Pennsylvania, expenditures for lower Cattaraugus Creek in 2004-05 totaled $971,000 (Markham 2006). Expansion of this fishery to the upper Cattaraugus Creek watershed and development of a sportfishery targeting *wild* steelhead would substantially increase the economic potential of this fishery.

The economic value of the existing fishery in the upper Cattaraugus Creek system was estimated by multiplying the number of trips on Cattaraugus Creek (15,488) (Evans 1998), Clear Creek, Lime Lake Outlet, McKinstry Creek and Hosmer Brook (2,865 trips combined) (Cornett 2006) by the aforementioned dollar values spent per trip. Total expenditures derived from Pennsylvania's trip values were $314,771. If the value per trip in Ohio of $26/trip (Kelch et al. 2004) was multiplied by the total estimated angler trips (18,353), the upper Cattaraugus Creek fishery would be worth a minimum value of $477,178. Neither estimate included angler trips spent on Elton Creek, a popular stocked stream.

Social Considerations

Benefits gained from passage of steelhead at Springville dam include expansion of the fishery into more accessible and "fishable" habitat and increased angling opportunities for this species. Steelhead have become the most popular sportfish in the tributaries of Lake Erie since this fishery expanded over the past decade. Because of its growing popularity, the expansion of the steelhead fishery to the upper Cattaraugus should result in increased angler activity over existing levels. Negative effects of steelhead passage may include angler crowding at preferred sites (Murray and Shields 2004), unethical behavior, overlaps in use with inland trout anglers, the need for increased law enforcement, posting of private property and a need for more/larger angler access facilities.

Angler Preferences

A survey of 161 anglers at the Hamburg Sportsman's Show (Erie County) in March 2006 provided insight into angler preferences in Western New York. Seventy-three percent of respondents favored, or slightly favored passing steelhead to the upper Cattaraugus Creek system. Fourteen percent slightly opposed or opposed it, while 13% were neutral on the subject. The majority of anglers (76%) in the survey identified themselves as anglers who fished Great Lakes tributaries for steelhead exclusively or who fished both the Great Lakes tributaries and inland trout streams. Of the anglers who said they only fished inland trout streams, 55% slightly favored or favored steelhead passage, while only 21% slightly opposed or opposed steelhead passage (NYSDEC Lake Erie Fish Unit, unpublished data).

Public access

Currently, NYSDEC-public fishing easements (34 miles) and parking areas (15) are adequate for angler use on the upper Cattaraugus Creek system. Steelhead passage at Springville Dam would likely increase angling use, increasing the need for additional parking lots and/or expansion of existing lots. Since steelhead angling occurs from fall through spring, the more popular parking lots would benefit from maintenance during the winter months. NYSDEC currently has no public fishing easements on the 12 miles of Cattaraugus Creek from Springville Dam upstream to Elton Creek. If steelhead passage at Springville Dam occurred, public fishing easements on this section of stream would be particularly desirable.

Fisheries Regulations

Currently, four streams in the upper Cattaraugus Creek system (Clear Creek, Lime Lake Outlet, McKinstry Creek and Hosmer Brook) have special regulations that include a nine-inch minimum size limit during the normal trout season, and a catch and release, artificial lures only season from October 15 to March 31 (the traditional closed season on inland trout waters). Upper Cattaraugus Creek and Elton Creek have a catch and release, artificial lures only season from October 15 to March 31. On Lake Erie and tributaries upstream to the first barrier impassable to fish the minimum size limit for salmonids is12 inches and there is no closed season. Greater regulatory consistency between inland and Great Lakes salmonid fisheries needs to be achieved prior to passage of steelhead to the upper Cattaraugus system.

Ecological Benefits

Construction of fish passage/dam removal would restore the natural hydrologic function of the system, re-establishing connectivity between the riverine and lake ecosystem that was lost when the dam was built. Ecological restoration of rivers was identified as a key component for river and estuary spawning fish species in the Lake Erie Environmental Objectives document (2005).

Future Research Opportunities

If fish passage is to occur, it would present a unique opportunity to scientifically measure ecological, social and economic changes in the sportfishery and the fish community. Agencies associated with this process should ensure that funding is in place to conduct studies prior to and following passage.

Issue Summary

This review of existing literature showed that changes in the sportfishery could be expected from passage of steelhead to the upper Cattaraugus system. Passage upstream of Springville Dam would provide access to 50+ miles of spawning habitat and result in the establishment of a sportfishery supported almost entirely by natural reproduction. Due to the popularity of steelhead, and particularly wild steelhead, angling use in the upper Cattaraugus Creek system would be expected to increase. Angling for steelhead would peak in late October and November, particularly during periods of peak flow. The fishery would continue until May with use by steelhead anglers declining substantially from June to October. The peak period for inland trout fishing occurs in April and May so some overlap in use for the two fisheries would occur during this time. Increased use of the resource in spring may lead to conflicts amongst anglers as well as declines in the "quality" of angling for those preferring a more secluded or isolated angling experience.

Although 34 miles of PFR and 15 parking lots exist on the upper Cattaraugus, use may exceed capacity at some of the more popular sites. These sites should be identified and if possible, public access obtained. This may require use of cooperative agreements and memorandums of understanding in addition to the more traditional acquisitions of easements (PFR) and/or parking lots. One specific area in need of additional PFR is the 12 miles upstream from Springville Dam to Elton Creek. A concerted effort should be made by NYSDEC to obtain PFR in this section, preferably in the period prior to passage.

Biological changes in the fishery are more difficult to predict but development of a naturally reproducing steelhead population in the upper Cattaraugus Creek system would likely cause some reduction in abundance of resident rainbow and brown trout. Relict populations of native brook trout occur in the headwater sections of 15 tributaries, one of which has a barrier impassable to fish. These 14 populations exist in association with resident, non-native, brown and rainbow trout. Based on existing literature it is difficult to predict whether steelhead would be an additional competitor to brook trout or if the predicted displacement of some resident brown and rainbow trout would result in no net increase in competition. This would certainly be an area of research that should be explored further.

The states of Pennsylvania and Ohio showed substantial economic benefits associated with the Lake Erie steelhead tributary fisheries. Expansion of steelhead to the upper Cattaraugus Creek system would be expected to produce comparable benefits, particularly if wild populations develop. Some loss in economic value associated with declines in abundance of resident brown and rainbow trout must also be considered but these losses would likely be small compared to the economic gains associated with expansion of the steelhead fishery.

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Table 1. Stream milage and public fishing access on the lower Cattaraugus Creek system (below Springville Dam) where steelhead occur during spawning runs*.

Section	Miles of Stream	Miles of Public Access	Spawning Likely to Occur
Cattaraugus Creek (Mouth to Springville Dam)	34	10	no
Clear Creek (mouth to T-9)	11	0	yes
North Branch Clear Creek (mouth to T-6)	4.5	0	yes
Cattaraugus Creek, T-16 (mouth up 1 mi)	1	0	?
Thatcher Brook (mouth up 1 mi)	1	0	no
Grannis Creek (mouth up 2 mi)	0.5	0	yes
South Br. Cattaraugus Creek (Mouth to falls)	2	2	no
Waterman Brook (mouth up 0.5 mi)	0.5	0	yes
Utley Brook (mouth up 2 mi)	2	0	yes
Coon Brook (mouth up 3 mi)	3	0	yes
Connoisarauley Creek (mouth to falls)	1.5	0	no
Derby Brook (mouth up 2.5 mi)	2.5	0	yes
Spooner Brook (mouth to T-6)	5.5	0	yes

* These are only the "sizable" streams known to have runs of steelhead. Numerous other tiny tributaries can under certain conditions support steelhead. Some streams not listed currently have wild trout populations.

Table 2. Stream mileage and public fishing access on the upper Cattaraugus Creek system (above Springville Dam) where steelhead would likely occur with passage at the Springville Dam*.

Section	Miles of Stream	Miles of Public Access	Spawning Likely to Occur
Cattaraugus Creek (Springville Dam to Elton Creek)	12	0	no
Cattaraugus Creek (Elton Creek to Java Lake)	19	12.2	no
Spring Brook (mouth to Village)	2.5	0	no
Buttermilk Creek (mouth to falls)	4	0	no
Cattaraugus Creek, T-34a (mouth up 1 mi)	1	0	yes
Richmond Gulf (mouth up 1 mi)	1	0	?
Otis Creek (mouth up 1 mi)	1	0	?
Hyler Creek (mouth up 2 mi	2	0	?
Dresser Creek (mouth up 2 mi)	2	0	?
Cattaraugus Creek, T-46 (mouth up 1 mi)	1	0	?
Elton Creek (mouth to Beaver Lake)	12	5.1**	yes
Elton Creek, T-1	0.9	0	yes
Elton Creek, T-2 (mouth to Rt 16)	0.8	0	yes
Elton Creek, T-1 of T-2 (mouth to Weaver Road)	0.6	0	yes
Elton Creek, T-4	1	0	yes
Lime Lake Outlet (mouth to lake)	4.5	4.1	yes
McKinstry Creek (mouth to headwaters)	4	4	yes
Hosmer Brook (mouth to Genesee Rd)	2.5	1.5	yes
Nicholes Brook (T-51) (mouth to Rt 16)	0.6	0	yes
Clear Creek (mouth to Freedom)	8	5.1	yes

Table 2. continued.			
Section	**Miles of Stream**	**Miles of Public Access**	**Spawning Likely to Occur**
Clear Creek, T-9 (Cheney Brook) (mouth to T-2)	1.2	0	yes
Monkey Run (mouth to T-5)	1.8	0	yes
Cattaraugus Creek, T-61 (mouth up 1 mi)	1	0	yes
Cattaraugus Creek, T-62 (mouth up 2 mi)	2	0	yes
Cattaraugus Creek, T-64 (mouth up 2 mi)	2	0	yes
Cattaraugus Creek, T-65 (mouth up 1.5 mi)	1.5	0	yes
Cattaraugus Creek, T-67 (Spring Brook) (mouth to T-3)	2	0.8	yes
Cattaraugus Creek, T-68 (mouth up 3 mi and tribs)	5	0	yes
Cattaraugus Creek, T-69 (mouth up 2.5 mi and tribs)	6.5	0	yes

* Theses are only the "sizable" streams likely to have runs of steelhead. Numerous other tiny tributaries could under support steelhead under certain conditions. Some of these streams not listed currently have wild trout populations.

** This includes 0.9 mi of PFR under agreement at this time, but not yet in state ownership.

Table 3. List of fish species found in the lower Cattaraugus Creek system (below Springville Dam).

Common Name	**Latin Name**	**Native to Watershed**
Rainbow trout (stocked and wild)	*Oncorhynchus mykiss*	no
Brown trout (stocked and wild)	*Salmo trutta*	no
Coho salmon	*Oncorhynchus tshawytscha*	no
Smallmouth bass	*Micropterus dolomieui*	yes
Largemouth bass	*Micropterus salmoides*	yes
Walleye	*Stizostedion vitrium*	yes
Rock bass	*Ambloplites rupestris*	yes
White sucker	*Catostomus commersoni*	yes
Northern hogsucker	*Hypentelium nigricans*	yes
Common carp	*Cyprinus carpio*	no
Lake Sturgeon (?)	*Acipenser fulvescens*	yes
Longnose gar	*Lepisosteus osseus*	yes
Gizzard shad	*Dorosoma cepedianum*	yes
Golden shiner	*Notemigonus crysoleucus*	?
Black crappie	*Pomoxis nigromaculatus*	yes
Channel catfish	*Ictalurus punctatus*	yes
River chub	*Nocomis micropogon*	yes
Central stoneroller	*Campostoma anomalum*	yes
Emerald shiner	*Notropis atherinoides*	yes
Common shiner	*Luxilus cornutus*	yes
Spotfin shiner	*Notropis spilopterus*	yes
Sand shiner	*Notropis stramineus*	yes
Fathead minnow	*Pimephales promelas*	?
Longnose dace	*Rhinichthys cataractae*	yes

Table 3. Continued		
Common Name	**Latin Name**	**Native to Watershed**
Blacknose dace	*Rhinichthys atratulus*	yes
Stonecat	*Noturus flavus*	yes
Pumpkinseed	*Lepomis gibbosus*	yes
Rainbow darter	*Etheostoma caeruleum*	yes
Rosyface shiner	*Notropis rubellus*	yes
Logperch	*Percina caprodes*	yes
Johnny darter	*Etheostoma nigrum*	yes
Golden redhorse	*Moxostoma erythrurum*	yes
White perch	*Morone americana*	no
Bluegill	*Lepomis machrochirus*	yes
Northern pike	*Esox lucius*	yes
Goldfish	*Crassius auratus*	no
Spottail shiner	*Notropis hudsonius*	yes
Redside dace	*Clinostomus elongatus*	yes
Bluntnose minnow	*Pimephales notatus*	yes
Creek chub	*Semotilus atromaculatus*	yes
Brown bullhead	*Ameiurus nebulosus*	yes
Fantail darter	*Etheostoma flabellare*	yes
Mottled sculpin	*Cottus bairdii*	yes
Sea lamprey	*Petromyzon marinus*	no

Table 4. List of fish species found in the upper Cattaraugus Creek system (above Springville Dam).

Common Name	Latin Name	Native to Watershed
Rainbow trout (wild)	*Oncorhynchus mykiss*	no
Brown trout (stocked and wild)	*Salmo trutta*	no
River chub	*Nocomis micropogon*	yes
Common shiner	*Luxilus cornutus*	yes
Creek chub	*Semotilus atromaculatus*	yes
Longnose dace	*Rhinichthys cataractae*	yes
Blacknose dace	*Rhinichthys atratulus*	yes
White sucker	*Catostomus commersoni*	yes
Northern hog sucker	*Hypentelium nigricans*	yes
Central stoneroller	*Campostoma anomalum*	yes
Stonecat	*Noturus flavus*	yes
Redside dace	*Clinostomus elongatus*	yes
Rainbow darter	*Etheostoma caeruleum*	yes
Fantail darter	*Etheostoma flabellare*	yes
Bluntnose minnow	*Pimephales notatus*	?
Mottled sculpin	*Cottus bairdii*	yes
Green sunfish	*Lepomis cyanellus*	no
Yellow perch*	*Perca flavescens*	no
Largemouth bass*	*Micropterus salmoides*	no
Bluegill*	*Lepomis macrochirus*	no
Brown bullhead*	*Ameiurus nebulosus*	no
Goldfish*	*Carassius auratus*	no

***** These fish species are not normal residents of the stream and likely move downstream from Java Lake or local ponds.

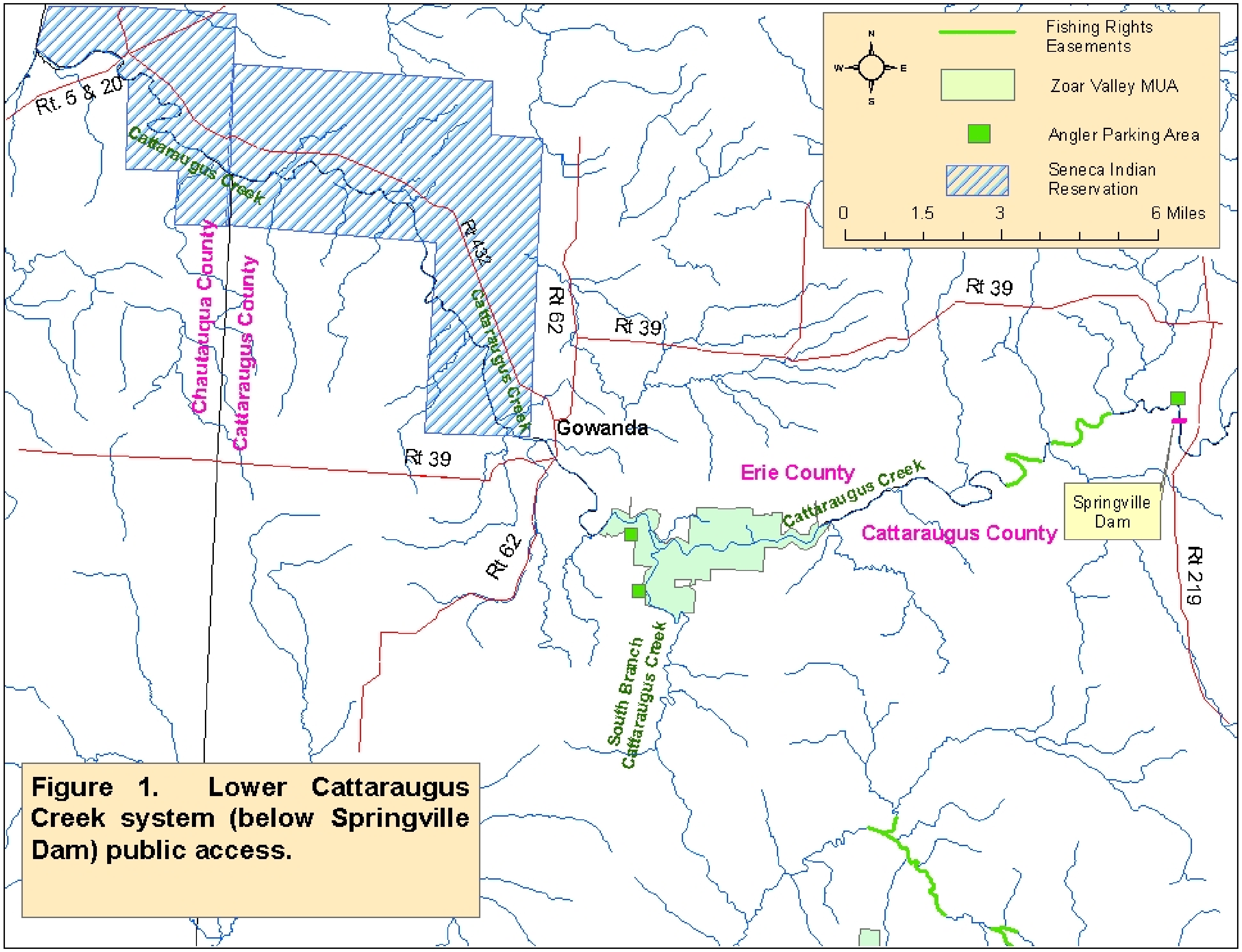

Figure 1. Lower Cattaraugus Creek system (below Springville Dam) public access.

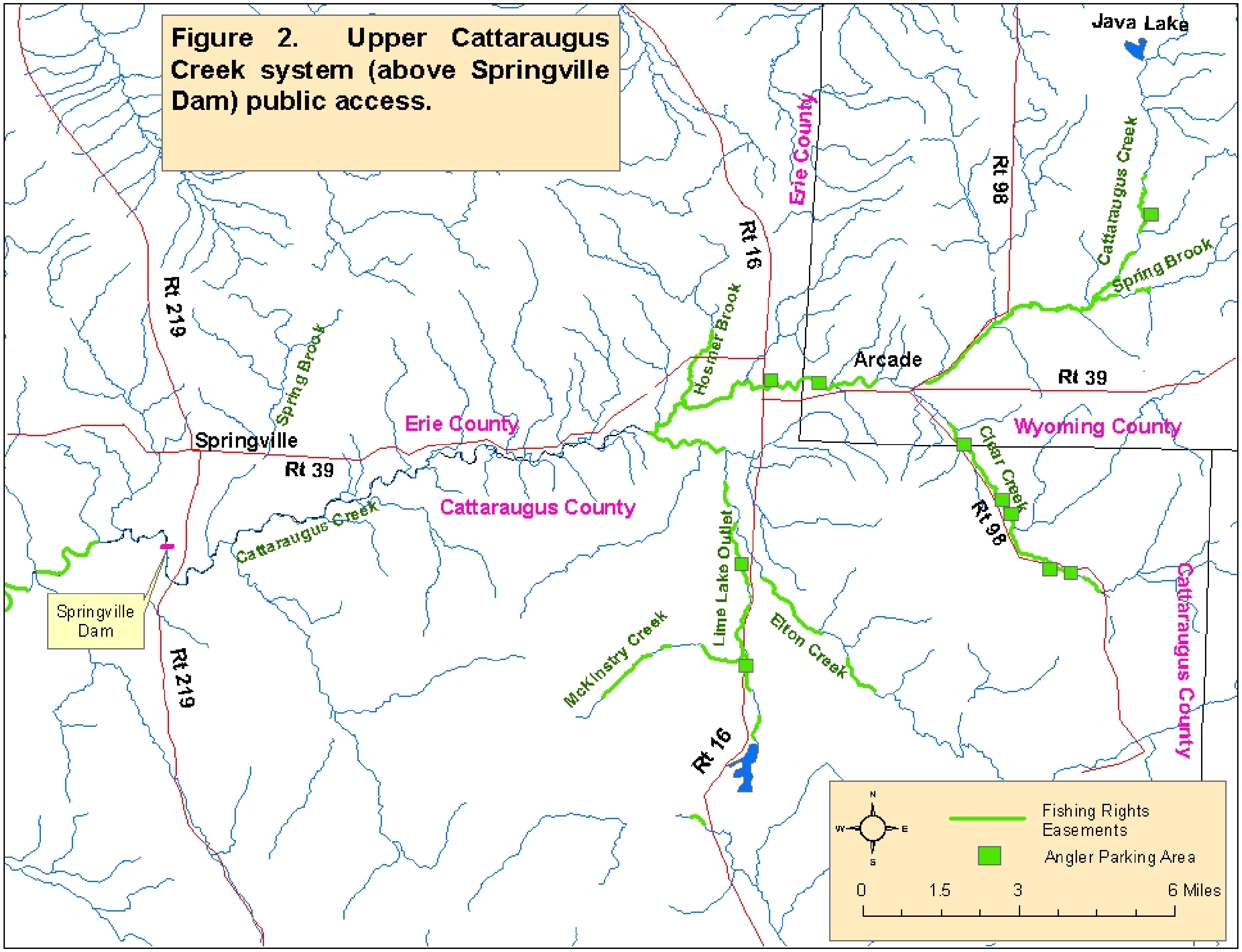
Figure 2. Upper Cattaraugus Creek system (above Springville Dam) public access.
Java Lake
Erie County
Rt 98
Cattaraugus Creek
Spring Brook
Rt 16
Rt 219
Hosmer Brook
Arcade
Rt 39
Spring Brook
Springville
Erie County
Wyoming County
Rt 39
Cattaraugus Creek
Cattaraugus County
Clear Creek
Rt 98
Lime Lake Outlet
Springville Dam
Rt 219
McKinstry Creek
Elton Creek
Cattaraugus County
Rt 16
N
W
E
S
Fishing Rights Easements
Angler Parking Area
0
1.5
3
6 Miles

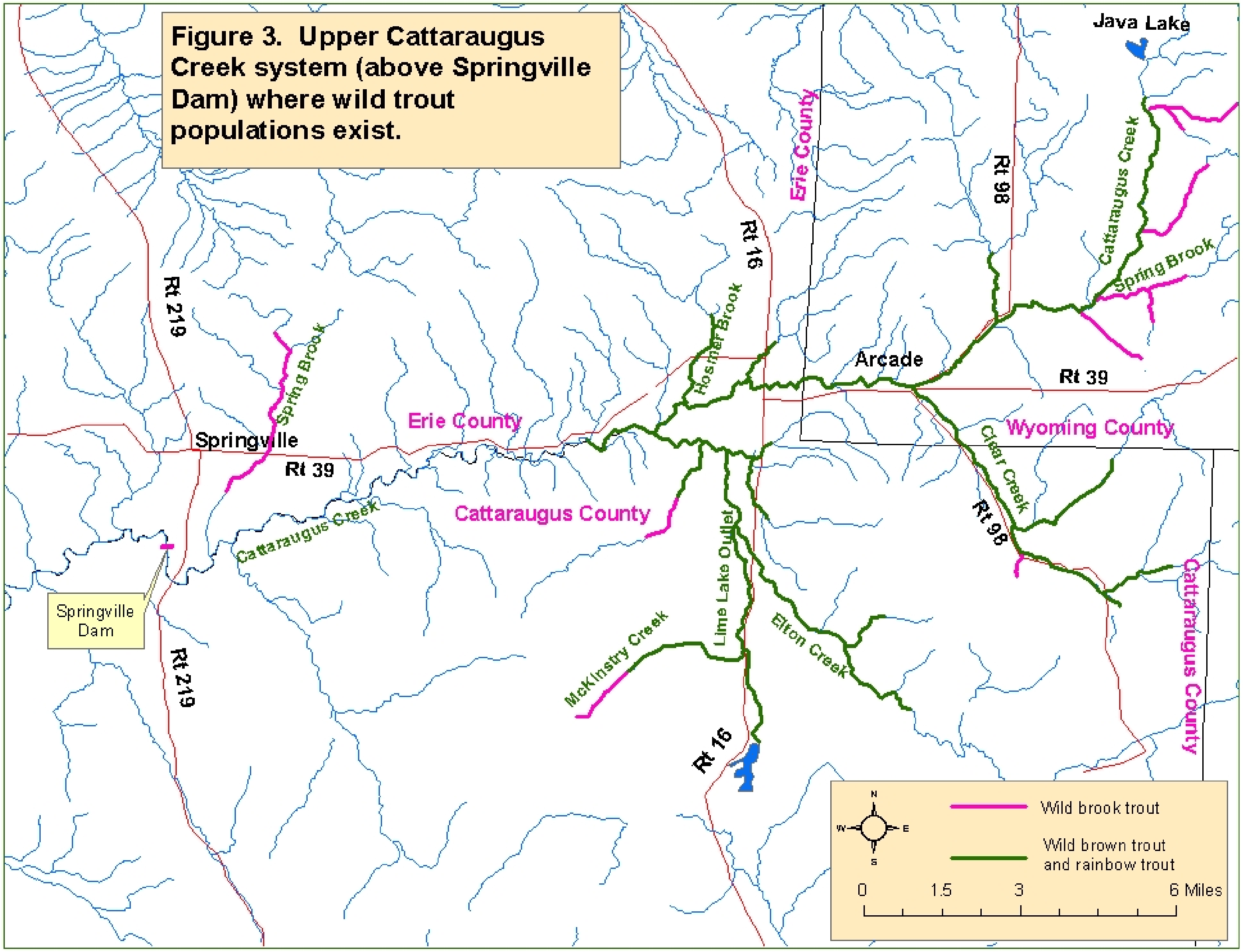
Figure 3. Upper Cattaraugus Creek system (above Springville Dam) where wild trout populations exist.
Java Lake
Erie County
Rt 98
Cattaraugus Creek
Spring Brook
Rt 16
Hosmer Brook
Arcade
Rt 39
Rt 219
Spring Brook
Springville
Erie County
Rt 39
Wyoming County
Clear Creek
Rt 98
Cattaraugus County
Cattaraugus Creek
Lime Lake Outlet
Springville Dam
Elton Creek
McKinstry Creek
Rt 219
Cattaraugus County
Rt 16
Wild brook trout
Wild brown trout and rainbow trout
0
1.5
3
6 Miles