Northern Sunfish Restoration Activities in Lower Tonawanda Creek and the Adjacent Erie Canal in 2023 and 2024

Final Report to
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Executive Summary

1. The Northern Sunfish (*Lepomis peltastes*), a threatened species in NY state, was caught in lower Tonawanda Creek and a wide water slough of the Erie Canal (study area) from 1974 to 2009. It was not caught at these locations after 2009 and was assumed to be extirpated.
2. This study began the process of testing the hypothesis that the absence of Northern Sunfish (NS) after 2009 was caused by removal of two-thirds of the NS caught in the study area from 2006-2009 for the purpose of obtaining brood stock to establish a pond population that would preserve the study area population and be used for stocking elsewhere in NYS.
3. In May 2023, more than 3,000 descendants of study area NS were stocked into the study area. Follow-up sampling by boat and backpack electrofishing caught 43, 12 and 9 stocked fish in July and September 2023 and June 2024, respectively. Many of the stocked fish and fish caught in June 2024 were gravid, but it was too soon to find evidence of recruitment.
4. Sampling in the study area is recommended in June 2025 to ascertain continuing presence of stocked NS and look for evidence of recruitment of progeny from NS stocked in 2023.

Introduction

The Northern Sunfish (*Lepomis peltastes* Cope, 1870; Figure 1) is threatened in NY state (NYSDEC, 2013), but this was not the case in 1939 when the NY Biological Survey documented the species at scattered, specialized habitats in six central and western NY watersheds (Carlson et al., 2016; western watersheds shown in Figure 2). After 1939 these historic populations disappeared until a new population was discovered in 1974. At irregular intervals using non-standardized sampling, Northern Sunfish (NS) were caught in a 6 km reach of lower Tonawanda Creek and at a nearby slough off the Erie Canal (hereafter both called the “study area”) through 2009 but not afterward.

From 1974 to 2004, by seining and backpack electrofishing, 18 NS were caught in the study area (Table 1). Funded by a State Wildlife Grant from the DEC, 23 NS were caught in the study area (Figure 3) by boat and backpack electrofishing and beach seining in 2005 (Wells & Haynes, 2007; Wells 2009). In 2005, NS were observed spawning at the confluence of Mud and Tonawanda creeks in the study area (Figure 3, Map 2o). Several gravid individuals captured in 2005 were returned to SUNY Brockport, spawned while briefly in captivity, and were returned alive to the study area.

Based on results of Wells' 2004-2005 studies (Wells, 2009), which included surveys for suitable NS habitat in the Johnson Ck., Tonawanda Ck., and lower Oak Orchard Ck. (including Marsh Ck.) watersheds (Figure 2), the DEC initiated a NS recovery stocking program. Three strains of NS (from Michigan, Ontario, and the study area), genetically evaluated by Near (2008), were established in separate production ponds at the DEC's Perch River Wildlife Management Area (Perch River WMA) to prevent genetic exchange among the strains (Carlson, 2022, unpublished data). Wild broodstock for the study area pond were collected from the study area by DEC from 2006 to 2009. Twenty-seven NS were collected (Table 1), 9 were returned alive, and the rest were taken to the Perch River WMA. In about 2015, study area NS from the Perch River WMA were used to establish populations of NS in two ponds at DEC's Randolph Hatchery in southwestern NY state.

Fourteen streams in central and western NY with historical records of NS (Carlson et al., 2016), as well as others identified by Wells & Haynes (2007) and the DEC as having potentially suitable habitat for NS, were stocked with more than 15,000 NS fingerlings from 2007 to 2015 (Carlson, 2022, unpublished data). Of those, 5,100 from the Tonawanda strain were stocked from 2008-2015 in the Tonawanda Creek watershed far upstream from the study area, and other streams in western NY (Oak Orchard, Johnson, Murder, Cayuga, and Ellicott creeks and their tributaries; Figure 2). None were stocked in the study area to avoid harm (e.g., genetic introgression from the pond-reared fish) to possibly remaining wild NS. Evaluations of stocking success across western NYS completed by DEC and SUNY Brockport from 2008-2015 caught 7 stocked NS, some in spawning condition, but none were caught during a few attempts from 2016-2018, so it was concluded that stocking had not restored NS in what appeared to be suitable habitat outside the study area.

No wild NS were caught during four efforts in the study area from 2010 to 2012. Funded by two U.S. Fish and Wildlife Service Habitat and Environmental Restoration Fund grants provided through the Niagara River Greenway Committee, in 2013 SUNY Brockport sampled and identified an abundant (>40,000 fish) and diverse (35 species) fish community, but no NS, in the study area (Sanderson-Kilchenstein 2015). From this result, it was concluded that the NS was extirpated from its last historic location in western NYS. Sampled *Lepomis* species, plus 25 NS from the Perch River WMA, were identified by key (Sanderson-Kilchenstein, 2015), morphometric-meristic characteristics (NY State Museum), and genetically (Haynes et al., 2017). Among the 91 sunfish (*Lepomis* spp.) identified by all three methods, 7 were female NS x male Bluegill (*L. macrochirus*) hybrids (Haynes et al., 2023).

Despite long-term water quality problems, changing proportions of native, naturalized and invasive species in the study area's fish community (especially Northern Pike, *Esox lucius*; Green Sunfish, *Lepomis cyanellus*; Bluegill; and Round Goby, *Neogobius melanostomus*); Sanderson-Kilchenstein 2015), and *Lepomis* hybridization, NS were caught consistently in the study area after their discovery in 1974 through 2009. This study was designed to explore the hypothesis that removal of two-thirds of the NS from the study area by sampling in 2006-2009 to establish a brood stock at the Perch River WMA may have caused the absence of NS during sampling after 2009.

Objectives:

This report details a collaborative project between SUNY Brockport (funded by the author) and the NYSDEC (in-kind contributions). It focuses on NS stocking and monitoring activities from May 2023 to June 2024, which had two objectives.

1) Stock DEC pond-reared NS, descended from the extirpated wild population in lower Tonawanda Creek and nearby Erie Canal, at their former locations in the study area.

2) Monitor for 1 year to evaluate survival of fish stocked in 2023. Because age 1 NS are too small to be captured by boat electrofishing, evidence of recruitment cannot be evaluated until 2025 and beyond when any surviving offspring of the NS stocked in 2023 will be age 2 and older.

Methods

Stocking

In late April 2023 we identified six accessible (from shore) stocking sites in the study area and gained property owners' permissions to stock NS (Appendix 1; Appendix 2a). On May 30-31, 2023, NS adults and juveniles were collected (dip nets, seine) from their rearing ponds at the Randolph Hatchery and fin clipped (left pelvic) to distinguish them from any wild NS that might be caught during recapture efforts. Based on the planned stocking number at each site (Appendix 2a), NS were loaded into separate, oxygenated tanks on a DEC hatchery truck filled with hatchery spring water (~9 C; the same water that flows into the ponds [12.2 C] with NS) then transported for ~1.5 h to four stocking locations on day 1 and two on day 2 (10.0-12.2 C receiving water temperature range). At each site, NS were netted from their designated tank and SUNY Brockport students carried 5 gal buckets of fish to the water.

Fish recapture

SUNY Brockport staff and students used Brockport's electrofishing boat (Smith-Root GPP 5.0, the same gear used for sampling the study area in 2005 and 2013) to assess NS presence from the EC slough (where NS were occasionally caught before 2009) to just above the Rt. 78 bridge (Figure 3) in July 2023. In July 2023 we sampled shoreline sections of lower Tonawanda Creek and the Erie Canal where NS were and not stocked May. Finding no NS in unstocked reaches of the study area in July, in September 2023 and June 2024 we focused on virtually the entire shoreline upstream from the Pendleton Riffle to just downstream from the Millersport Riffle (Figure 3, maps m-p) and the EC slough near the canal's confluence with Ransom Ck (Figure 3, map k; Appendix 2b shows GPS starting and ending points of electrofishing runs.) In September 2023 and June 2024, we also sampled using two Halltech backpack electrofishing units upstream of the Millersport Riffle from ~50 m below to ~10 m above the Rt. 78 bridge (Figure 3, map p). We visually assessed each captured NS for sex and gravidity, measured their lengths, and released them alive near their capture sites.

Community analysis

The Percentage of Community Similarity Index (PCSI) and Simpson's Index of Diversity (SID) were calculated based on CPUE of fish species in the July 2005, 2013, and 2023 fish community samples. The PCSI is calculated by comparing the percentage of each species common to two communities, e.g., 8 of species 1 caught in community 1's total sample of 100 fish = 8%, and 15 members of species 1 caught in community 2's total sample of 150 fish = 10%. The minimum value for species 1 (8% in this case) in the two communities is used to calculate the index.

PS = ∑ (minimum % of species 1 in communities 1 & 2) + minimum % of species 2 in communities 1 & 2) +… minimum % of species 'n' in communities 1 & 2)

SID calculates the probability that two fish sampled from a community of fish will belong to different species (the more even the abundance of individuals across species, the higher the probability that the two individuals sampled will belong to different species). SID values range from 0 to 1, with 1 representing perfect evenness (all species present in equal numbers). The formula for Simpson's Index is:

$$D_s = 1 - \sum \frac{n_i(n_i - 1)}{N(N - 1)}$$

where n_i = the number of individuals in the i^{th} species collected, and N = the total number of organisms in the sample. SID values for pairs of communities can be compared using an adapted Student's t-test (Brower and Zar, 1984) with a Bonferroni correction of α to account for multiple paired tests. Standard deviation for each community is calculated by

$$s^2 = \frac{4[\sum p_i{}^3 - (\sum p_i{}^3)^2]}{N}$$

where p_i is the proportion of the number of organisms in the i^{th} species (n_i) to the total number of organisms in the sample (N). The t-test statistic to determine whether pairs of sample communities have different Simpson's Diversity is calculated by

$$t = \frac{D_1 - D_2}{\sqrt{(s^2{}_1 + s^2{}_2)}}$$

Differences among the 2005, 2013 and 2023 fish communities sampled in the month of July were evaluated using Non-metric Multi-dimensional Scaling analysis (NMDS; Clark and Gorley, 2006). Analysis of Similarity (ANOSIM) was used to compare the 2005, 2013 and 2023 fish communities and Similarity Percentages (SIMPER) was used to determine how different the fish communities were between pairs of years and which taxa contributed to the differences. Correspondence Analysis of Principal Components (CAP) was used to visualize separations of the 2005, 2013 and 2023 fish communities in multivariate space and included vectors showing which taxa influenced each year's position in that space.

Results

In July 2023, September 2023 and June 2024, we caught 43, 12 and 9 NS, respectively, or 18.3, 5.2 and 3.2 NS/h adjusted for CPUE (Table 2; Appendix 2b); however, CPUE for July 2023 is inflated after stocking over 3,000 NS 2 months earlier. The lengths of NS in a haphazard sample of the 3,109 active, healthy stocked NS ranged from 50-106 mm, and their median length was 77 mm. Median lengths of NS caught in July and September 2023 and June 2024 were 68 mm (range: 57-89 mm), 79 mm (range 54-92 mm) and 85 mm (range 71-92 mm), respectively. Sexes of NS caught were 18 female/16 male/8 not determined in July, 2 F/1 M/9 nd in September and 7 F/2 M/0 nd in June. Gravidity of NS caught was 2 F/ 0 M/ 41 nd in July; 12 nd in September; and 7 F/1 M/1 nd in June (Table 2; Appendix 2c).

A note about Redhorse Suckers (*Moxostoma* spp.): Redhorse species were identified by key in 2005, lumped by genus in 2013, and identified visually in 2023. The same four species were identified in the study area in 2005 and 2023: Silver Redhorse, *M. anisurum*, Golden Redhorse, *M. erythrurum*, Shorthead Redhorse, *M. macrolepidotum*, and Greater Redhorse, *M. valenciennesi*. Silver Redhorse CPUE was 0/h in 2005 and 0.49/h in 2023. Golden Redhorse CPUE was 36/h in 2005 and 55.5/h in 2023. Shorthead Redhorse CPUE was 12/h in 2005 and 5.3/h in 2023. Greater Redhorse CPUE was 4/h in 2005 and 2.4/h in 2023. In 2013 Redhorse Sucker CPUE was 6.8/h (Appendix 3a).

The percent similarity of pairs of fish communities in the study area was 49.5%, 71.7% and 43.2% for the 2005-2013, 2005-2023 and 2013-2023 comparisons, respectively (Table 3: Appendix 3b). Species Richness of the fish community in the study area in July was 36, 35 and 39 in 2005, 2013 and 2023, respectively (Table 3: Appendix 3b). Simpson's diversity of the July fish community in the study area were 0.909, 0.856 and 0.911 in 2005, 2013 and 2023, respectively. There were no significant differences ($p > 0.5$) in SID between pairs of years (Table 3: Appendix 3c).

CAP revealed clear separations among the 2005, 2013 and 2023 fish communities in July in the study area (Figure 4). The presence of NS (LEPE) in 2005 and 2024 is clearly indicated by the LEPE vector and the similar position of 2005 and 2024 fish samples on CAP axis 1 (CAP1, Figure 4). Based on the absence of NS in the 2013 fish community and the higher catches of Pumpkinseed (LEGI), native cyprinids (NACY), Green Sunfish (LECY), Bluegill (LEMA) and pike/pickerel (ESOX), the position of the 2013 samples is located farther out on CAP1. While aligned on CAP1 the fish community samples for 2005 and 2023 are separated on CAP2. This is because darters (DART) and non-native cyprinids (NNCY) were more common in 2005 than in 2023 samples.

The July fish communities differed significantly among the three study years (ANOSIM: global R = 0.882 [range 0-1], $p < 0.001$), and the pairwise tests between years were also highly significant ($p < 0.001$): global R values were 0.963 (2005 vs. 2013), 0.921 (2013 vs. 2023), and 0.541 (2005 vs. 2023 (Appendix 3d). The lower dissimilarity between 2005 and 2023 is due to the presence of NS in those years. SIMPER ranked each taxon's contribution to dissimilarity of fish communities between pairs of years. Average dissimilarity between years was 42.2% (2005 vs. 2013), 41.7% (2005 vs. 2023), and 47.1% (2013 vs. 2023) (Table 3, Appendix 3d). Seven or 8 taxa contributed to 60% or more of the fish community differences between the three pairs of years (Table 4; Appendix 3d). Three to 4 *Lepomis* spp. contributed to the first 60% of cumulative dissimilarity between pairs of years: Green Sunfish (LECY), Bluegill (LEMA), Northern Sunfish (LEPE), and Pumpkinseed (LEGI) (Table 4; Appendix 3d). The relative abundance of five other taxa also contributed to differences between pairs of years: Darters (DART), Redhorses (MOXO), non-native cyprinids (NNCY), Gizzard Shad (DOCE) and Rock Bass (AMRU) (Table 4; Appendix 3d).

Discussion

COSEWIC (2016) suggested three important limiting factors for NS that also characterized its situation in our study area.

1. Restricted spawning and juvenile habitat: From 1974-2004, only 13 NS were found in a 6-km reach of LTC and 2 wide waters off the Erie Canal (Table 1), which suggests that good

habitat is sparse in the study area. However, adding boat electrofishing to backpack electrofishing and seining from 2005-2009 produced 49 more NS in the study area.

2. Low dispersal capacity, which slows recovery following depopulation and diminishes potential for population rescue: There are no potential NS source populations for the study area elsewhere in the Tonawanda Creek watershed and Erie Canal, so even with good habitat, recolonization of the study area after extirpation would be difficult.

3. Low tolerance of turbidity: Tonawanda Creek (especially) and the Erie Canal are quite turbid, but that condition did not change from 1974 to the present, so this seems to be an unlikely reason for the disappearance of NS from the study area after 2009.

Despite these drawbacks, a NS population existed in the study area from 1974-2009, then could not be detected with high effort in 2013-2014.

Haynes et al. (2023) discussed three factors that might have accounted for the absence of NS in the study area after 2009.

1. Fish community differences among 2005 (Wells, 2009), 2013 (Sanderson-Kilchenstein, 2015) and 2023 (this study): Swings in relative abundance of some native and invasive species comprising the study area's fish community have occurred during SUNY Brockport's 19-year study (especially Northern Pike, Green Sunfish, Bluegill and Round Goby; Sanderson-Kilchenstein 2015). While Percent Community Similarity (Table 3) and CAP (Figure 4) analyses suggest fish community changes from 2005 to 2023, the Simpson's Diversity analysis found no significant differences among years (Table 3). Evidence of *Lepomis* hybridization was reported by Haynes et al. (2017, 2023), although hybrids were a small proportion of total *Lepomis* captured in 2013 (Sanderson Kilchenstein, 2015). This was not surprising, because hybridization between *Lepomis spp*. is widely reported. Accordingly, observed changes in the fish community composition of the study area do not account well for the disappearance of NS after 2009.

2. LTC watershed disturbances: The entire Tonawanda Creek watershed has been exposed for over 150 years to varying levels of agricultural (deforestation, soil erosion, manure, inorganic fertilizers, herbicides, pesticides), residential (riparian zone development) and infrastructure (roads, winter road salt) impacts, including the 35 years NS were found in the study area. If anything, water quality is better today than in the past, so changes in land use and water quality do not account well for the disappearance of NS after 2009. In addition to watershed scale conditions, local disturbances may have affected NS in the study area. For example, in 2005, NS were collected and observed spawning on a small patch of gravelly substrate at the confluence of Mud Creek and lower Tonawanda Creek (Wells, 2009; Figure 3, Map 2o). Then in 2012, a residential property on the steep north bank of Mud Creek 60 m upstream from the confluence had a landslide that blocked the flow of Mud Creek into Tonawanda Creek for several weeks (personal communication, Timothy DePriest, NYSDEC, Buffalo, NY). This event delivered much sediment to the backwater eddy at the confluence and buried the small gravelly area where NS spawning was observed in 2005. By 2016, the silt deposits at this location had been washed away. However, extensive sampling in 2013-2014 and the few sampling efforts there in 2016 and 2018 caught no NS (Carlson, 2022, unpublished data). One stocked NS was caught at this location in June 2024. Accordingly,

observed changes in watershed disturbances (watershed and local scales) do not account well for the disappearance of NS after 2009.

3. Removal of two-thirds of the 27 NS captured in the study area from 2006-2009 to establish production ponds for preservation of the study area NS stock and support subsequent stocking efforts at locations in NYS formerly inhabited by NS (Carlson et al., 2016) or other apparently suitable habitats (Wells, 2009; Sanderson-Kilchenstein, 2015): With no evidence of significant change in factors 1 and 2 above, the purpose of this project was to begin investigating whether factor 3 is responsible for the absence of NS in the study area after 2009. We did this via the stocking and monitoring methods described above, and we recaptured NS during three sampling periods: 2, 4 and 12 months after stocking. While there were many gravid NS among those stocked in May 2023 and recaptured in June 2024, we found no evidence of age 1 progeny of the fish stocked in 2023. However, age 1 NS are very small and difficult to capture by boat electrofishing. To date we have demonstrated that some stocked NS survived for a year and many were gravid in June 2024 in the study area.

Recommendations

1. Sample the study area in June 2025 to determine whether NS are detectable 2 years after stocking and whether there is evidence of recruitment (e.g., age 2 fish younger than any NS stocked in 2023 would be). Sampling for evidence of NS survival and recruitment in the study area in June 2025 and beyond will require additional funding.
2. If NS are not detected in the study area June 2025, it would be reasonable to conclude that the 2023 stocking effort failed. If NS are detected but there is no evidence of recruitment (age 2 fish), DEC and SUNY Brockport should discuss how to proceed.

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Table 1. Northern Sunfish records from Tonawanda Creek and the Erie Canal, 1974-2009, with number caught in parentheses.

Capture Location	Dates
Lower Tonawanda Creek Study Area (6 km)	1974 (1), 1975 (1), 1988 (6), 1998 (1), 2000 (1), 2002 (3), 2005 (22[a]), 2006 (2), 2007 (11), 2008 (3), 2009 (2)
Tonawanda Creek, 2 km upstream from LTC Study Area	1990 (1)
Erie Canal, 6 km downstream from the LTC confluence	1988 (1), 1999 (1), 2008 (9)
Erie Canal, 13 km downstream from the LTC confluence	2001 (2)

[a] High-effort electrofishing (boat and backpack) and beach seining during the peak spawning season in July with repeat captures likely.

Table 2. Northern Sunfish electrofishing recapture numbers and biological data from July 2023 to June 2024 (nd = not determined).

Month	July 2023	September 2023	June 2024
Recaptured	43	12	9
Power-on Minutes	141.0	139.8	166.2
CPUE/h	18.3	5.2	3.2
Length (mm)			
Median	68.0	79.5	85.0
Range	57-89	54-92	71-92
Sex(nd/F/M)	8/18/16	9/2/1	0/7/2
Gravid (nd/Yes, No)	40/2/0	12/-/-	1/8/-

Table 3. Percent Community Similarity and Simpson's Diversity results. Bonferroni-corrected α = 0.05/3 = 0.0167.

Year Pairs	**2005-2013**	**2005-2023**	**2013-2023**	
Percent Similarity	49.5	71.7	43.2	Appendix 3
Percent Dissimilarity	42.2	41.7	47.1	Appendix 4
Year	**2005**	**2013**	**2023**	**P-value**
Simpson's Diversity	0.909	0.856	0.911	p > 0.5
Variance	0.0087	0.0044	0.0095	(all 3 year-pairs)
df	63	67	66	

Table 4. Fish species accounting for 60% of the dissimilarity between the 2005, 2013 and 2023 fish communities in the study area. Note the importance of four *Lepomis* spp.: Green sunfish (LECY), Bluegill (LEMA), Northern Sunfish (LEPE), and Pumpkinseed (LEGI).

Average dissimilarity = 42.2: 2005 vs. 2013		
Species	**Contribution%**	**Cumulative%**
LECY	15.32	15.32
DART	7.67	22.98
ESOX	7.54	30.52
LEMA	7.3	37.82
LEPE	5.94	43.75
DOCE	5.76	49.52
AMRU	5.75	55.27
NNCY	5.68	60.95
Average dissimilarity = 41.7: 2005 vs. 2023		
Species	**Contribution%**	**Cumulative%**
LEGI	10.45	10.45
NACY	9.43	19.89
DART	7.97	27.86
LECY	7.59	35.45
MOXO	7.56	43.01
NNCY	6.6	49.61
AMRU	5.59	55.19
LEMA	5.54	60.73
Average dissimilarity = 47.1: 2013 vs. 2023		
Species	**Contribution%**	**Cumulative%**
LECY	18.26	18.26
NACY	9.96	28.21
LEPE	9.46	37.67
LEGI	8.16	45.83
MOXO	6.78	52.61
LEMA	6.07	58.68
DOCE	4.79	63.47

Figure 1. Male (above) and female (below) Northern Sunfish (*Lepomis peltastes*) caught in the study area in June 2024.

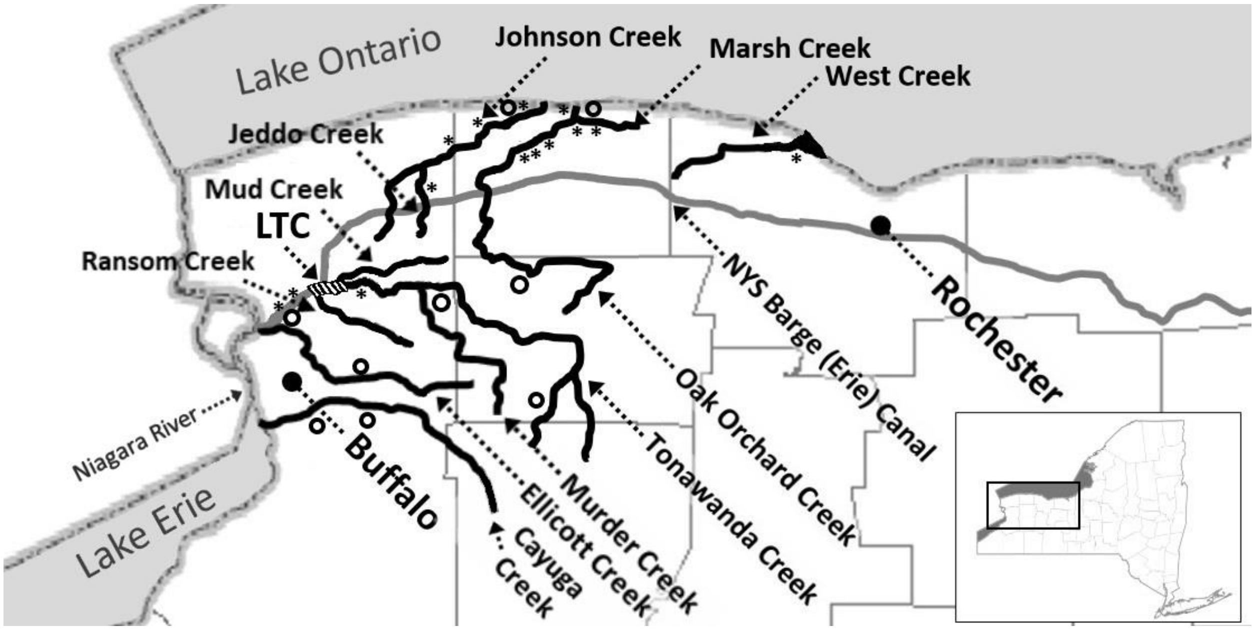

Figure 2. Map of Northern Sunfish distribution (1974-2009) in lower Tonawanda Creek (LTC) and the adjacent Erie Canal (hash marks), streams in western New York tributary to Lake Ontario and the Niagara River with historical catches of NS in 1939 (*), and locations (o) with apparently suitable habitat where NS were stocked from 2007-2015 and surveyed from 2008-2018.

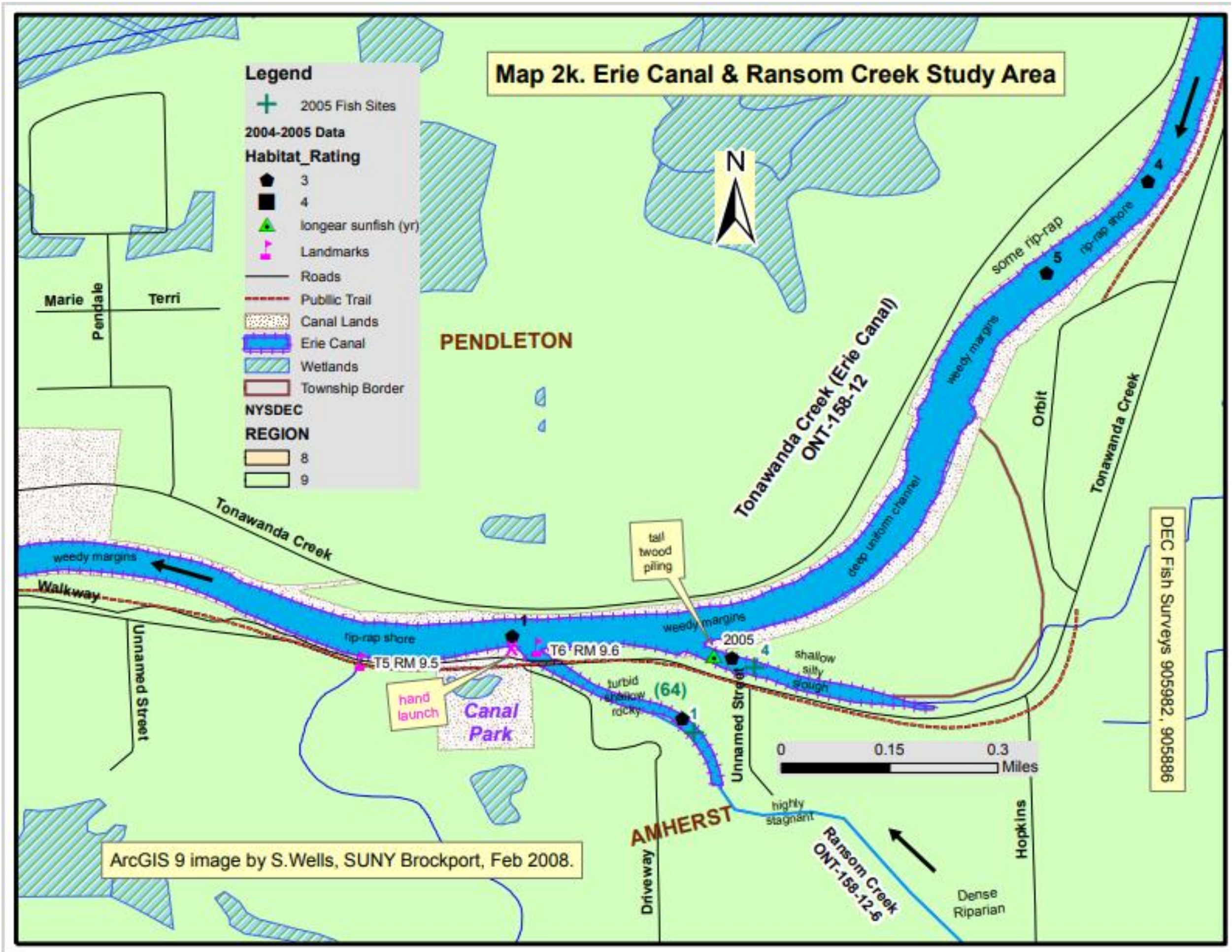

Figure 3, Map 2k. Sampling areas (2005, 2013, 2023): Erie Canal slough near confluence with Ransom Creek.

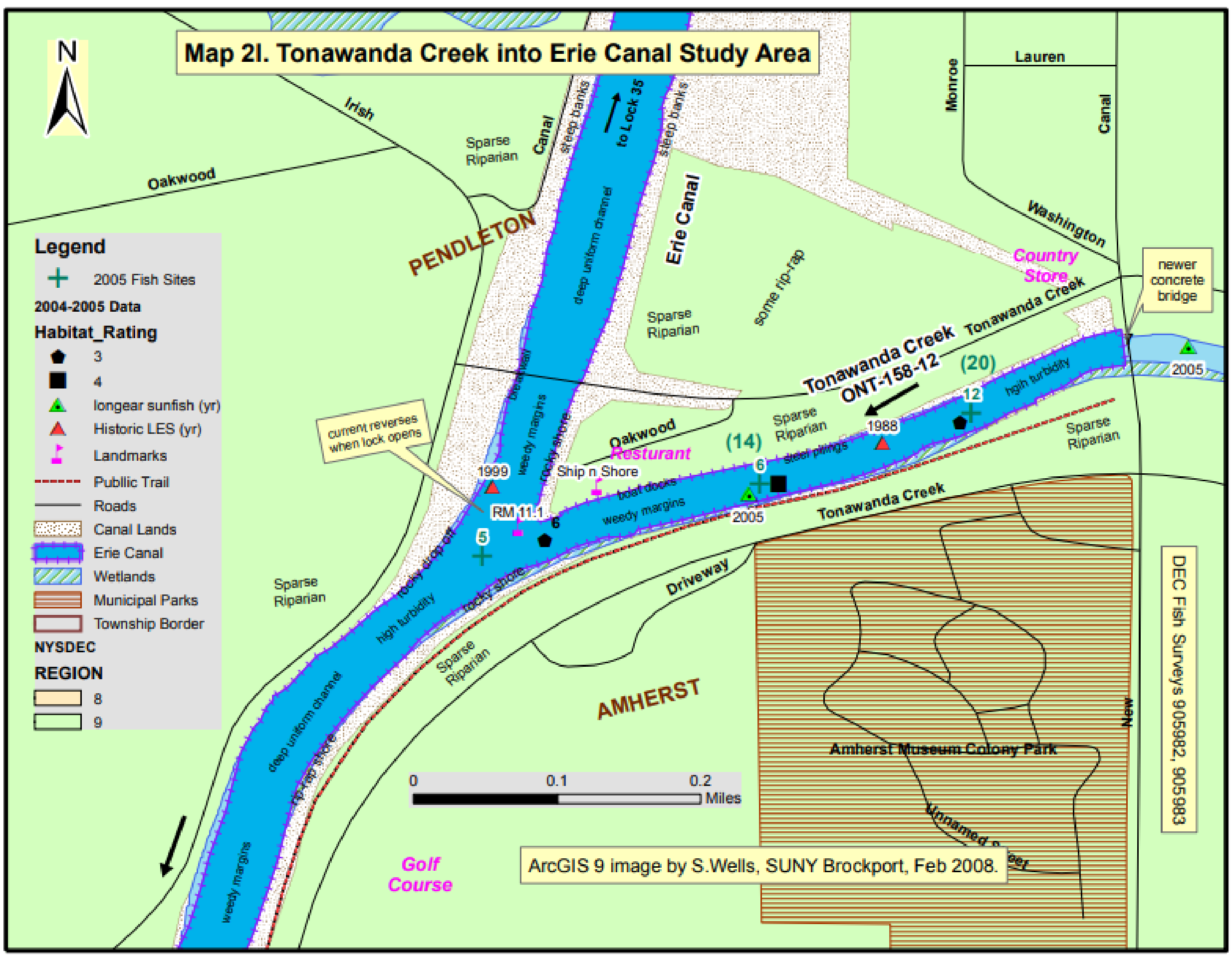

Figure 3, Map 2l. Sampling areas (2005, 2013, 2023): Confluence of lower Tonawanda Creek and the Erie Canal (Wells, 2009).

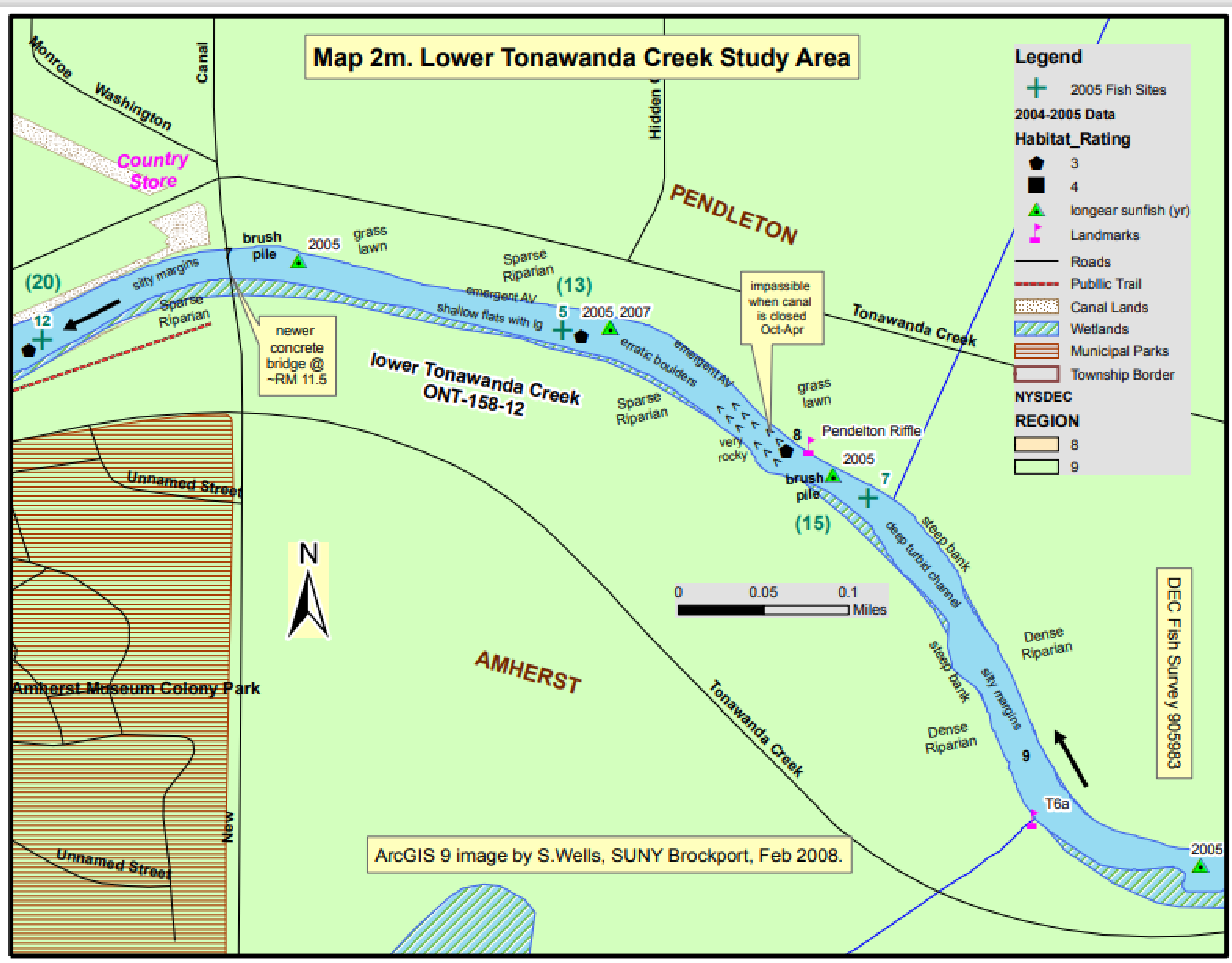

Figure 3, Map 2m. Sampling areas (2005, 2013, 2023): Pendleton Riffle section of lower Tonawanda Creek (Wells, 2009).

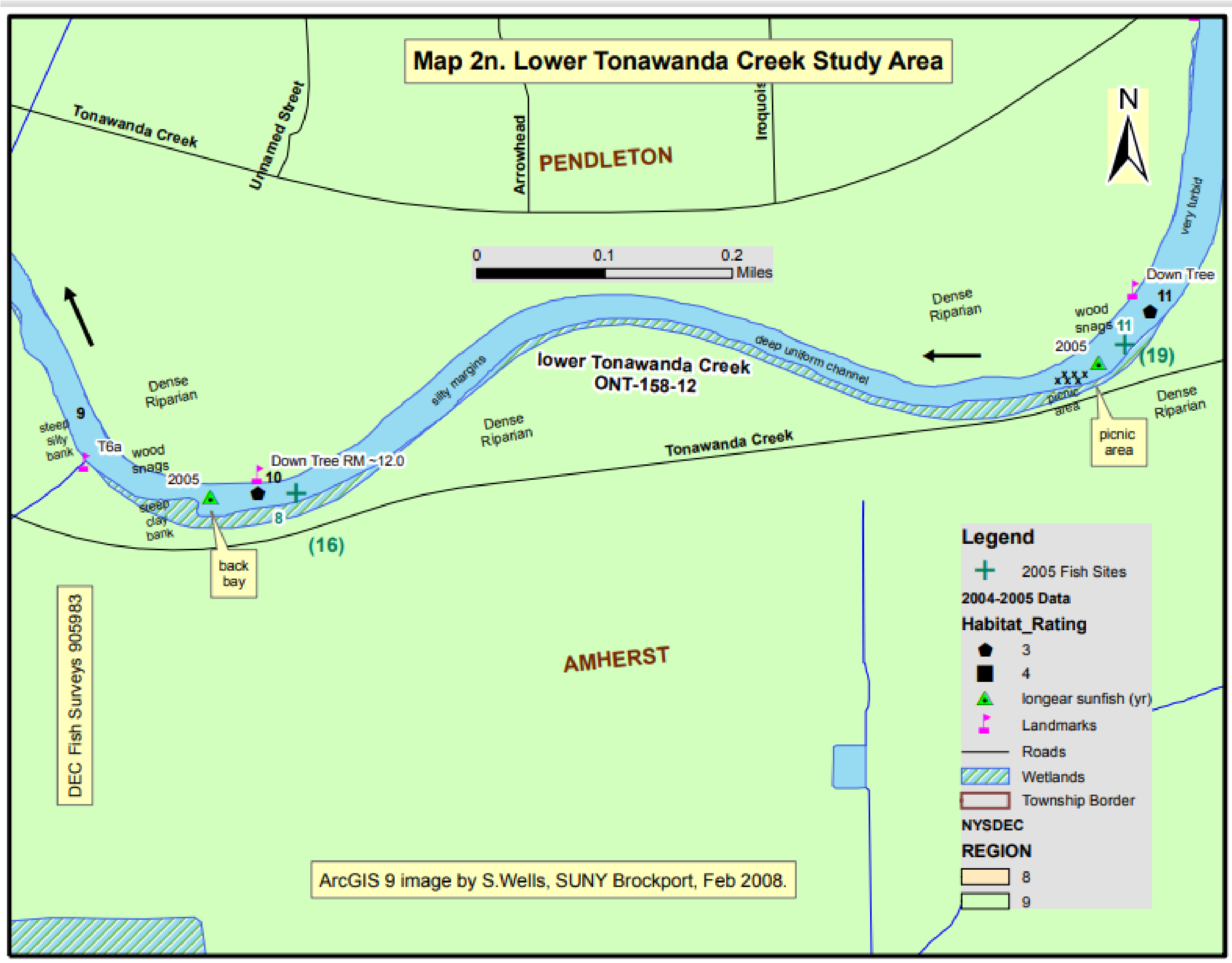

Figure 3, Map 2n. Sampling areas (2005, 2013, 2023): Section of lower Tonawanda Creek between the Pendleton Riffle and Mud Creek (Wells, 2009).

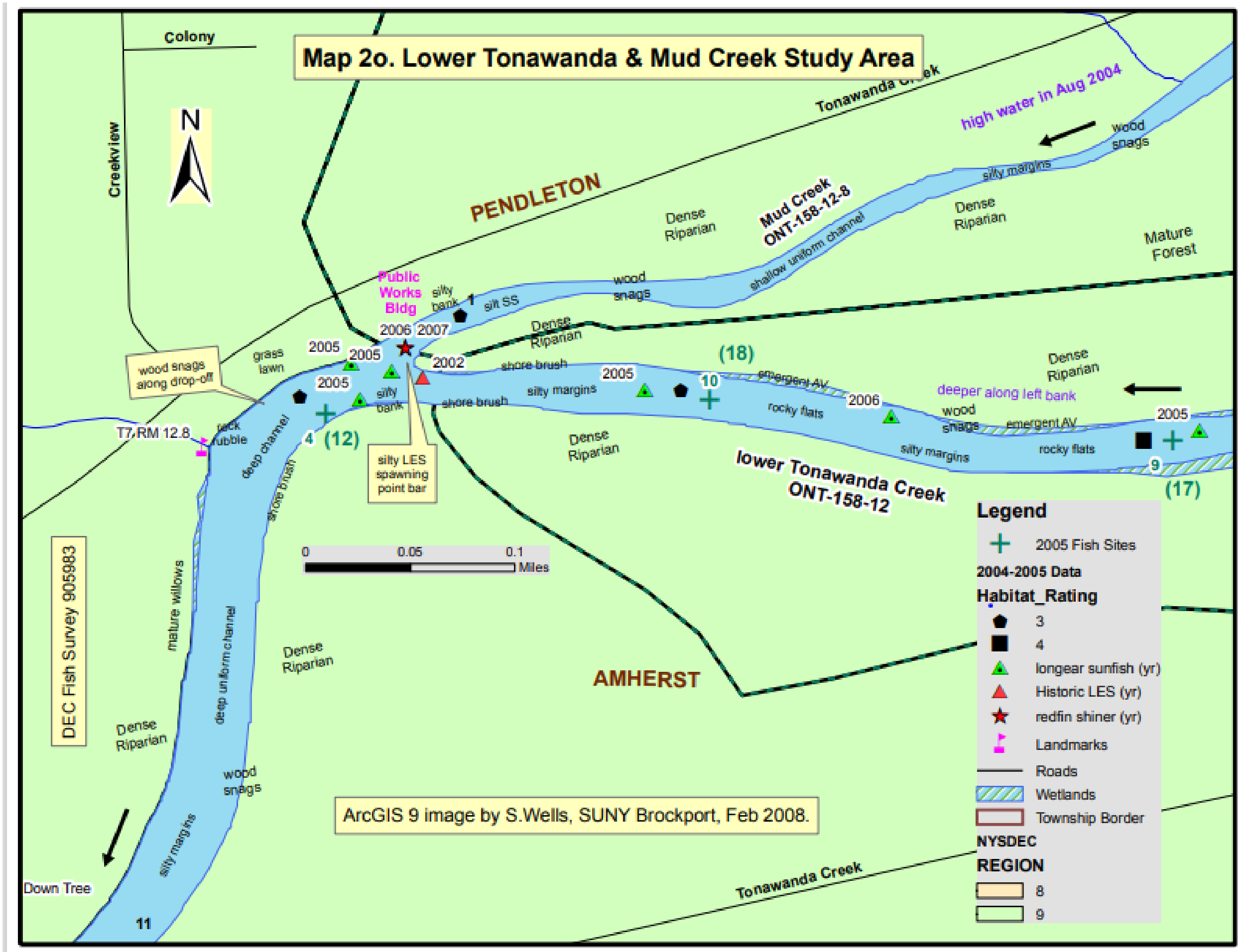

Figure 3, Map 2o. Sampling areas (2005, 2013, 2023): Mud Creek confluence section of lower Tonawanda Creek (Wells 2009)

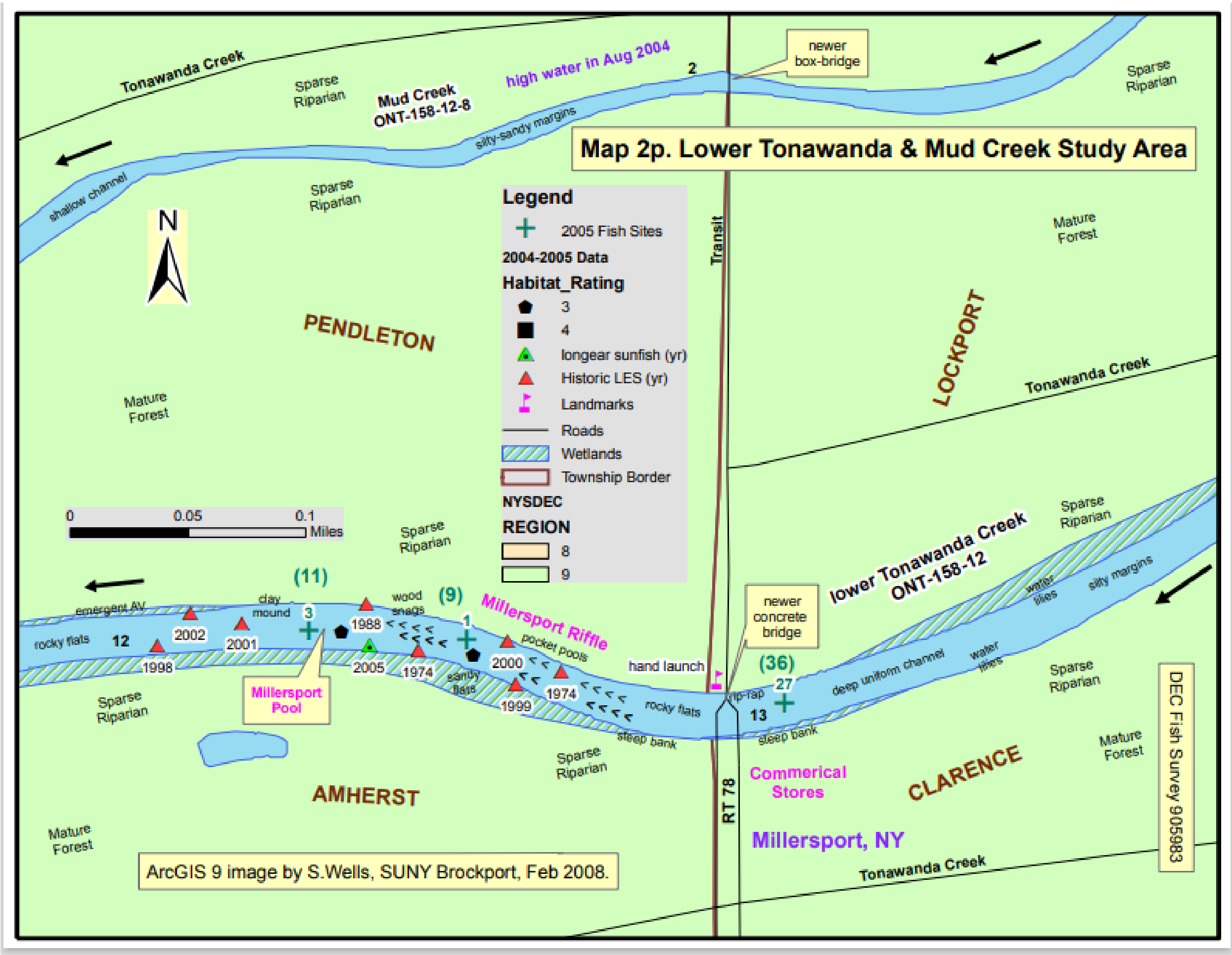

Figure 3, Map 2p. Sampling areas (2005, 2013, 2023): Millersport Riffle section (to just upstream from Rt. 78, Transit Rd. bridge over lower Tonawanda Creek (Wells, 2009).

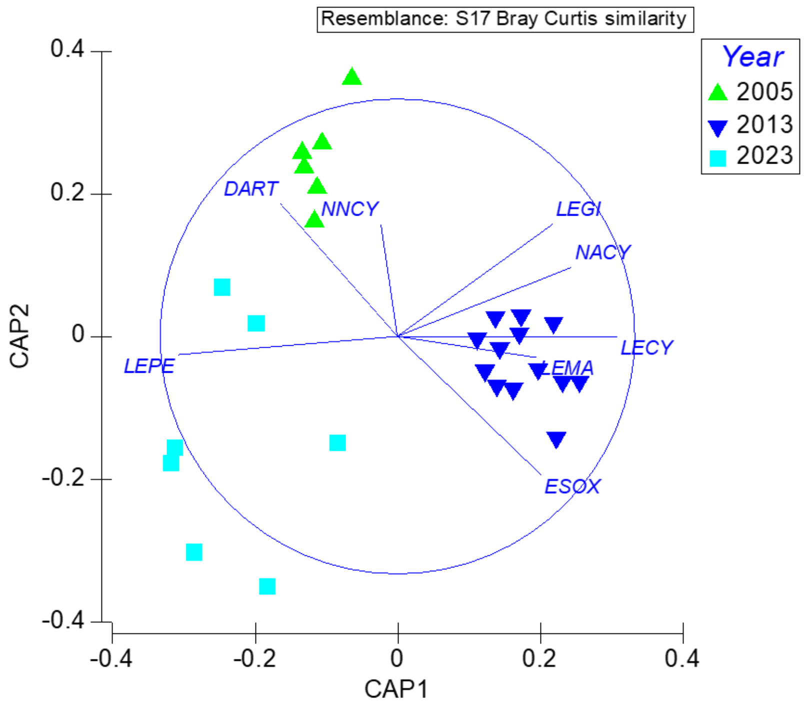

Figure 4. Canonical Analysis of Principal Components (CAP) using sampling run catch per unit effort data from 2005 (Wells, 2009), 2013 (Sanderson-Kilchenstein, 2015) and 2023 (this study} in the study area. Vectors show species' contributions to differences in the fish communities among years. Clockwise from the left: LEPE = Northern Sunfish (*Lepomis peltastes*), DART = darters (*Etheostoma* and *Percina* species), NNCY = non-native North American cyprinids, LEGI = Pumpkinseed (*L. gibbosus*), Native North American cyprinids, LECY = Green Sunfish (*L. cyanellus*), LEMA = Bluegill (*L. macrochirus*), and ESOX = pike/pickerel.

Appendix 1.

The College at BROCKPORT
STATE UNIVERSITY OF NEW YORK

Department of Environmental Science and Ecology
350 New Campus Drive
Brockport, NY 14420-2973

5/20/23

Dear Property Owner

From May 30 to June 1, SUNY Brockport and the NY State Department of Environmental Conservation will stock Northern Sunfish (*Lepomis peltastes*) at road-accessible points along lower Tonawanda Creek from Rt 78 to the Erie Canal and at a canal wide water near Ransom Creek. The Northern Sunfish is closely related to Bluegill and Pumpkinseed sunfish and is endangered in NY state. Discovered in 1974, the last wild Northern Sunfish in western NY state were detected in lower Tonawanda Creek and the canal wide water in 2009. Before then, a few Northern Sunfish from these areas were taken to establish new populations in two DEC hatchery ponds. We will stock several thousand descendants of those fish to try to reestablish Northern Sunfish in their former native habitat, and we need your help to do this.

Based on our reconnaissance on May 17, your property offers convenient access to one of the sites where we would like to stock fish. Stocking will involve parking a DEC stocking truck along your road and one of two ways to get fish to the water: 1) directly from the truck by hose, or 2) a bucket brigade of Brockport students crossing your property carrying the fish. I hope you will help us restore the Northern Sunfish to its native habitat in lower Tonawanda Creek and the nearby Erie Canal wide water by allowing us to cross your property.

If you have questions or would like further information, please contact me at the email address (quickest way to get my attention) or cell number listed below my signature. Otherwise, I will assume it is alright for us to cross your property, as described above. If you are at home when we arrive, I'd be happy to meet you and show you some Northern Sunfish.

With best regards,

James M. Haynes, Professor Emeritus
Department of Environmental Science & Ecology
State University of New York, Brockport
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Brockport, NY 14420
585-315-2720 (cell)
jhaynes@brockport.edu