U.S. Fish and Wildlife Service

Early Detection of Aquatic Invasive Species in Lake Michigan: Green Bay



Monitoring Summary No. 02 – December 2014

U.S. Fish and Wildlife Service
Green Bay Fish and Wildlife Conservation Office
2661 Scott Tower Drive
New Franken, Wisconsin 54229

Ken King, Matt Petasek, Anthony Rieth, & Timothy Strakosh

Lake Michigan

CONSERVING AMERICA'S fisheries
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Great Lakes
RESTORATION

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On the cover:

(Left photo): Measuring a Bowfin captured by electrofishing in Green Bay, Wisconsin.

(Middle photo): Anthony Rieth (USFWS) and Matt Petasek (USFWS) with stocked juvenile Muskellunge captured in the Fox River, Wisconsin.

(Right photo): A non-native Chinook Salmon caught in a fyke net in Green Bay, Wisconsin.

Summary

The Green Bay area was sampled as part of the 2014 U.S. Fish and Wildlife Green Bay Conservation Office (USFWS GBFWCO) Aquatic Invasive Species (AIS) early detection and monitoring program. Sampling occurred in Green Bay and the Fox River from August 12th through November 13th (Figures 13 to 17). All fish were identified to species, measured to the nearest mm (TL) and released. For each unit of effort, if >50 individuals were captured for a species, the first fifty were measured and the remaining were counted. Seventy-six units of effort captured a total of 4,108 fish from 37 different species (Table 1). Nonnative species accounted for 7 of the 37 species present; no new nonnative species were caught in the Green Bay sampling area. All rare fish species (n<3) caught are listed in Table 3.

Electrofishing was conducted during both day and nighttime hours from August 18th through November 13th. Thirty-nine shocking runs (≈ 10 min each) covered various habitats including sand flats, lagoons, weed beds, rocky structures and riverine habitat. Electrofishing yielded 2,295 fish from 35 different species for a total catch per unit effort (CPUE) of 5 fish per min (Table 1). Eleven of the thirty-five species captured were unique to this sampling method (Table 1). Fin clips were noticed on four Muskellunge *Esox masquinongy* captured by electrofishing (Table 2).

Fyke net and mini-fyke net sets were deployed in the bay and river areas from August 20th to November 12th and fished overnight. Each set consisted of two nets joined together by their lead lines. Total catch from 6 paired fyke nets was 307 fish from 17 different species; CPUE was 51 fish per paired net night (Table 1). One of the seventeen species captured was unique to this sampling method (Table 1). Six paired mini-fyke nets yielded a CPUE of 247 fish per paired net night (Table 2). Total catch consisted of 1,482 fish from 19 different species (Table 1).

Twenty-four minnow trap arrays were deployed between August 12th and 15th. Every array consisted of five minnow traps positioned 7.62 m apart. The traps were randomly baited with cheese, hot dogs, bread, dog food, or left empty before being fished overnight. Arrays were set parallel to unique features or the shoreline. The arrays yielded a CPUE of 1 fish per array night; the total catch consisted of 24 fish from four different species (Table 1).

Table 1. Total number and CPUE of fish caught in the Green Bay sample area by species and gear type.

Species	Total Catch By Gear Type (CPUE)				Total
	Electrofishing (Fish / Min)	Fyke Net (Fish/ Paired Net Night)	Mini-Fyke Net (Fish/ Paired Net Night)	Minnow Trap (Fish / Array Night)	
Alewife	2 (0.005)	15 (2.5)	12 (2)		29
Black Bullhead	3 (0.007)				3
Black Crappie	3 (0.007)	50 (8.333)	84 (14)		137
Bluegill	7 (0.017)	3 (0.5)	5 (0.833)		15
Bluntnose Minnow	1 (0.002)		3 (0.5)		4
Bowfin	2 (0.005)		1 (0.167)		3
Brown Bullhead	2 (0.005)				2
Burbot	17 (0.04)				17
Common Carp	71 (0.168)	3 (0.5)			74
Channel Catfish	2 (0.005)	2 (0.333)			4
Chinook Salmon		1 (0.167)			1
Central Mudminnow	1 (0.002)				1
Common Shiner	7 (0.017)		1 (0.167)		8
Emerald Shiner	828 (1.955)		27 (4.5)		855
Flathead Catfish	6 (0.014)				6
Fathead Minnow	6 (0.014)		1 (0.167)		7
Freshwater Drum	78 (0.184)	9 (1.5)			87
Gizzard Shad	498 (1.176)	101 (16.833)	35 (5.833)		634
Golden Shiner	1 (0.002)				1
Golden Redhorse	6 (0.014)				6
Green Sunfish	20 (0.047)				20
Largemouth Bass	10 (0.024)				10
Log Perch	22 (0.052)		1 (0.167)		23
Lake Whitefish	235 (0.555)				235
Muskellunge	4 (0.009)				4
Northern Pike	4 (0.009)	2 (0.333)	1 (0.167)		7
Quillback	6 (0.014)				6
Rock Bass	3 (0.007)		1 (0.167)		4
Round Goby	9 (0.021)	4 (0.667)	573 (95.5)	2 (0.08)	588
Smallmouth Bass	36 (0.085)	1 (0.167)			37
Spottail Shiner	1 (0.002)		274 (45.667)	3 (0.12)	278
Trout Perch		2 (0.333)	2 (0.333)	1 (0.04)	5
Walleye	112 (0.264)	48 (8)	2 (0.333)		162
White Bass	11 (0.026)	4 (0.667)			15
White Perch	36 (0.085)	8 (1.333)	2 (0.333)		46
White Sucker	5 (0.012)	4 (0.667)	36 (6)		45
Yellow Perch	240 (0.567)	50 (8.333)	421 (70.167)	18 (0.72)	729
Total	2,295 (5.418)	307 (51.167)	1,482 (247)	24 (0.96)	4,108
Effort	423.62 Min. (39 runs)	6 Nights	6 Nights	25 Nights	

Table 2. Marked fish captured in the Green Bay sample area.

Species	Marking	Length (mm)	Method of Capture
Muskellunge	Left Pelvic Fin Clip	284	Electrofishing
Muskellunge	Left Pelvic Fin Clip	294	Electrofishing
Muskellunge	Left Pelvic Fin Clip	300	Electrofishing
Muskellunge	Left Pelvic Fin Clip	301	Electrofishing

Table 3. Green Bay sample area rare fish species (n<3), lengths, and capture method.

Species	Length (mm)	Capture Method
Brown Bullhead	325	Electrofishing
Brown Bullhead	328	Electrofishing
Chinook Salmon	133	Fyke Net
Central Mudminnow	81	Electrofishing
Golden Redhorse	84	Electrofishing

Table 4: Abbreviations, scientific and common names of all fish species caught in the Green Bay sample area.

Common Name:	**Scientific Name:**	**Abbreviation:**
Alewife	*Alosa pseudoharengus*	ALE
Bass, Largemouth	*Micropterus salmoides*	LMB
Bass, Rock	*Ambloplites repestris*	ROB
Bass, Smallmouth	*Micropterus dolomieu*	SMB
Bass, White	*Morone chrysops*	WHB
Bluegill	*Lepomis macrochirus*	BLG
Bowfin	*Amia calva*	BON
Bullhead, Black	*Ameiurus melas*	BLB
Burbot	*Lota lota*	BUT
Carp, Common	*Cyprinus carpio*	CAP
Catfish, Channel	*Ictalurus punctatus*	CHC
Catfish, Flathead	*Pylodictus olivaris*	FHC
Crappie, Black	*Pomoxis nigromaculatus*	BLC
Drum, Freshwater	*Aplodinotus grunniens*	FWD
Goby, Round	*Neogobius melanostomus*	ROG
Logperch	*Percina caprodes*	LOP
Minnow, Bluntnose	*Pimphales notatus*	BNM
Minnow, Fathead	*Pimphales promelas*	FHM
Mudminnow, Central	*Umbra limi*	CMM
Muskellunge	*Esox masquinongy*	MUE
Perch, White	*Morone americana*	WHP
Perch, Yellow	*Perca flavescens*	YEP
Pike, Northern	*Esox lucius*	NOP
Quillback	*Carpoides cyprinus*	QUB
Redhorse, Golden	*Maxostoma erythrurum*	GOR
Salmon, Chinook	*Oncorhynchus tshawytscha*	CHS
Shad, Gizzard	*Dorosoma cepedianum*	GIS
Shiner, Common	*Luxilus cornutus*	CNS
Shiner, Emerald	*Notropis athernoides*	EMS
Shiner, Golden	*Notemigonus crysoleucas*	GOS
Shiner, Spottail	*Notropis hudsonius*	STS
Sucker, White	*Catostomus commersonii*	WHS
Sunfish, Green	*Lepomis cyanellus*	GRS
Trout-perch	*Percopsis omiscomaycus*	TRP
Walleye	*Sander vitrius*	WAE
Whitefish, Lake	*Coregonus clupeaformis*	LWF

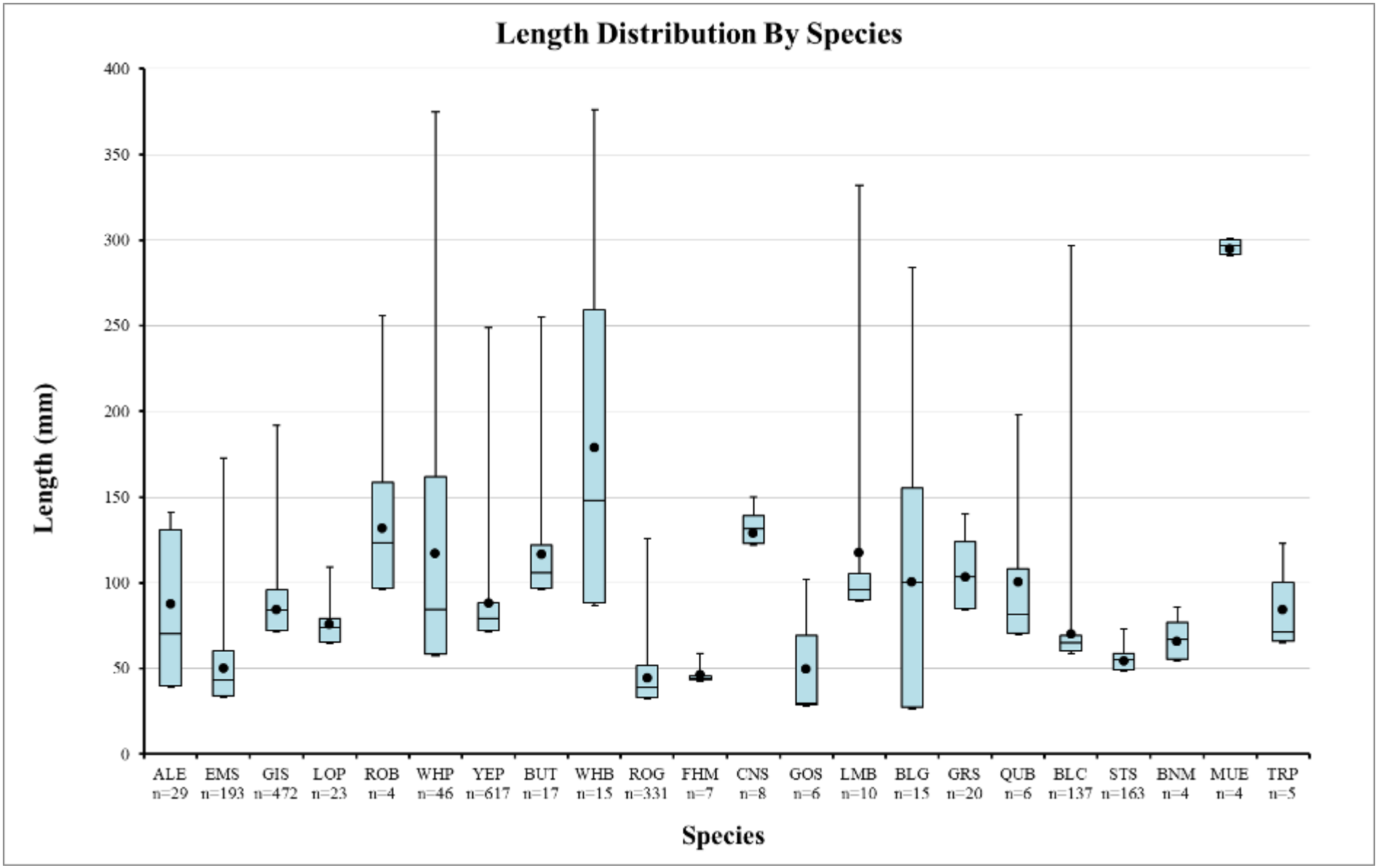

Figure 1. Length distribution of all species (n>3) with maximum length less than 400mm caught in the Green Bay sample area. Maximum and minimum lengths are depicted by the upper and lower whiskers, while the box height represents the span from the 1st to the 3rd quartile. Mean length is depicted by the dot, while the median is represented by horizontal line for each species.

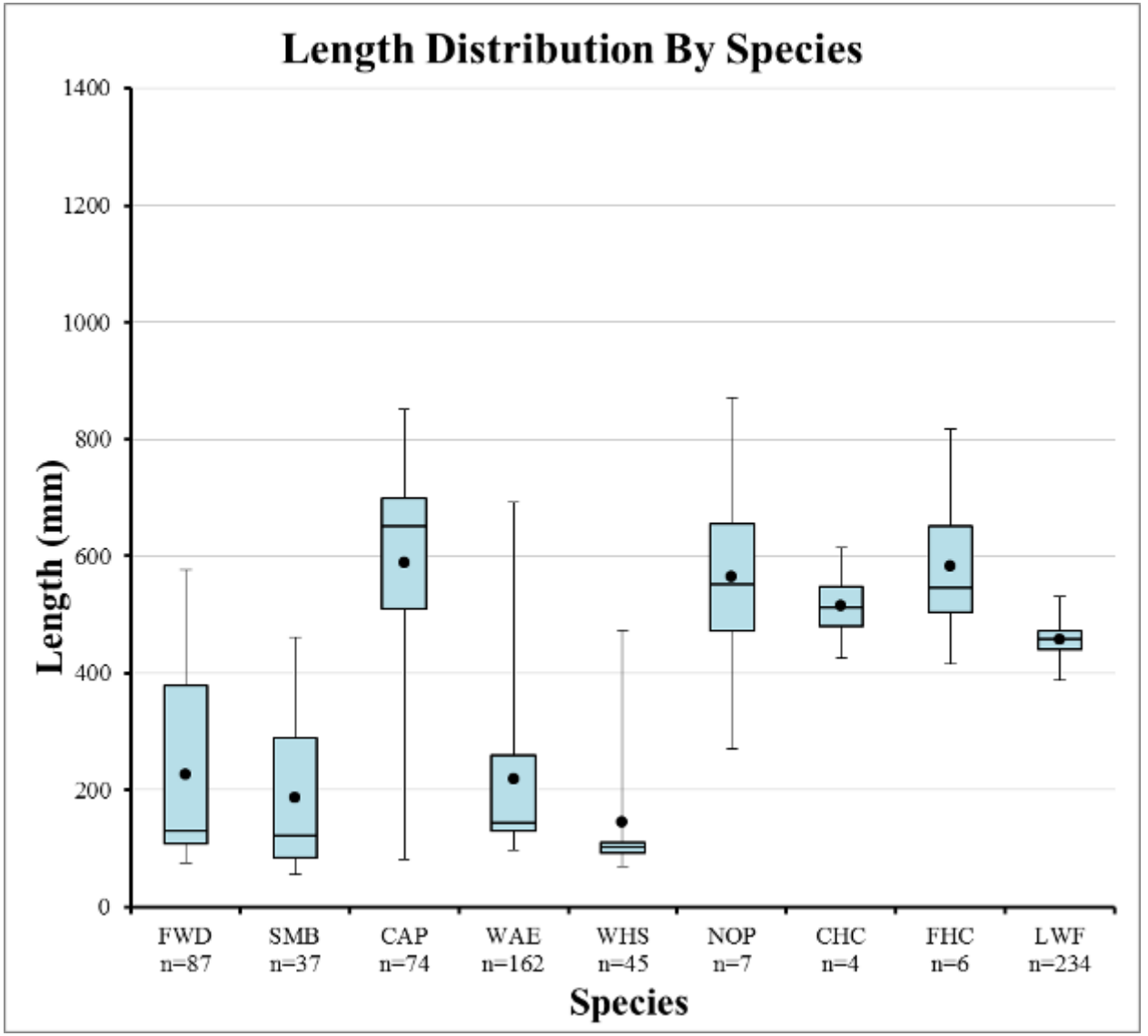

Figure 2. Length distribution of all species (n>3) with maximum length greater than than 400mm caught in the Green Bay sample area. Maximum and minimum lengths are depicted by the upper and lower whiskers, while the box height represents the span from the 1st to the 3rd quartile. Mean length is depicted by the dot, while the median is represented by horizontal line for each species.

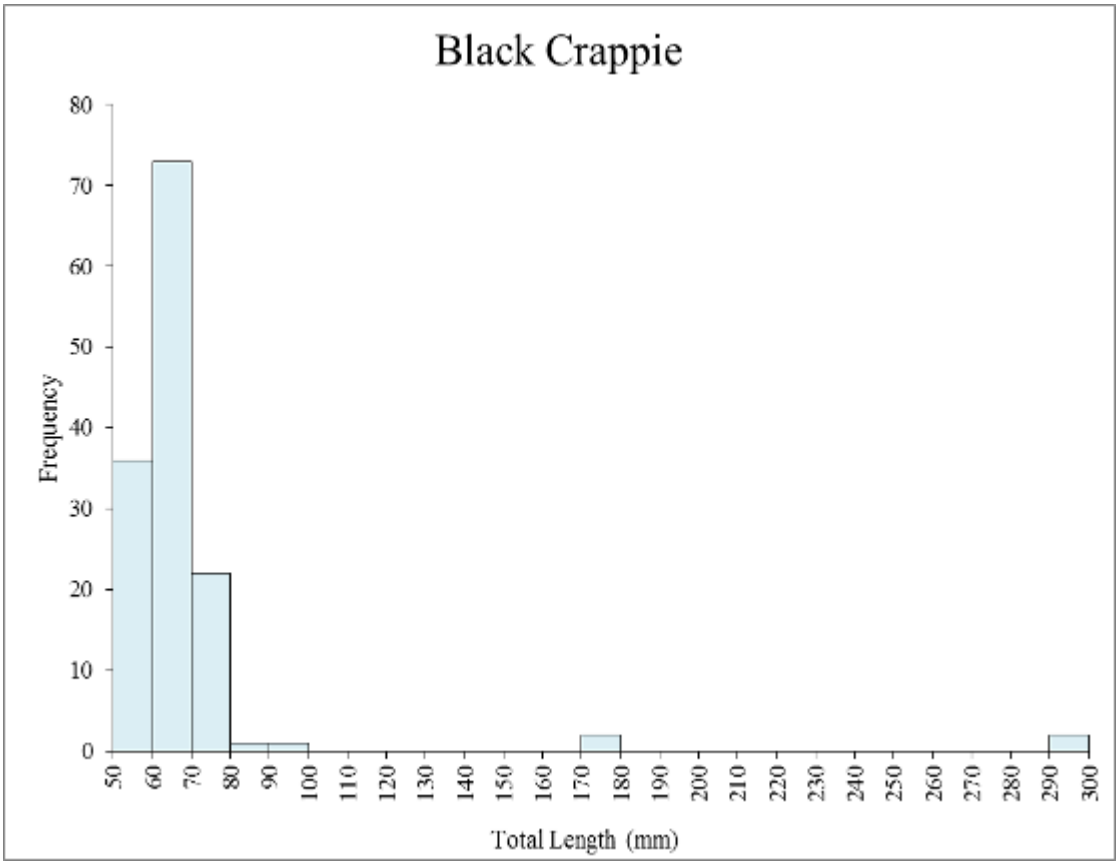

Figure 3. Black Crappie length distribution for the Green Bay sample area.

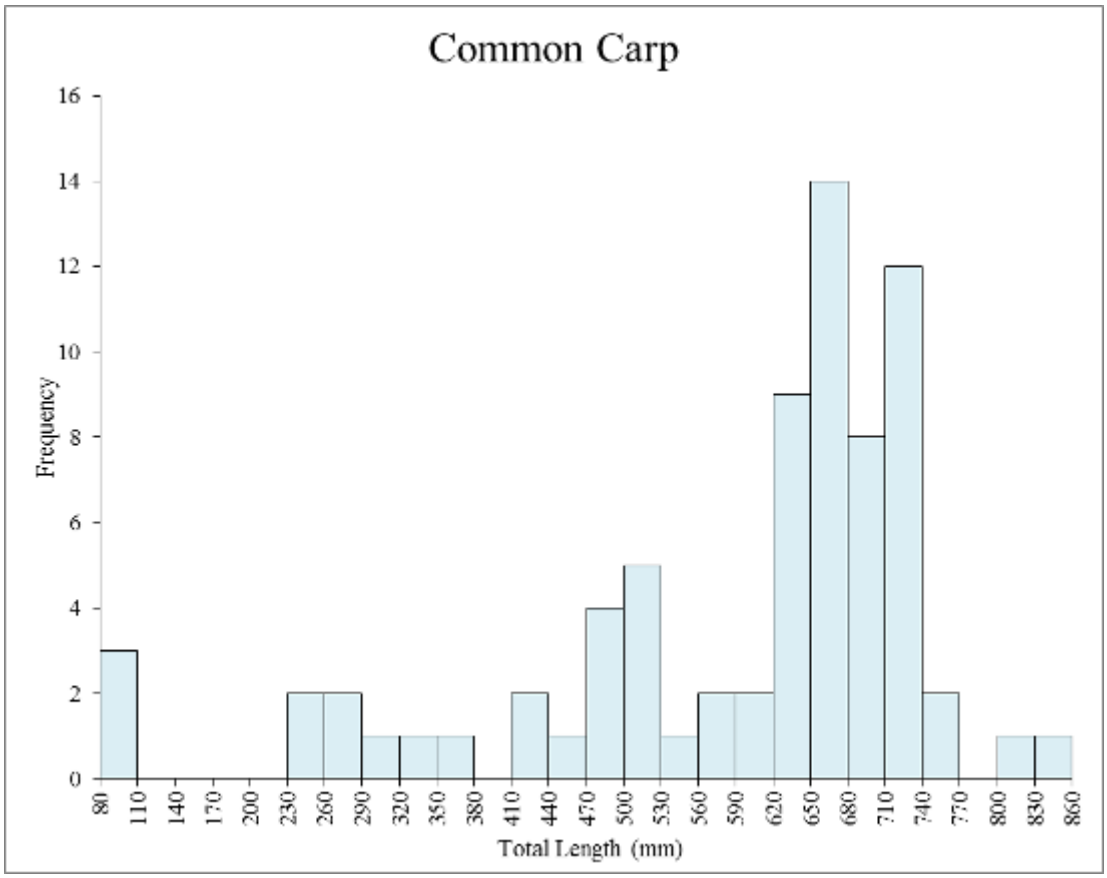

Figure 4. Common Carp length distribution for the Green Bay sample area.

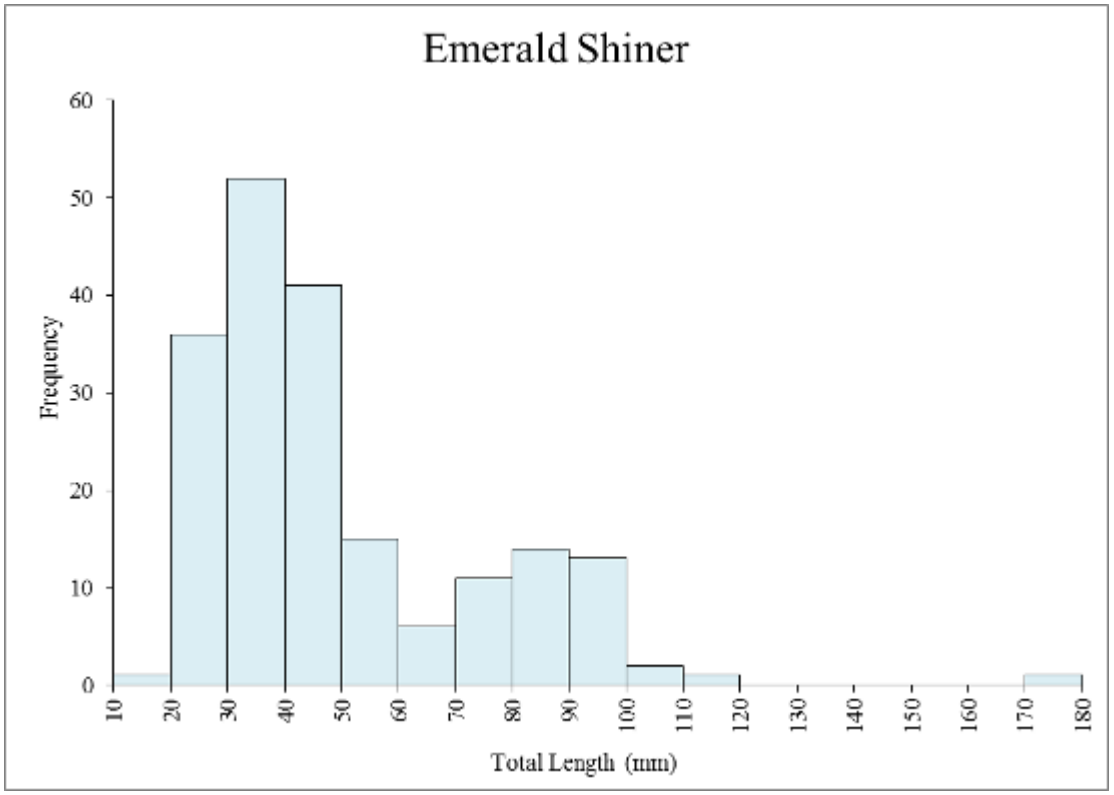

Figure 5. Emerald Shiner length distribution for the Green Bay sample area.

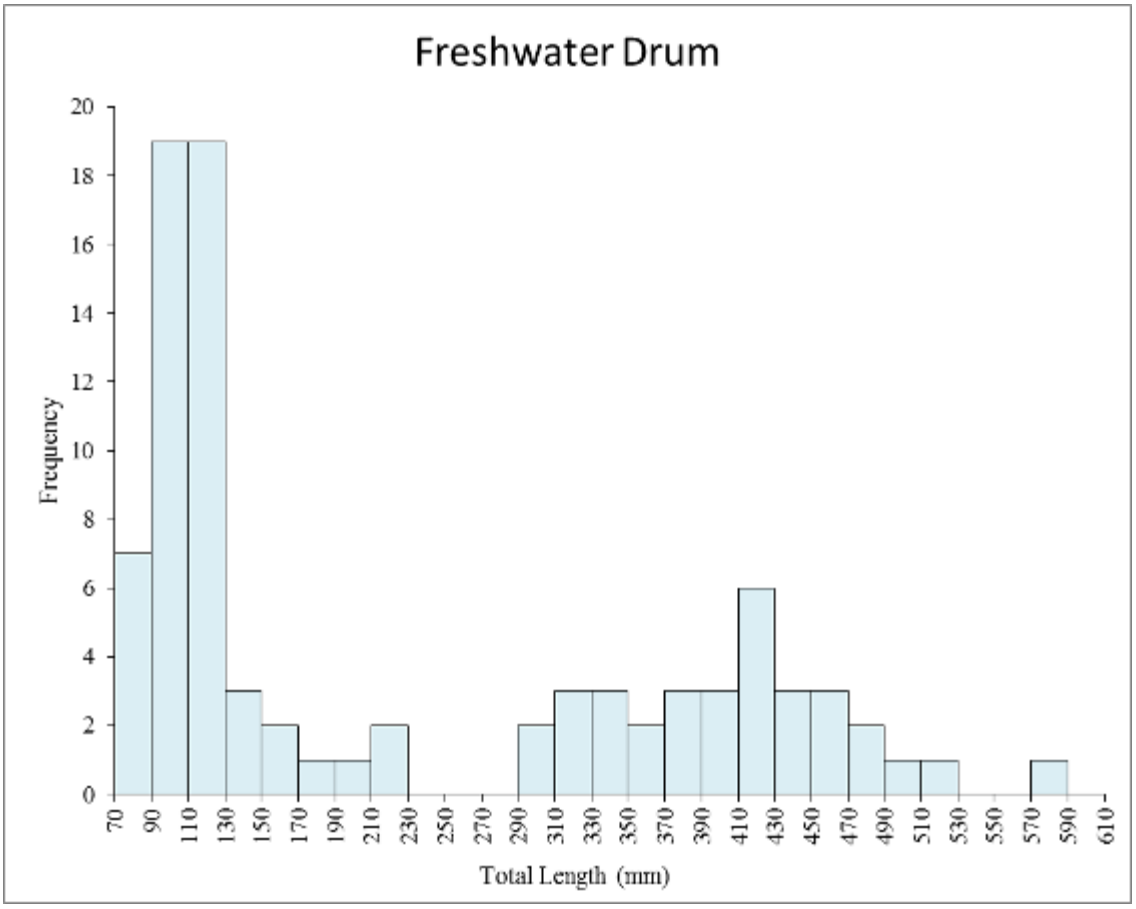

Figure 6. Freshwater Drum length distribution for the Green Bay sample area.

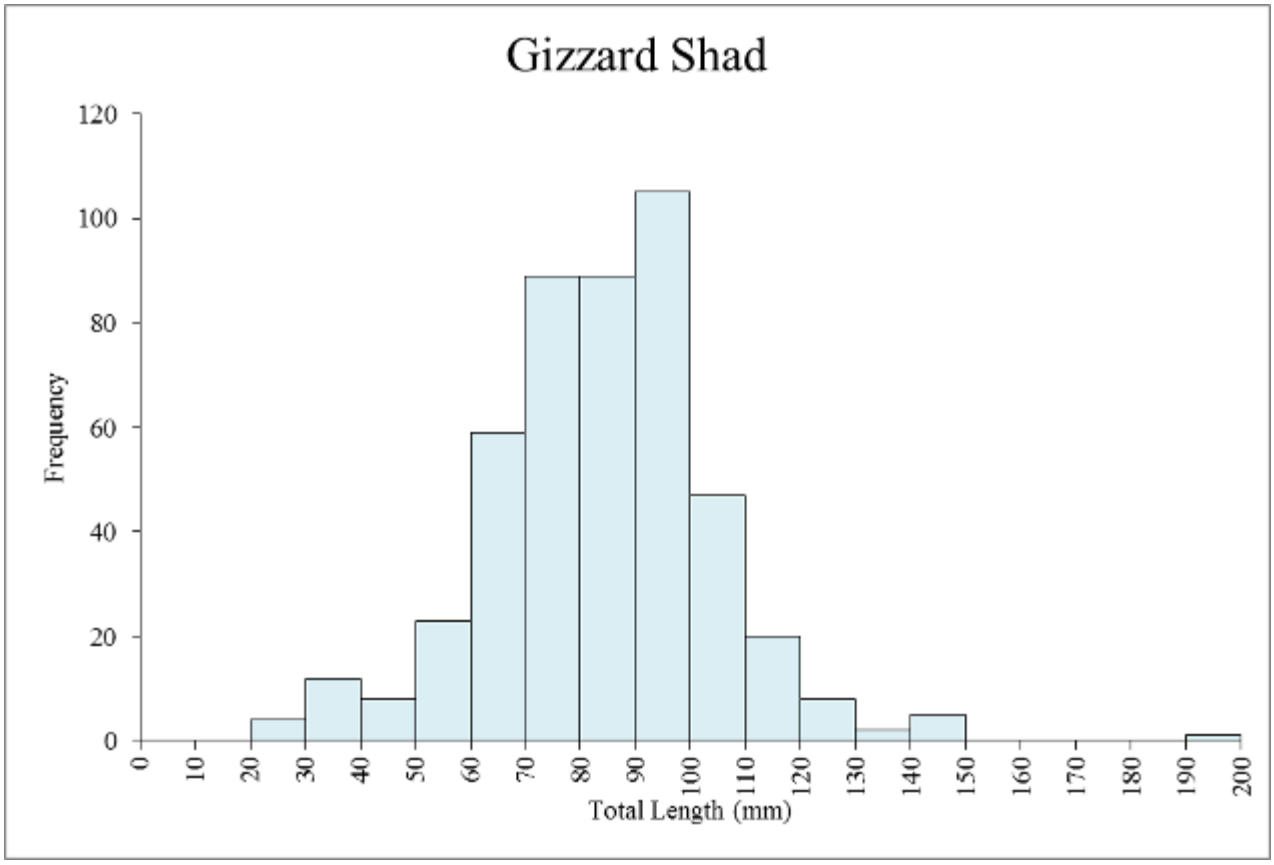

Figure 7. Gizzard Shad length distribution for the Green Bay sample area.

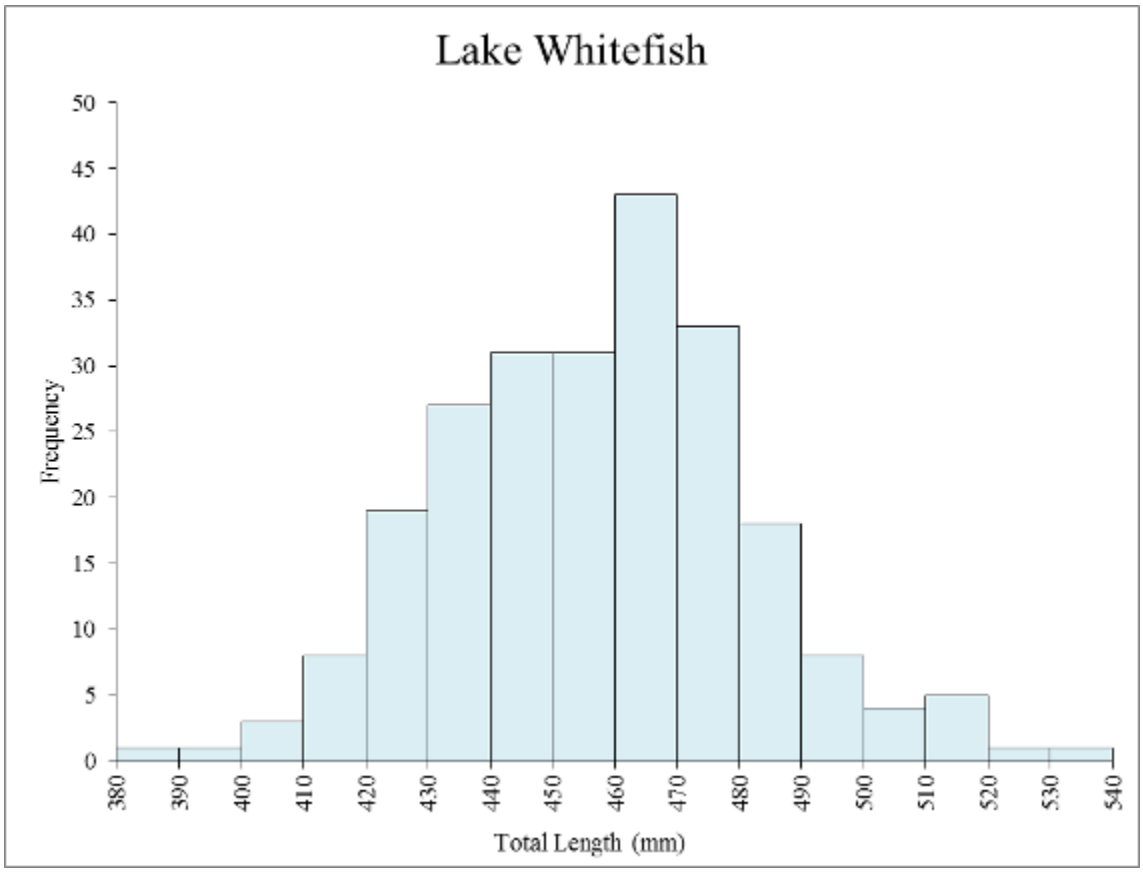

Figure 8. Lake Whitefish length distribution for the Green Bay sample area.

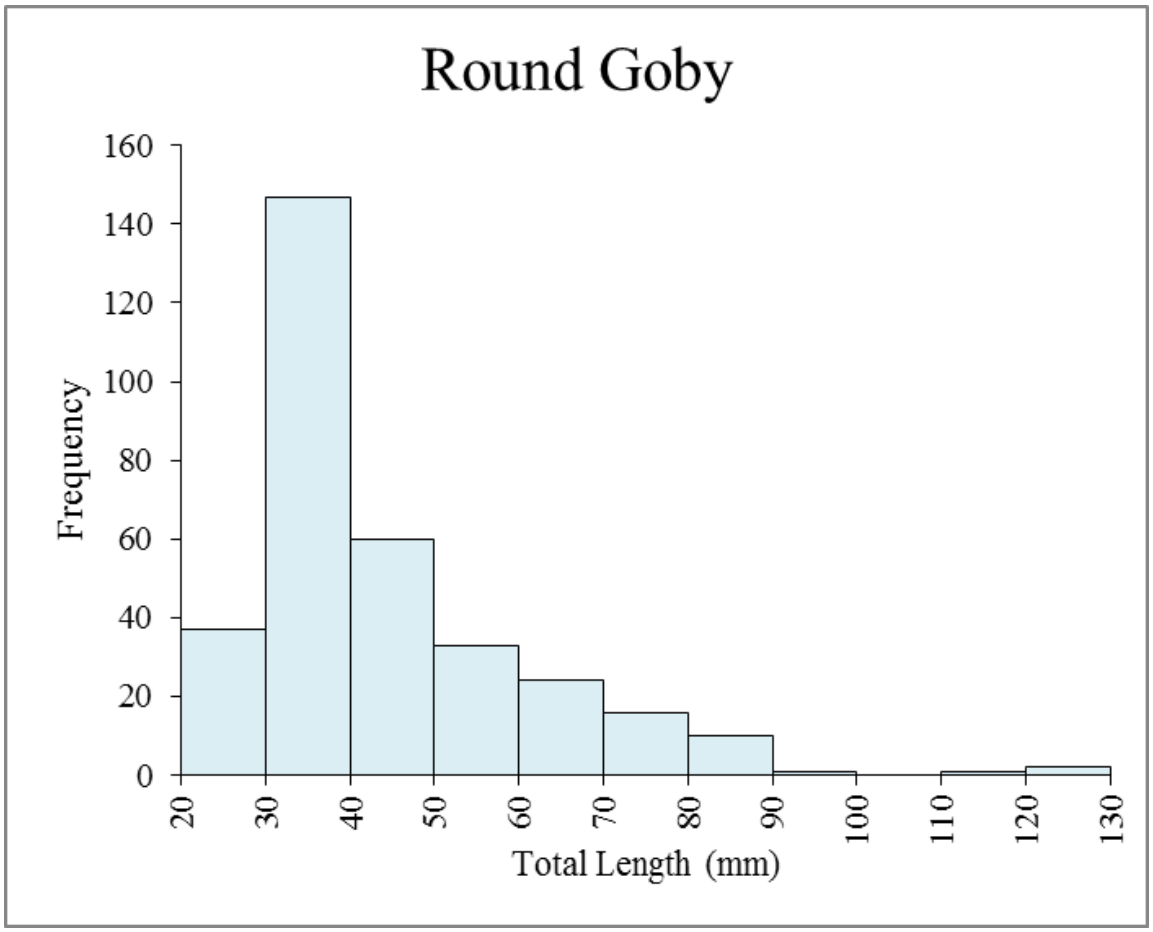

Figure 9. Round Goby length distribution for the Green Bay sample area.

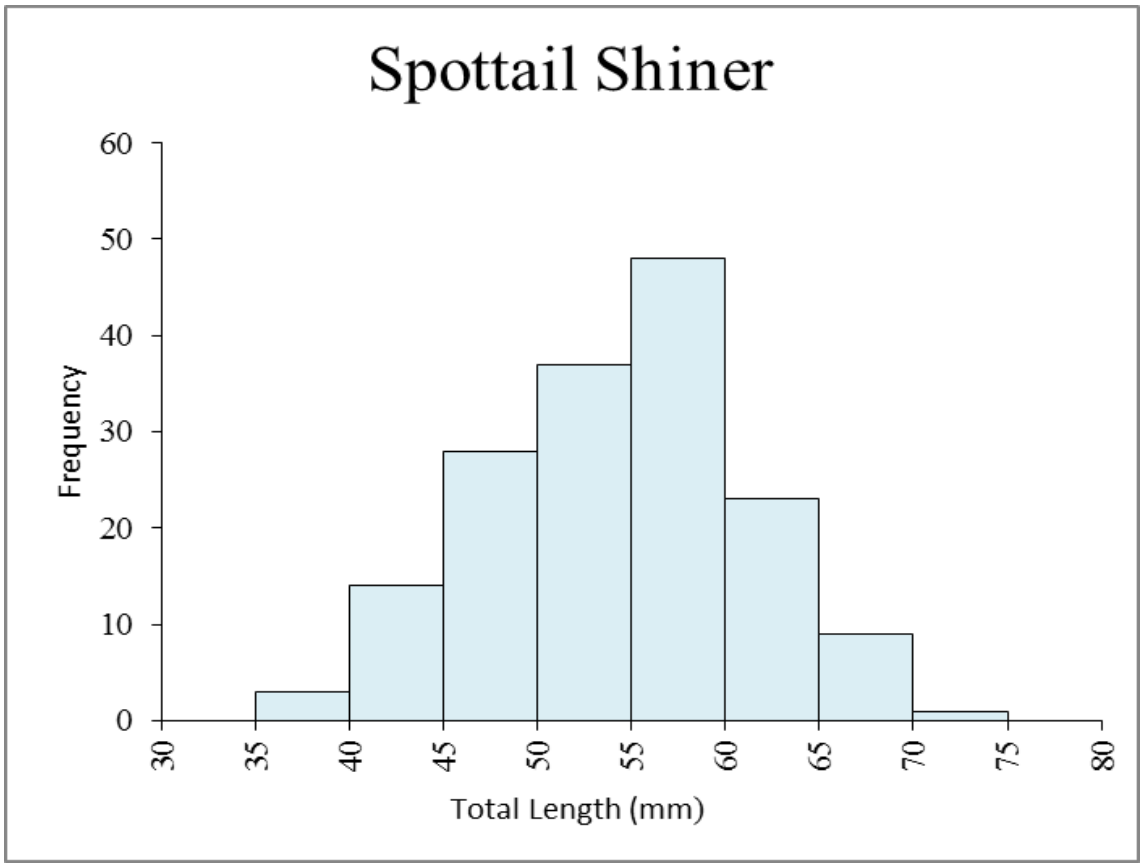

Figure 10. Spottail Shiner length distribution for the Green Bay sample area.

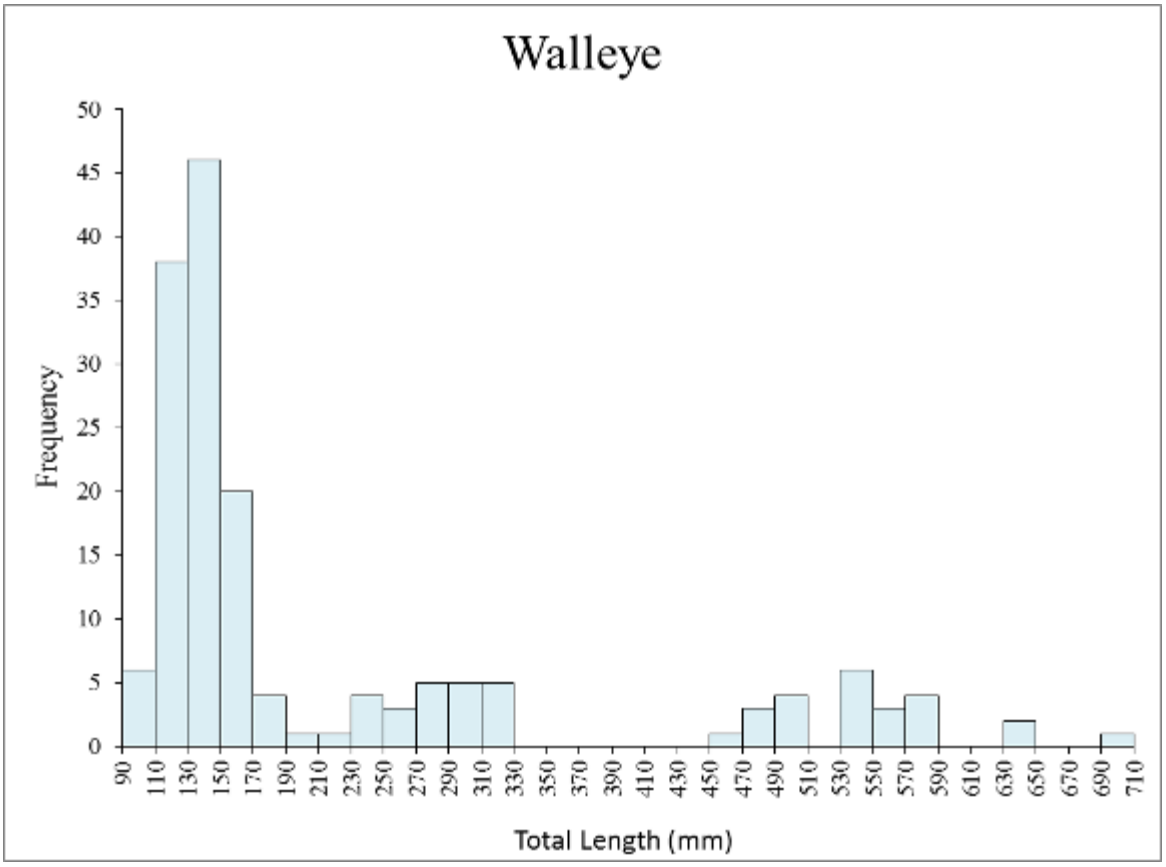

Figure 11. Walleye length distribution for the Green Bay sample area.

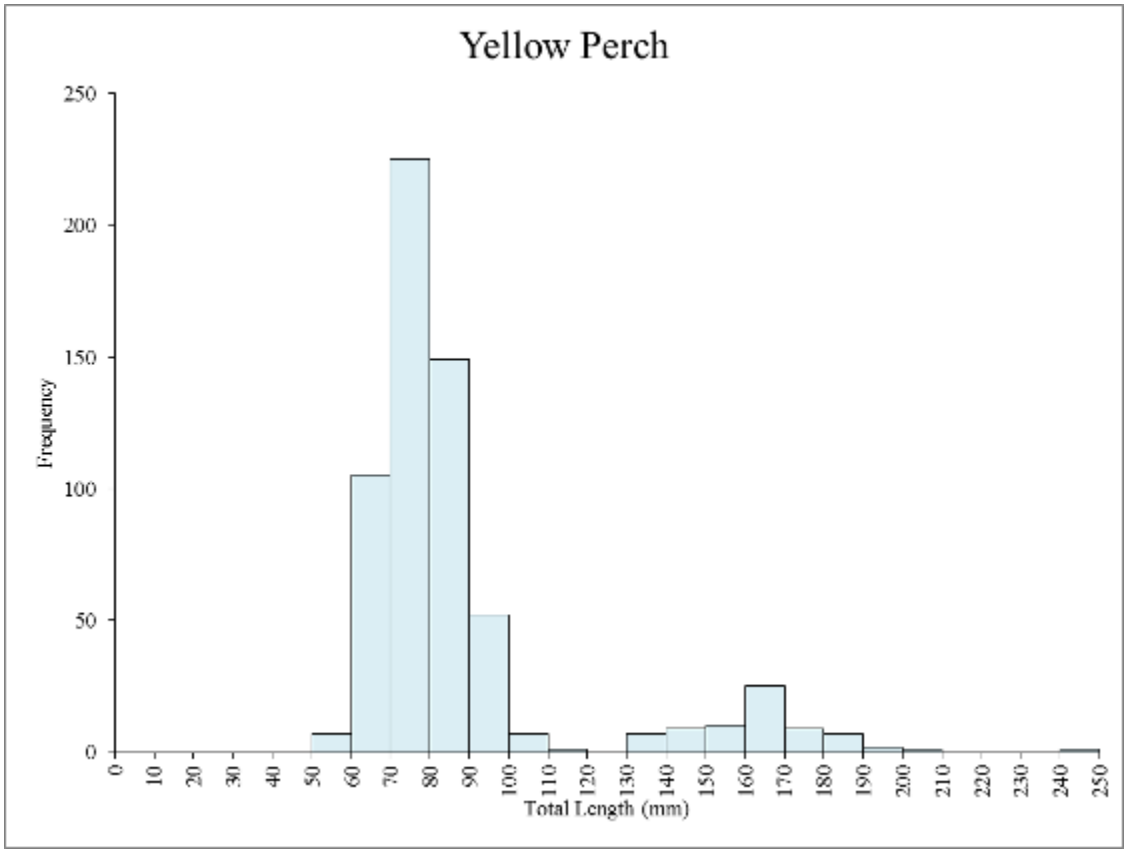

Figure 12. Yellow Perch length distribution for the Green Bay sample area.

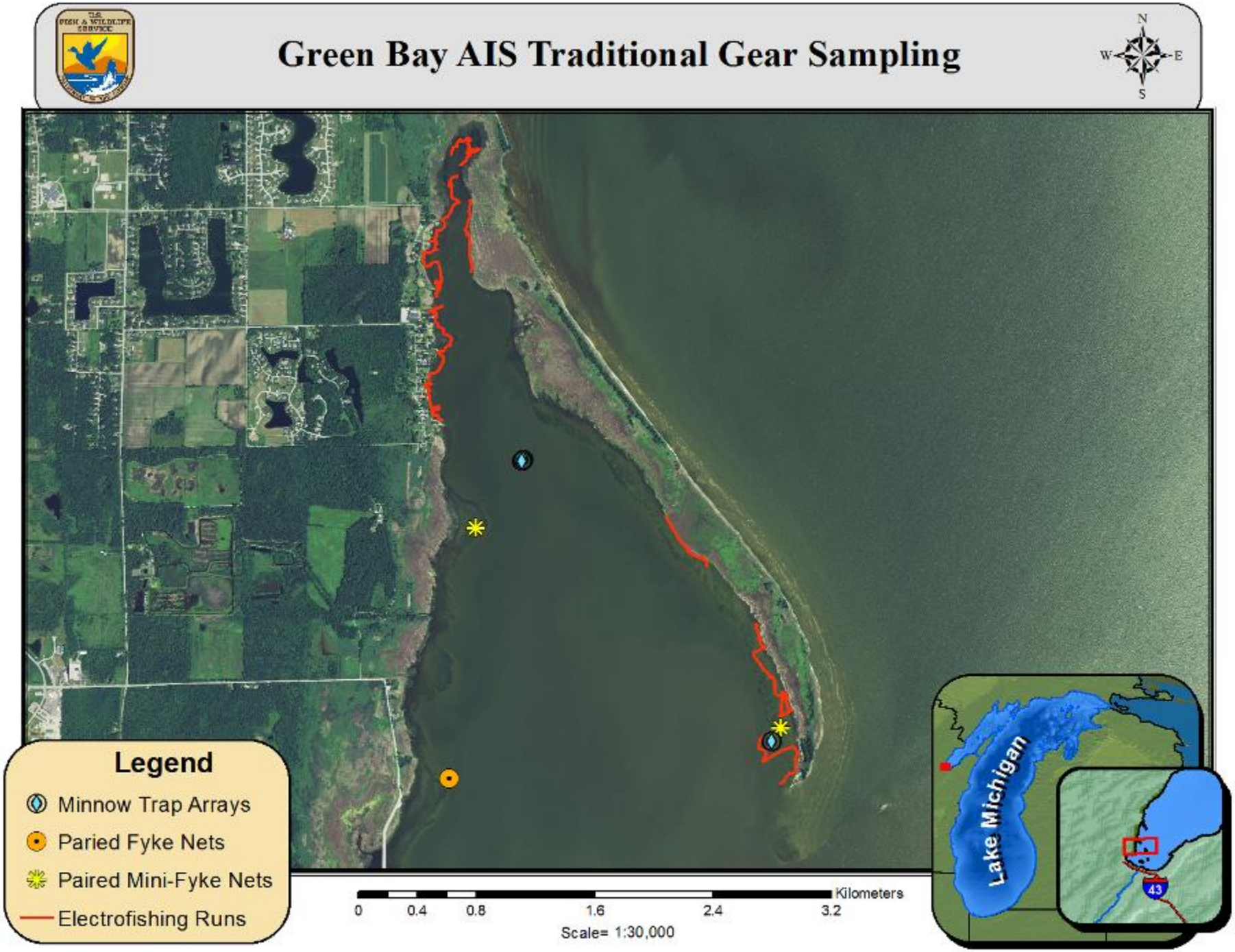

Figure 13: USFWS traditional gear sampling sites in the Northwest quadrant of the Green Bay sample area.

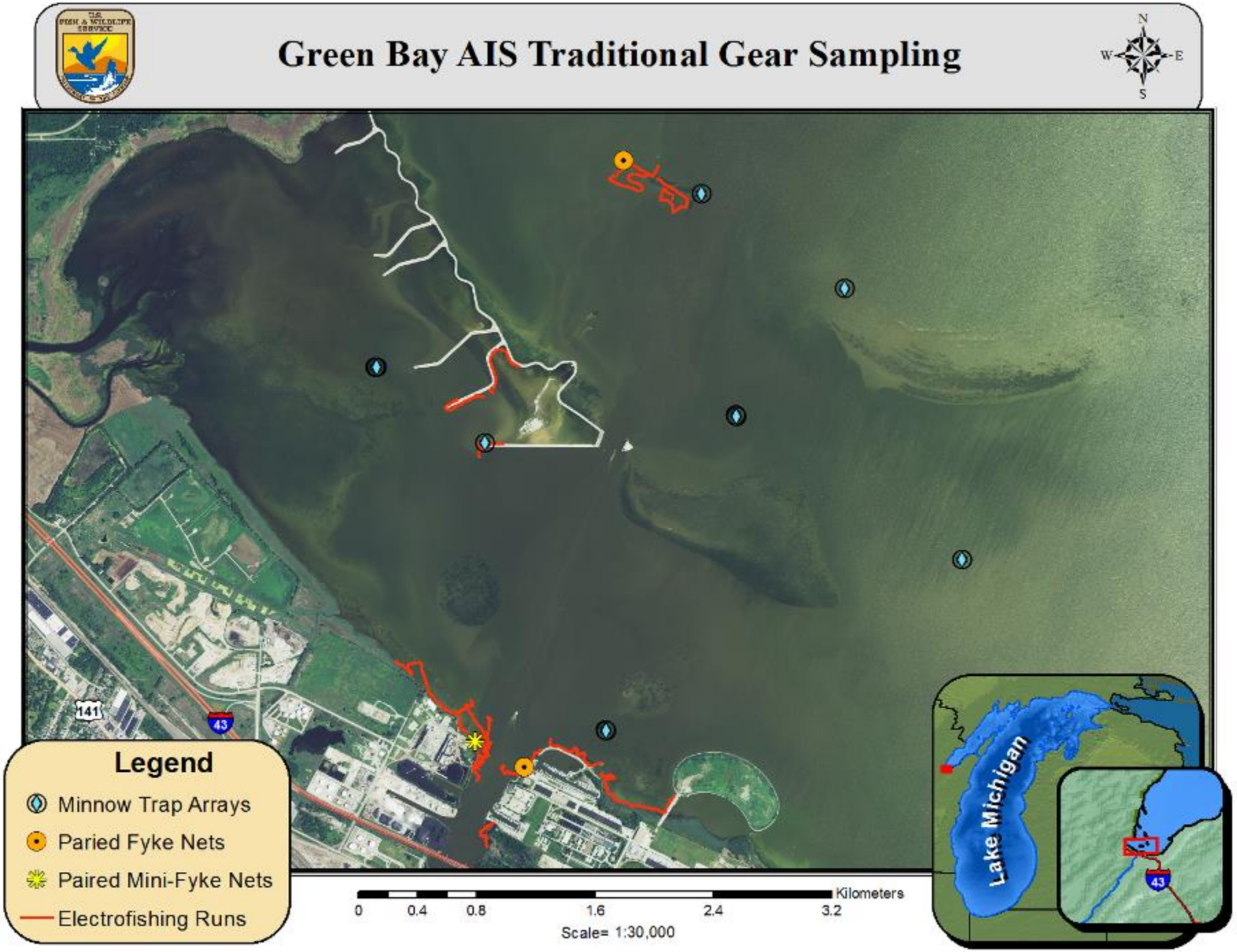

Figure 14: USFWS traditional gear sampling sites in the Southwest quadrant of the Green Bay sample area.

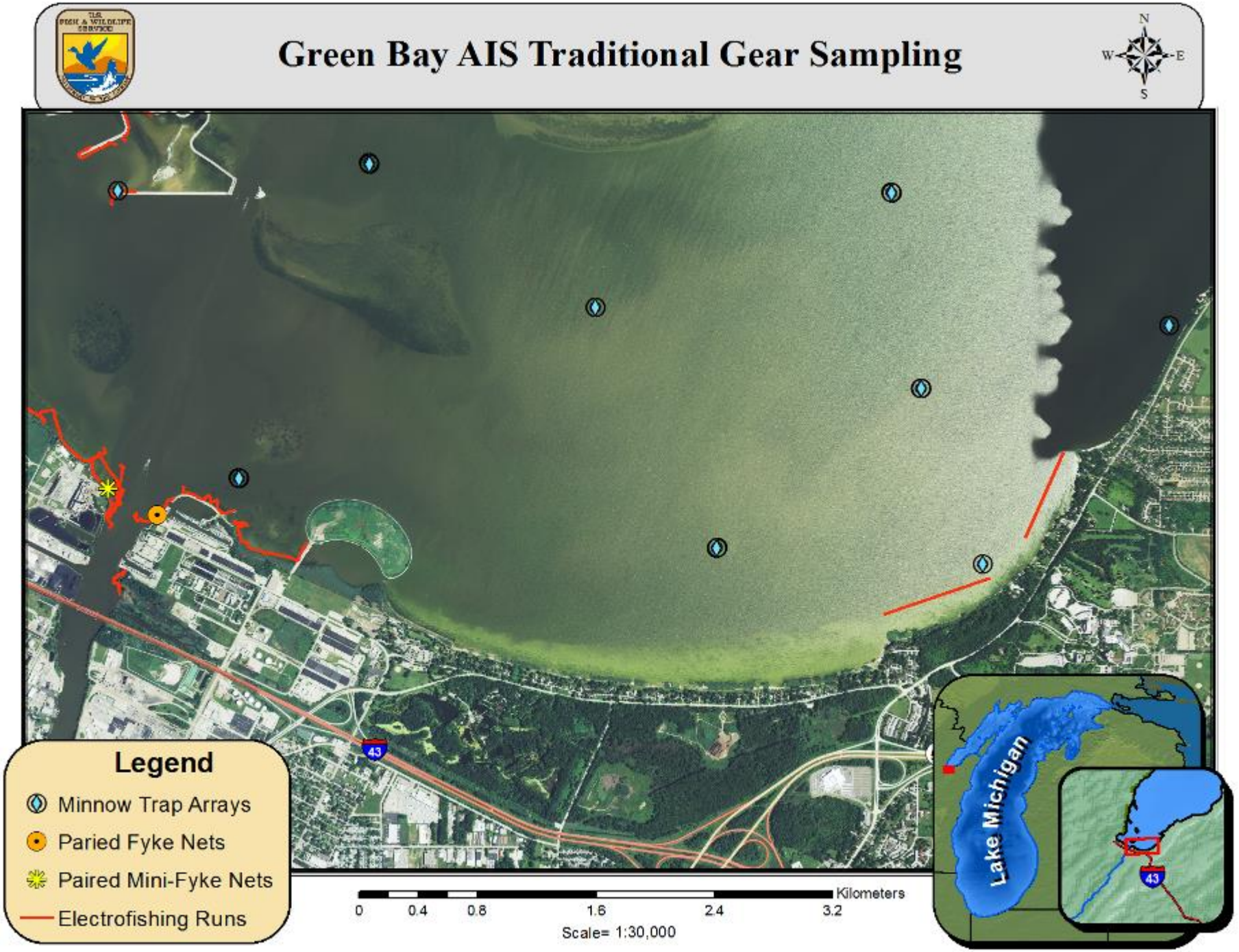

Figure 15: USFWS traditional gear sampling sites in the Southeast quadrant of the Green Bay sample area.

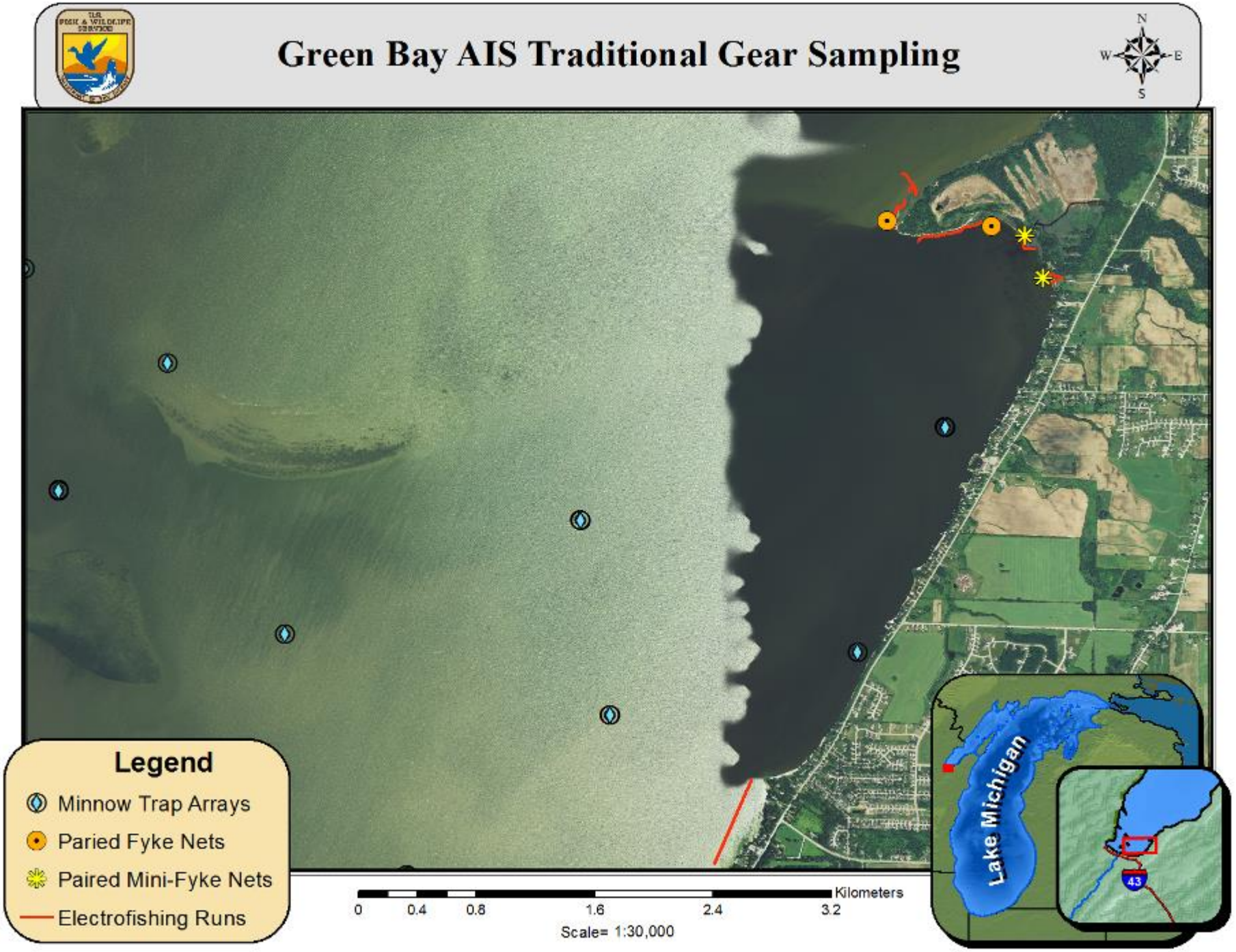

Figure 16: USFWS traditional gear sampling sites in the Northeast quadrant of the Green Bay sample area.

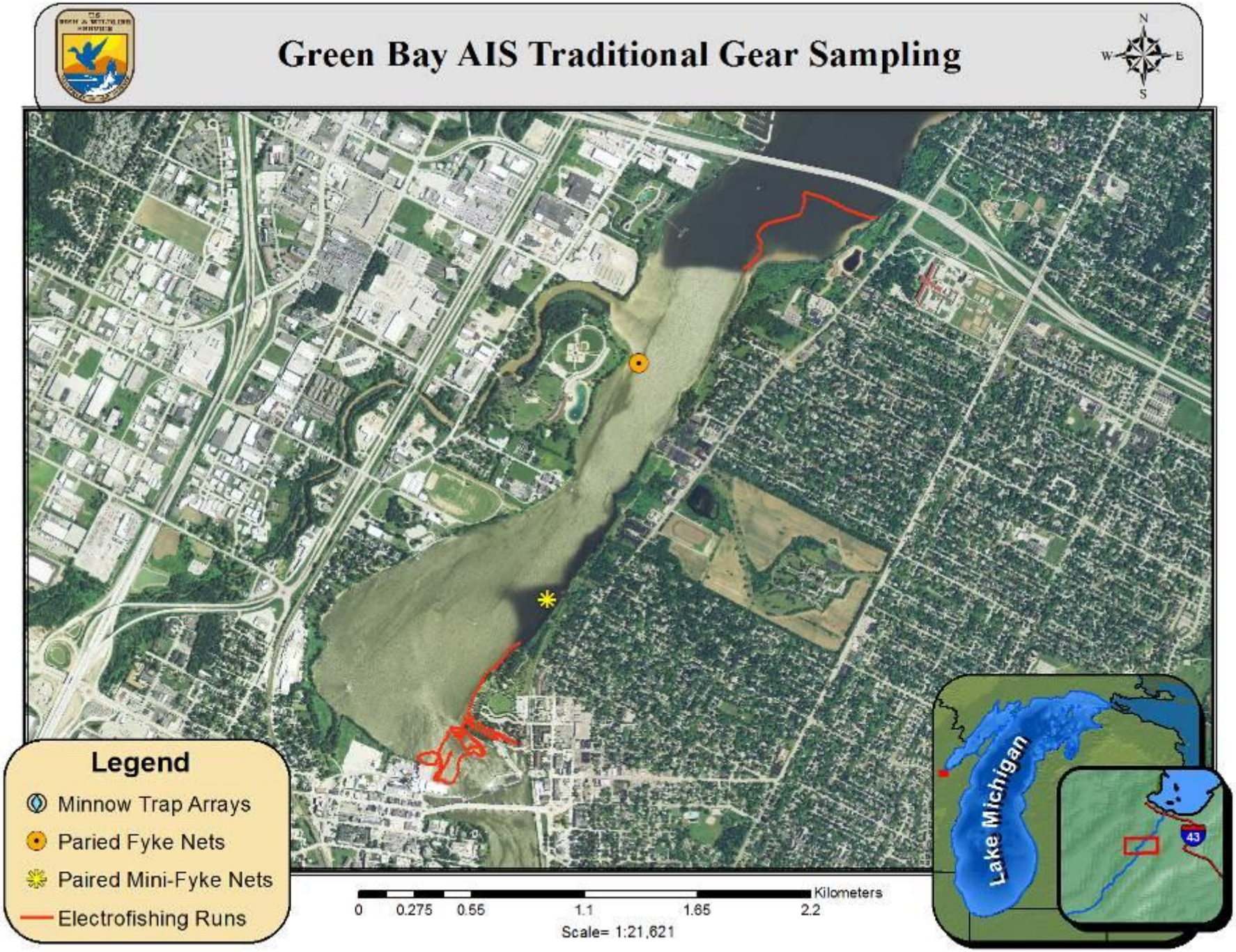

Figure 17: USFWS traditional gear sampling sites on the Fox River in the Green Bay sample area