

Great Lakes - Great Water – Bragging Rights

95% of US - 20% of world's surface fresh water

Drinking water for 35 million people

Over 100 rare plants and species

**Only 1% of water in Great Lakes replenished annually –
rest gift from glaciers**

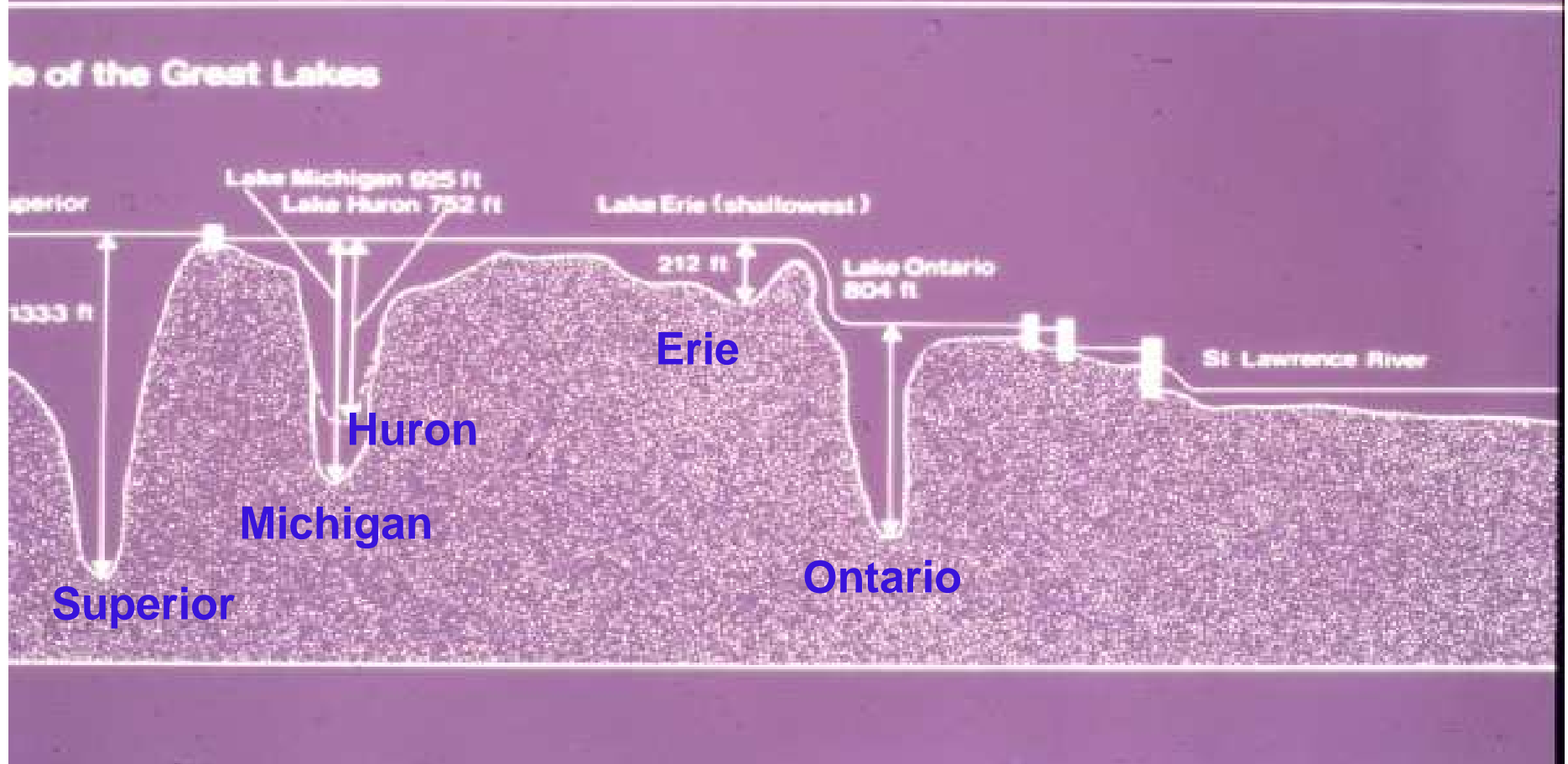
10,900 miles of shoreline = half distance around world

Other states and countries 'eyeing' Great Lakes Water



Great Lakes Depths

Lake Erie So Shallow

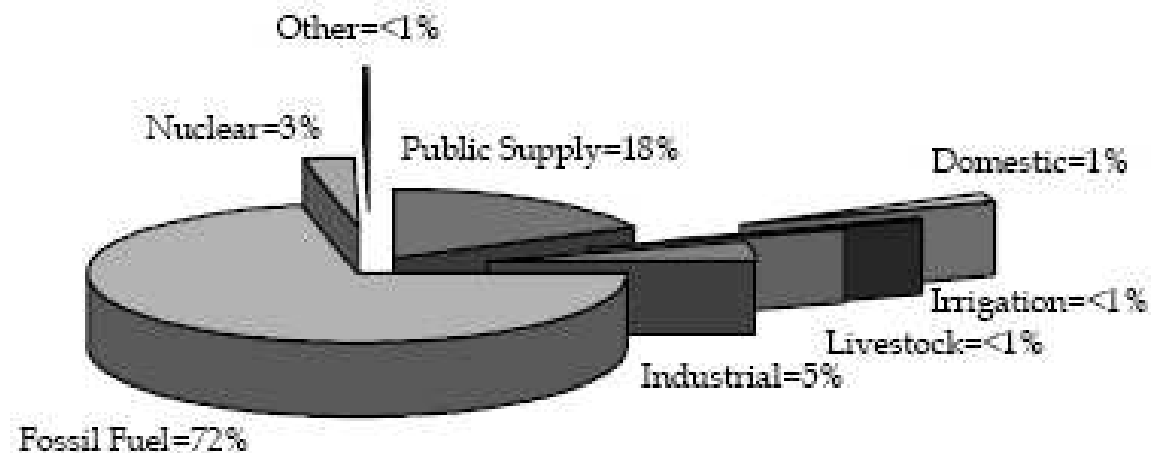


2002 Ohio Water Use in mgd

Total Use = 3,352.67

No Hydroelectric Withdrawals Reported

■	Public Supply=590.60
□	Domestic=56.70
■	Irrigation=20.49
□	Livestock=12.38
■	Industrial=156.62
□	Fossil Fuel=2,407.88
■	Nuclear=102.82
□	Other=5.18



Prepared by Great Lakes Commission 2005 – Great Lakes Water Use

Western Lake Erie

**Great Lake's
Warmest, Shallowest,
'Fishiest' Waters**



Nursery of the Great Lakes

32% of Lake Erie's Shoreline

Most Dredged area | Great Lakes

13% of Lake Erie's Area

Maumee Largest Watershed

5% of Lake Erie's Volume

24' Aver. Depth

Anglers have limits - get fined
Power Plant Intakes have no limits &
most give nothing back

West Erie Impingement /Entrainment

Fish Kills in Power Plant Intakes

- Importance of Western Lake Erie
- Fish Kills and Great Lakes
- Yellow Perch Study
- Legal Approaches
- Data Needed



Water use:

River Raisin/DTE

1.9 billion gallons/day

Erie Marsh/Consumers

330 million gallons/day

Maumee River/Bayshore

650 million gallons/day

**Nearly 3Billion
gallons/day**

Fish Kills:

Millions small fish –
impinged

Billions fish larvae and
eggs entrained

Heats water 5-8°F

Kelso and Milburn (1979) estimate that more than 100 million fish were killed by impingement and more than 1.28 billion by entrainment annually in the 1970s in the Great Lakes and connecting channels. More recent summaries, which include all power plants sited on the Great Lakes and connecting channels, indicate even larger fish losses. In Lake Michigan, for example, thermal-electric plants killed more than 75 billion fish eggs and larvae; a single pumped-storage hydro plant on the lake's eastern shore killed more than 400 million fish larvae and more than 100 million juvenile alewives, yellow perch, and salmon (Jensen et al. 1982; Liston et al. 1981). These losses of young fish in Lake Michigan and western Lake Erie are significant, representing between 3 percent and 10 percent of the total annual production (Manny 1984). (Dick Munson)

Governor orders reduction in sport fishing bag limit for perch

Posted by [Donna J. Miller](#) April 10, 2007 15:09PM

Categories: [Breaking News](#)

In response to declining fish populations, Ohio Gov. Ted Strickland has ordered a reduction in the sport fishing bag limit for Lake Erie yellow perch, from 40 to 30.

The order took effect Monday.

The Lake Erie yellow perch bag limit was increased to 40 last year. It was 30 the previous nine years.

"Perch is an important species for our sport anglers in Ohio and an important part of Ohio's commercial fishing economy, and this collaborative action will help Ohio take the lead in maintaining our perch levels for Ohioans to enjoy in the future," Strickland said in a news release.

"Recent estimates of perch abundance were lower than we initially expected and reflect weak hatches from 2002, 2004, and 2005, especially in the western basin," said Roger Knight of the Division of Wildlife. "Our projections indicate that the Ohio recreational fishery would exceed its quota allocation without a bag limit change."

The quota for yellow perch in Ohio's waters of Lake Erie is split between commercial netters and sport anglers, with roughly 40 percent of the quota being allocated to commercial and 60 percent to sport each year.

Late last week, the Ohio Wildlife Council voted unanimously in favor of reducing quotas and bag limits for both sport anglers and commercial netters.

Estimated Impacts of Intake Kills

According to a 1975 – 1976 Yellow Perch Larval Intake Kill Analysis by Michigan DNR

“With additional plants (referring to plants in addition to Monroe Detroit Edison) with once-through cooling being situated in the western basin, it is easily seen that their combined pressure on the fisheries will be substantial and coupled with excessive harvests, could trip the yellow perch fisheries into an irreversible decline.... The major reasons for (yellow perch declining) are over exploitation and poor recruitment, but the fact remains that entrainment and impingement is exercising an impact on the fisheries. ” ...

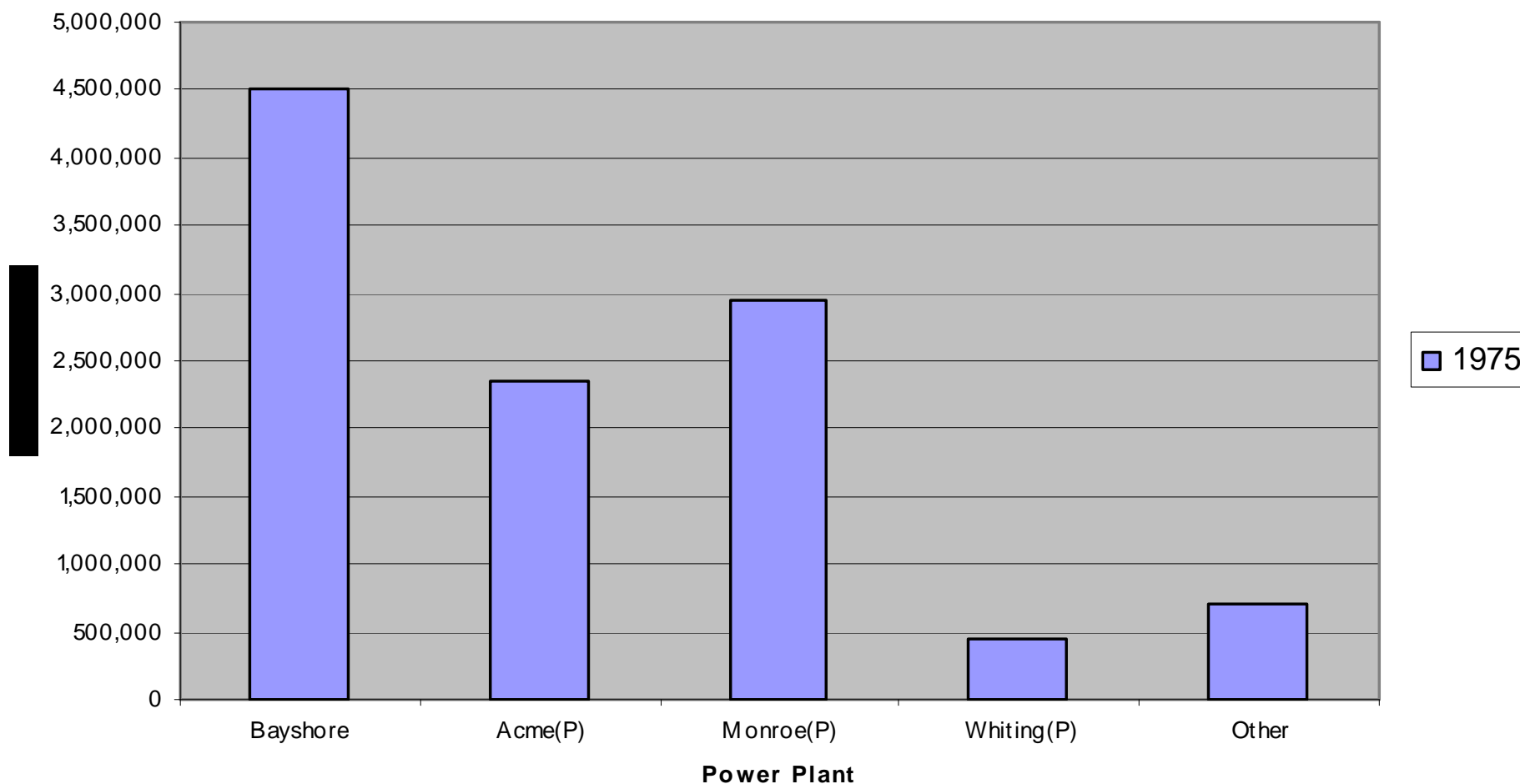
“Thus, the impact of a given level of entrainment and impingement mortality upon the yellow perch population is most severe when the population is in a depressed condition, as is the present situation.”

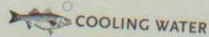
Range of Larvae Entrainment - Michigan & Ohio Intakes. **Maximum Larvae Intake Kill**

	<u>1975</u>		<u>1976</u>	
<u>Michigan</u>				
Fermi(P)	349,000	3.2%	728,000	0.9%
Monroe(P)	2,940,000	26.9%	6,150,000	7.6%
Whiting(P)	439,000	4.0%	1,521,000	1.9%
Monroe City	69,200	0.6%	544,600	0.7%
<u>Ohio</u>				
Acme(P)	2,340,000	21.4%	24,200,000	30.1%
Bayshore	4,510,000	41.2%	46,600,000	57.9%
Davis Besse	0		334,000	0.4%
East Harbor State Park	900		700	
Erie Industrial Park	11,900	0.1%	9,600	
Kelleys Island	1,000		400	
Lakeside Association	1,000		2,300	
Marblehead	600		2,100	
Oregon	6,900	0.1%	6,600	
Port Clinton	88,700	0.8%	23,200	
Put-In-Bay	1,500	0.0%	2,900	
Sandusky	61,000	0.6%	270,000	0.3%
Toledo	<u>124,000</u>	<u>1.1%</u>	<u>118,000</u>	<u>0.1%</u>
Totals	10,944,700	100.0%	80,513,400	99.9%
Power Plants as %of Total		89.50%		97.50%
Sourcce: Michigan DNR Study 1975-1976				

Estimated Entrainment West Erie Power Plants 1975-1976

Entrained Yellow Perch West Erie





COOLING WATER

Lake Erie
Power Plant kills
a million fish
per hour

License to Kill

By Sandy Bihn, Western Lake Erie Waterkeeper

► ANGLERS WADE for walleye in the Maumee River during the spring walleye run, the best in the Great Lakes. This is spawning time and the catches are great. But few anglers are aware of their biggest competitor, and just how many walleye fry — the small fish and larvae — swim down the Maumee only to be swallowed by the Bayshore First Energy power plant. Estimates of impinged and entrained fish in the Bayshore power plant exceed 10 billion annually — that averages to over one million fish killed per hour. Because of the abundance of fish in the Maumee watershed, the Bayshore plant is Great Lakes' largest fish-killing power plant.

The state of Ohio does not require a permit for power plants to discharge effluents into the Maumee River. Considering that on most days the Maumee River and Maumee Bay supply 750 million gallons of water to Bayshore First Energy power plant for cooling. Studies show that Bayshore First Energy discharges 1.9 billion gallons of water daily from the Maumee River and Maumee Bay and Detroit River. Combined, the three power plants use about three billion gallons of water daily from the most biologically productive waters of the Great Lakes, discharging waters five to eight degrees warmer than the natural temperature.

What's worse, the fish coming out of Maumee River hoping to reach Lake Erie are also entrapped by the Army Corps of Engineers' dredge disposal facilities in Maumee Bay. The Corps constructed one dredge disposal island near the mouth of the Maumee River and another between the intake and outfall of the Bayshore First Energy power plant. Fish are trapped, herded in a



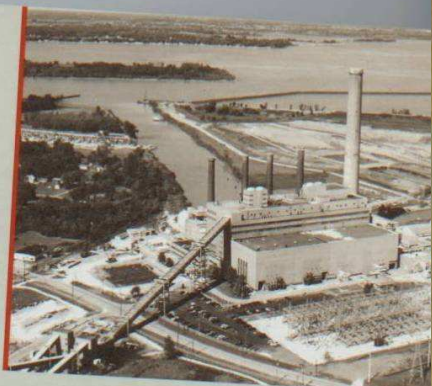
The biggest fish killer on the Great Lakes is First Energy's Bayshore power plant on the western shore of Lake Erie.

channel entering the power plant. The fish are discharged into a cove on the disposal peninsula. The dredge disposal island vastly increase fish mortality.

To protect the walleye, the Ohio Department of Natural Resources has limited fishing for mouth bass and other fish. The department has limited fishing to four walleye 15 inches or longer from March through May, limited perch catches and banned bass fishing during the spawning season. Anyone caught violating these rules is subject to revocation of fishing license, fine and possible incarceration.

Yet there are no size or quantity limits for the fish kills in the Bayshore First Energy power plant intake, nor are there bans on the power plant during spawning season. The vital question is — why are recreational and commercial fishermen regulated by power plants are free to kill fish anytime, anywhere?

After decades of work pulling the Great Lakes back from near death, algae blooms, dead zones are back in Lake Erie. The power plants continue to heat the waters and kill fish of the incredibly beautiful and bountiful Western Lake Erie Basin. Despite massive fish kills the Maumee River boasts one of the largest populations of migrating walleye east of the Mississippi. To let these fish be swallowed up by thirsty power plants with antiquated technology is nothing short of a tragic loss that should be rectified —



A Bayshore First Energy power plant on the western shore of Lake Erie.



200 Bass
100 Shiners
80 Perch
1600 Gizzard Shad
7-24-2001

DTE Monroe – River Raisin 1983 Study

10.3 Million Impinged: Over 90% Gizzard Shad: Yellow Perch 8,917 lbs. 78,246

White Perch 6,529 lbs. 461,268

Walleye 2,194 lbs. 7,374

Entrained: 4.7 billion – 90% May to June

Yellow Perch 128 million

Walleye 29,000



Consumers Power Erie Marsh

Whiting

Before Net Installation

	<u>Impingement</u>	<u>Entrainment</u>
Raw Losses-No. organisms	12,588,366	1,182,989,518
Age 1 equivalents(#fish)	21,493,215	1,831,713
Fishery Yield	844,301	70,045
Production Foregone	404,074	290,215

After Net Installation

	<u>Impingement</u>
Raw Losses# of organisms	1,612,966
Age 1 equivalents(#of fish)	1,612,966
Fishery Yield(lbs of fish)	62,730
Production Foregone(lbs of Fish)	30,685



Federal Impingement Entrainment Lawsuits Decided in Favor of Fish

- Feb. 16, 2004 Second Circuit Federal Court – Over 50 mgd water – reduce kills by 60-90% *Environmental Law Advisory states: “After almost three decades of amicable détente, battle has broken out this month...”*
Requiring the 316b evaluation
- Jan. 25, 2007 Court decision on USEPA rules – Restitution no replacement for reducing fish kills
- Appealed to Supreme Court Decision 2009



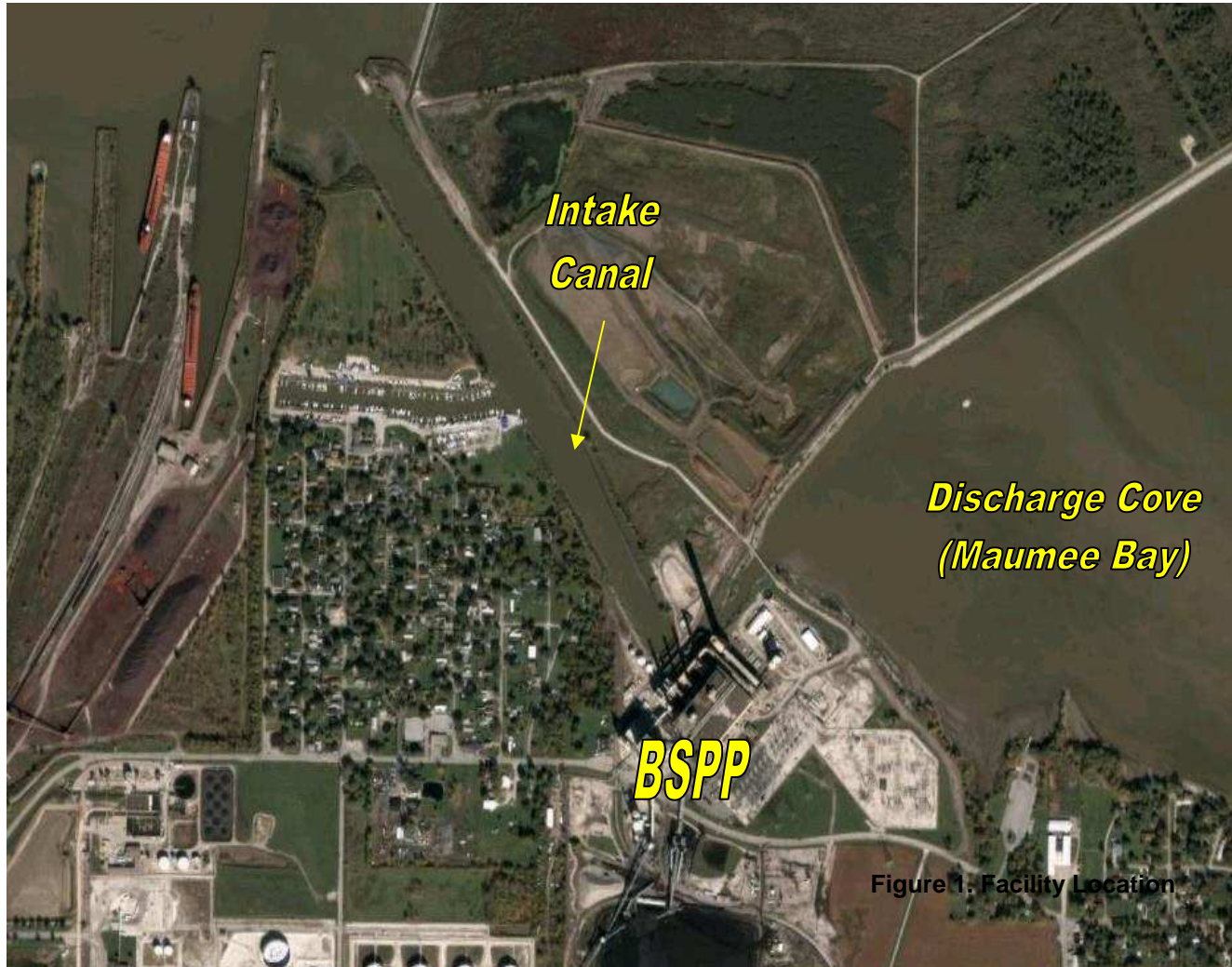



Figure 1. Facility Location



The two arrows point to the intakes where the water and fish are sucked in. In the fall all of the water in the Maumee River is pulled into these intakes

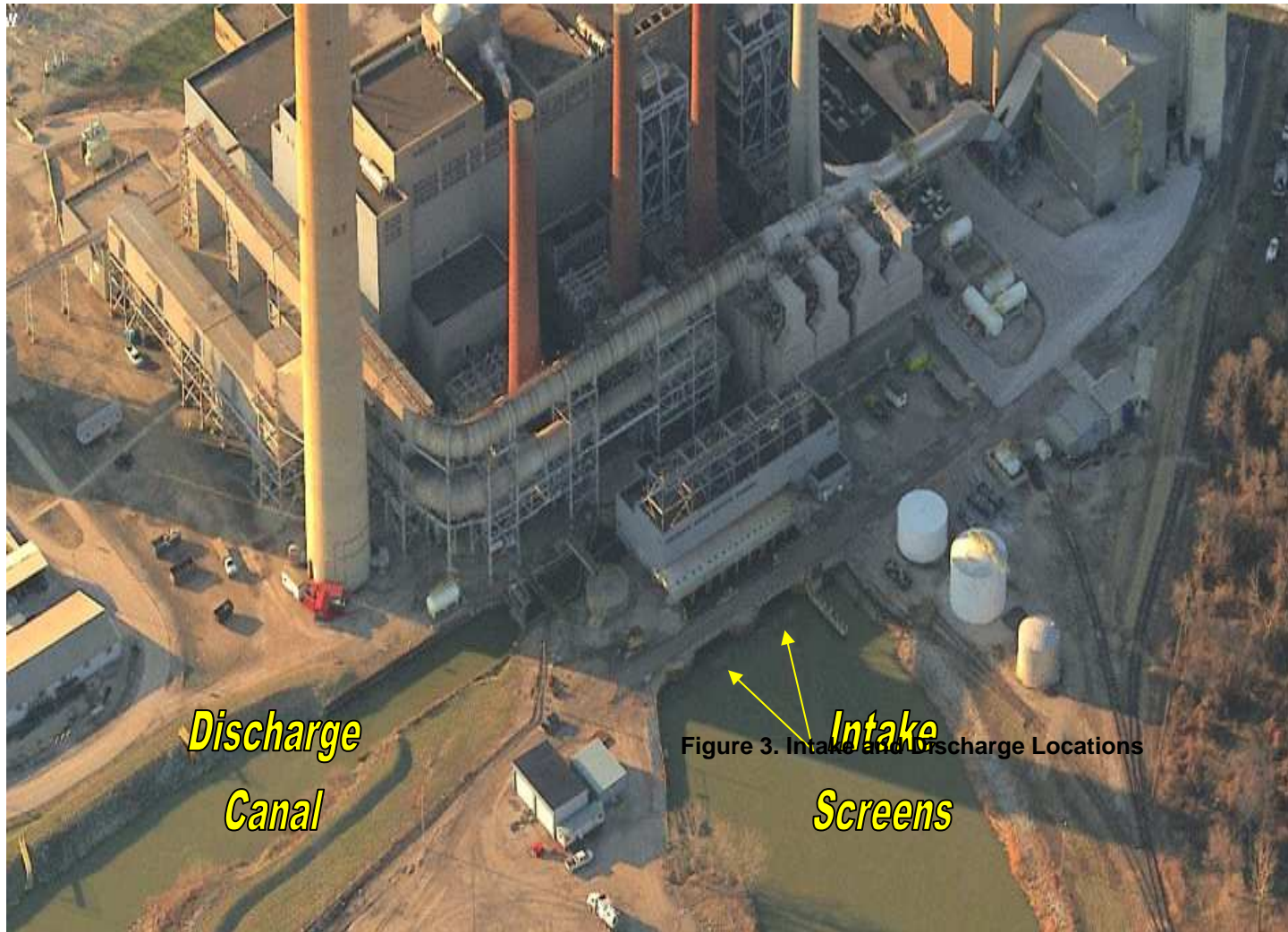


Table 1. Estimated 2005-2006 Impingement ($n > 50,000$)

Tetra Tech 0209

Species	# Impinged
emerald shiner	24,080,877
gizzard shad	14,313,113
white perch	4,769,163
white bass	1,593,199
spottail shiner	313,326
freshwater drum	225,706
trout-perch	159,379
yellow perch	123,405
round goby	93,918
walleye	77,812
channel catfish	77,469
logperch	51,547

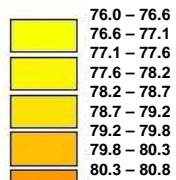
**Table 2. Estimated 2005-2006
Larvae and Juvenile Entrainment** Tetra Tech 0209

Species	Larvae	Population loss [a] (% of total larvae)	Juveniles
freshwater drum	977,426,912	10.1%	155,542
rainbow smelt/Clupeidae	536,265,835	10.9%	4,365,674
unidentifiable	465,945,050	10.2%	—
Morone sp.	137,549,760	10.8%	—
logperch	32,763,640	11.0%	1,328,768
white sucker	29,196,575	11.3%	—
emerald shiner	19,001,574	9.6%	3,915,565
white bass	17,840,256	10.1%	1,097,805
walleye	8,157,828	9.8%	663,715
Cyprinidae	7,484,343	10.2%	—
Notropis sp.	4,707,966	9.8%	17,405
yellow perch	3,180,492	12.3%	—
Percidae	2,300,638	10.8%	—
common carp/goldfish	2,143,190	10.7%	—
walleye/yellow perch	511,779	10.0%	—

THERMAL IMPACT

Surface Temp Aug 21, 02

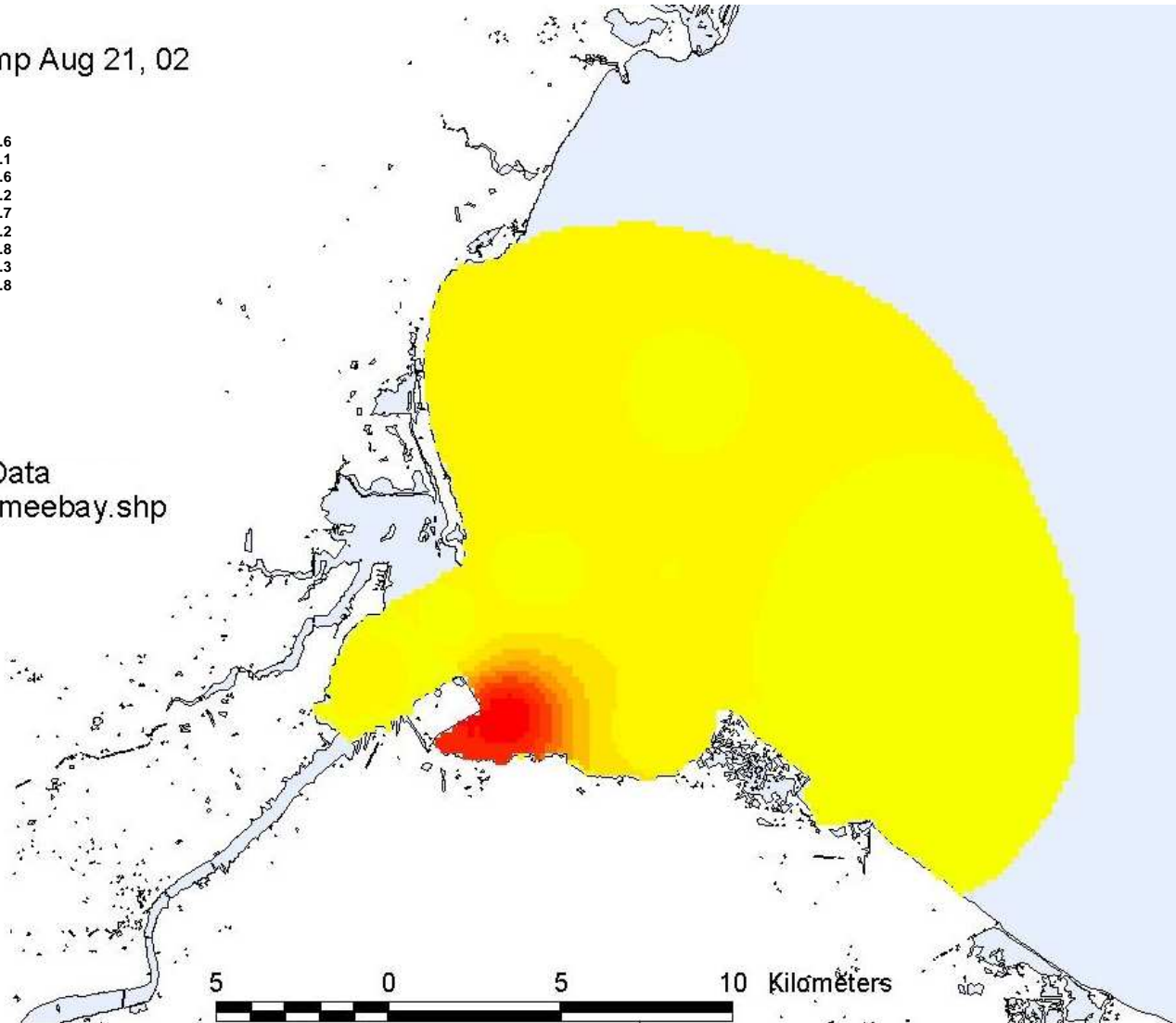
°F



No Data
Maumeebay.shp



5 0 5 10 Kilometers



COOLING TOWERS

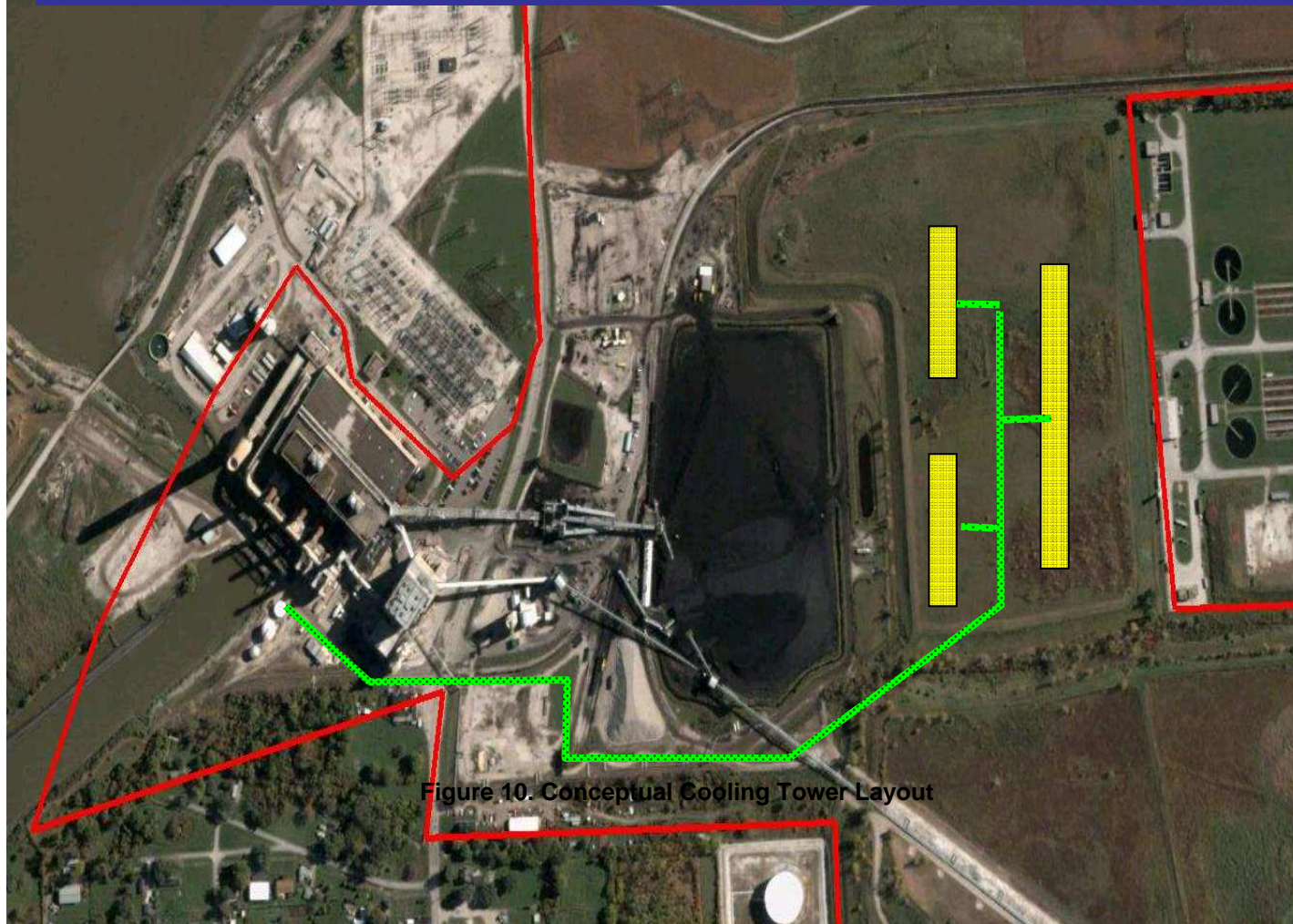


Figure 10. Conceptual Cooling Tower Layout

Ludington Power Plant 1999 – Lake Michigan

Settlement:

- **Between Consumers Energy and Detroit Edison**
- **Establishes incentives for development of additional protective measures**
- **Provides compensation for past fish damages, ensures compensation for future fish losses, and provides recreational development and habitat protection**
- **Requires the continued use and improved effectiveness of the barrier net originally installed outside of the project in 1989 - installed each April and removed in October - protects fish over four inches in length from entrainment in the LPSP.**
- **Annual financial compensation for fish mortality is based on the effectiveness of the barrier net and the ability to protect Great Lakes fish.**