2017 NW WISCONSIN LAKES CONFERENCE

CLAM LAKE: CARP CONTROL AND WILD RICE MANAGEMENT

PRESENTED BY:

TONY HAVRANEK
SENIOR ENVIRONMENTAL SCIENTIST
WSB & ASSOCIATES, INC.

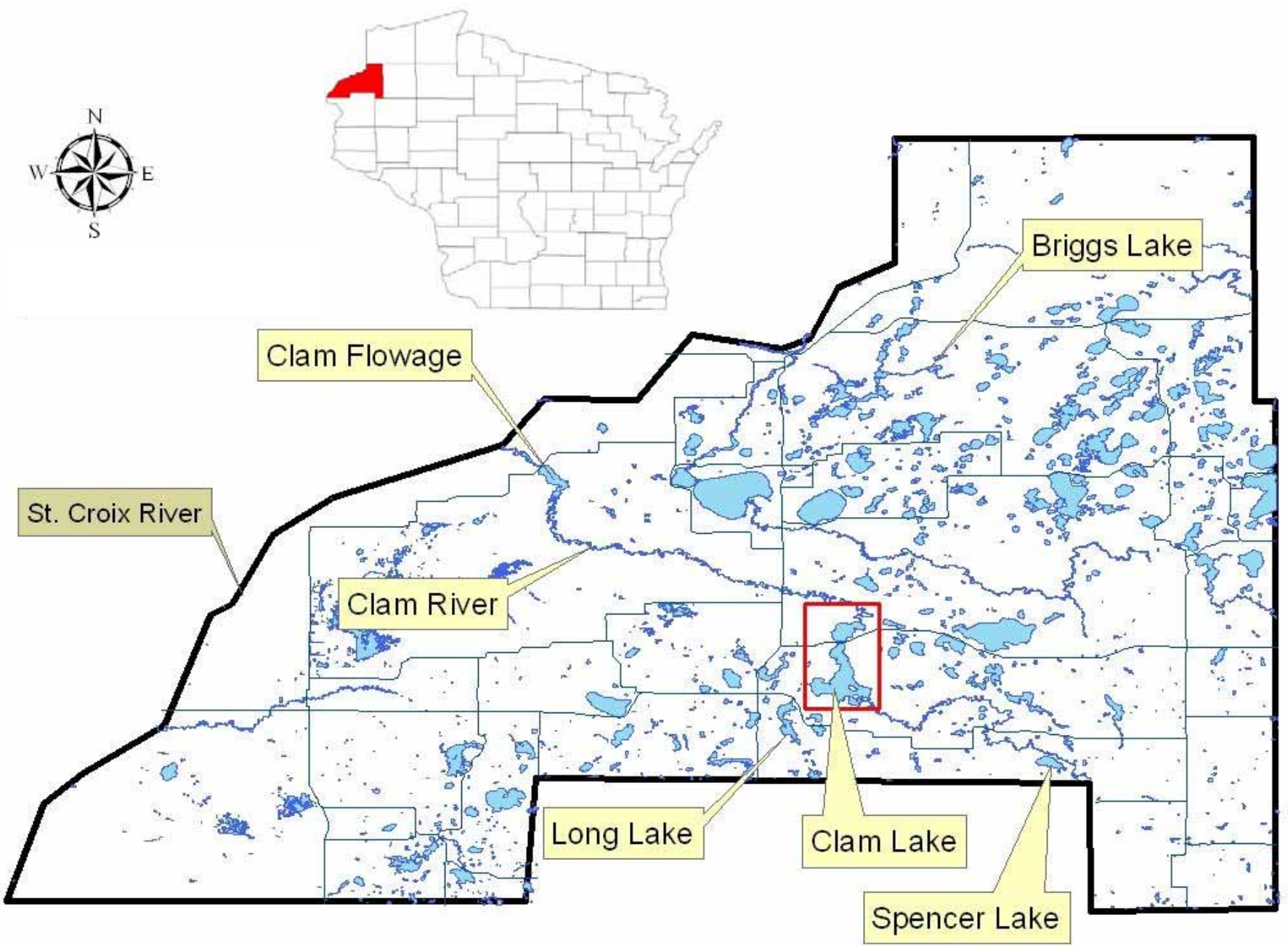
CODY MATTISON
CONSERVATION SPECIALIST
ST. CROIX TRIBAL ENVIRONMENTAL/NATURAL RESOURCES DEPT.

CLAM LAKE RESTORATION PROJECT

- FUNDED BY
  - ST. CROIX CHIPPEWA INDIANS OF WISCONSIN
  - BUREAU OF INDIAN AFFAIRS
  - U.S. FISH AND WILDLIFE SERVICE
  - CLAM LAKE PROTECTION AND REHABILITATION DISTRICT
- PARTNERS
  - WI DNR
  - GREAT LAKES INDIAN FISH AND WILDLIFE COMMISSION
  - FRESHWATER SCIENTIFIC SERVICES
  - BURNETT COUNTY LAND AND WATER DEPARTMENT
  - UNIVERSITY OF MINNESOTA- DEPT. OF FISHERIES

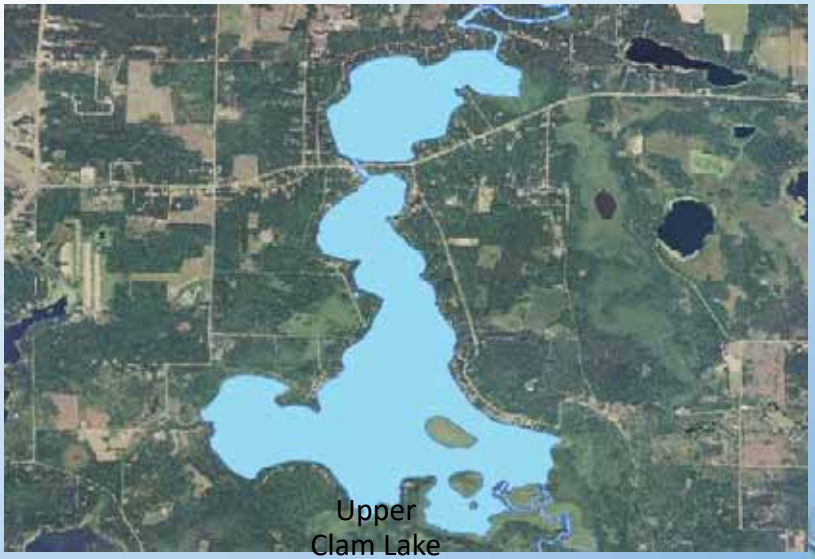
PROJECT OVERVIEW

- DOCUMENT LOSS OF WILD RICE BEDS
- DETERMINE EFFECTS OF COMMON CARP ON WILD RICE
- UNDERSTAND MOVEMENTS OF COMMON CARP WITHIN THE CLAM RIVER SYSTEM AND CLAM LAKE
- QUANTIFY COMMON CARP POPULATION
- MEASURE RESPONSE OF FISHERY, AQUATIC PLANT COMMUNITY, AND WATERFOWL TO MANAGEMENT EFFORTS
- RESTORE WILD RICE AND ECOLOGY OF CLAM LAKE


N
W
E
S
Briggs Lake
Clam Flowage
St. Croix River
Clam River
Long Lake
Clam Lake
Spencer Lake

UPPER CLAM LAKE

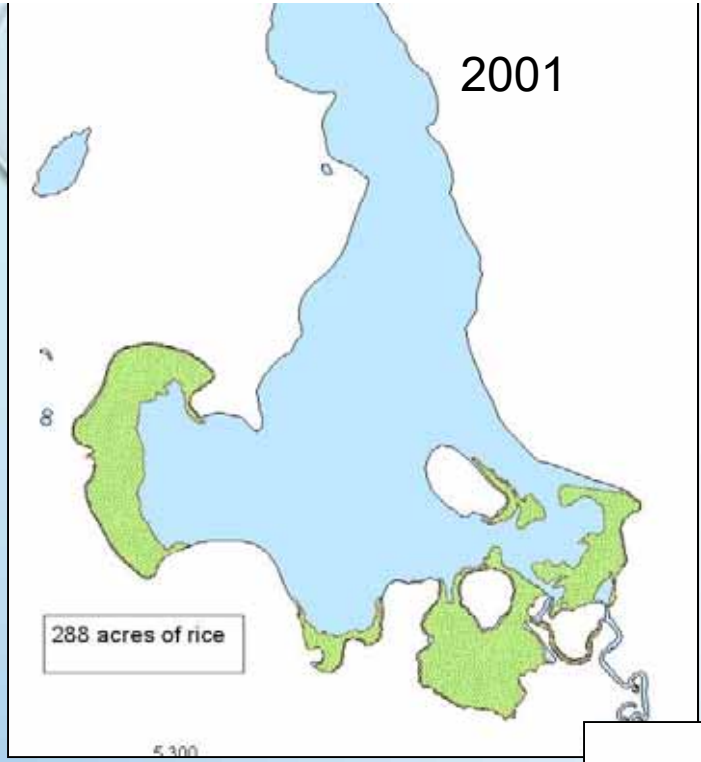
- 1,363 ACRES
- MAX DEPTH ~10 FT.
- CONNECTED TO LOWER CLAM LAKE (377 ACRES)
- CLAM RIVER
  - 325-336 FT^3/S
- SHORELINE DEVELOPMENT
- FISHERY
- WATER QUALITY (TSI)



2006 Lonestar Bay Wild Rice

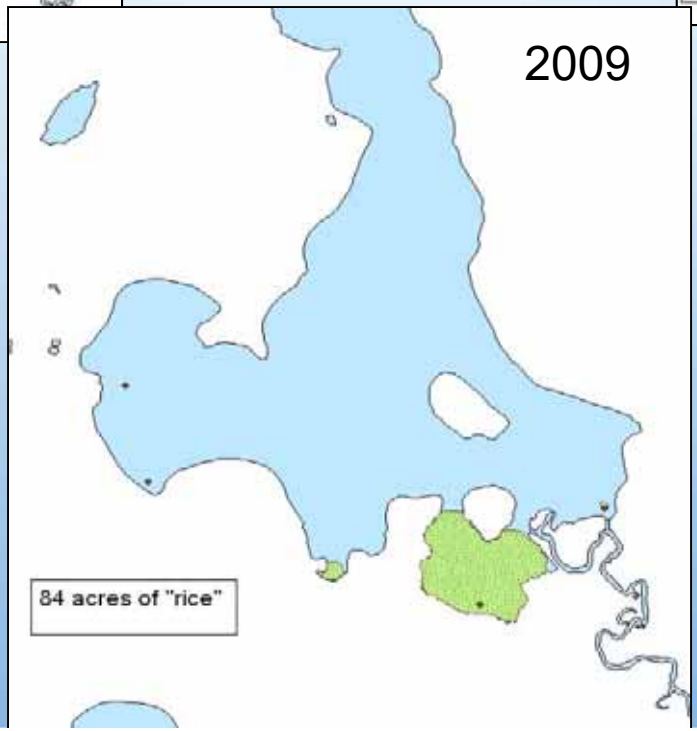
2008 and 2009 Lonestar Bay

2001



2008

2009



IMPORTANT WILD RICE RESOURCE

- 47,366 LBS HARVESTED AND 1,077 TRIPS 1992-2006
- MAKES UP ~10% OF TOTAL REPORTED HARVEST 1992-2012, WITH NO HARVEST SINCE 2006*
- RANKS #1 FOR TOTAL REPORTED HARVEST

Data Provided by Peter David (*Great Lakes Indian Fish and Wildlife Commission*)

EFFECTS OF COMMON CARP ON WILD RICE

- SEED BANK
- EFFECT ON AQUATIC VEGETATION AND WILD RICE ACREAGE
- RESULTS IN INDIRECT EFFECT ON FISHERY AND WATERFOWL

Measuring Direct Effect on Seed Bank

	Samples	Seeds/m^2	Empty Hulls/m^2
Upper Clam Lake	58	2 ±2	440 ±65
Long Lake	21	240 ±39	540 ±107
Clam River Flowage	10	80 ±27	1080 ±291

Johnson, J.A. Wild Rice Enumeration Report: 2009-2010

Measuring Direct Effect on Vegetation

Fenced Plots

Open Plots

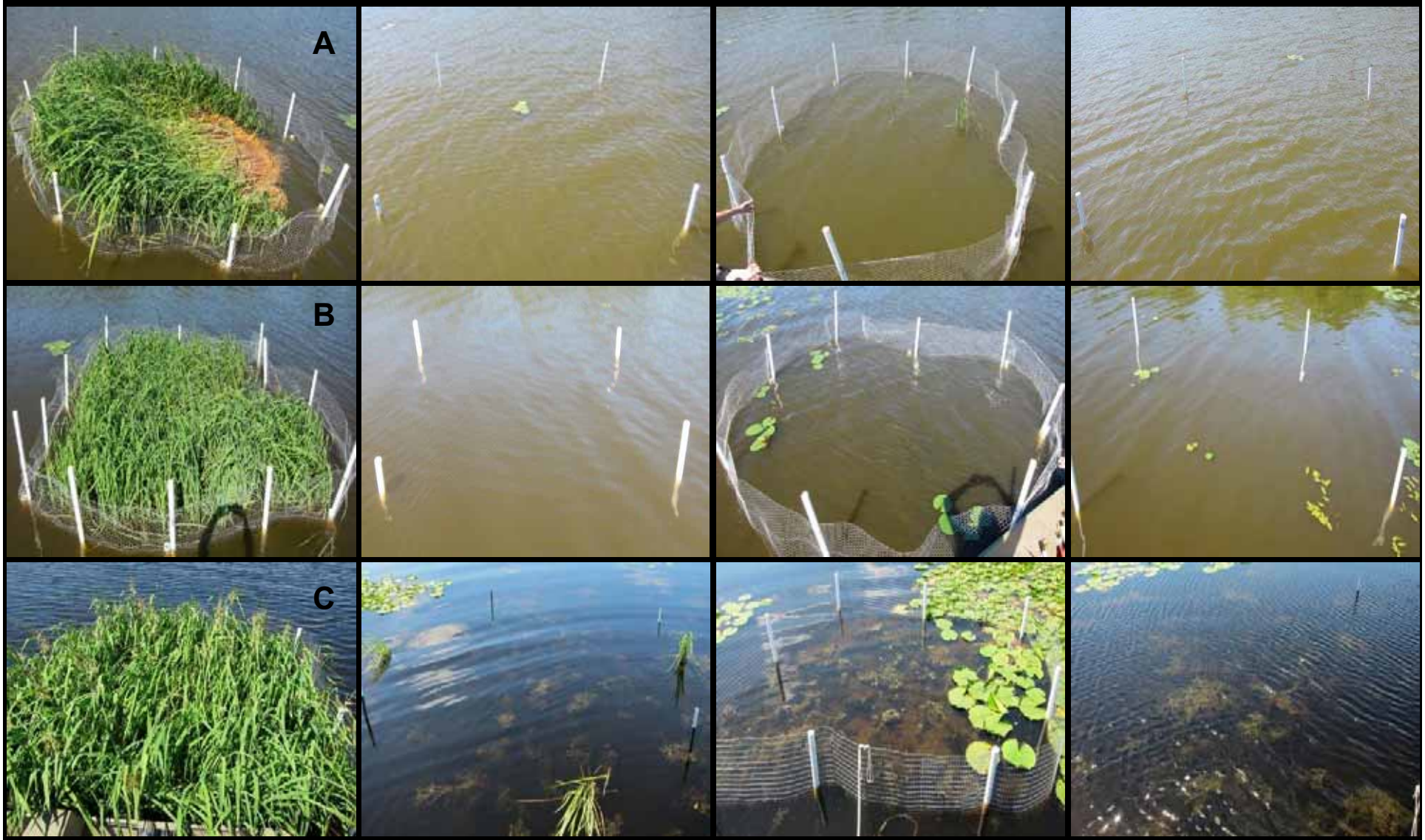
Seeded

Not Seeded

Seeded

Not Seeded

July 2010



DIRECT EFFECT ON VEGETATION

2009 POINT INTERCEPT SURVEY

Summary Statistics:	Upper Clam	Lower Clam
Total number of points sampled	668	350
Total number of sites with vegetation	219 (32%)	70 (20%)
Total number of sites shallower than the maximum depth of plants	661	338

Berg. Warm Water Point/Intercept Macrophyte Survey Upper and Lower Clam Lakes Burnett County, WI. 2009

INDIRECT FISHERY IMPACT

- CATCH RATES FOR BLUEGILL > 3 INCHES DECREASED FROM 262 FISH/MILE IN 1995 TO 8 FISH/MILE IN 2011
- CATCH RATES FOR BLUEGILL > 6 INCHES DECREASED FROM 163 FISH/MILE TO 7 FISH/MILE IN THE SAME PERIOD
- CARP CATCH RATES INCREASED FROM 0.9 FISH/NET NIGHT IN 1995 TO 15.3 FISH/NET NIGHT IN 2011

Wendel, Jamison. WI DNR. Upper and Lower Clam Lake Fishery Survey, 2011.

CARP INTEGRATED PEST MANAGEMENT

IPM APPLIED TO CLAM LAKE

- DATA GATHERING
- PHYSICAL REMOVAL
- BIOLOGICAL CONTROL
- BARRIERS
- REGULAR MONITORING
- EDUCATION

DATA GATHERING-UNDERSTANDING MOVEMENTS

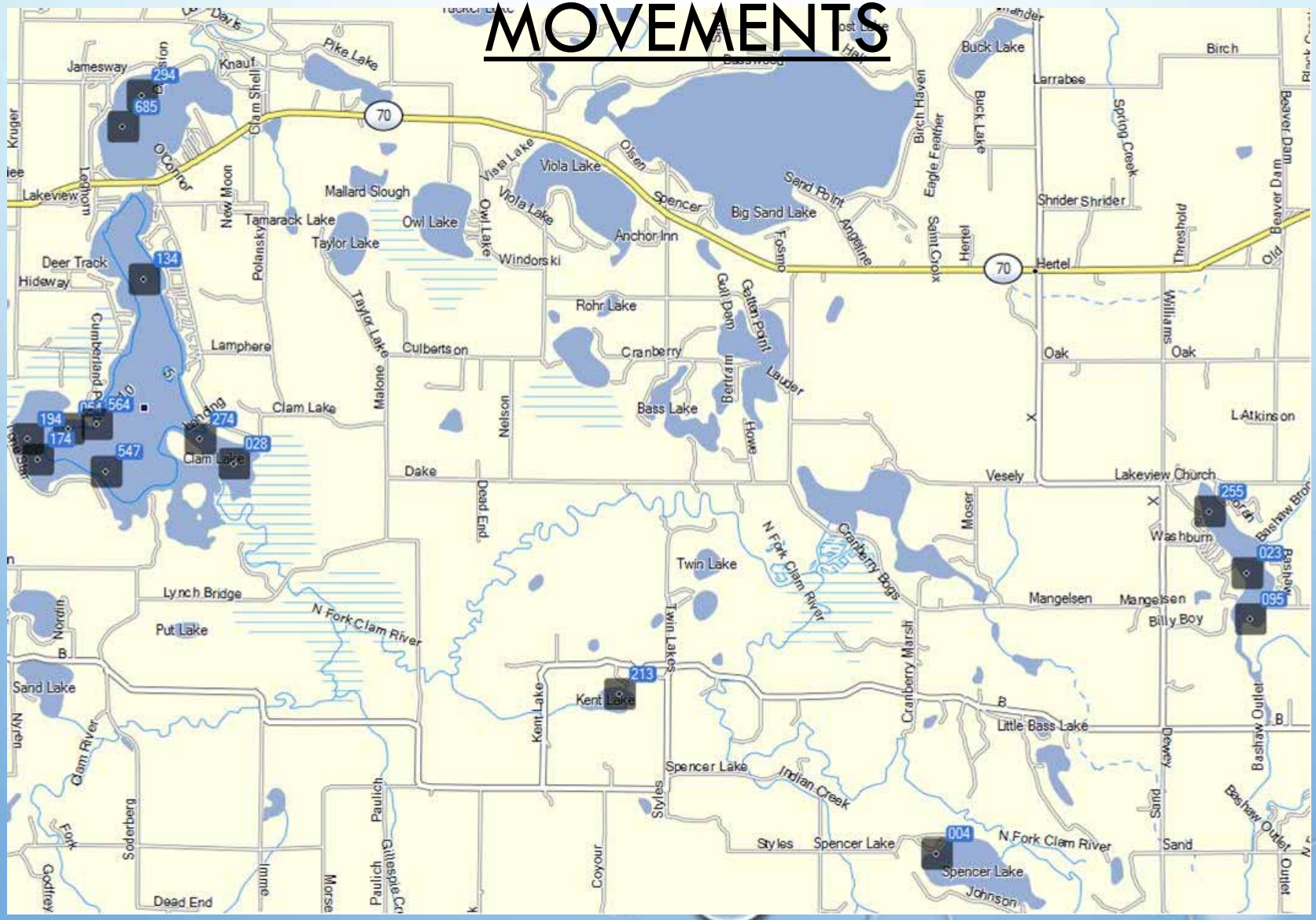
- DO CARP STAY IN THE BASIN?
- IF SO, WHERE DO THEY GO THROUGHOUT THE YEAR AND WHERE DO THEY AGGREGATE?
- IF NOT, WHERE DO THEY MIGRATE TO?

DATA GATHERING-UNDERSTANDING MOVEMENTS

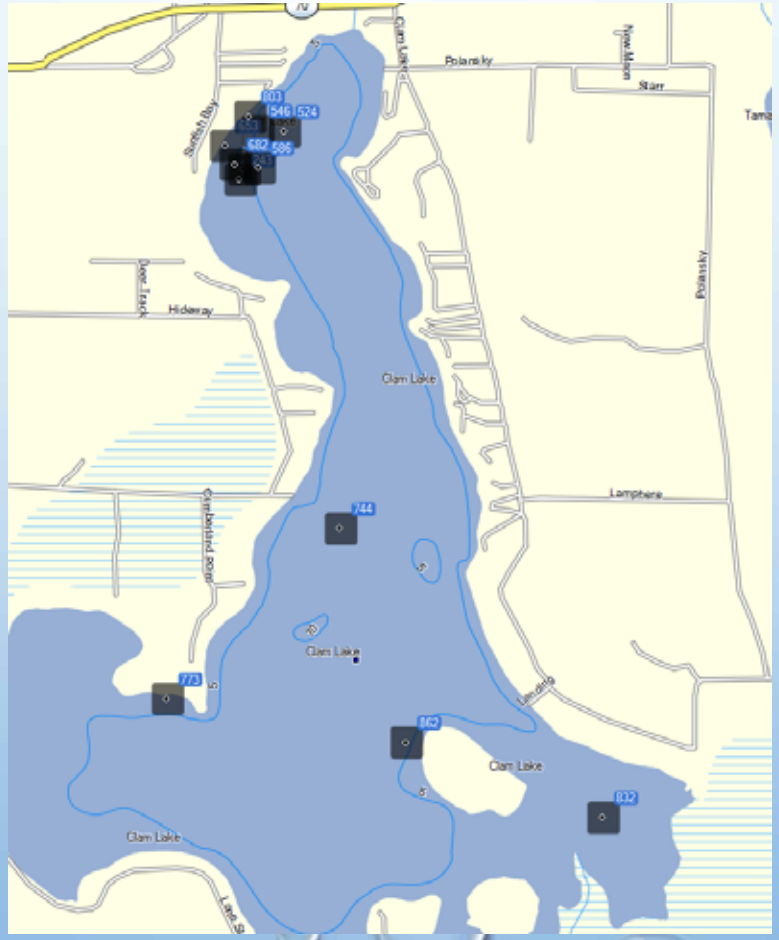
- USED SURGICALLY IMPLANTED HIGH FREQUENCY RADIO TRANSMITTERS (ADVANCED TELEMETRY SYSTEMS, INC.)

- TRACKED BY BOAT, FOOT, AND PLANE
- IRREGULAR SCHEDULE (EMPHASIS ON SPAWNING AND WINTER PERIODS)

DATA GATHERING-UNDERSTANDING MOVEMENTS



DATA GATHERING-UNDERSTANDING MOVEMENTS



RESULTS

- CLAM LAKE CARP STAY IN CLAM LAKE; FOR THE MOST PART
- BEGAN STUDYING ENTIRE SYSTEM; NO MOVEMENT BETWEEN LAKES UNTIL 2014
- DOCUMENTED AGGREGATION AREAS AND PREPPED FOR REMOVAL

DATA GATHERING- QUANTIFYING THE PROBLEM

- BASED ON WORK DONE BY BAJER AND SORENSON (U OF MN) ON MN AND IL LAKES
- IDENTIFIED THRESHOLD OF ROUGHLY 89 LBS/ACRE AS TIPPING POINT
- USE MARK AND RECAPTURE METHODOLOGY
- RADIO TAGGING TO FIND AGGREGATIONS AND TRACK MOVEMENTS

DATA GATHERING- QUANTIFYING THE PROBLEM (POPULATION ESTIMATES)

- USED A FIN CLIP FOR EACH YEAR OF STUDY STARTING IN 2011
- INITIAL ADULT POPULATION ESTIMATE OF 79,602 (±11,152)
- INITIAL AVERAGE WEIGHT WAS ~8.5 POUNDS
- RESULTS IN A CARP BIOMASS OF 767,617 POUNDS FOR CLAM LAKE

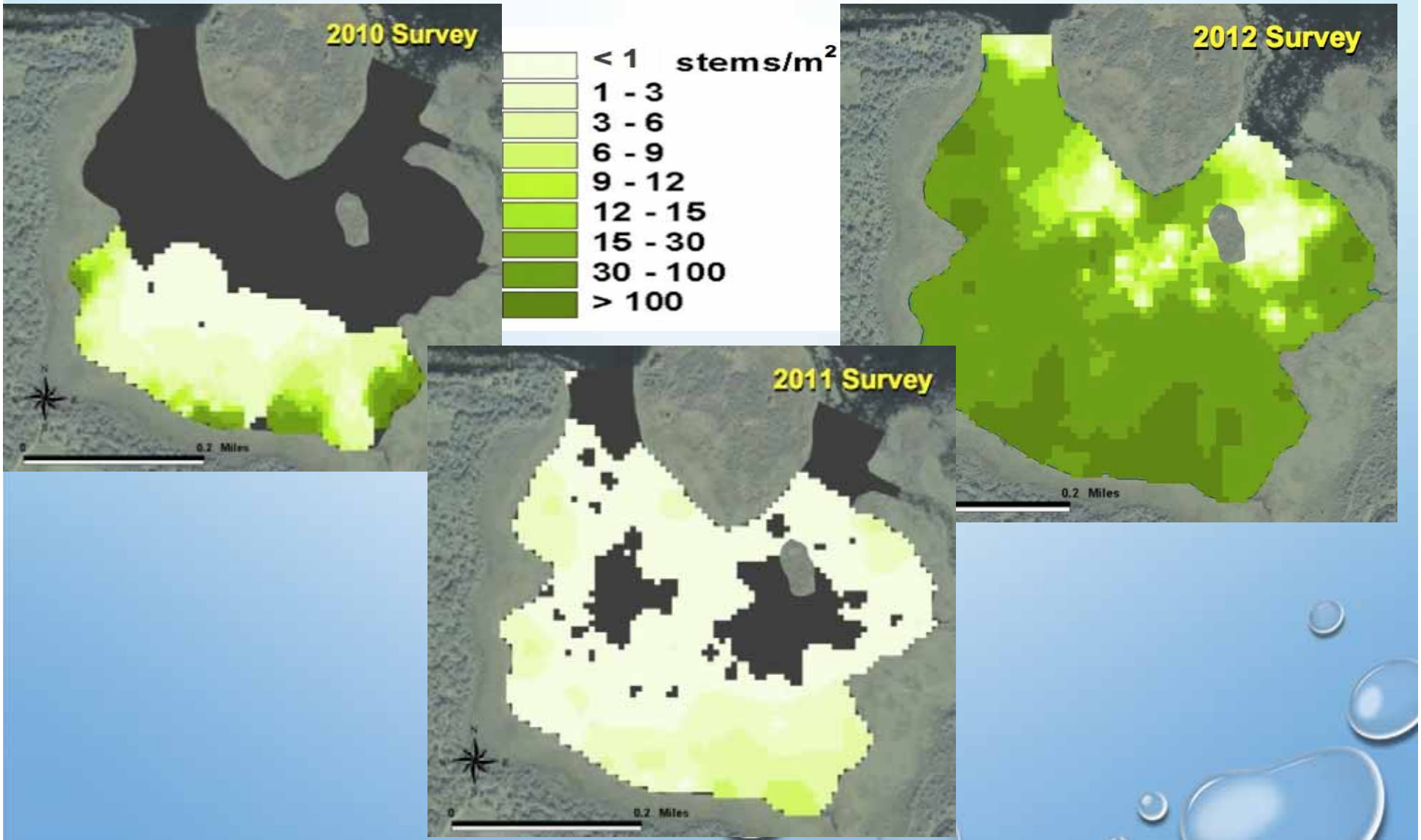
DATA GATHERING- QUANTIFYING THE PROBLEM (POPULATION ESTIMATES)

- USING THE BIOMASS THRESHOLD FROM BAJER & SORENSON (89 POUNDS/ACRE) AS A COMPARISON, CLAM LAKE CARP BIOMASS WAS 4 TIMES THE TIPPING POINT VALUE (398 POUNDS/ACRE)

CARP IPM- BARRIERS

CARP IPM- BARRIERS

CARP IPM- BARRIERS
SEED SOURCE DEVELOPMENT



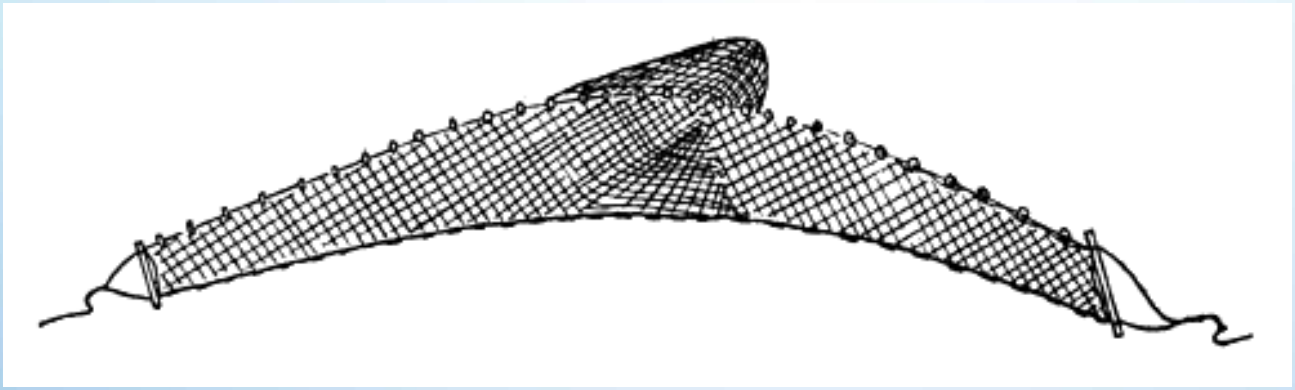
CARP IPM- BARRIERS

September 2013

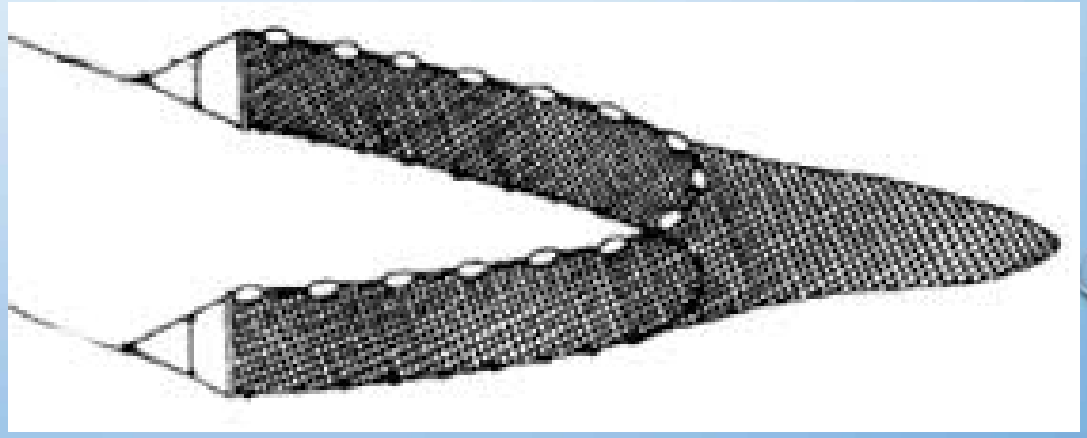
CARP IPM- REMOVAL

- STARTED REMOVALS IN 2011
- REMOVED CARP USING COMMERCIAL FISHING CREW AND SEINE NETS
- REMOVALS GUIDED BY RADIO TELEMETRY AND SONAR
- LARGEST AMOUNT OF BIOMASS CAPTURED AND REMOVED WHEN CARP WERE AGGREGATED IN WINTER

CARP IPM-REMOVAL



Seine Net



CARP IPM-REMOVAL

- HTTPS://WWW.YOUTUBE.COM/WATCH?V=YXEBJHFLR1W

CARP IPM-BIOCONTROL

- BLUEGILL FOUND TO BE THE MAIN PREDATOR OF CARP EGGS AND LARVAE
- INSTALLED COARSE WOODY HABITAT “FISH STICKS”

CARP IPM - BIOCONTROL

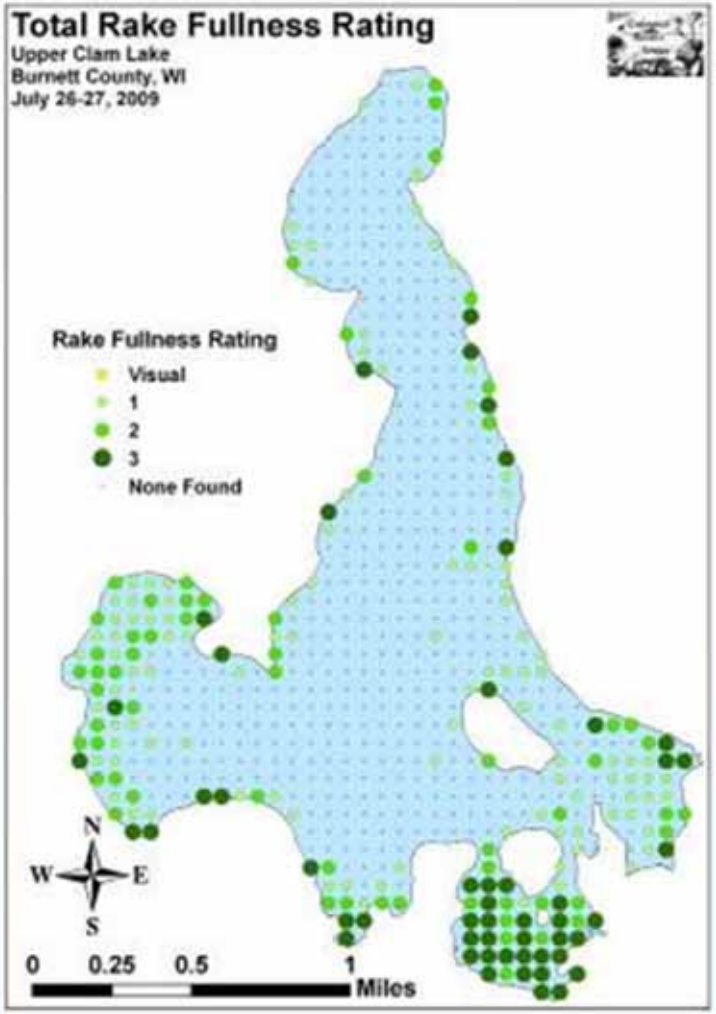
CLAM LAKE CARP IPM

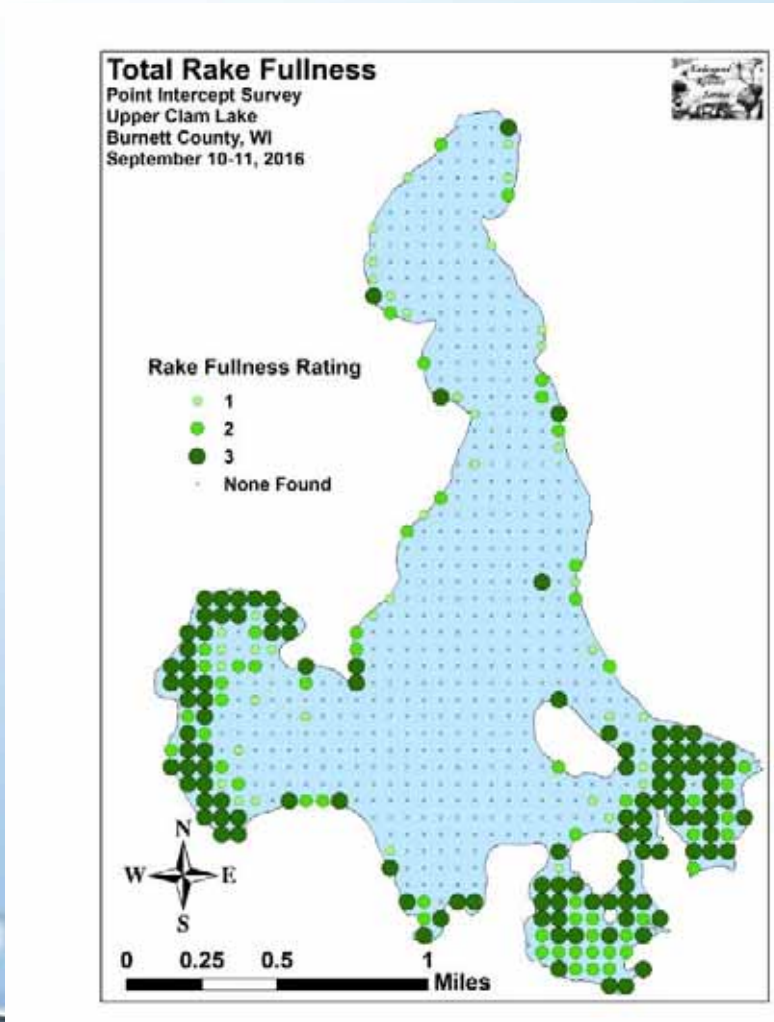
RESULTS

CLAM LAKE CARP IPM RESULTS- AQUATIC VEGETATION

Summary Statistics:	2009	2012	2014	2015	*2016*
Total number of points sampled	668	668	668	668	668
Frequency of occurrence at sites shallower than maximum depth of plants	32.98	30.31	50.16	42.60	40.73
Simpson Diversity Index	0.90	0.91	0.92	0.93	0.92
Average number of all species per site (shallower than max depth)	0.88	0.93	1.28	1.49	1.33
Mean total rake fullness (veg. sites only)	1.76	2.09	1.89	2.34	2.36

CLAM LAKE CARP IPM RESULTS- AQUATIC VEGETATION

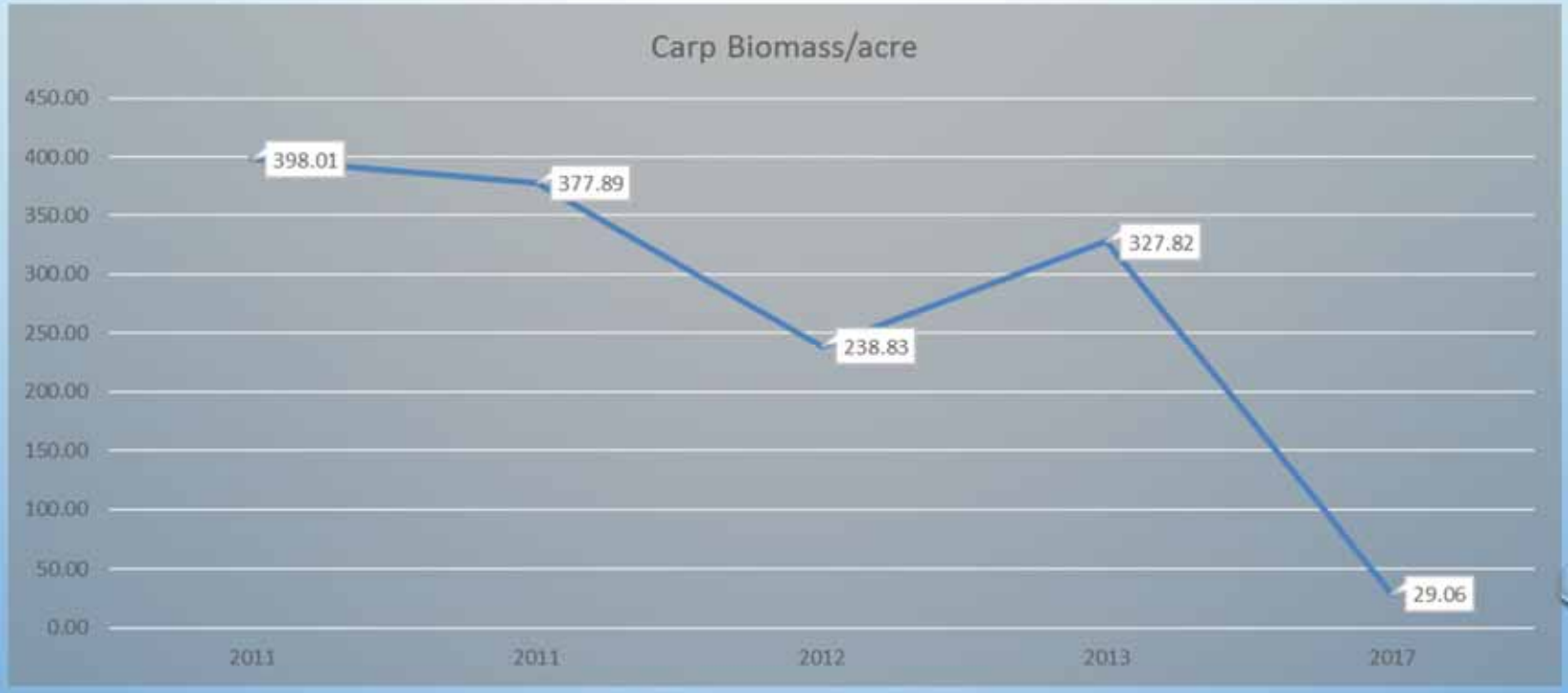




CLAM LAKE CARP IPM RESULTS-CARP BIOMASS

- ROUGHLY 656,358 POUNDS OF CARP BIOMASS REMOVED SINCE 2011
- ROUGHLY 75,711 INDIVIDUAL CARP REMOVED SINCE 2011
- CARP BIOMASS INITIALLY DECREASED, THEN INCREASED IN RESPONSE TO A HIGHER AVERAGE WEIGHT WITH LESS INDIVIDUALS
- DRAMATIC DECREASE BY 2017 IN CARP BIOMASS DENSITY

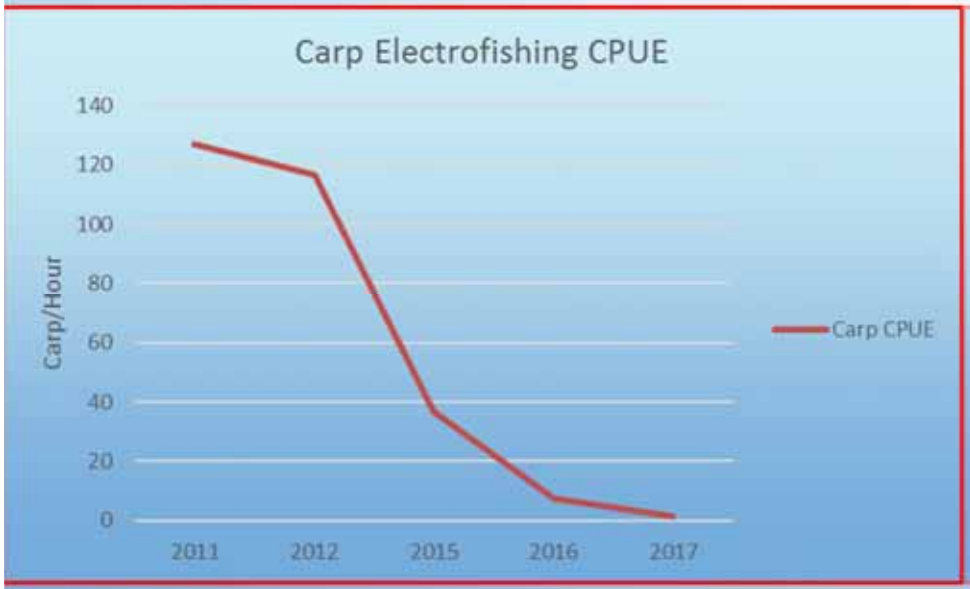
CLAM LAKE CARP IPM RESULTS-CARP BIOMASS

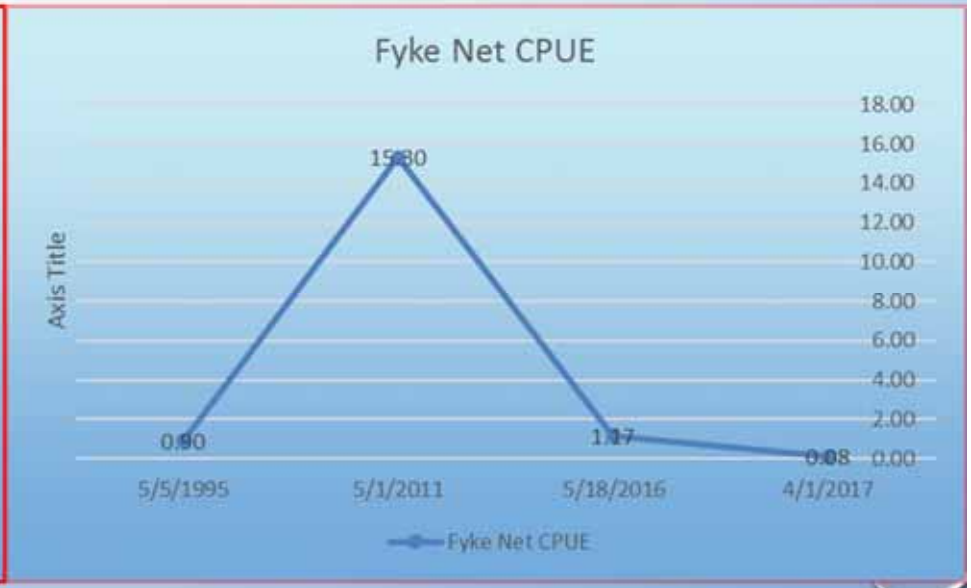


CLAM LAKE CARP IPM RESULTS-CARP BIOMASS

CLAM LAKE CARP IPM RESULTS-FISHERY

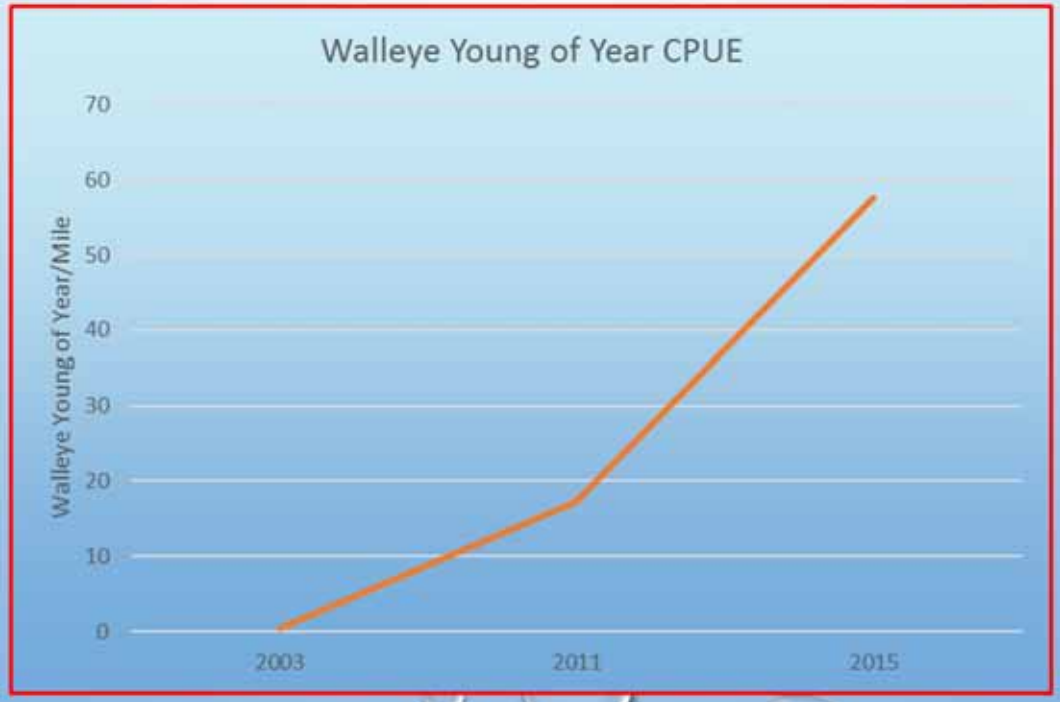
- DRAMATIC DECREASE IN CARP ELECTROFISHING AND NETTING CATCH RATES





CLAM LAKE CARP IPM RESULTS-FISHERY

- WALLEYE ARE INCREASING IN ABUNDANCE AND ALL AGE CLASSES ARE WELL REPRESENTED



CLAM LAKE CARP IPM RESULTS-FISHERY

BLUEGILL

	1995	2011	2017
≥3 in	178	8	137
≥6 in	111	7	26
≥8 in	8	4	1

ELECTROFISHING CPE DATA. WI DNR-SPOONER OFFICE

- DATA SHOWS AN INCREASE IN BLG CPE, BUT NOT YET TO PRE-CARP EVENT

CLAM LAKE CARP IPM RESULTS- FISHERY

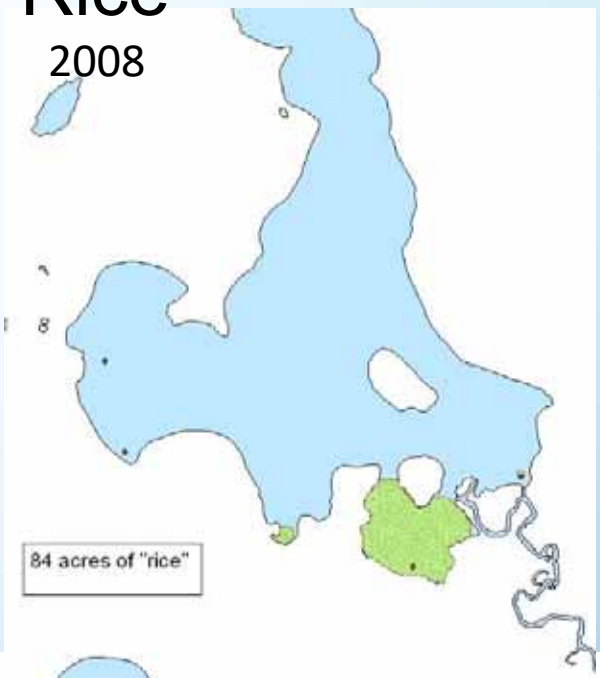
	BLACK CRAPPIE	BLUEGILL	COMMON CARP	LARGEMOUTH BASS	YELLOW PERCH
1995	41.0	898.0	0	20.5	83.3
2003	280.4	26.0	0.1	6.9	15.1
2011	32.3	506.2	0	20.3	11.0
2012	57.6	1122.0	0.8	8.8	1.2
2014	13.7	0.5	0	1.3	641.2
2015	14.0	1641.8	3.2	1.8	23.0
2017	19.5	39.8	33.2	9.3	0.3

Additional minifyke data collected in summer 2017 indicates by St Croix Tribal Environmental Department indicates juvenile carp CPE value of 129.3/net.

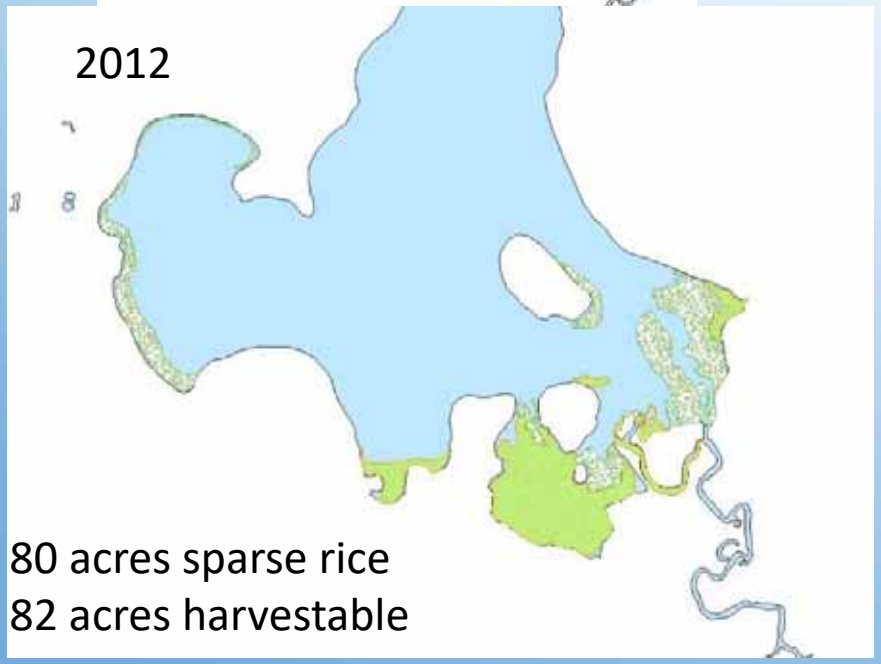
Clam Lake Carp IPM Results-Wild Rice

2001

2008

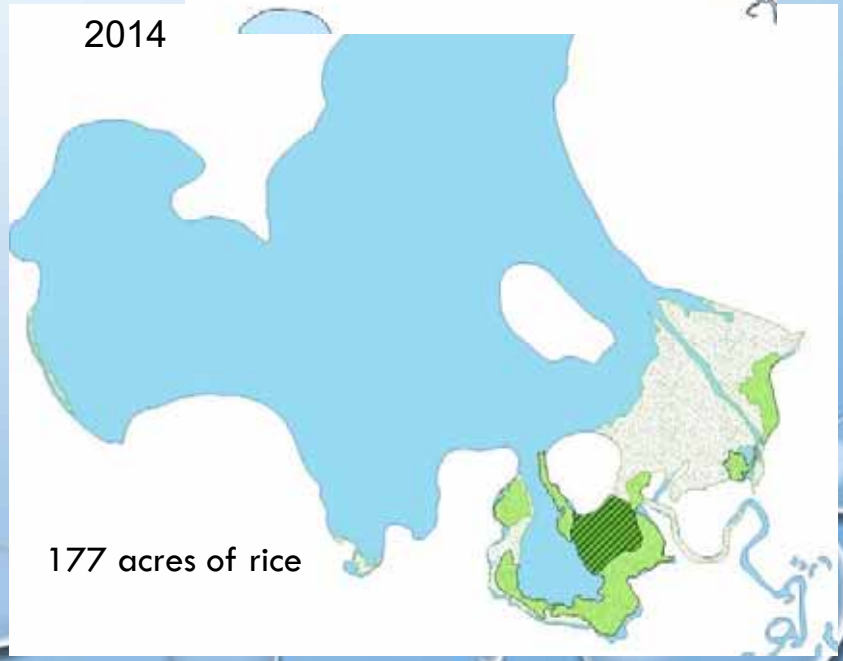


2012



80 acres sparse rice
82 acres harvestable

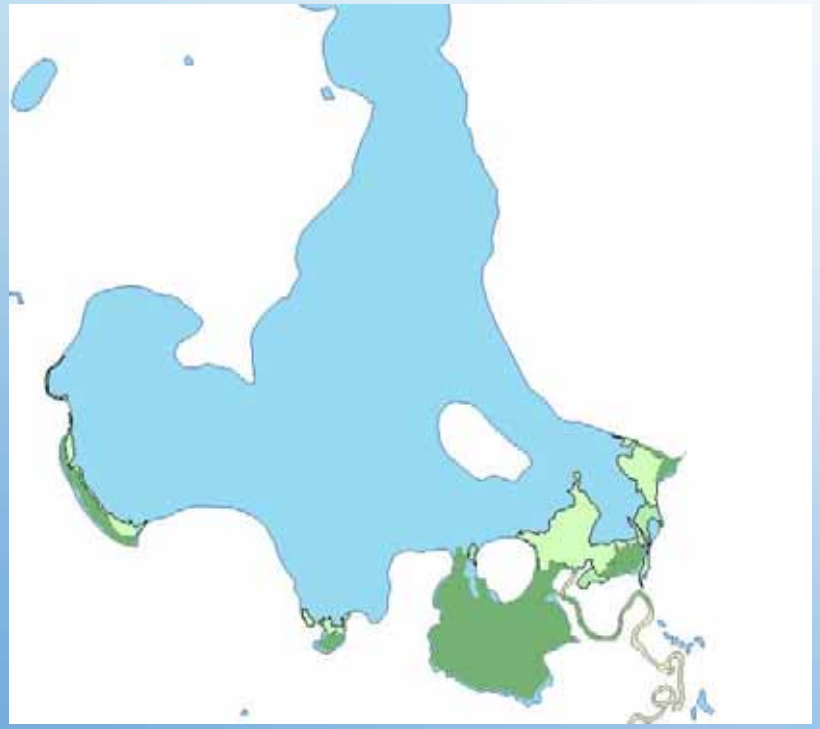
2014



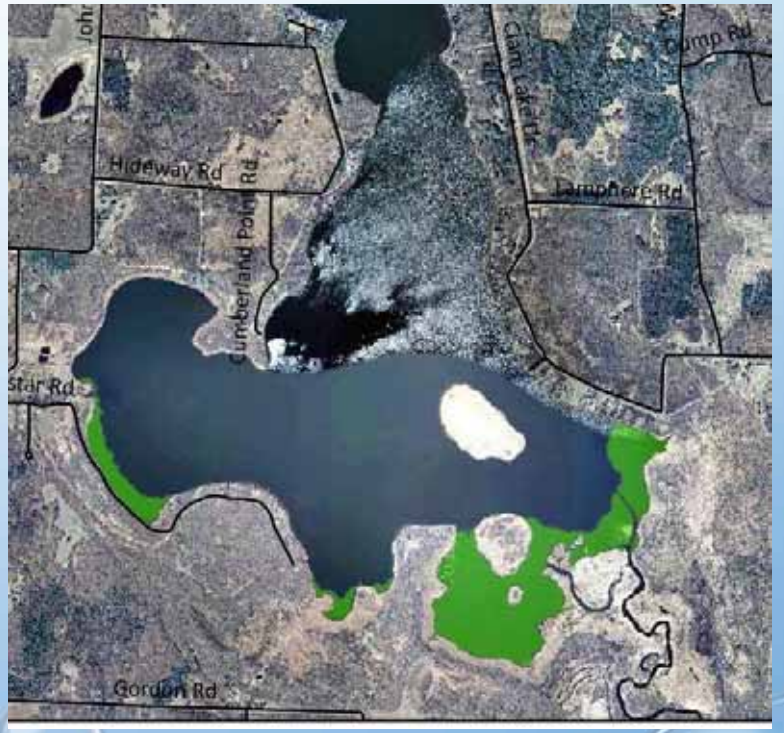
177 acres of rice

CLAM LAKE CARP IPM RESULTS- WILD RICE

2016-
155 Acres
of Rice



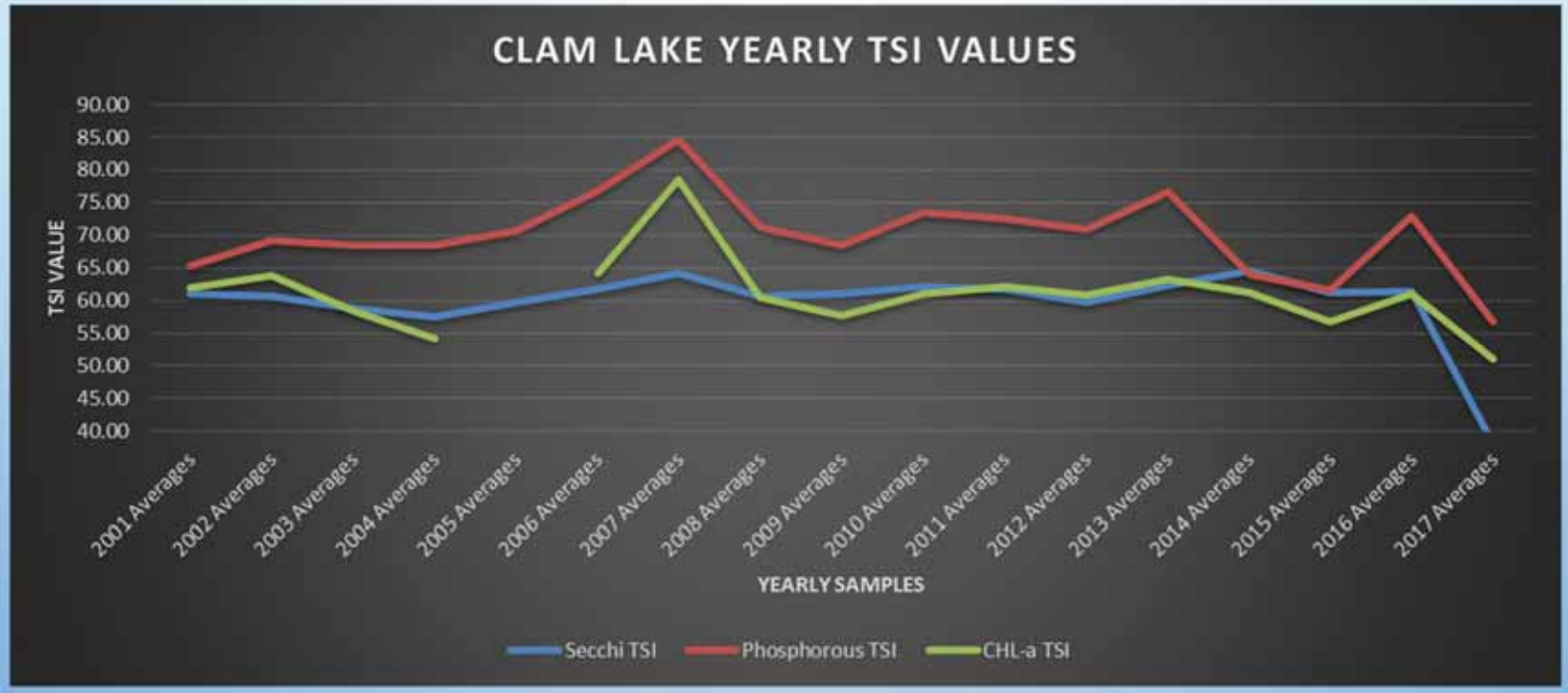
2017-
177 Acres
of Rice



CLAM LAKE CARP IPM RESULTS-WILD RICE

2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
1432	2730	0	0	0	0	0	0	35	15	66.5	588	997

CLAM LAKE CARP IPM RESULTS-WATER QUALITY

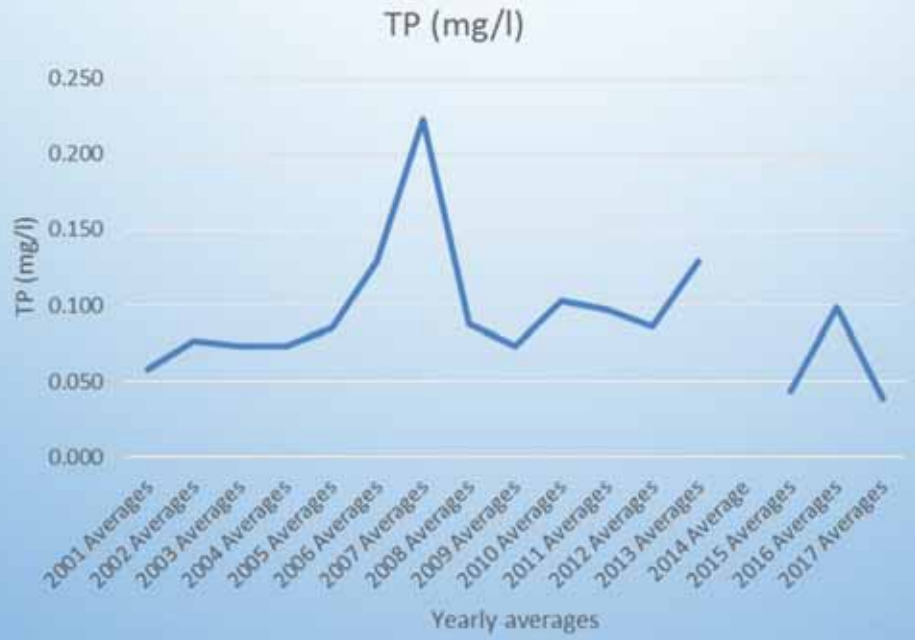


CLAM LAKE CARP IPM RESULTS-SECCHI

- 10 YEAR ROLLING AVERAGE IS 2.8 FT; 2017 AVERAGE IS 4.9.

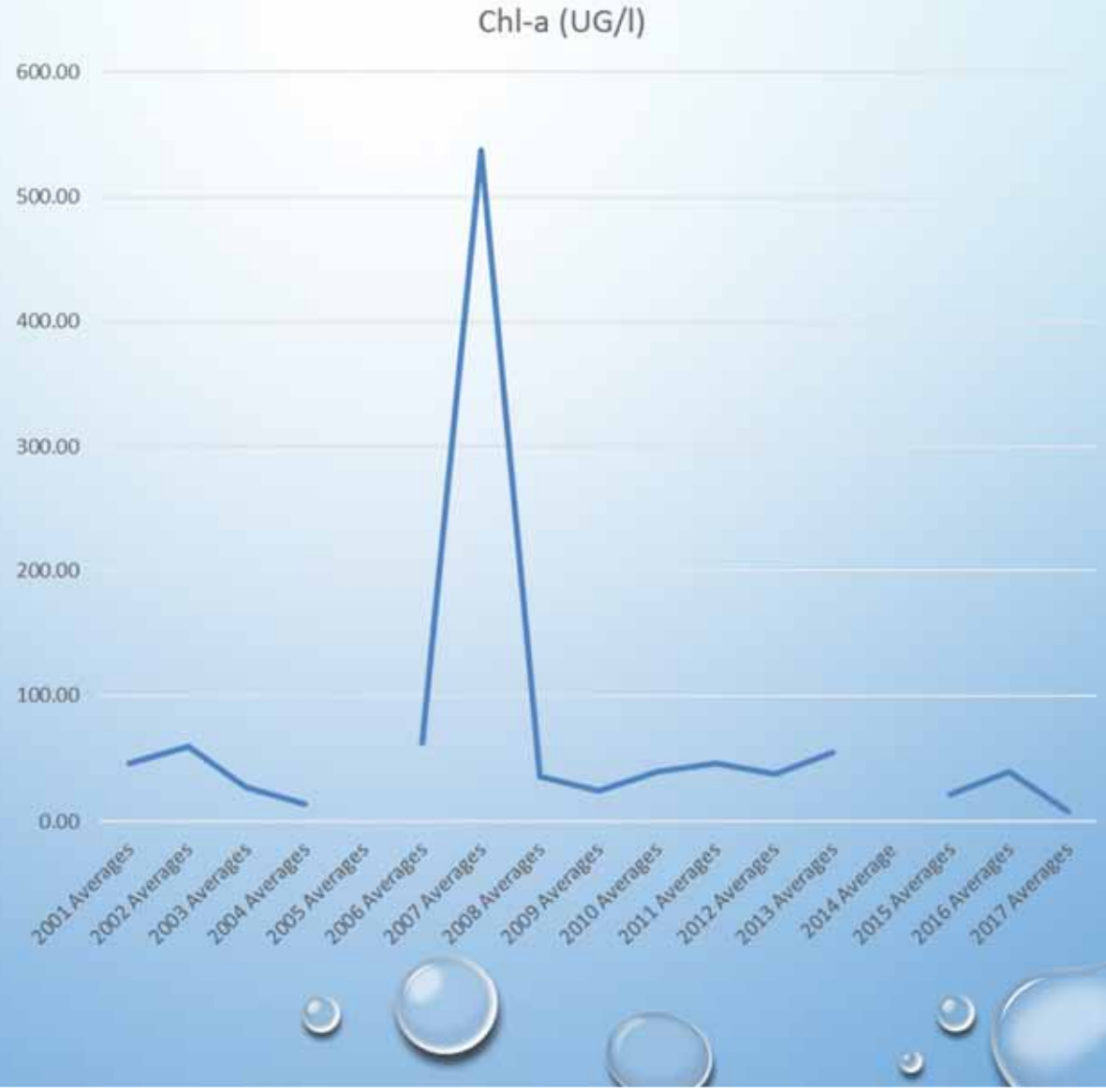
CLAM LAKE CARP IPM RESULTS- TP

- 10 YEAR ROLLING AVERAGE IS 0.098 MG/L; 2017 AVERAGE IS 0.039



CLAM LAKE CARP IPM RESULTS- CHL-A

10 YEAR ROLLING AVERAGE IS 84.84 UG/L; 2017 AVERAGE IS 8.47 UG/L



OTHER ONGOING MANAGEMENT ACTIVITIES

- ADDITION OF NEAR SHORE COARSE WOODY HABITAT
- WILD RICE SEEDING

CONTINUED MONITORING

- GAMEFISH AND PANFISH SURVEYS
- POINT INTERCEPT SURVEYS
- WINTER AND SUMMER WATER QUALITY
- CARP TELEMETRY

QUESTIONS?