Carter Lake CLEAR Council Meeting
June 20, 2007

Agenda

- Phosphorus Loading Review
- In-Lake Analysis
  - Dredging Options
  - Increasing Flow
  - Alum Treatments
  - Boating Restrictions
  - Fisheries Management
  - Shoreline Protection
- Next Steps

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P Loading Review

Existing Phosphorus Load = 3,166 lbs

TMDL Target Load = 1,462 lbs

54% (1,704 lb) Reduction

WMP Target Load = 977 lbs

69% (2,189 lb) Reduction

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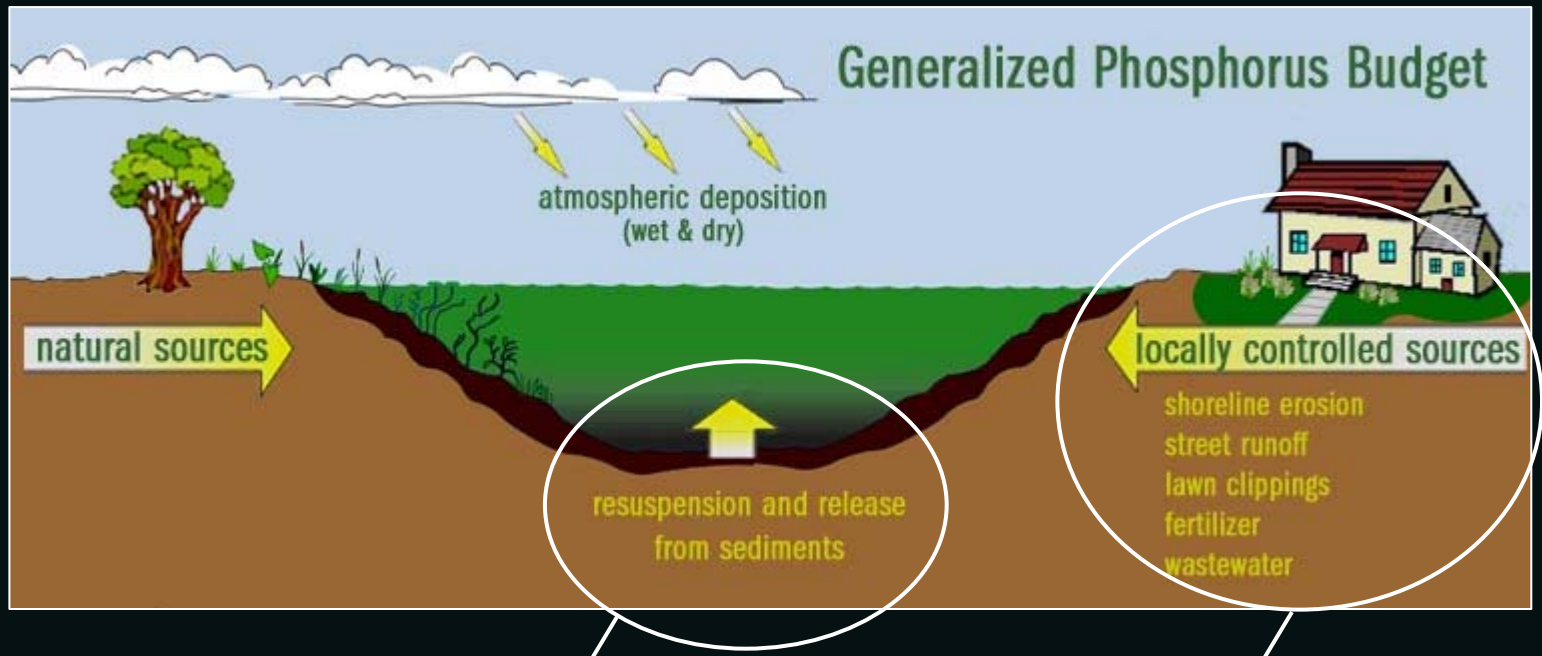
Existing P Loading Sources



Internal
994 lbs

31%

External
2,172 lbs

69%

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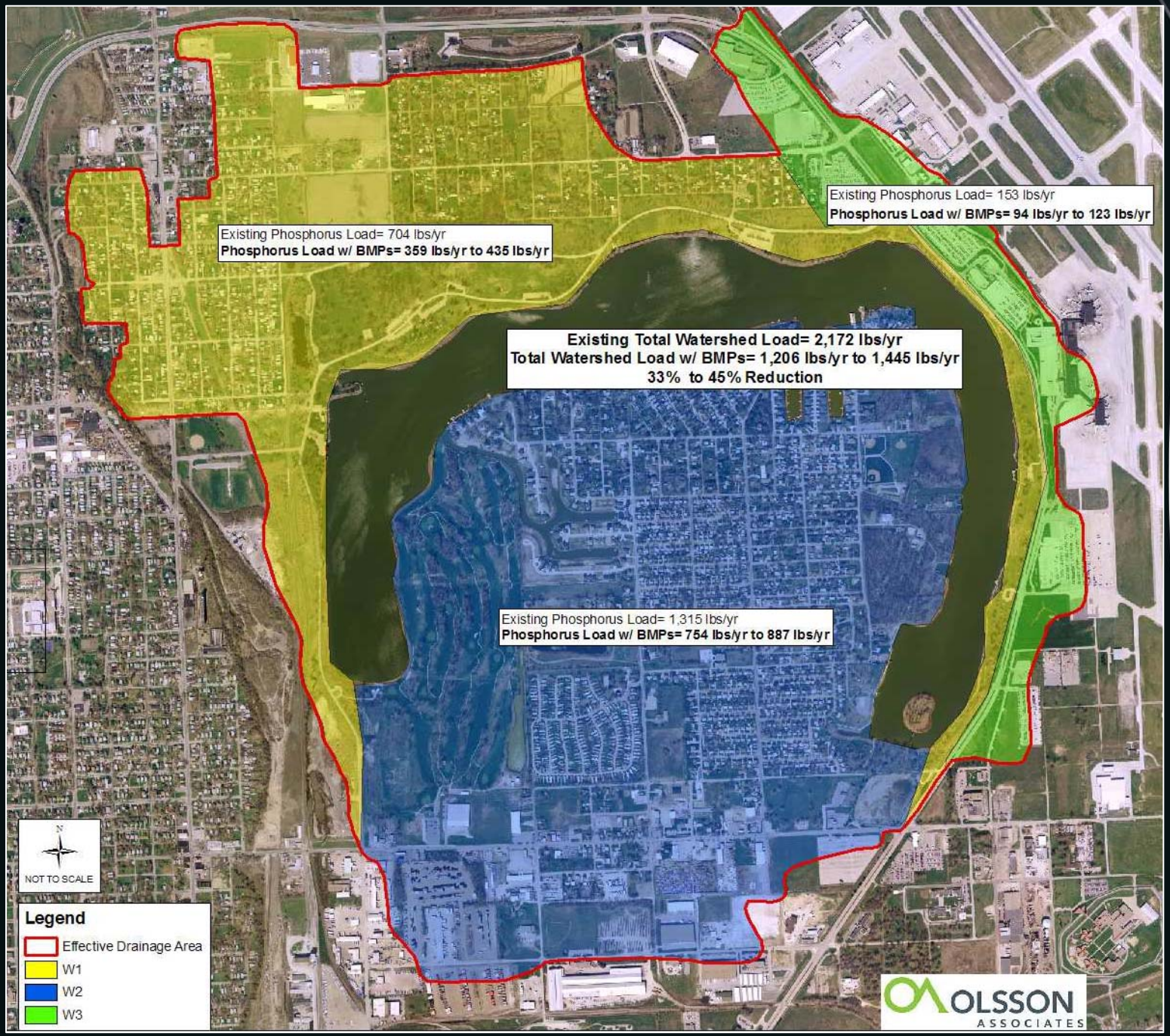

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After Watershed Improvements

External P Load = 1,206 lbs

Internal P Load = 994 lbs

Total P Load = 2,200

TMDL Target Load = 1,462 lbs

Required In-Lake Removal = 738 lbs

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Carter Lake

- How does it work?
  - Corps of Engineers 1985 & 1960
  - Schemmer Study in 1998

SAME FINDINGS

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- Spring ground water “lifts” clay
- Rapid inflow

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- Summer lake levels “compress” clay
- Slow outflow

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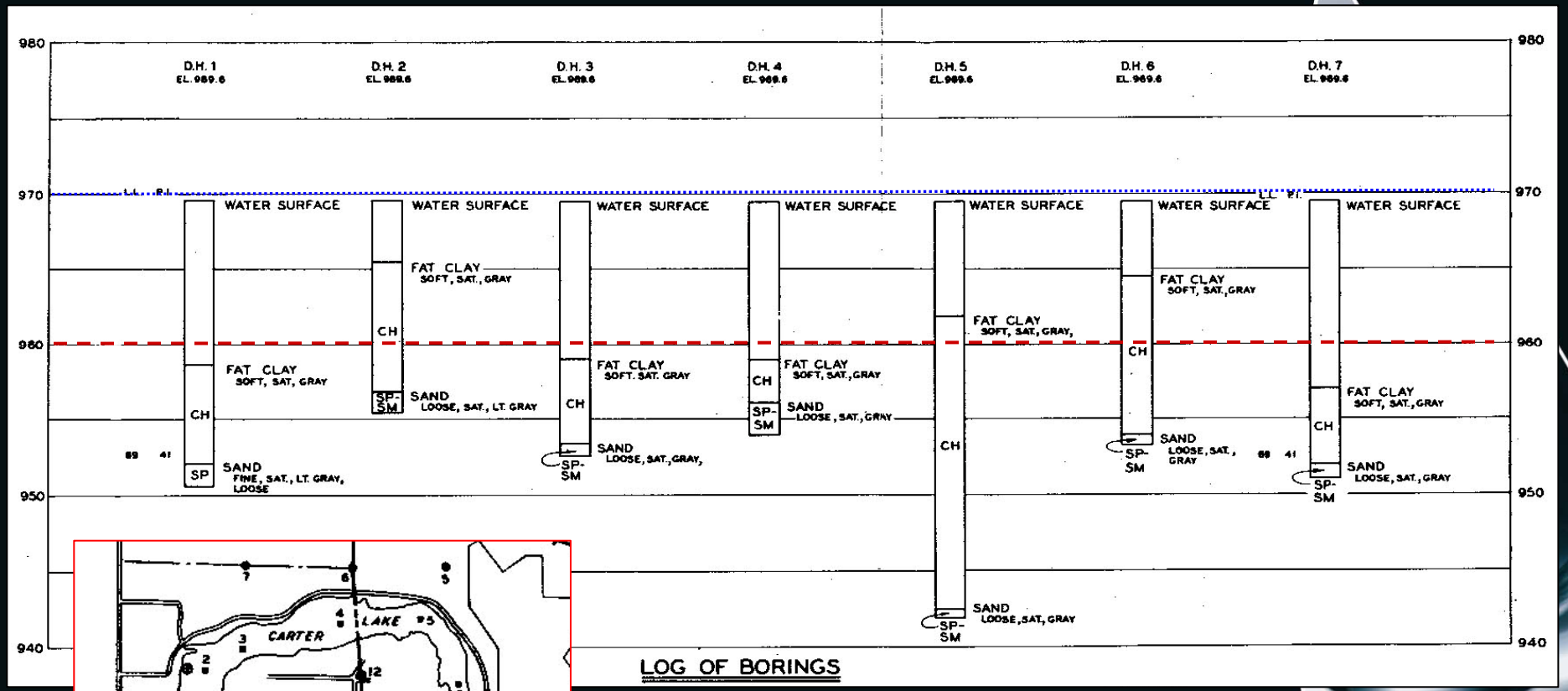
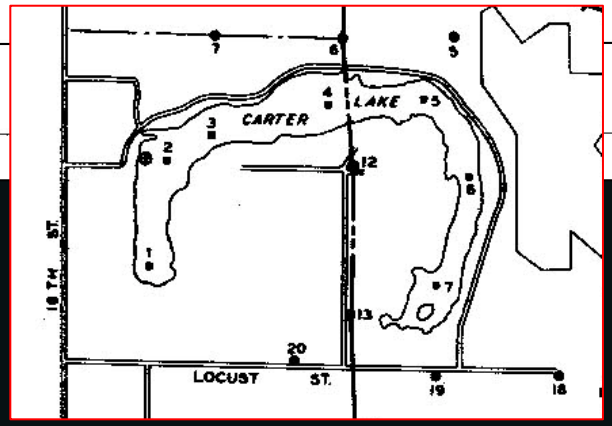
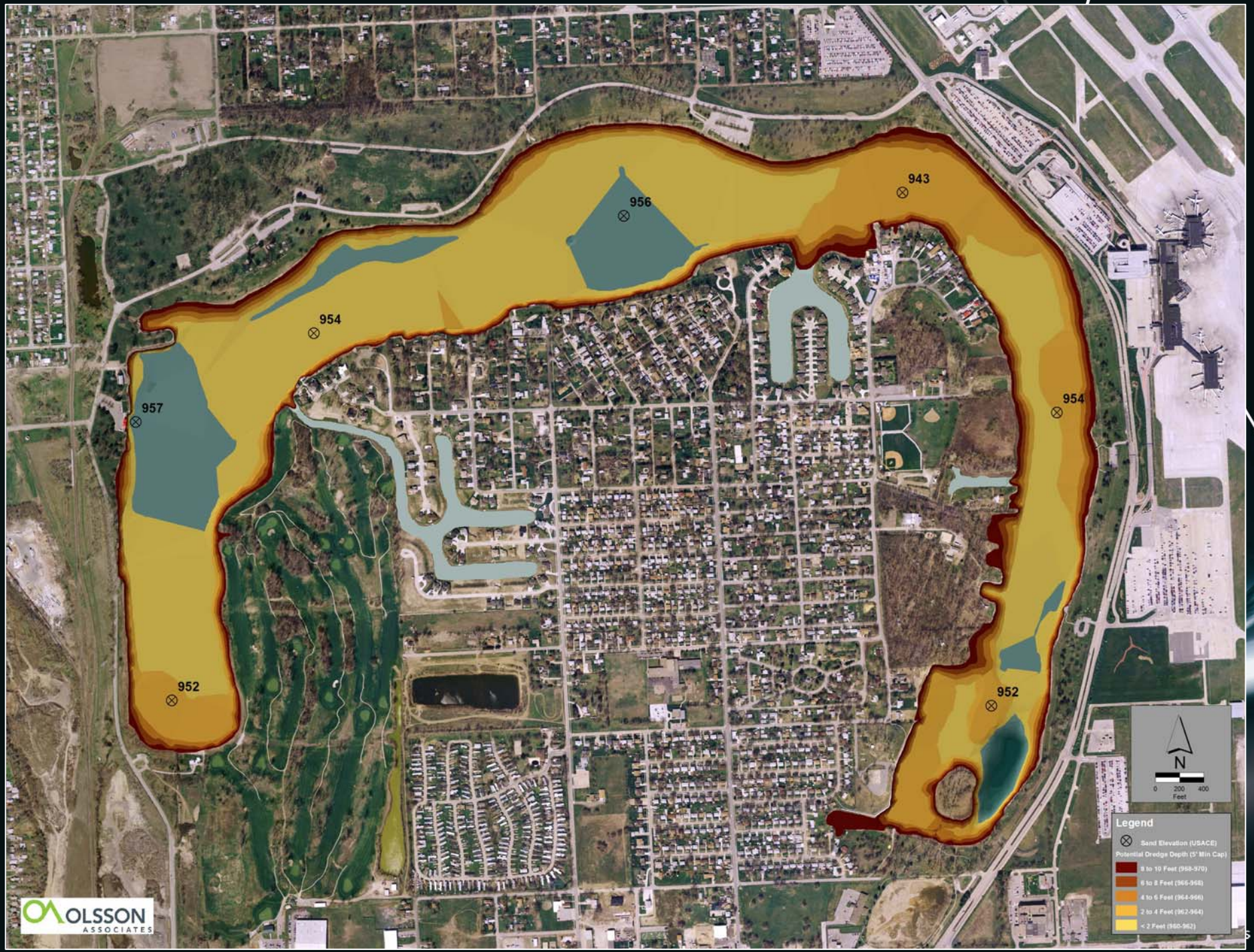

980
970
960
950
940
D.H. 1
EL. 969.6
D.H. 2
EL. 969.6
D.H. 3
EL. 969.6
D.H. 4
EL. 969.6
D.H. 5
EL. 969.6
D.H. 6
EL. 969.6
D.H. 7
EL. 969.6
WATER SURFACE
FAT CLAY
SOFT, SAT., GRAY
CH
SAND
LOOSE, SAT., LT. GRAY
SP-SM
FAT CLAY
SOFT, SAT, GRAY
SAND
FINE, SAT., LT. GRAY, LOOSE
SP
SAND
LOOSE, SAT., GRAY,
SAND
LOOSE, SAT., GRNY
SAND
LOOSE, SAT., GRAY
FAT CLAY
SOFT, SAT., GRAY,
SAND
LOOSE, SAT, GRAY
LOG OF BORINGS


LAKE
CARTER
LOCUST
ST.
18TH
ST.


943
956
954
957
954
952
952
N
0 200 400
Feet
Legend
Sand Elevation (USACE)
Potential Dredge Depth (5' Min Cap)
8 to 10 Feet (968-970)
6 to 8 Feet (966-968)
4 to 6 Feet (964-966)
2 to 4 Feet (962-964)
< 2 Feet (960-962)
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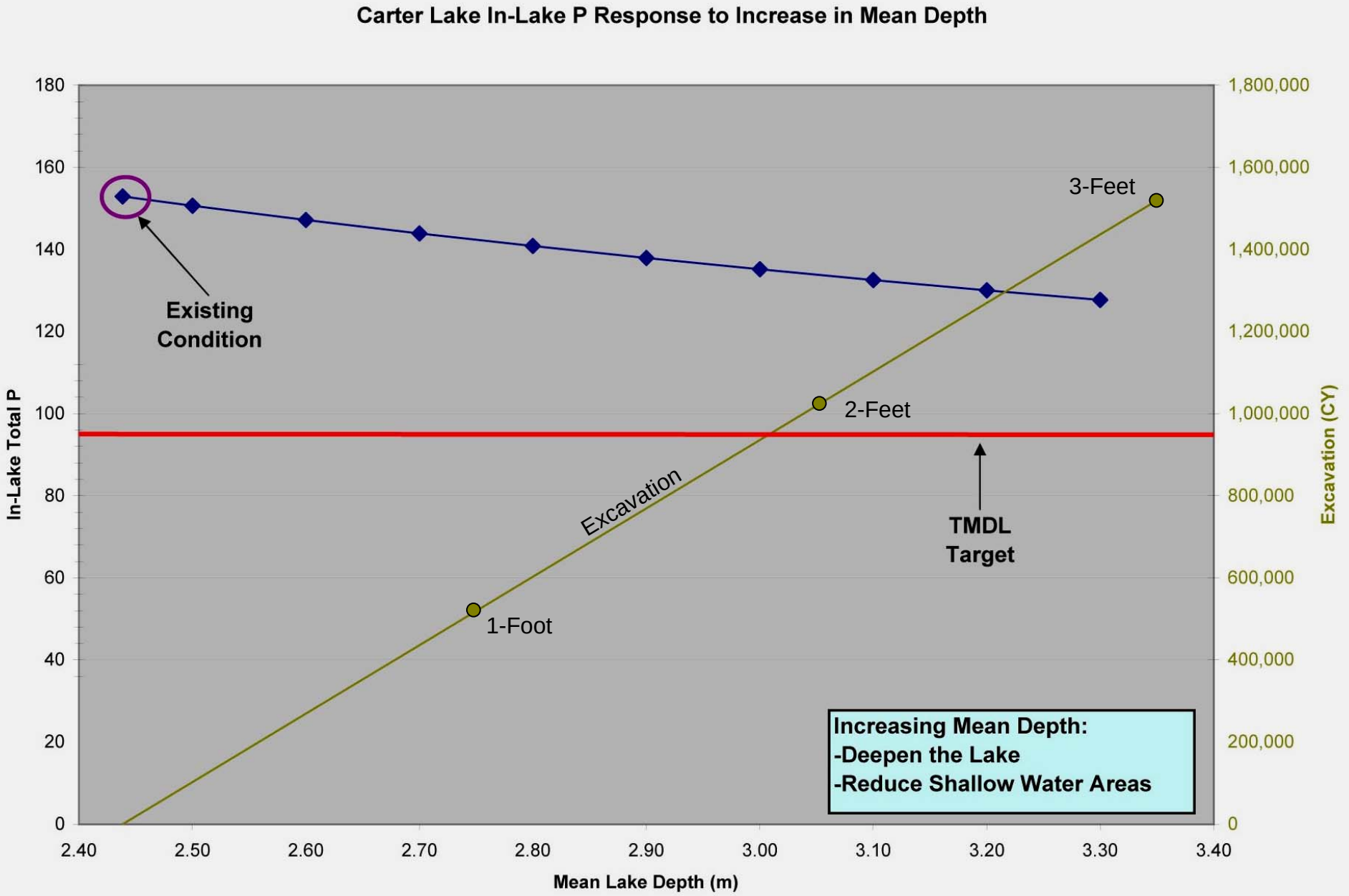
Carter Lake In-Lake P Response to Increase in Mean Depth
In-Lake Total P
Excavation (CY)
Mean Lake Depth (m)
180
160
140
120
100
80
60
40
20
0
1,800,000
1,600,000
1,400,000
1,200,000
1,000,000
800,000
600,000
400,000
200,000
0
2.40
2.50
2.60
2.70
2.80
2.90
3.00
3.10
3.20
3.30
3.40
Existing Condition
3-Feet
2-Feet
1-Foot
Excavation
TMDL Target
Increasing Mean Depth:
-Deepen the Lake
-Reduce Shallow Water Areas

Increasing Inflow

CSO!
Clean Solutions for Omaha

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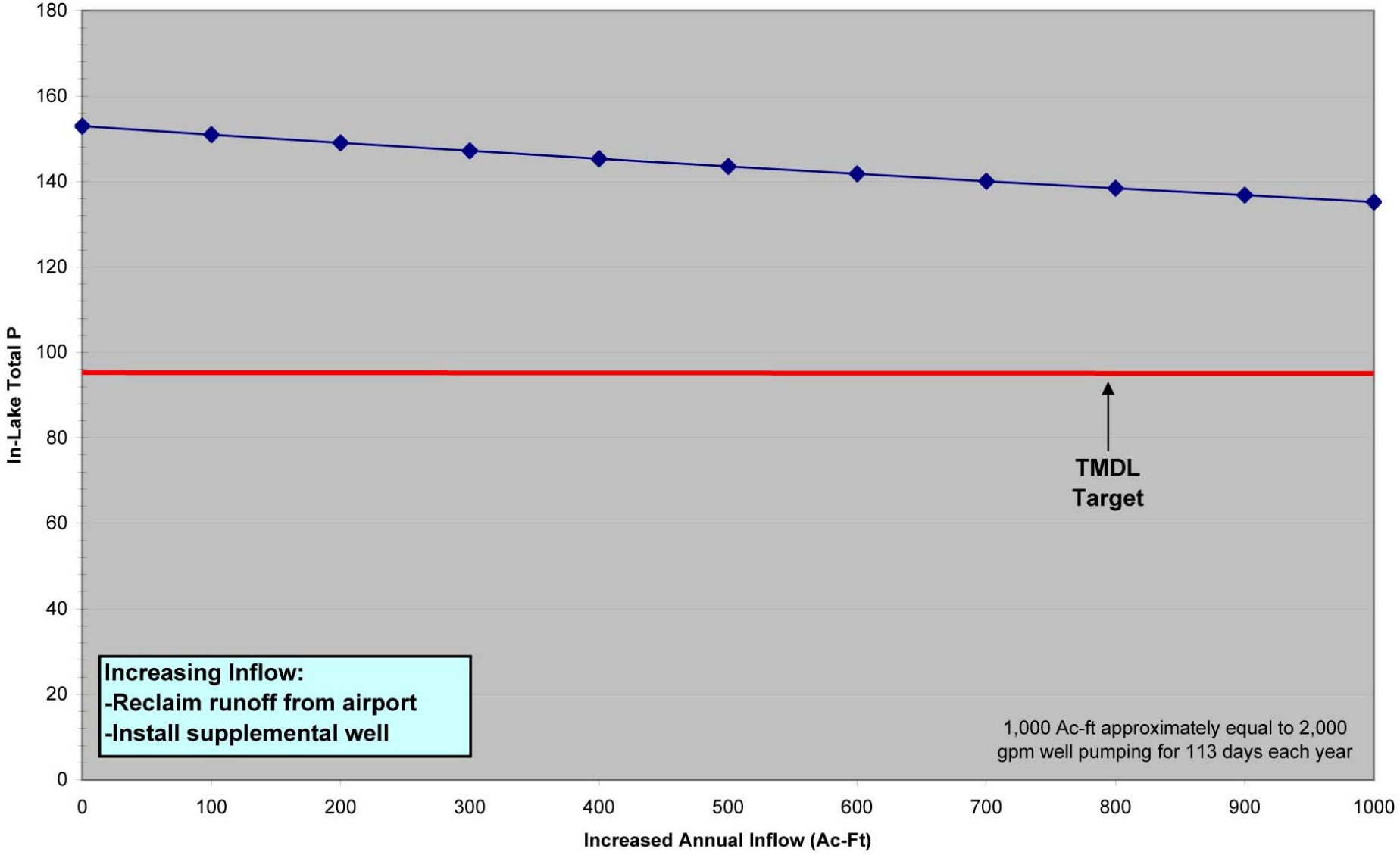
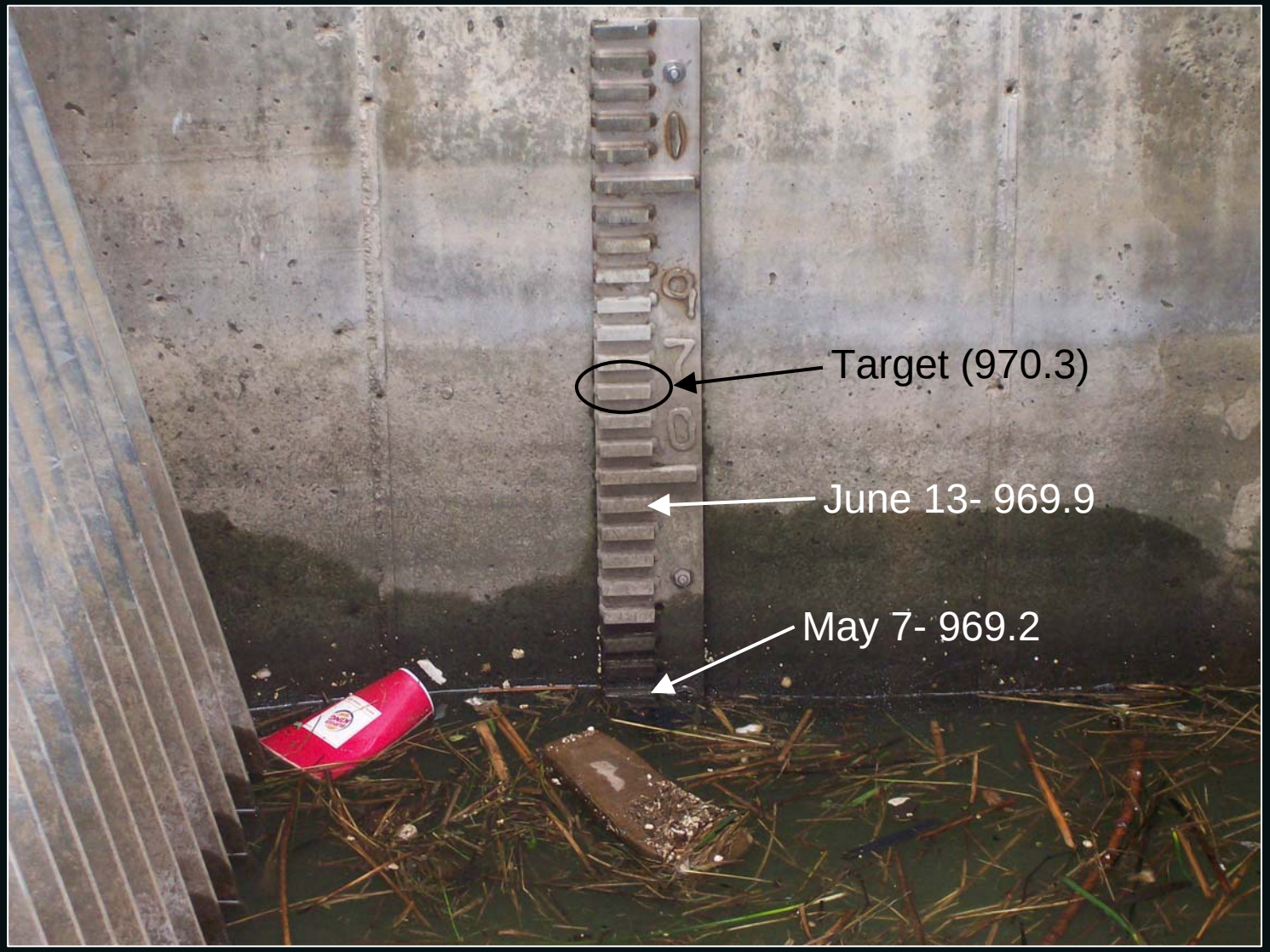
Modeled Carter Lake In-Lake P response to Increased Lake Inflow*

* Assumes inflow has 0 mg/l P concentration



Recent Water Levels



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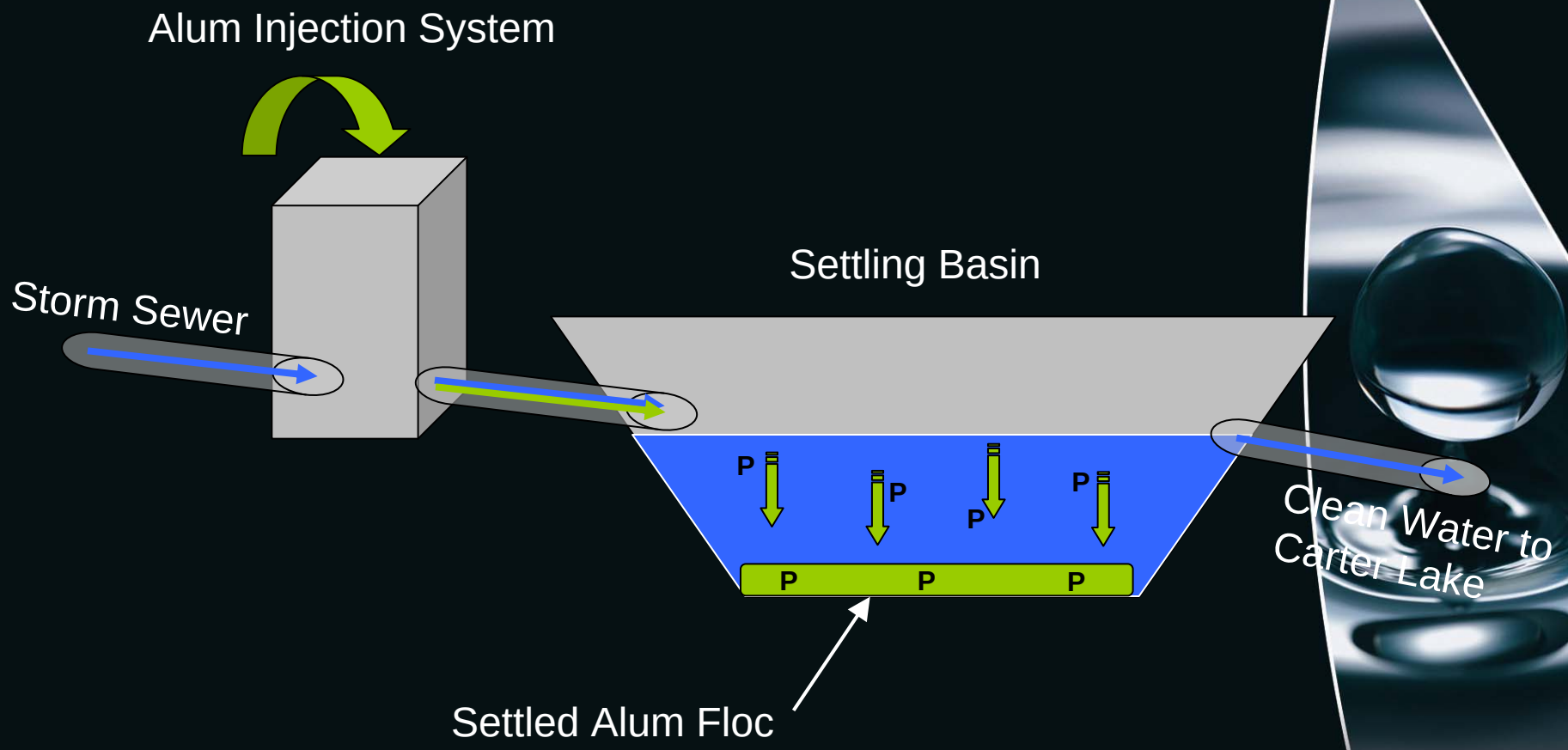
Alum – Stormwater Injection



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NW Corner of Carter Lake

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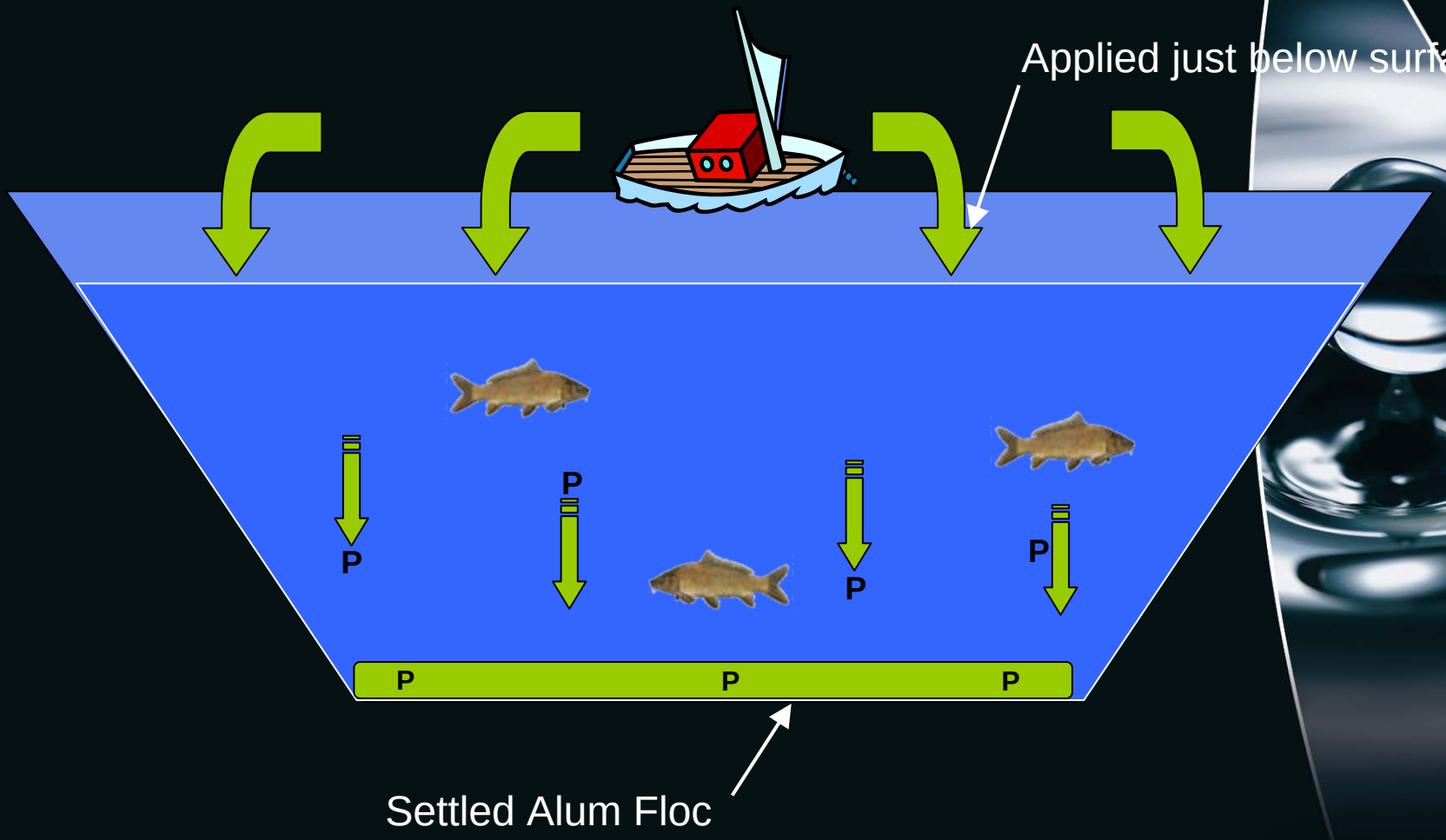
Alum – Lake Application



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Alum – Lake Application

Ontario County Planning Department, Lake Honeoye

Wisconsin Department of Natural Resources

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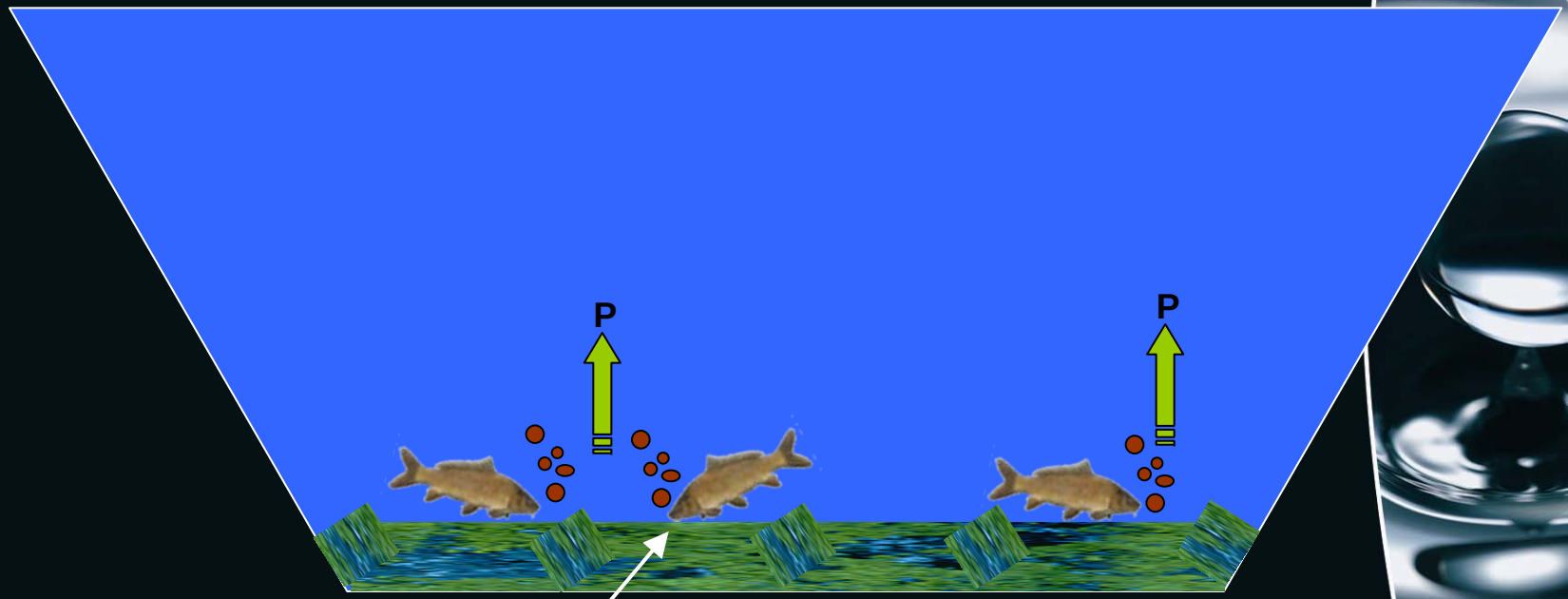
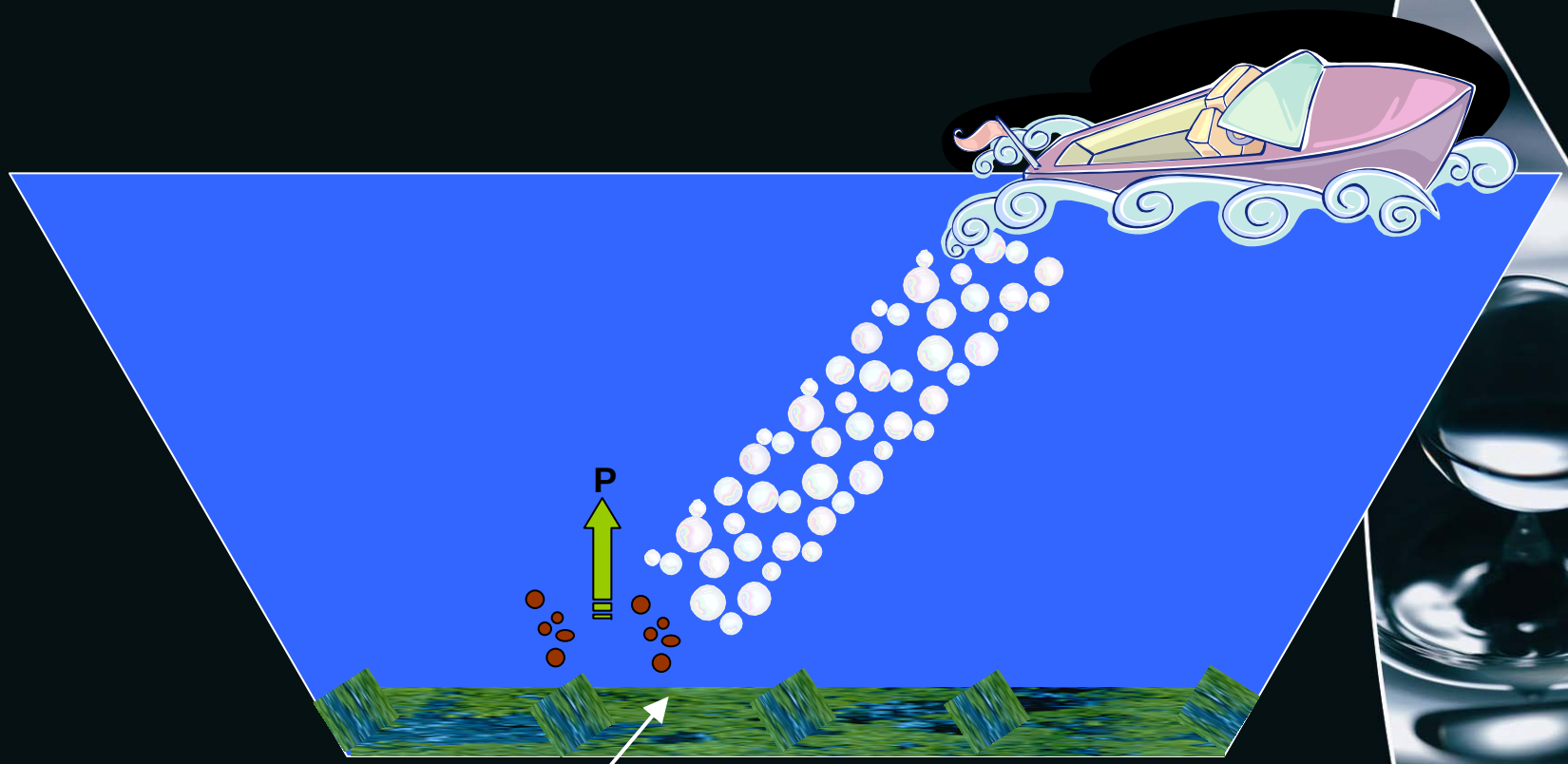
Fish Management



Bottom feeding fish (carp, bullhead) can have significant impacts on water clarity and P concentrations by stirring up sediment

Watercraft Management



Watercraft such as boats and jet skis also stir up sediments

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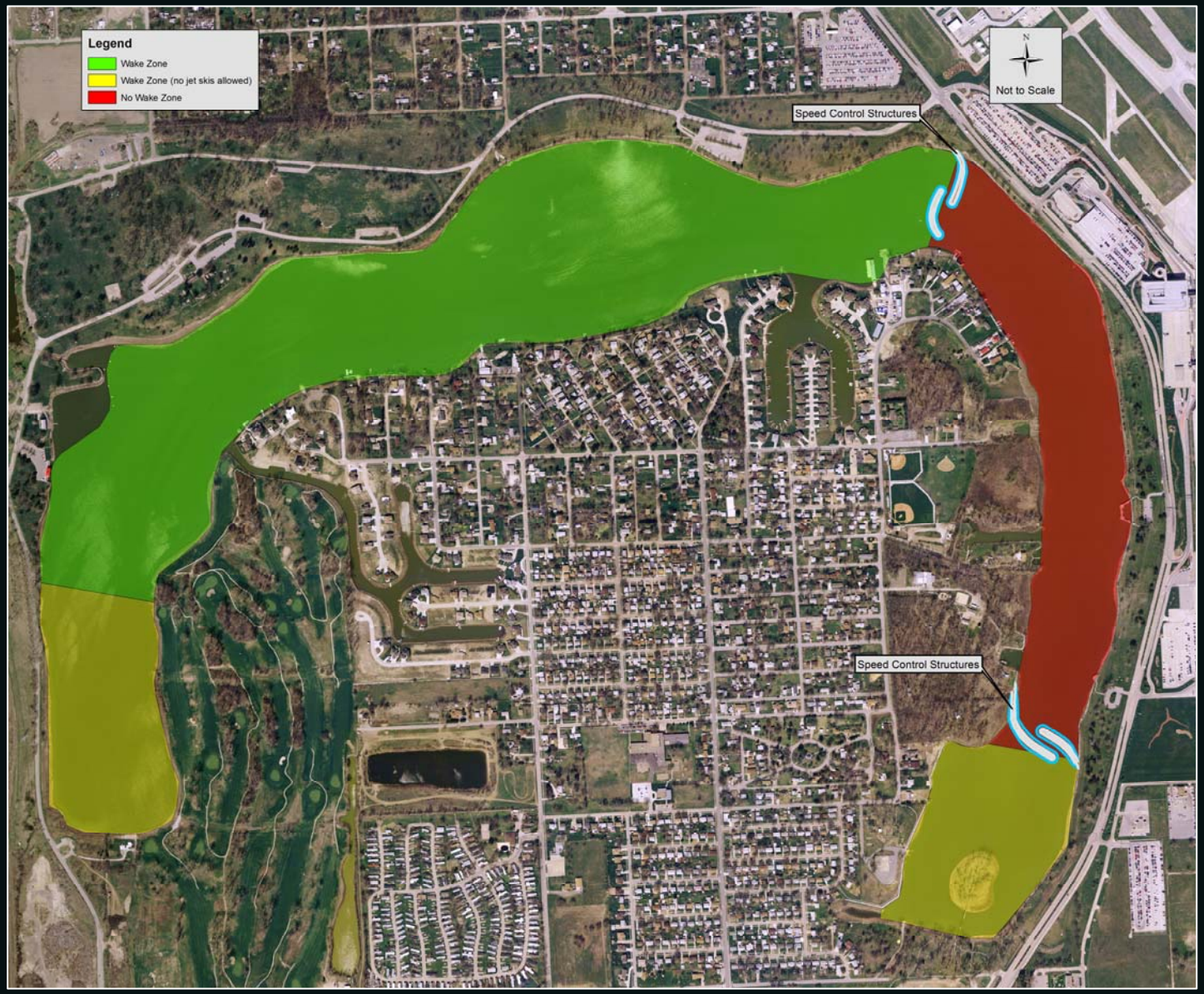
Watercraft Management



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Shoreline Protection

After In-Lake Improvements

Required P Removal = 738 lbs

Alum Injection System → 240 lbs

Shoreline Stabilization → 82 lbs
(5,500 feet of stabilization)

In-Lake Alum Treatment → 422 lbs
(Avg. over 10 years)

In-Lake Reduction = 812 lbs
→ Meets Goal!

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Discussion

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