

WURTSMITH AIR FORCE BASE – PUBLIC MEETING

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Remediation and Redevelopment Division (MDEQ)

October 25, 2016



PFC Use in Different Industries

Examples of Fluoropolymer Applications



Semiconductor Manufacturing



Non-stick Coatings for Cookware and Small Electrical Appliances



Data Wire & Cabling



Low Permeable Automotive Fuel Hose



Electronics



Chemical and Pharma Processing Valves, Lined Piping, Tanks



Aerospace Materials - Hydraulic Tubing Wire & Cabling

- <http://fluorocouncil.com/PDFs/Industrial-Reliance-on-FluoroTechnology.pdf>
- OECD (2013) Synthesis Paper on Per- and Polyfluorinated Chemicals (PFCs) (https://www.oecd.org/env/ehs/risk-management/PFC_FINAL-Web.pdf)

PFC Use in Different Industries

Examples of Fluorinated Polymer and Non-Polymer (Surfactants) Applications



**Protective Health
Care Garments**



**Architectural
Coatings**



**Protective Finishes on
Apparel and Textiles**



Industrial Firefighting



Paint

- <http://fluorocouncil.com/PDFs/Industrial-Reliance-on-FluoroTechnology.pdf>
- OECD (2013) Synthesis Paper on Per- and Polyfluorinated Chemicals (PFCs) (https://www.oecd.org/env/ehs/risk-management/PFC_FINAL-Web.pdf)

PFCs at Wurtsmith

- The primary source of PFCs at Wurtsmith are attributed to AFFF* use.
- Prior to the invention of AFFF, Protein Foam was widely used – but not as effective.
- The Fluorine and Carbon bond is a very strong chemical bond, which makes PFCs resistant to heat, oxidation and reduction.
- PFCs are persistent in the environment (i.e. very difficult to remediate and remove).

* - Aqueous Film Forming Foam

Why AFFF?

1967 – USS Forrestal fire
Protein Foam



134 sailors **died**, 161 sailors **injured**

1978 – DC-10 Crash LAX
3M AFFF

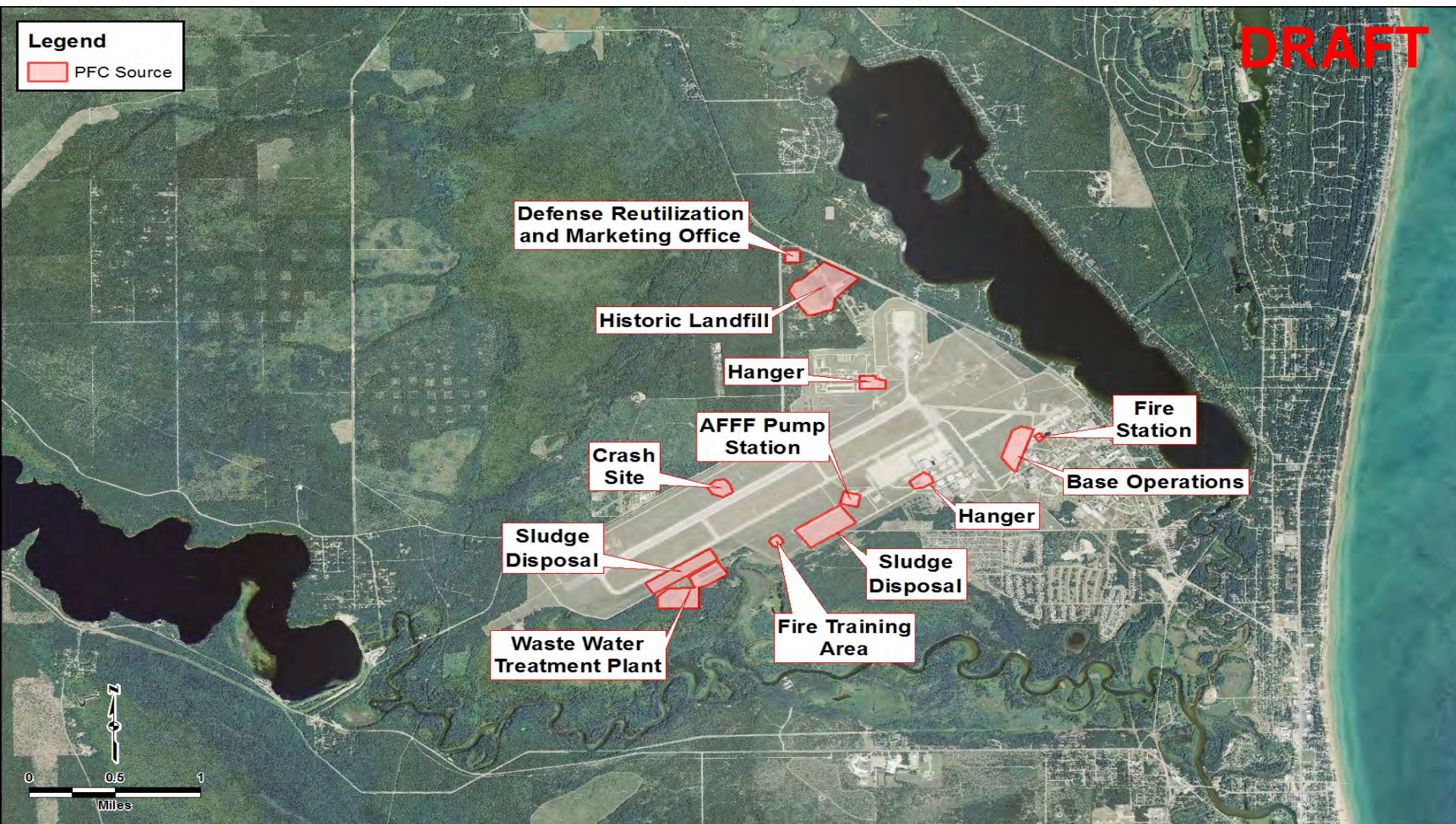


196 lives **saved** out of 200

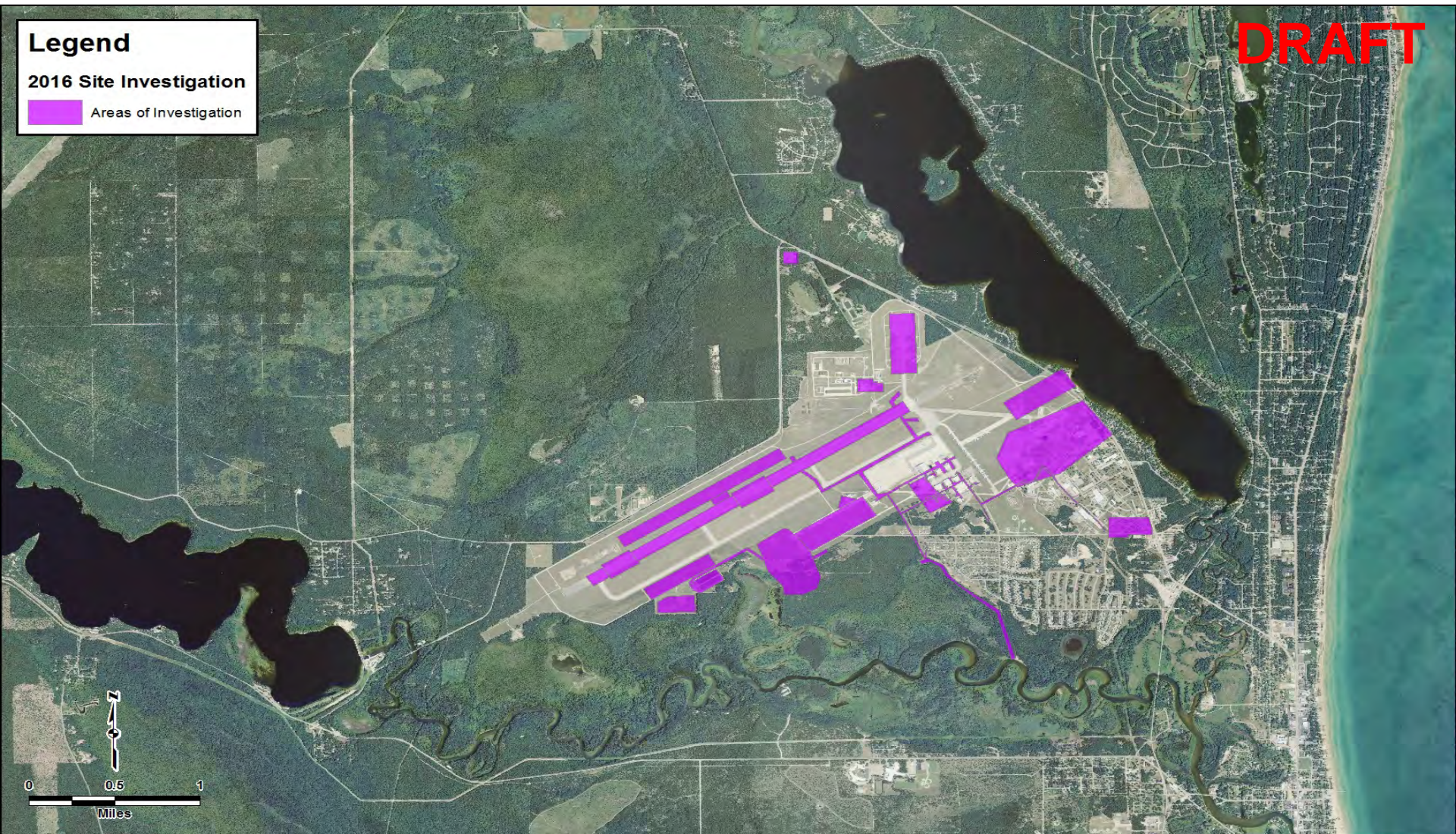
Former Wurtsmith Air Force Base



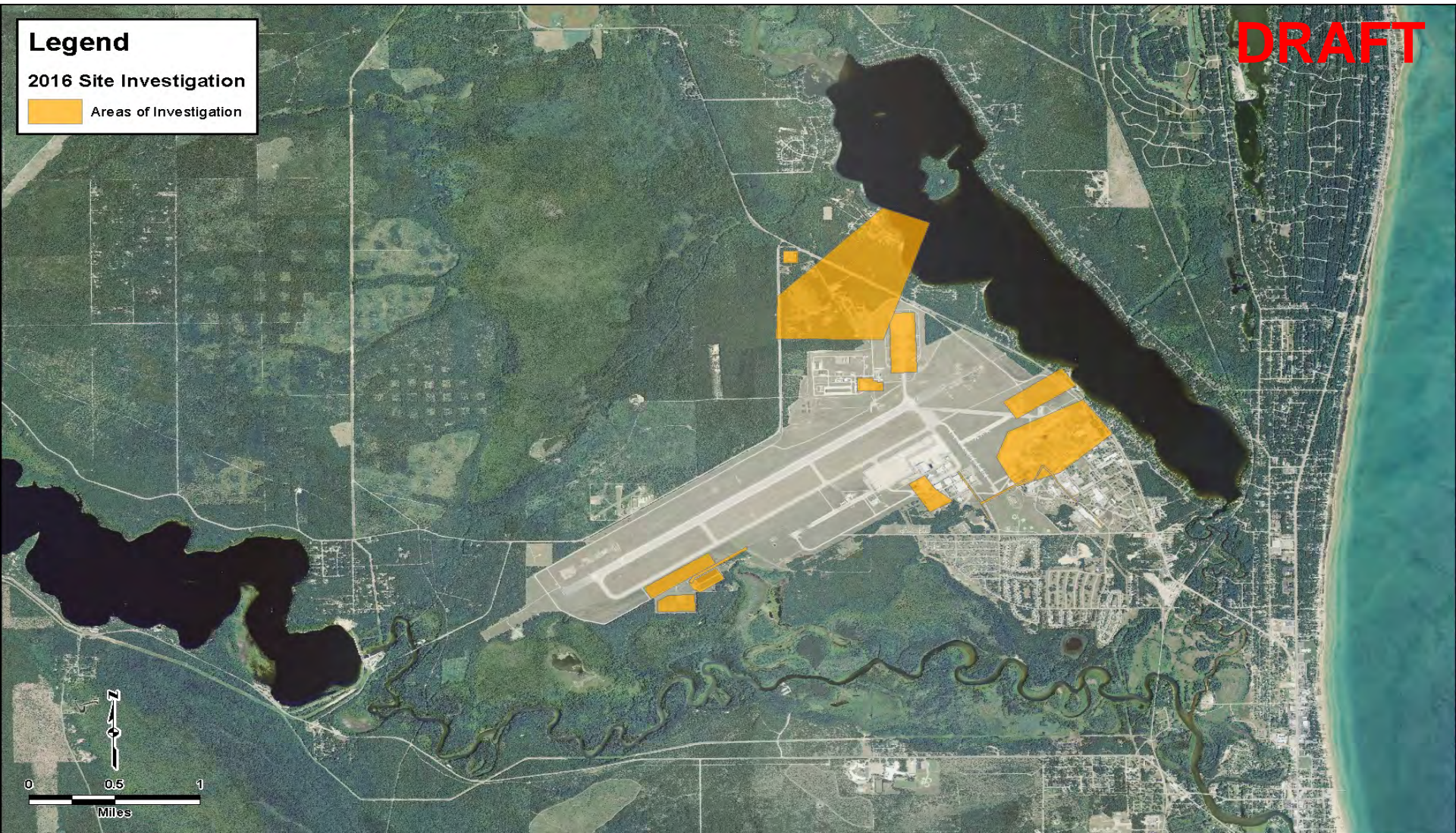
Identified PFC Sources



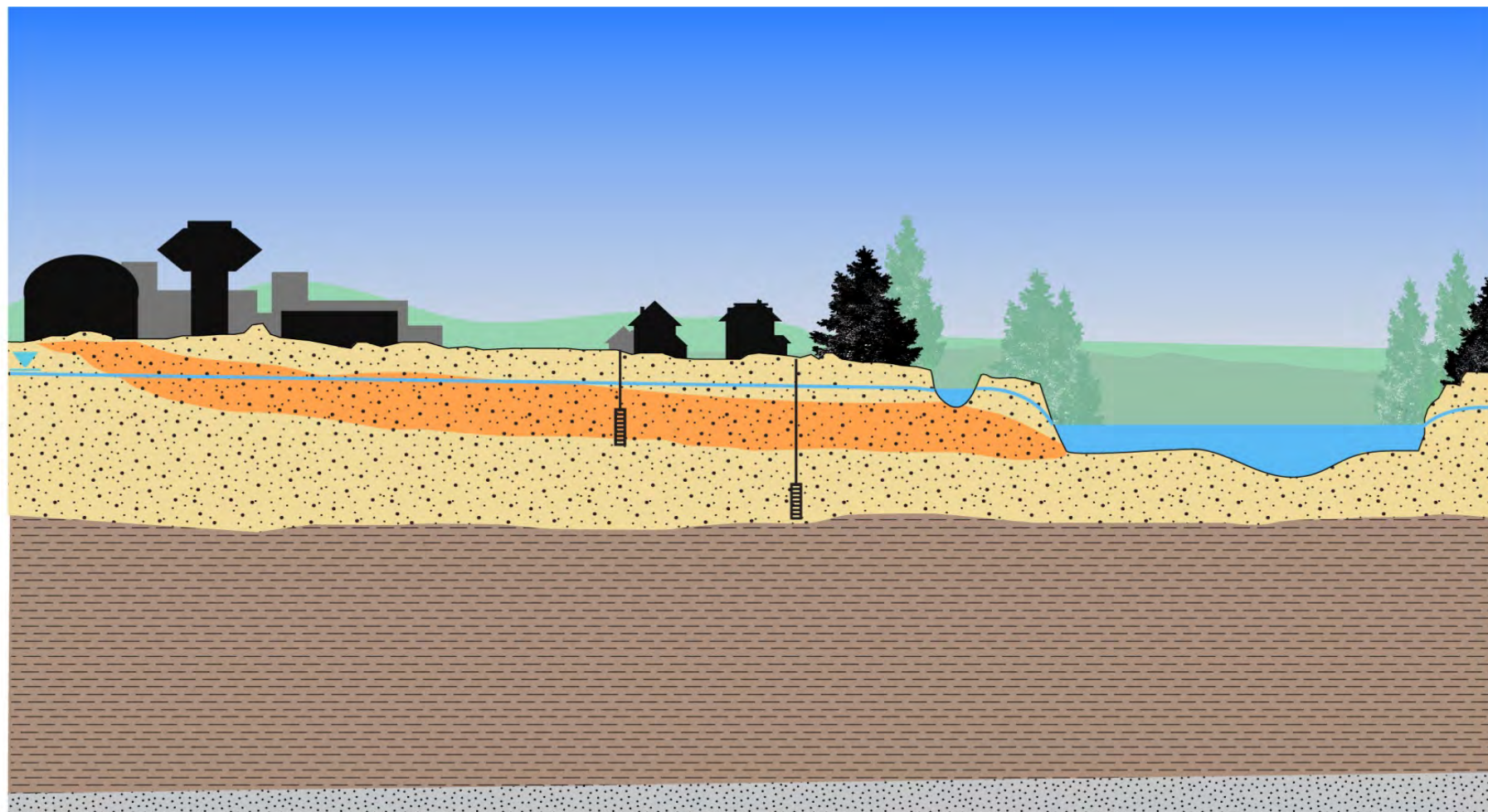
2016 PFC Site Investigation - Completed



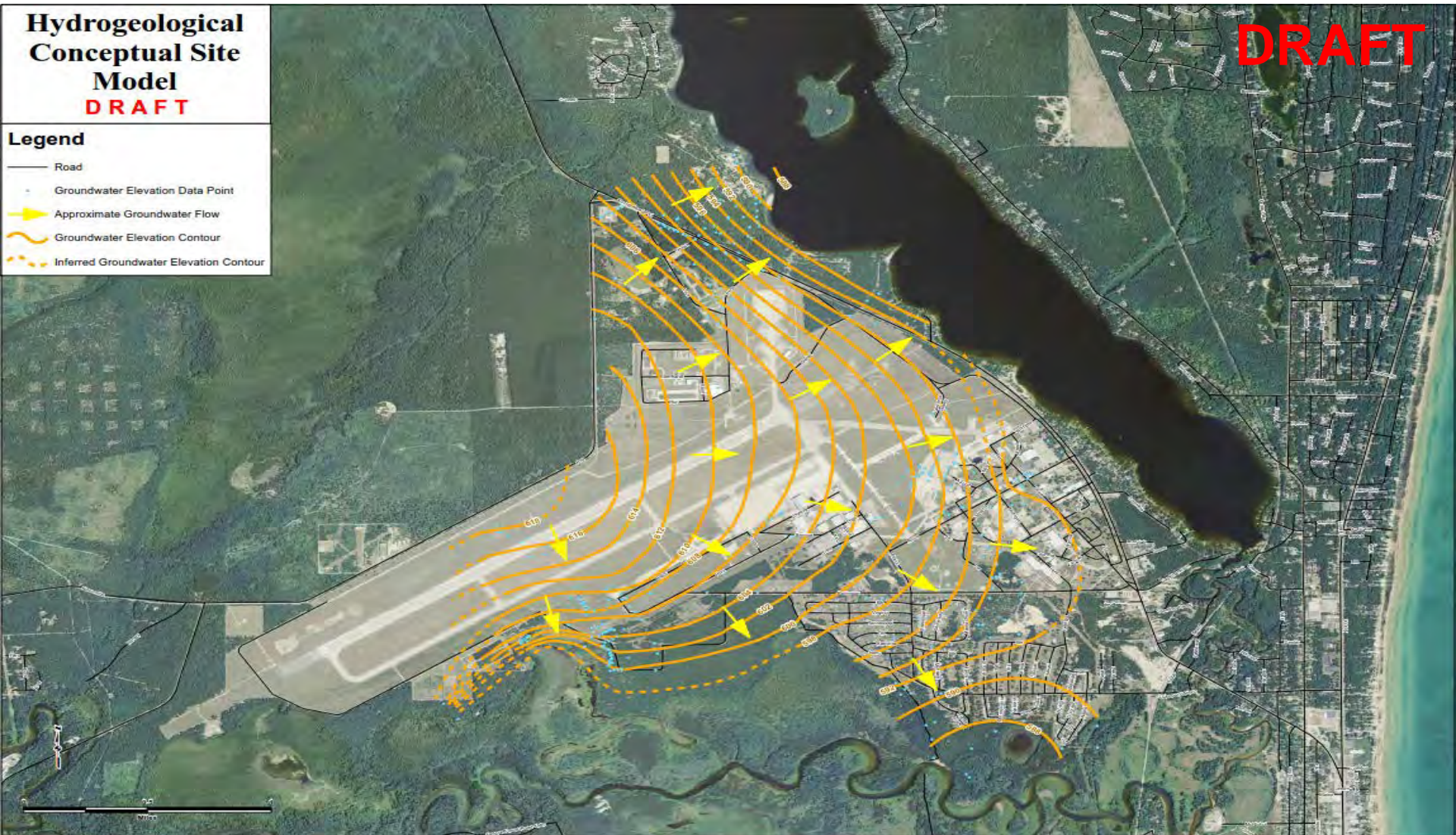
2016 PFC SI Addendum – In Progress



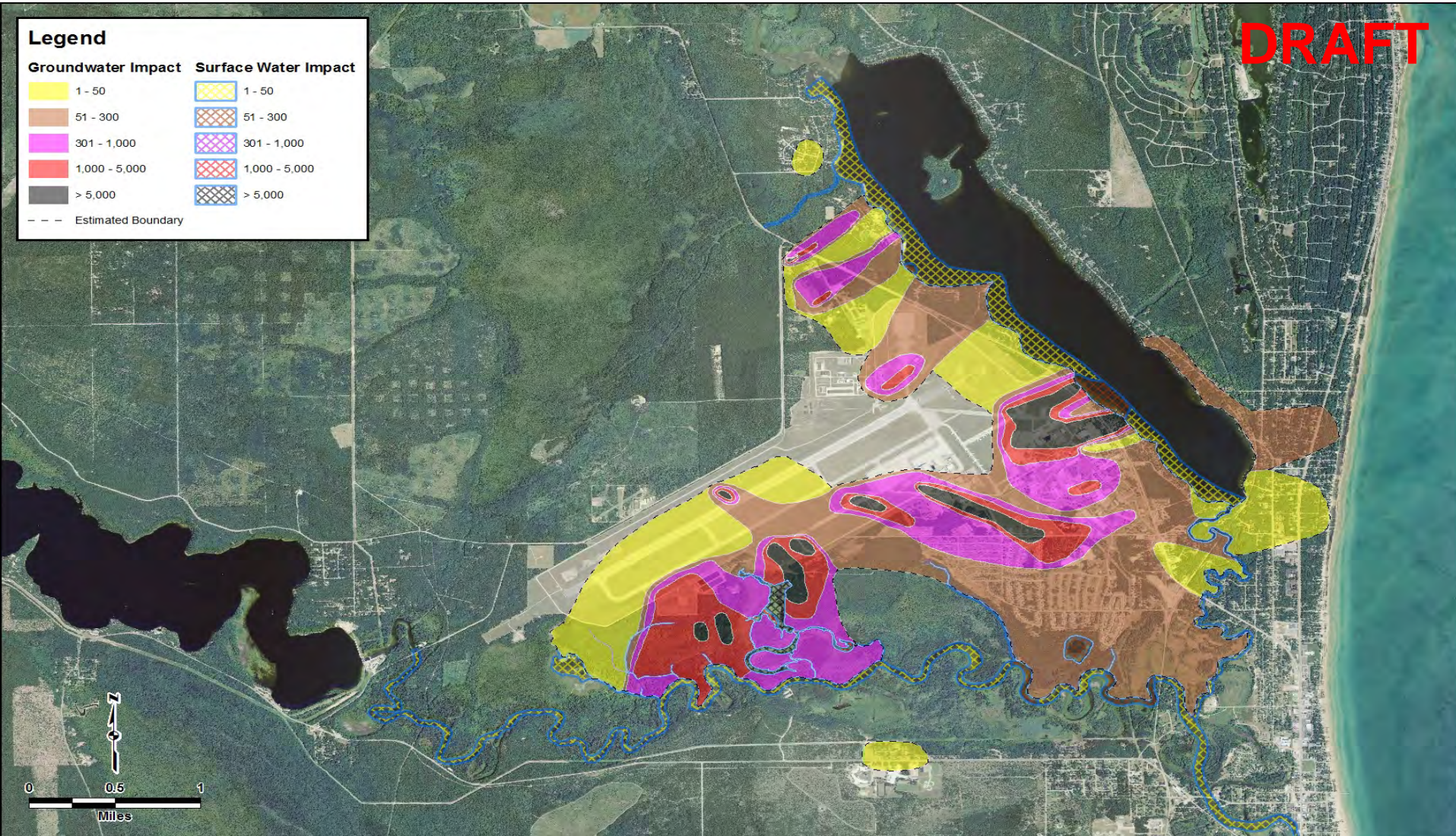
Conceptual Contaminant Migration



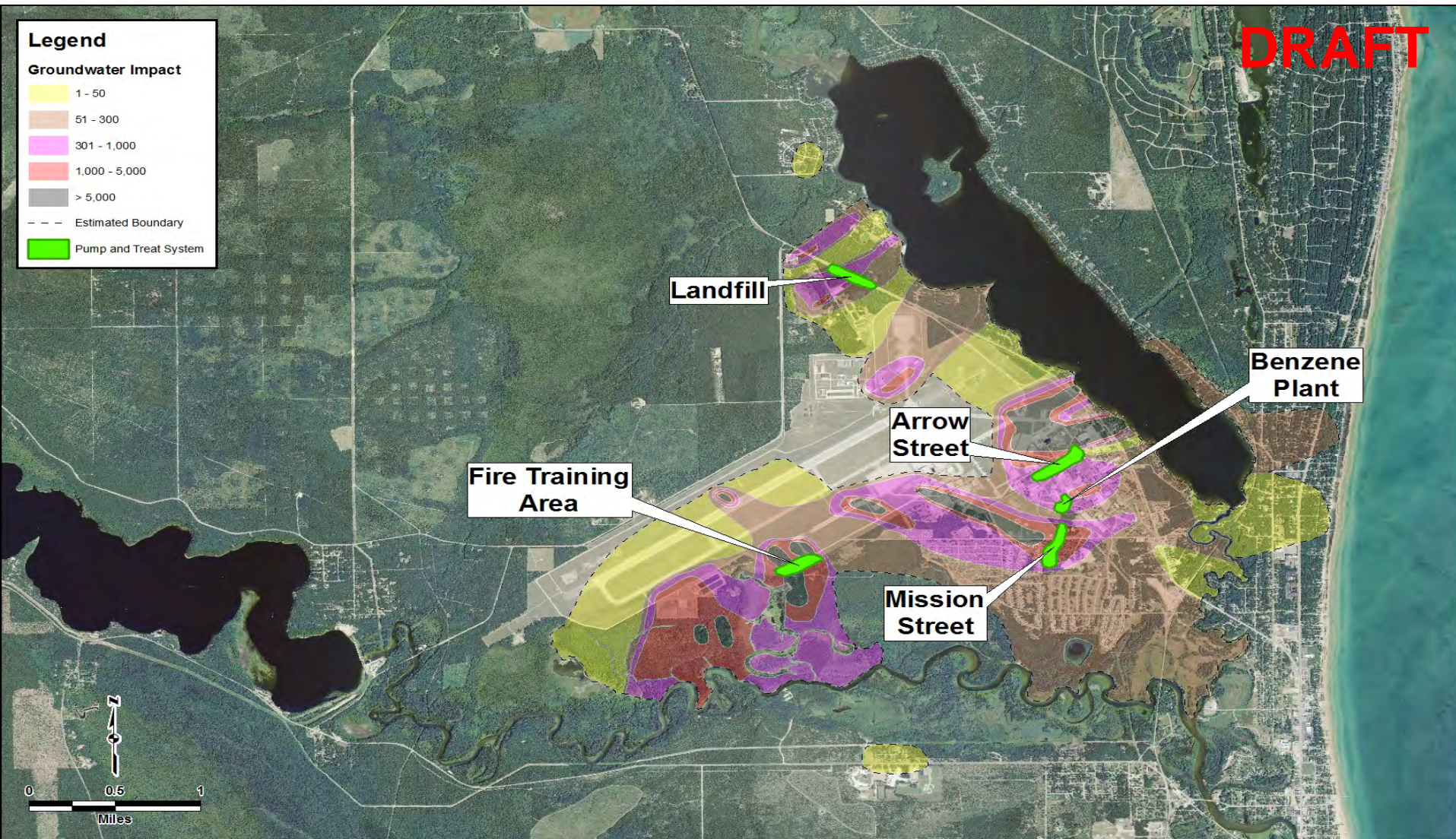
Groundwater Flow Direction



Approximate Extent of PFC Contamination



WAFB Pump and Treat Systems (1978 - Present)



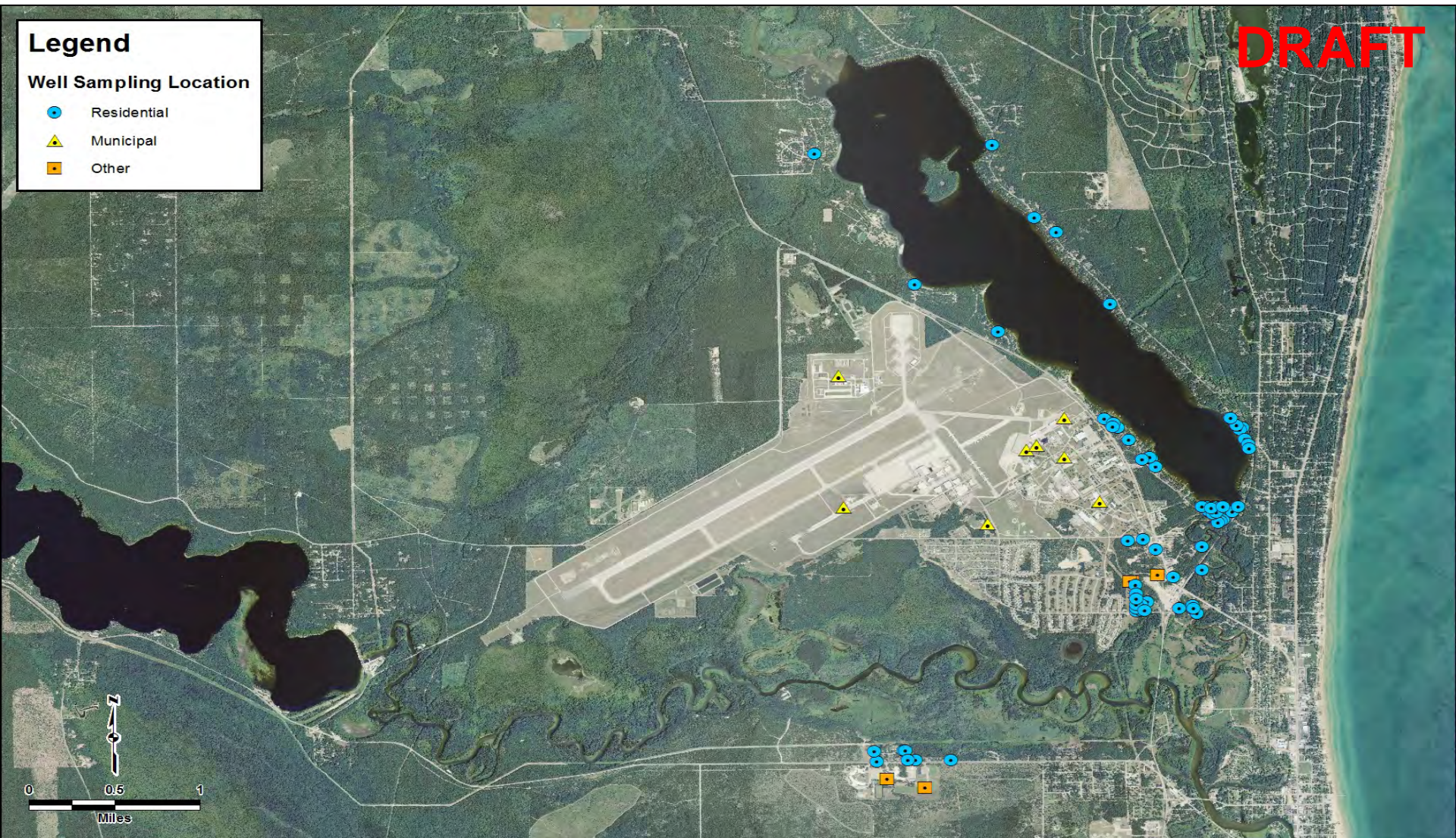
Drinking Water Sampling – June 2016

Legend

Well Sampling Location

- Residential
- ▲ Municipal
- Other






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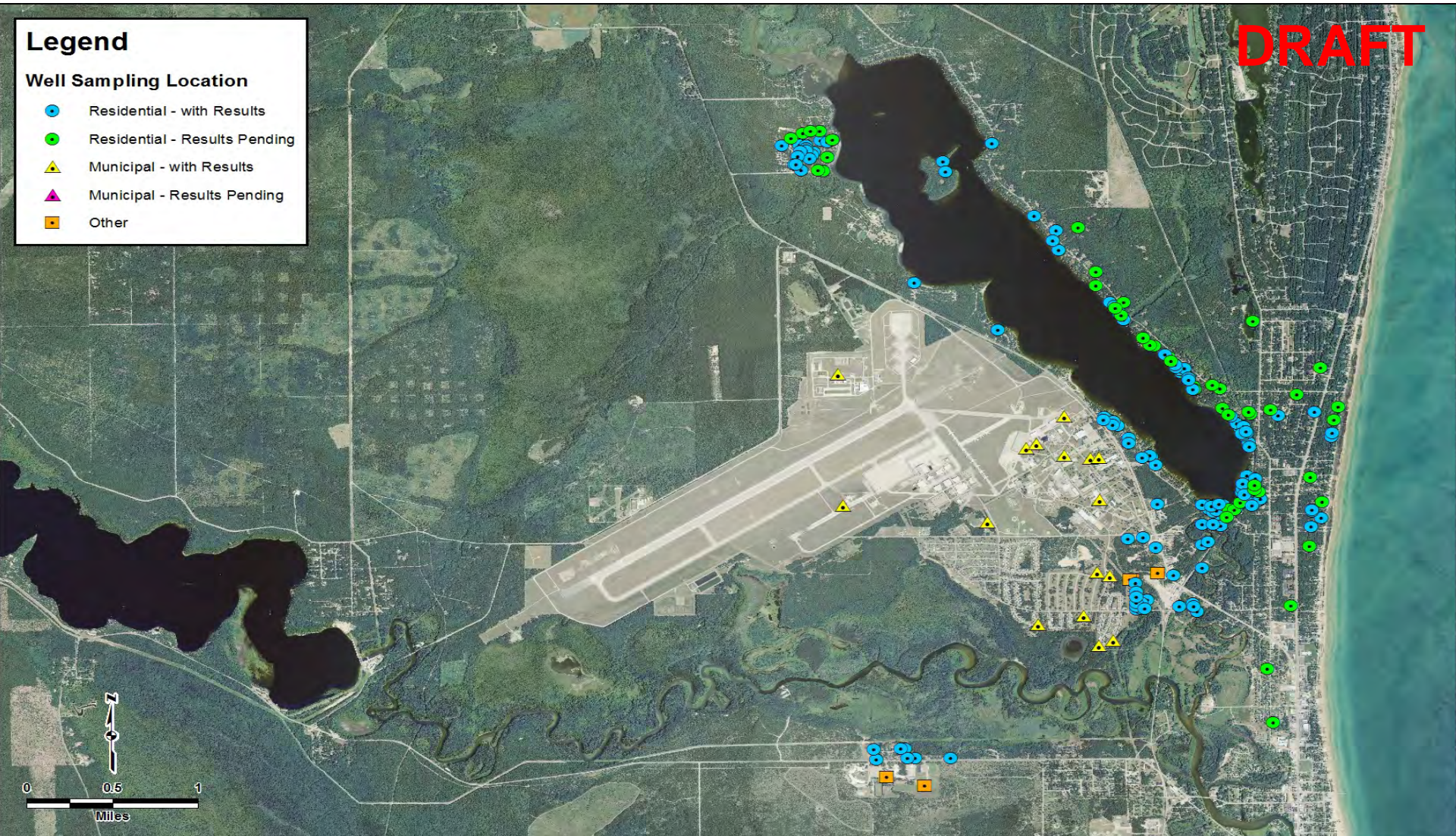
Drinking Water Sampling – Current

Legend

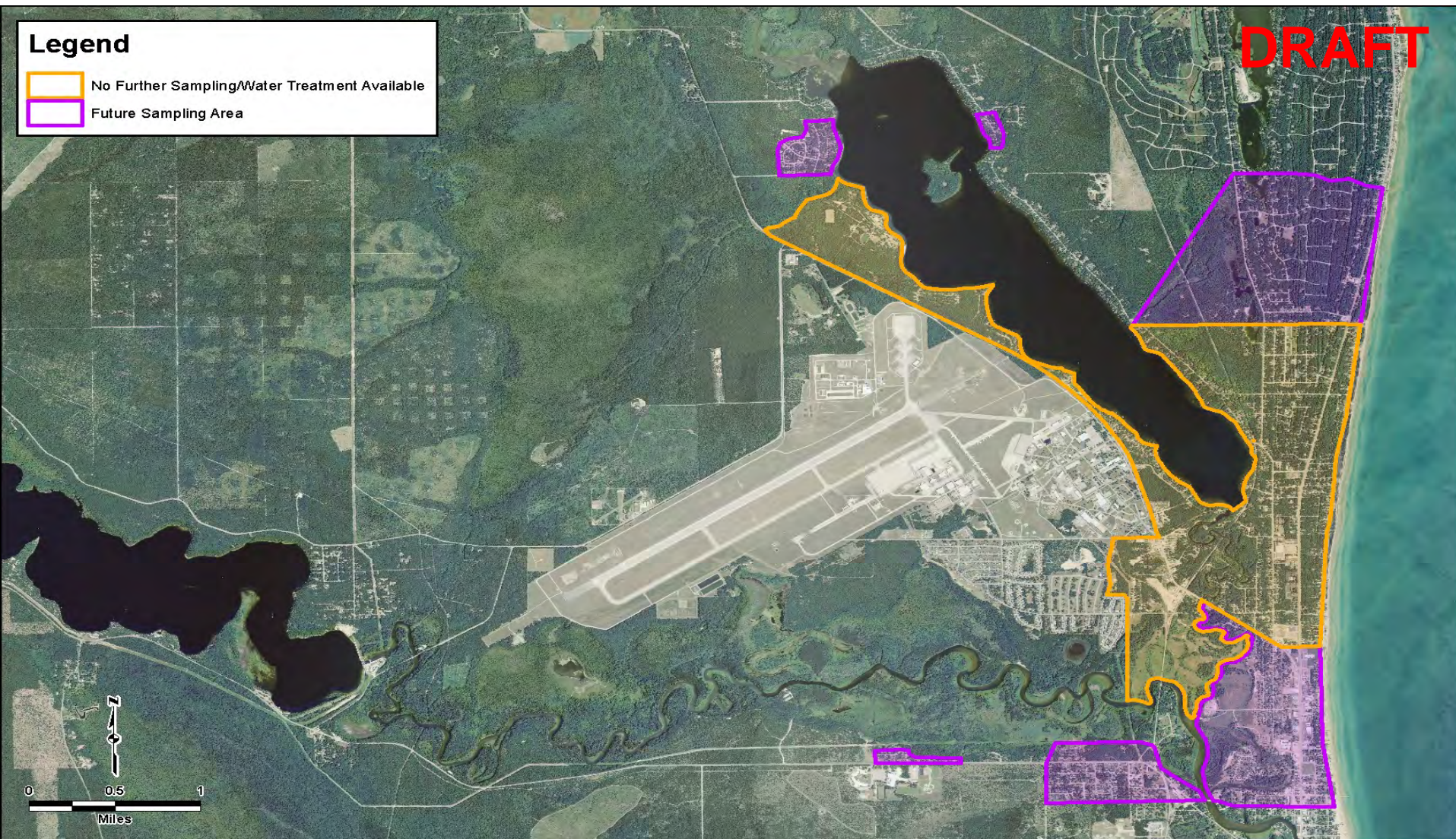
Well Sampling Location

-  Residential - with Results
-  Residential - Results Pending
-  Municipal - with Results
-  Municipal - Results Pending
-  Other

DRAFT



Targeted Areas for Drinking Water Sampling



Background PFC Concentrations

Legend



DEQ Background Well
Total PFC Results
in ng/L or ppt

DRAFT

DEQ-ML4S
3.24

DEQ-ML4M
3.44

DEQ-ML4D
3.85

DEQ-ML2S
2.17

DEQ-ML2M
2.9

DEQ-ML2D
4.42

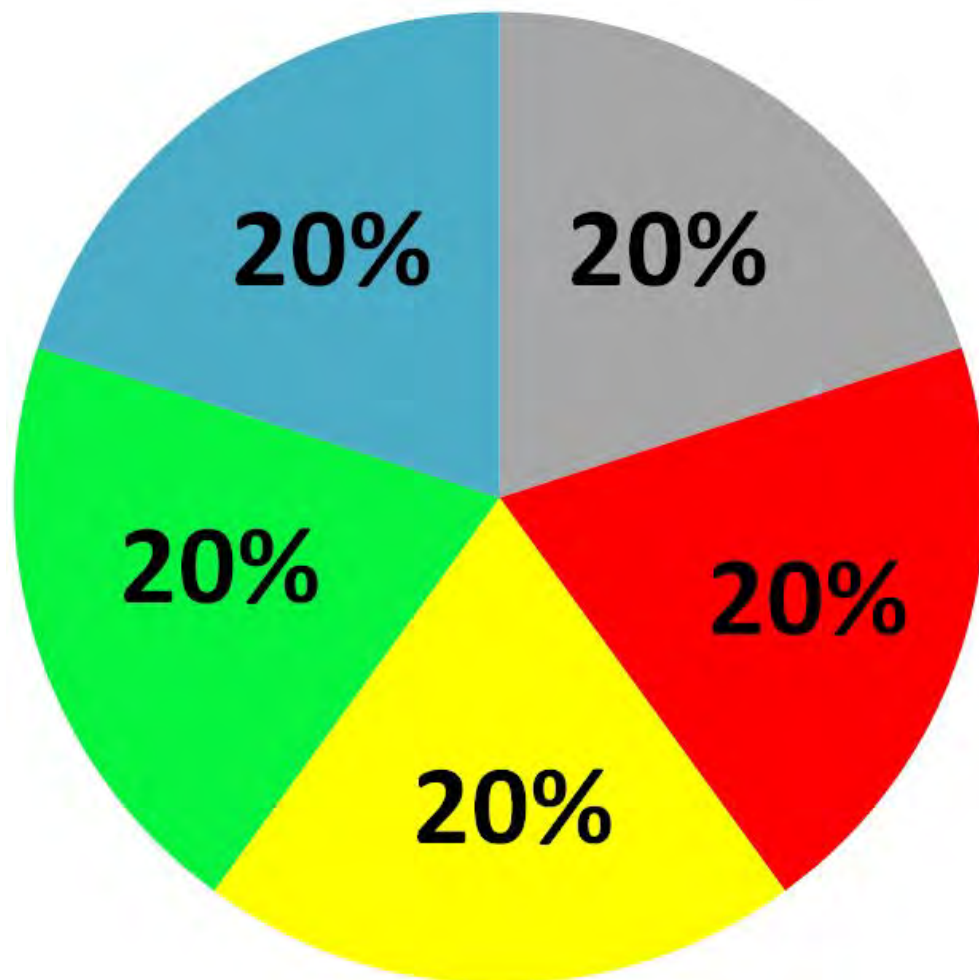
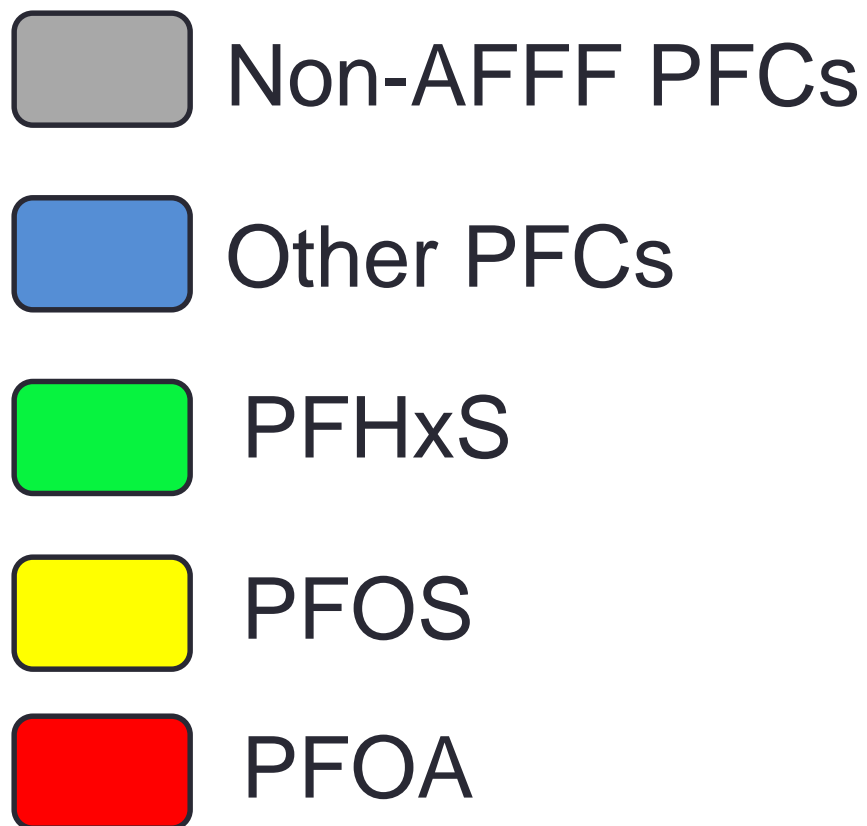
DEQ-ML3S
5.31

DEQ-ML3M
1.24

DEQ-ML3D
3.37



PFC Fingerprinting



PFC Fingerprinting - Groundwater

DRAFT

Legend

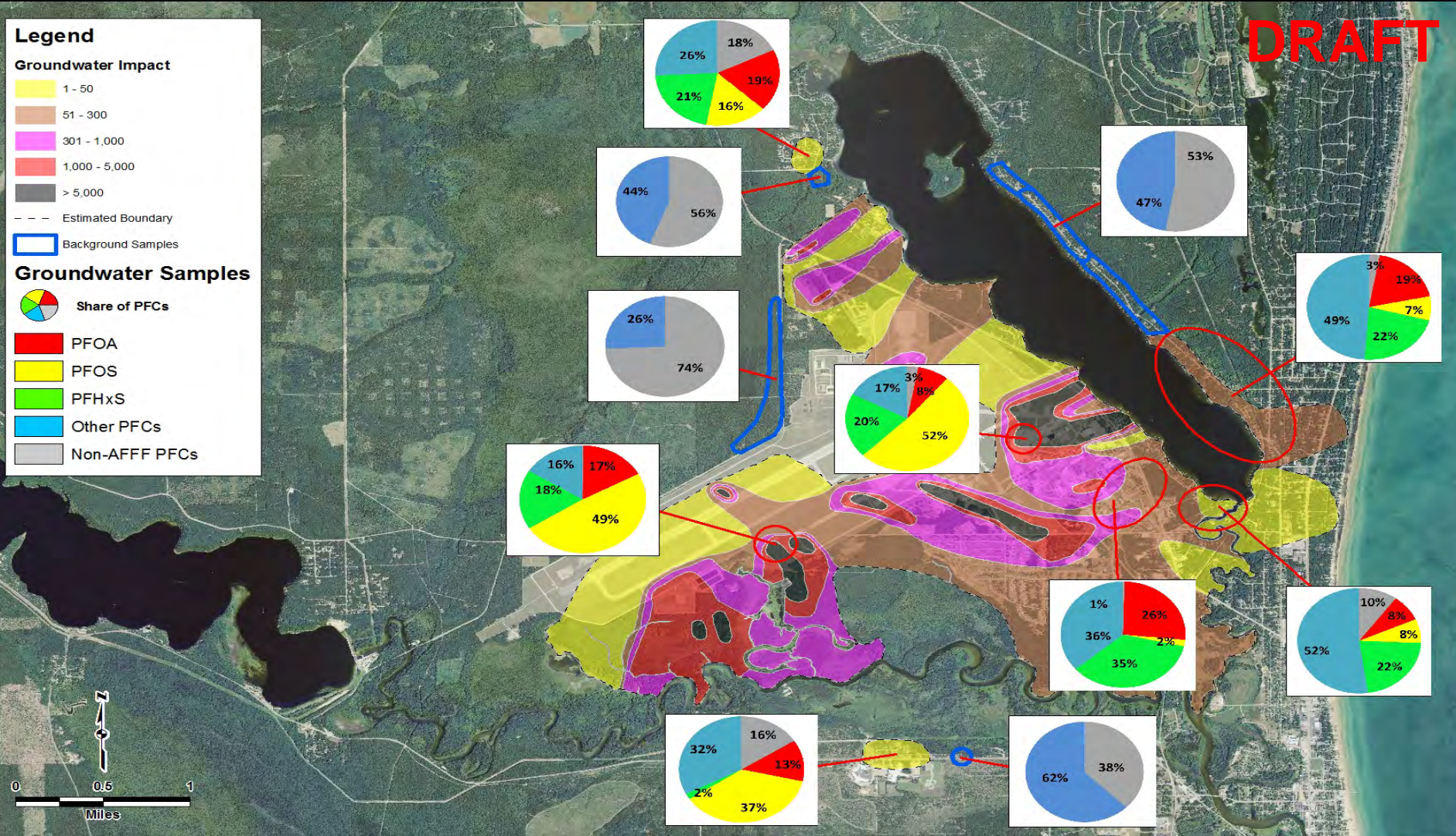
Groundwater Impact

- 1 - 50
- 51 - 300
- 301 - 1,000
- 1,000 - 5,000
- > 5,000
- Estimated Boundary
- Background Samples

Groundwater Samples

Share of PFCs

- PFOA
- PFOS
- PFHxS
- Other PFCs
- Non-AFFF PFCs



PFC Fingerprinting – Surface Water

Legend


Surface Water Sample


 Share of PFCs

 PFOA

 PFOS


 PFHxS

 Other PFCs

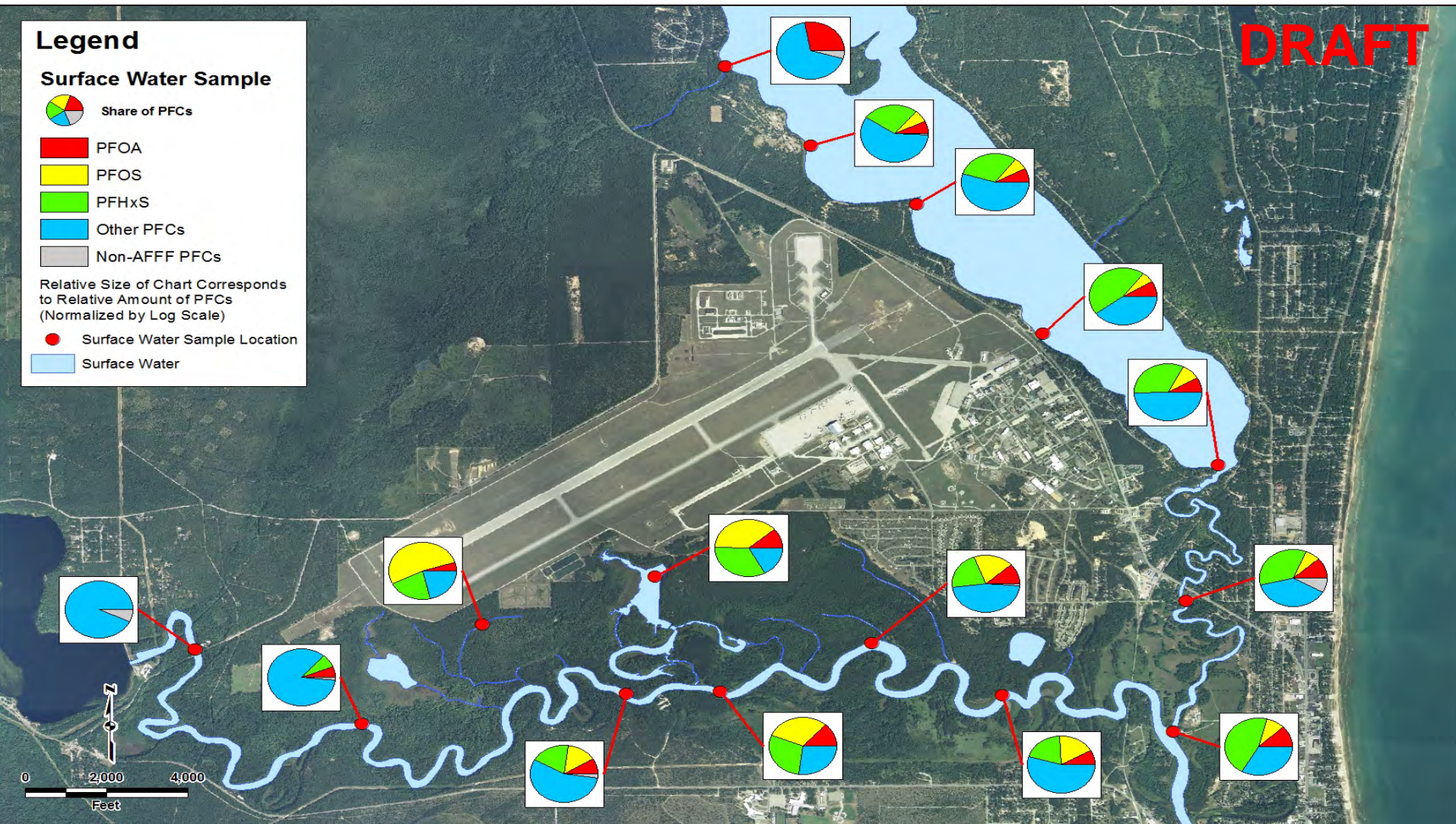
 Non-AFFF PFCs

Relative Size of Chart Corresponds to Relative Amount of PFCs (Normalized by Log Scale)

 Surface Water Sample Location

 Surface Water

DRAFT



Geological Services Unit – Field Investigation

DRAFT

Legend

Proposed DEQ GSU Samples

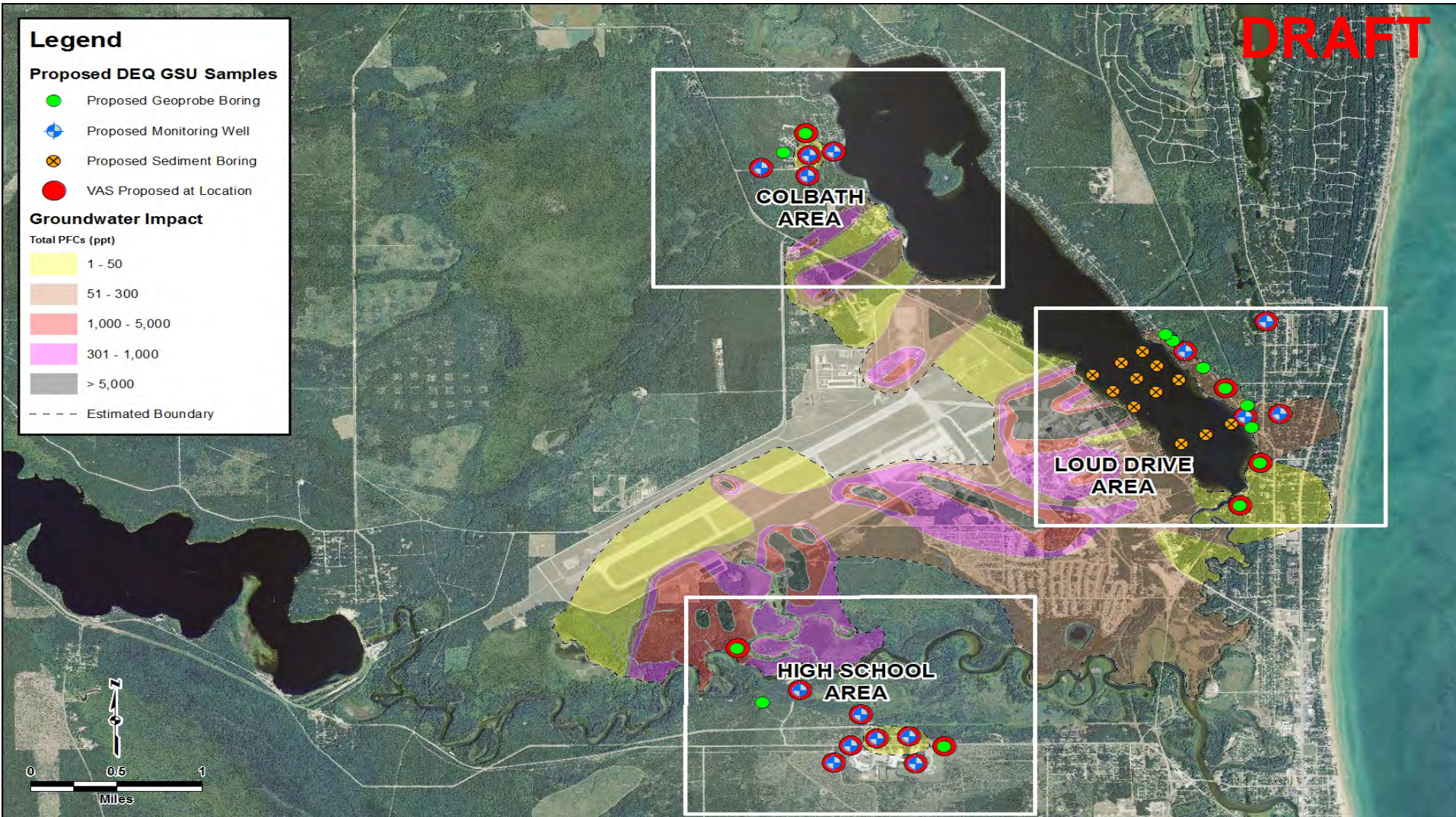
- Proposed Geoprobe Boring
- + Proposed Monitoring Well
- ⊗ Proposed Sediment Boring
- VAS Proposed at Location

Groundwater Impact

Total PFCs (ppt)

- 1 - 50
- 51 - 300
- 1,000 - 5,000
- 301 - 1,000
- > 5,000

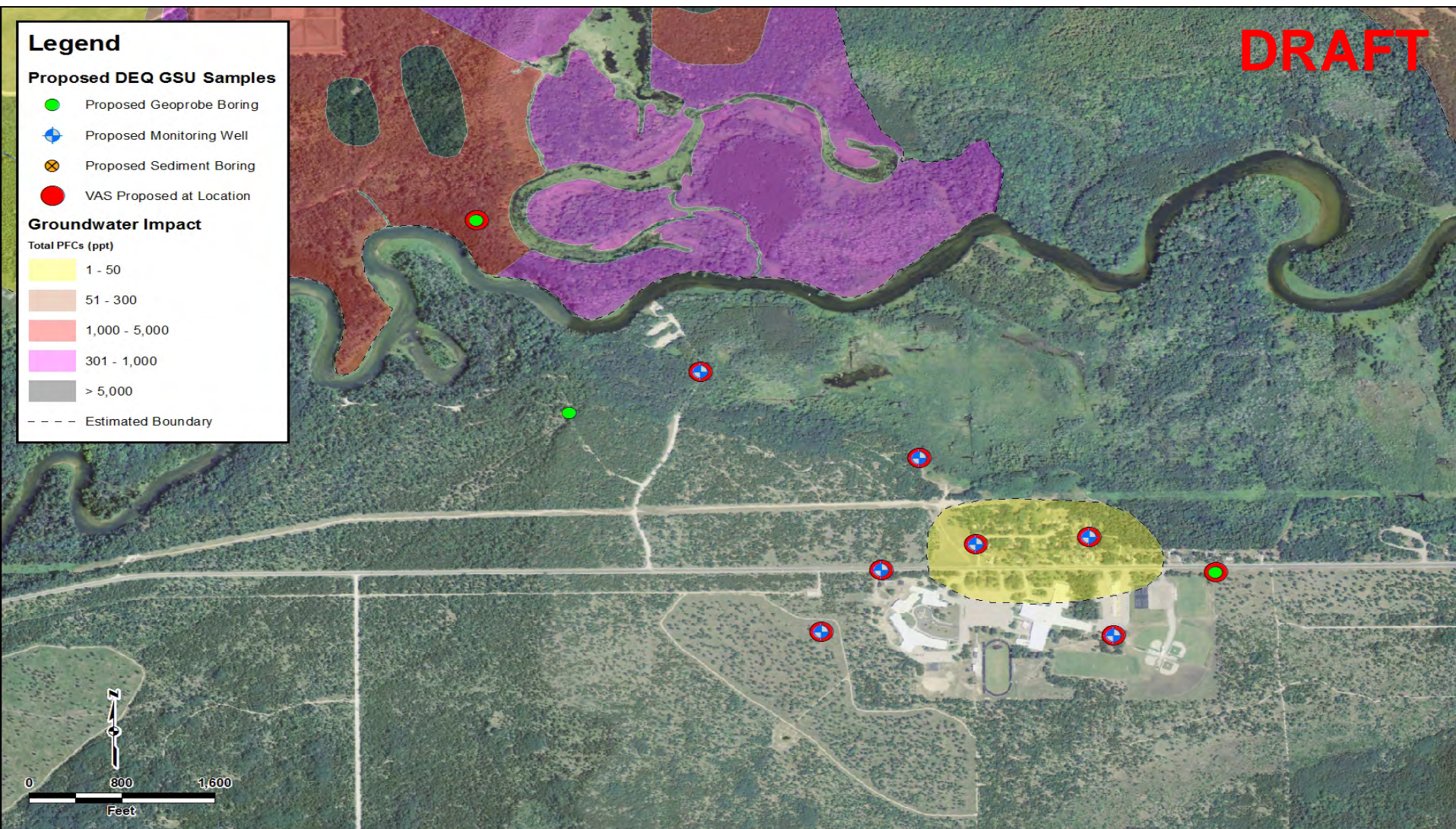
- - - - Estimated Boundary



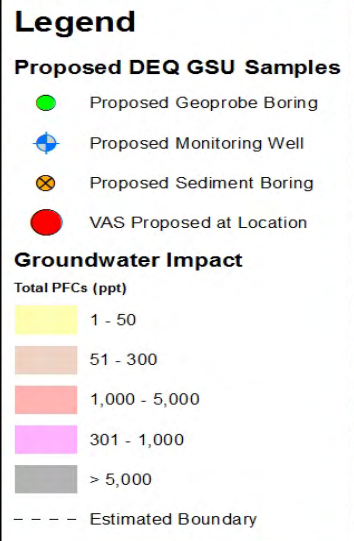
Geological Services Unit – Loud Drive Area



Geological Services Unit – High School Area



Geological Services Unit – Colbath Area

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MDEQ Grant – Field Investigation (Phase 1)

DRAFT**Legend**

Proposed Supplemental Workplan
Investigation Samples

● Phase I



Questions?

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To obtain a copy of this presentation, please
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