5.4 Innovative Techniques to Map *Phragmites australis* in the Lake St. Clair Watershed

**Introduction**

*Phragmites australis* (*Phragmites*) is a highly invasive grass that has the ability to become a monoculture in habitats ranging from uplands to freshwater marshes. *Phragmites* is creating dense monocultures throughout the Great Lakes, reducing plant and animal diversity in the process. It has a strong capacity to spread and recent low water levels in the Great Lakes appear to be favoring the expansion of *Phragmites* in the Lake St. Clair watershed. Mapping of *Phragmites* was undertaken in order to determine the current location of stands, predict future spread and develop a long-term control strategy. This project mapped 4,909 hectares (12,130 acres) of *Phragmites* in a 123,774 hectare (305,853 acre) project area, encompassing the Lake St. Clair watershed and surrounding townships. The photo interpretation was completed in ESRI’s ArcMap software, using Southeast Michigan Council of Government’s (SEMCOG) 0.6 meter resolution true color 2005 spring imagery. Other imagery, such as the two meter 2005 National Agriculture Imagery Program (NAIP), Bing Maps oblique Bird’s Eye imagery, and Google Street View, was used as ancillary data.

**Project Area**

The project area consists of 123,774 hectares (305,853 acres) located in the southeast Michigan counties of St. Clair, Macomb, and Wayne (Figure 1). The area encompasses the entire Lake St. Clair watershed and extends to the boundaries of Clay, Cottrellville, Ira, Chesterfield, Harrison, St. Clair Shores and Grosse Pointe townships.

**Methods**

ESRI’s ArcMap software was used to digitize stands of *Phragmites* from the 2005 SEMCOG 0.6 meter resolution imagery at an approximate scale of 1:1200. True color 2005 NAIP two meter resolution imagery was also used to help determine vegetation types, as *Phragmites* shows up with a bluish “cotton candy” look. Also, very helpful in identifying stands of *Phragmites* were Bing and Google image sources.

Bing Maps oblique Bird’s Eye imagery was available for a majority of the mapping area. This imagery is not only high resolution, but is also at an oblique angle that makes the height of *Phragmites* more prominent than surrounding vegetation. Also, in many areas the point of view can be rotated, helping to see around obstructions like trees or buildings.

*Figure 1. Project Area*
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Google Street View provided the ability to virtually drive up and down the roads and find very small stands of *Phragmites*, such as along ditches. It also was a valuable verification tool for many areas.

Once the mapping was completed, a roadside survey was conducted to verify a sampling of mapped stands of *Phragmites*, and to note any omitted stands, or areas incorrectly identified as *Phragmites*. Field verification sites were selected based on the amount of *Phragmites* mapped in the area, and taking into account traffic and safety concerns. Since the verification involved frequent stops and very slow driving, main roads were avoided. The field crew compared the actual *Phragmites* observed with the mapped *Phragmites* to confirm its presence or absence.

**Results and Discussion**

In total, 4,909 hectares (12,130 acres) of *Phragmites* were mapped in the 123,774-hectare (305,853-acre) project area (Figure 2). Of the 4,909 hectares (12,130 acres), 1,267 (3,130) have been field verified, of which 29 hectares (71 acres) were missed during the initial mapping and two hectares (four acres) were called *Phragmites* that were incorrectly identified.

Although we did not quantify the results, the use of Bing high resolution oblique and Google Street View imagery was very helpful in the mapping process. There was a higher level of uncertainty and smaller stands of *Phragmites* were probably missed more often in mapping areas where these images were not available. The original work plan for this project included identifying historic stands of *Phragmites* from rectified 1978 imagery. Due to the scale of the 1978 imagery and the lack of historic location data, stands of *Phragmites* were very difficult to identify from the imagery.

Therefore, funding allocated for the identifying historic stands of *Phragmites* was allocated to the design and building of an internet map viewer: http://glaromaps.ducks.org/StClair_Phragmites/. This viewer (Figure 3) allows the data to be viewed over aerial imagery and downloaded in shapefile or personal geodatabase format.
Figure 3. Phragmites map viewer.

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