IV. Environmental Changes From 1990 to 2016

Broadly speaking, both the 2016 survey and historical records show significant environmental changes at Flag Ponds over the 1990-2016 interval. These include both climate and man related interventions.

Weather related environmental changes occur as a result of high winds, lightning, and coastal storms, surges, and tidal flooding. The National Weather Service Severe Weather Database for this period includes :

1.Tornados – 7 (For the general region, not specifically for Flag Ponds)
2.Tropical Storms – 3
3. Storm Surge/Coastal Flooding/Tidal Flooding – 12
4. Ice Storm – 2
5. High winds/thunderstorms – 84
6. Winter storms/blizzards – 26.

These might be broadly grouped as: 1. Coastal changes, 2. Pond changes, 3. Plant changes, and 4. Animal changes.

Coastal changes: The water/land interface along the shores of Chesapeake Bay has always been a dynamic process of sediment deposition and coastal erosion. This is aptly illustrated at Flag Ponds. Sedimentation distribution as mapped by the Maryland Geological Survey in the Chesapeake Bay Earth Science Study found pure sand (typical of a high energy environment) as the predominant sediment off the coast of Calvert County.

Meteorological tides (the interaction of weather and tides) produce complex offshore currents predominantly from the north, mainly due to outflow from the Susquehanna River and the narrowing of the upper region of Chesapeake Bay. When combined with the configuration of the coastline at Flag Ponds, the long-term tendency has been erosion of the northern shoreline and deposition along the southern portion (Figure 1.). This is enhanced by the human development north of Flag Ponds with the resulting installation of rip-rap, etc. to control shoreline erosion.

During periods of severe weather events, significant changes are observed over short time intervals. This is illustrated in more detail in the aerial photos for 1993 (Figure 2.), 2005 (Figure 3.), 2009 (Figure 4.), and 2013 (Figure 5.). Using both the northeast corner of Flag Ponds and the loop drive of Flag Ponds Parkway as reference points, the erosion of the northeast coast and the expansion and southern extension of the sandy hook are clearly discernible.

The 1990 Site G2 on the northeastern point of the survey was located 325 feet inland from the beach within the tree line, as indicated by a 1990 map and the presence of red maple. By 2016, the 1990 site was approximately 47 feet out in the Bay. Moreover, the preliminary survey of G2 in March 2015 shows a large dead tree down that was completely washed away by April 2016.

Pond changes: The entire coastal lowland area of Flag Ponds is subject to severe flooding due to tidal surge and storm surge. Debris washed in from the Bay is common even as far inland as the base of the cliffs. The sequence of aerial photographs clearly show the changes in individual ponds as well as the creation and disappearance of smaller ponds. As one example, the site at J8 was accessible in 1990, but has become flooded by 2016, with the resultant loss of trees and a complete change in vegetation habitat. Likewise, Site G4 is now located 90 feet off the shore of Richardson's Pond. However, in 1990 H3 was 50 feet northwest of a small pond. This site remains the same in 2016.

Plant changes: Significant vegetation changes have occurred throughout the Park related both to natural environmental changes and to human impact. Erosion along the northerly coast has caused the loss of many trees, to the extent that the beach area is blocked by downed trees.

In the upland areas, the 26-year interval has resulted in normal forest succession affecting both hardwoods and pine trees. In addition many areas have been severely affected by high wind damage causing significant stretches of downed trees, particularly along ridge lines.

Man's impact in some cases has been deliberate, such as in the northwest portion of the park where a large beaver pond existed in 1990. With the decision

to relocate the beaver population, the pond was lost, with only wetlands continuing along the stream valley.

In addition, public access and use have greatly increased, and have undoubtedly contributed to the introduction and increase of many invasive plants, to the detriment of native plants. The widespread occurrence of downed trees has provided open space for sun-seeking invasive plants. Japanese wineberry is presently observed throughout the Park, but was not reported in1990. Phragmites was observed in 1990, but is now so dense in the lowland wetlands that some 1990 sites are not possible to reach. Site H4 in 1990 was located between 2 ponds, but by 2016 had become totally inaccessible due to dense Phragmites growth.

Animal changes: As mentioned earlier, beavers are no longer present due to relocation. The beaver pond has retreated, with both tree and herbaceous plants being affected. The deer population, and the resulting impact on habitat thru browsing, has also greatly increased, but comparative numbers are not available.

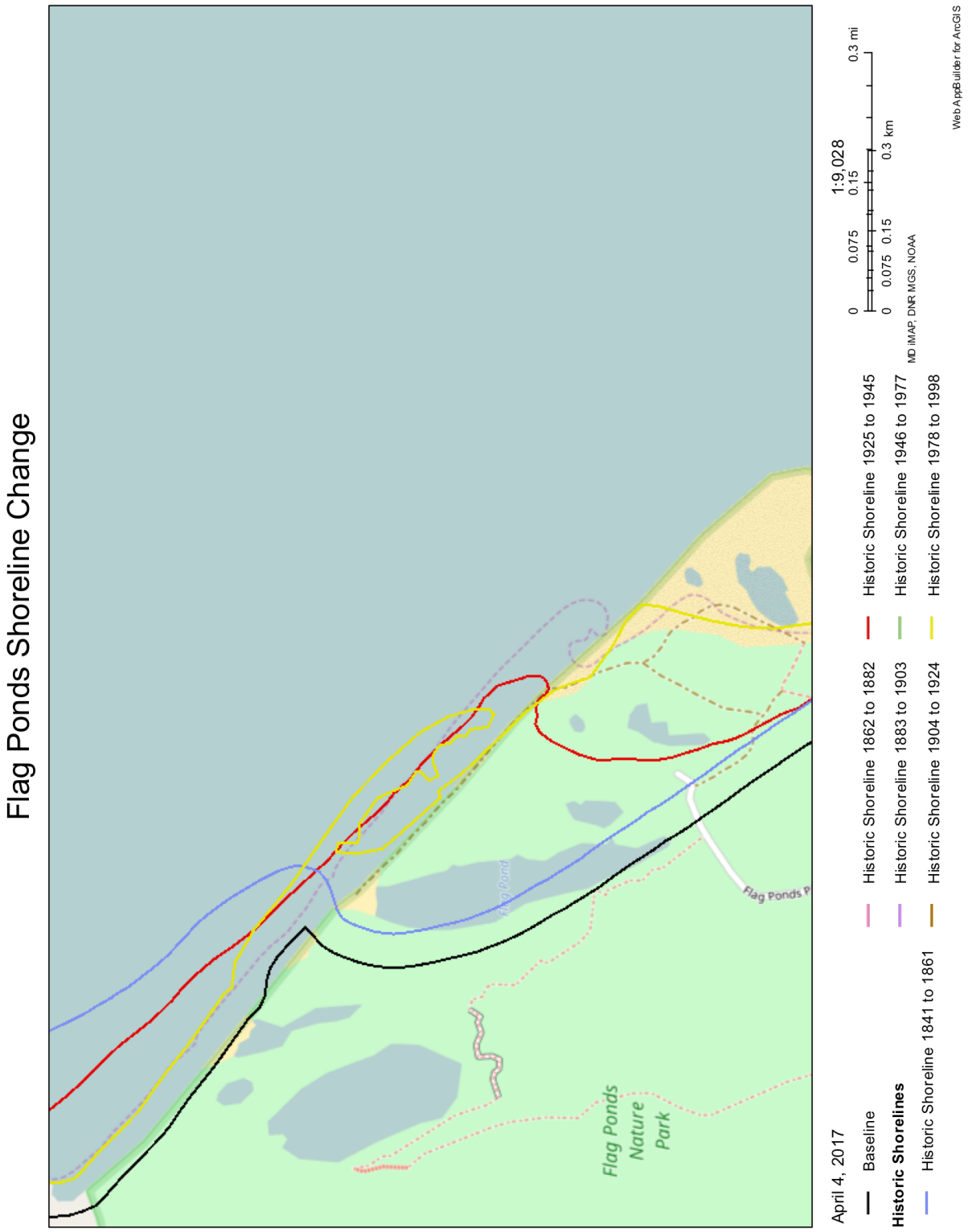
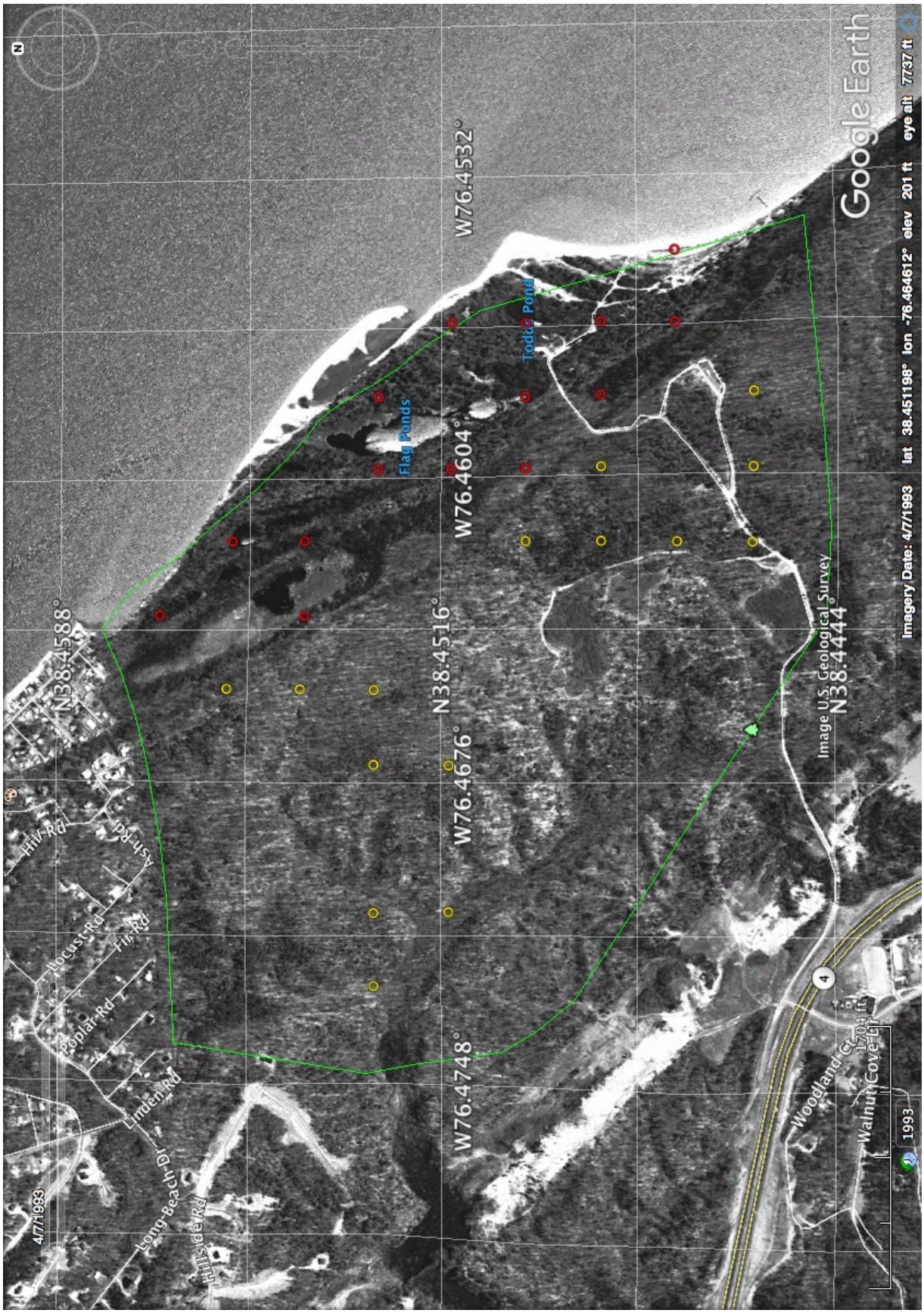
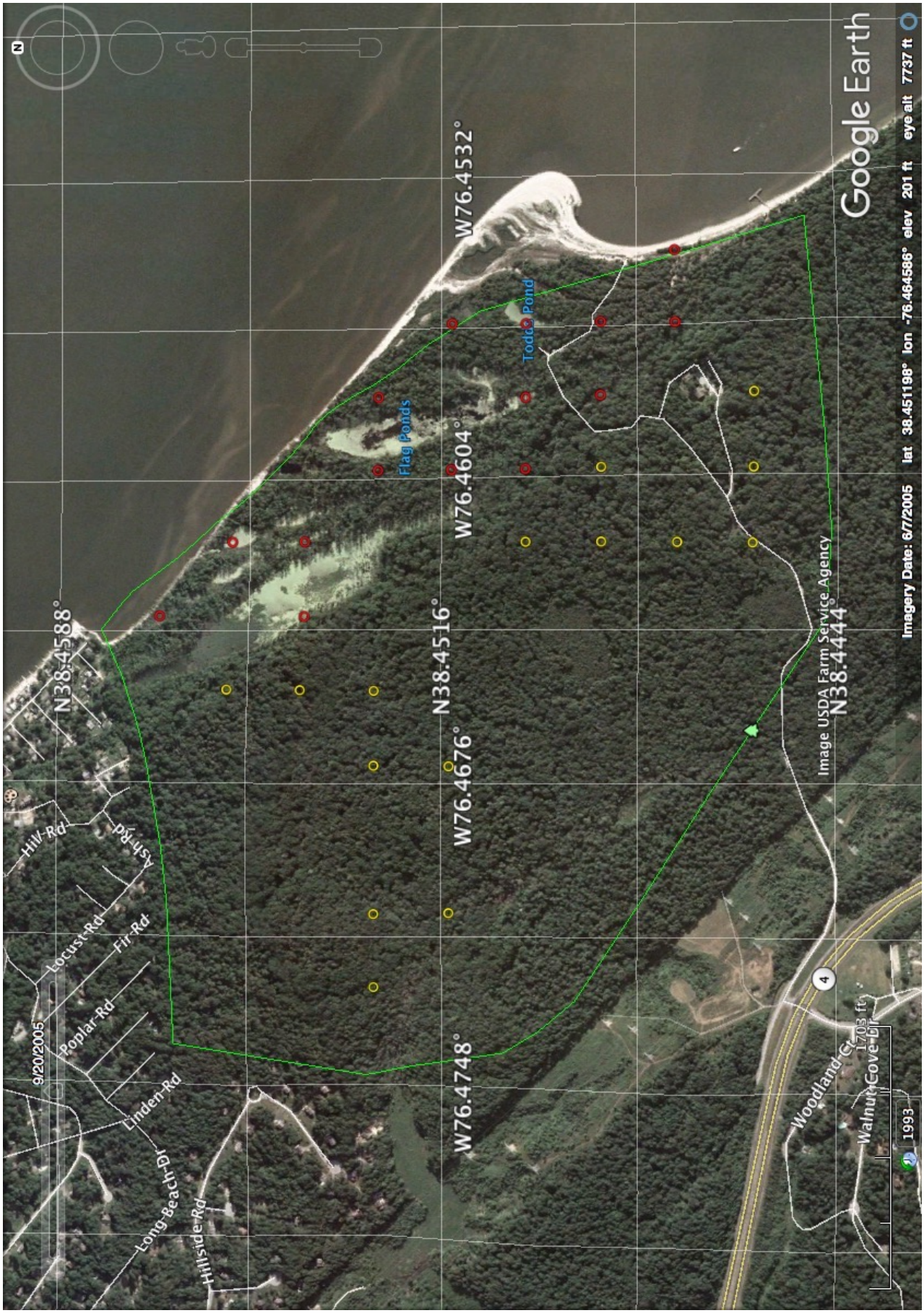

Flag Ponds Shoreline Change
Flag Ponds Nature Park
Flag Pond
Flag Ponds P
April 4, 2017
Baseline
Historic Shorelines
Historic Shoreline 1841 to 1861
Historic Shoreline 1862 to 1882
Historic Shoreline 1883 to 1903
Historic Shoreline 1904 to 1924
Historic Shoreline 1925 to 1945
Historic Shoreline 1946 to 1977
Historic Shoreline 1978 to 1998
1:9,028
0 0.075 0.15 0.3 mi
0 0.075 0.15 0.3 km
MD iMAP, DNR MGS, NOAA
Web AppBuilder for ArcGIS

Figure 1.



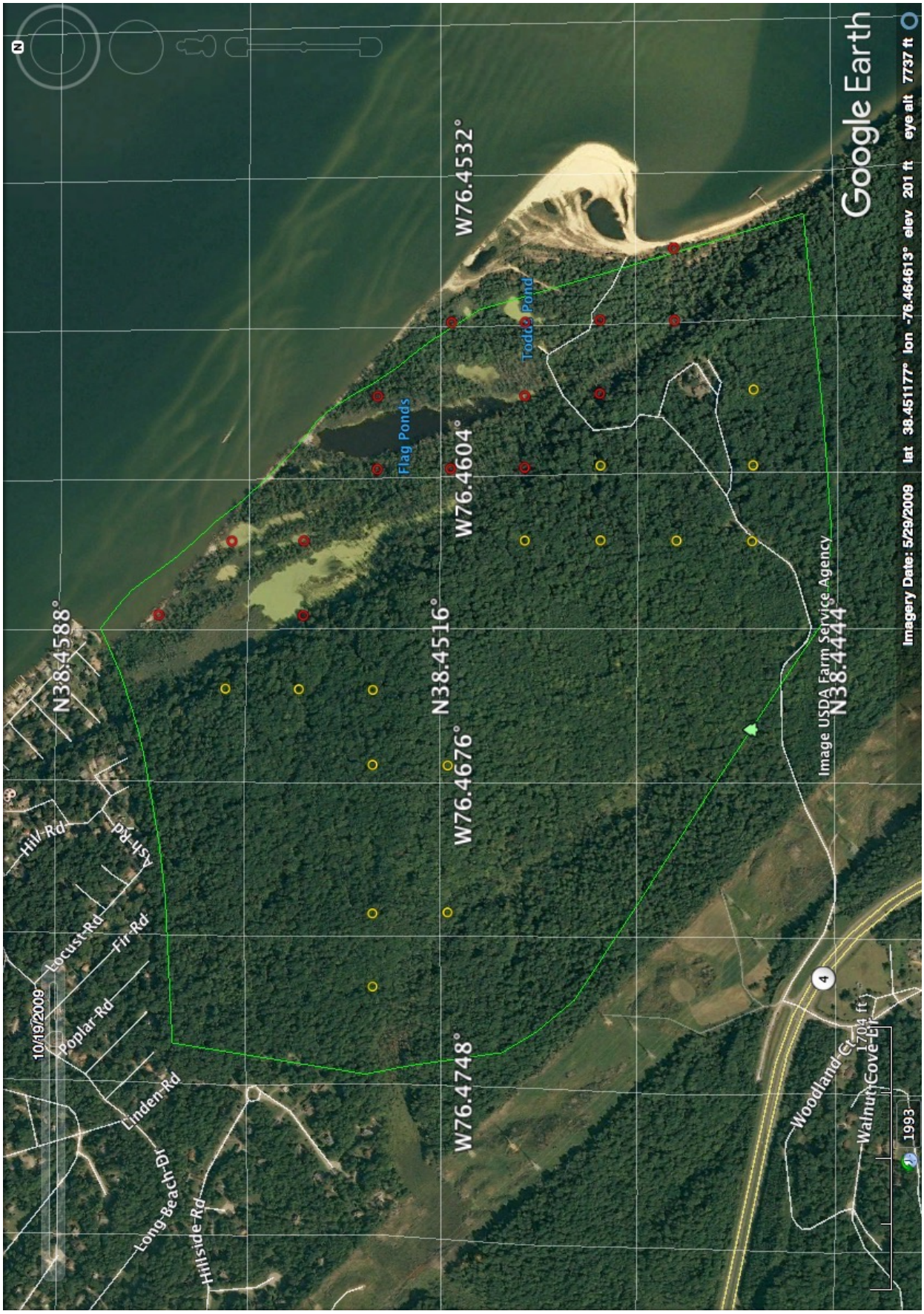
Upland sites in yellow; Lowland sites in red

Fig. 2 - 1993



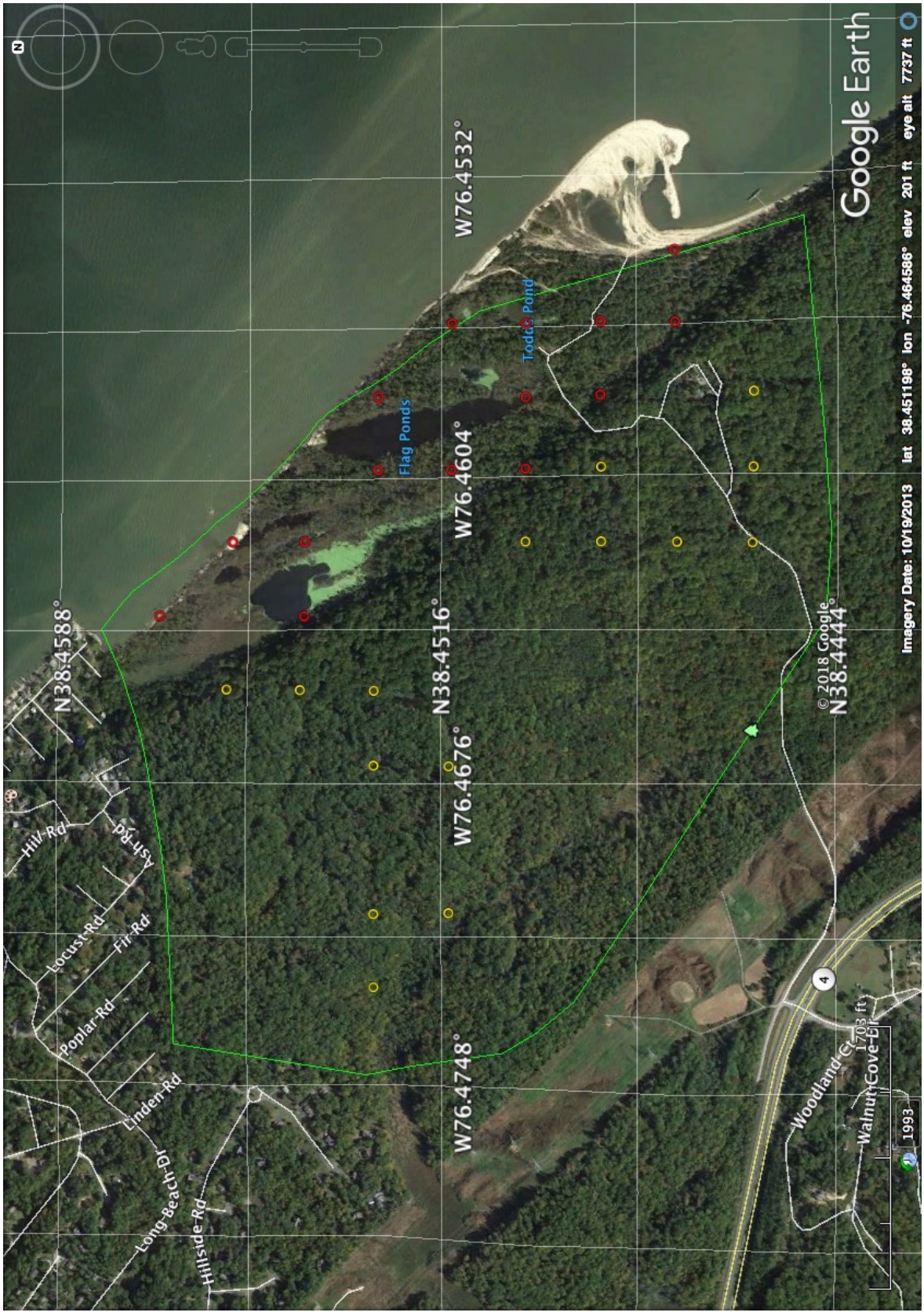
Upland sites in yellow; Lowland sites in red

Fig. 3 - 2005



Upland sites in yellow; Lowland sites in red

Fig. 4 - 2009



Upland sites in yellow; Lowland sites in red

Fig. 5 - 2013