Draft: Wilson Lake, Price County, 2,4-D Herbicide Monitoring Summary, 2012

7 November 2012

John Skogerboe
US Army Engineer Research and Development Center (ERDC)

On 24 April, 2012 three sites in Wilson Lake, infested with Eurasian watermilfoil, were treated with a liquid formulation of 2,4-D (Figure 1, (Onterra LLC 2012). Sites A, B, and C were treated at 1700, 1000, and 1000 ug/L ae respectively n order to provide a basin wide concentration of 0.3235 ug/L ae. The size of the treatment areas ranged from 16.5 to 56.9 acres, and the mean depth ranged from 4.0 to 4.5 ft. Four water sample locations (WI-A1, WI-A2, WI-B, and WI-C) were established in the treatment sites, and three location were established in not target sites (WI-1, WI-2, WI-3, WI-4 and WI-5) (Figure 2).

Water samples were collected using an integrated water sampler which collects a water sample from the entire water column. Water samples were collected at intervals of .25, 1, 2, 3, 5, 7, 10, 14, 21 and 28 days after treatment (DAT). Samples were taken to shore after completion of each sample interval, and 3 drops of muriatic acid were added to each sample bottle to fix the herbicide and prevent degradation. Samples were then stored in a refrigerator, until shipped to the ERDC laboratory in Gainesville, FL for analysis of 2,4-D.

Initial herbicide concentrations in samples from treated sites WI-A1, WI-A2, and WI-C ranged from 704 to 901 ug/L ae, while initial concentrations in samples from site WI-B were lower at 135 ug/L ae (Figure 13). Herbicide concentrations initially dissipated rapidly at sites W!-A1 and WI-A2 to between 300 and 500 ug/L at 1 DAT ae and remained relatively constant through 7 DAT. Herbicide concentrations then declined at site WI-A1 (farthest up stream site) to below 100 ug/L ae between 10 and 14 DAT. Herbicide concentrations declined more slowly in samples from site WI-A2, and declined below 100 ug/L ae between 14 and 21 DAT.

Herbicide concentrations in samples from treated site WI-B initially declined rapidly through 1 DAT, and then increased slowly through 10 DAT. Herbicide concentrations then declined slowly to less than 100 ug/L ae between 21 and 28 DAT. Herbicide concentrations in samples from site WI-C did not show an initial peak, but did slowly increase in concentration through 10 DAT. Concentrations decline to less than 100 ug/L ae between 21 and 28 DAT.

Concentrations in samples from sites in Wilson Lake but not in treated areas showed similar dissipation patterns as those from the actual treated areas indicating that the herbicide did dissipate throughout the lake (Figure 4). The mean concentration for all sample sites in Wilson Lake was 315 mg/L ae compared to the lake wide target concentration of 335 mg/L ae. Concentrations in samples from the upstream site were higher than samples from downstream sites. Exposure times in downstream locations were longer than exposure times from upstream locations probably from exposure to herbicide from the upstream locations. Concentrations in samples from sites down outside of and stream from Wilson Lake (WI-4 and WI-5) were elevated but never exceeded 100 ug/L ae.

Figure 1. Wilson Lake 2,4-D Treatment Locations, 2012 (Onterra LLC)

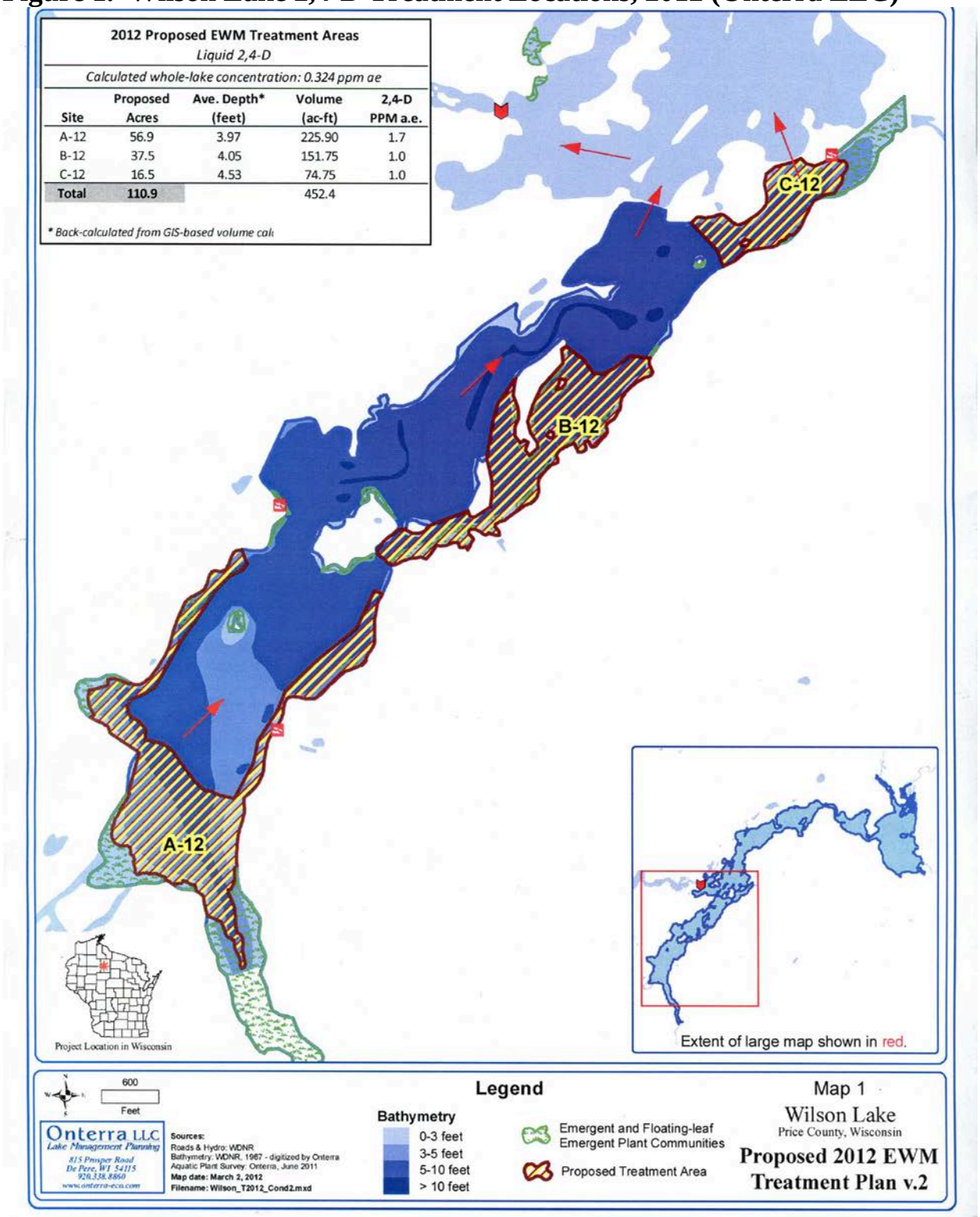

Figure 2. Wilson Lake 2,4-D Sample Locations, 2012 (Onterra LLC)

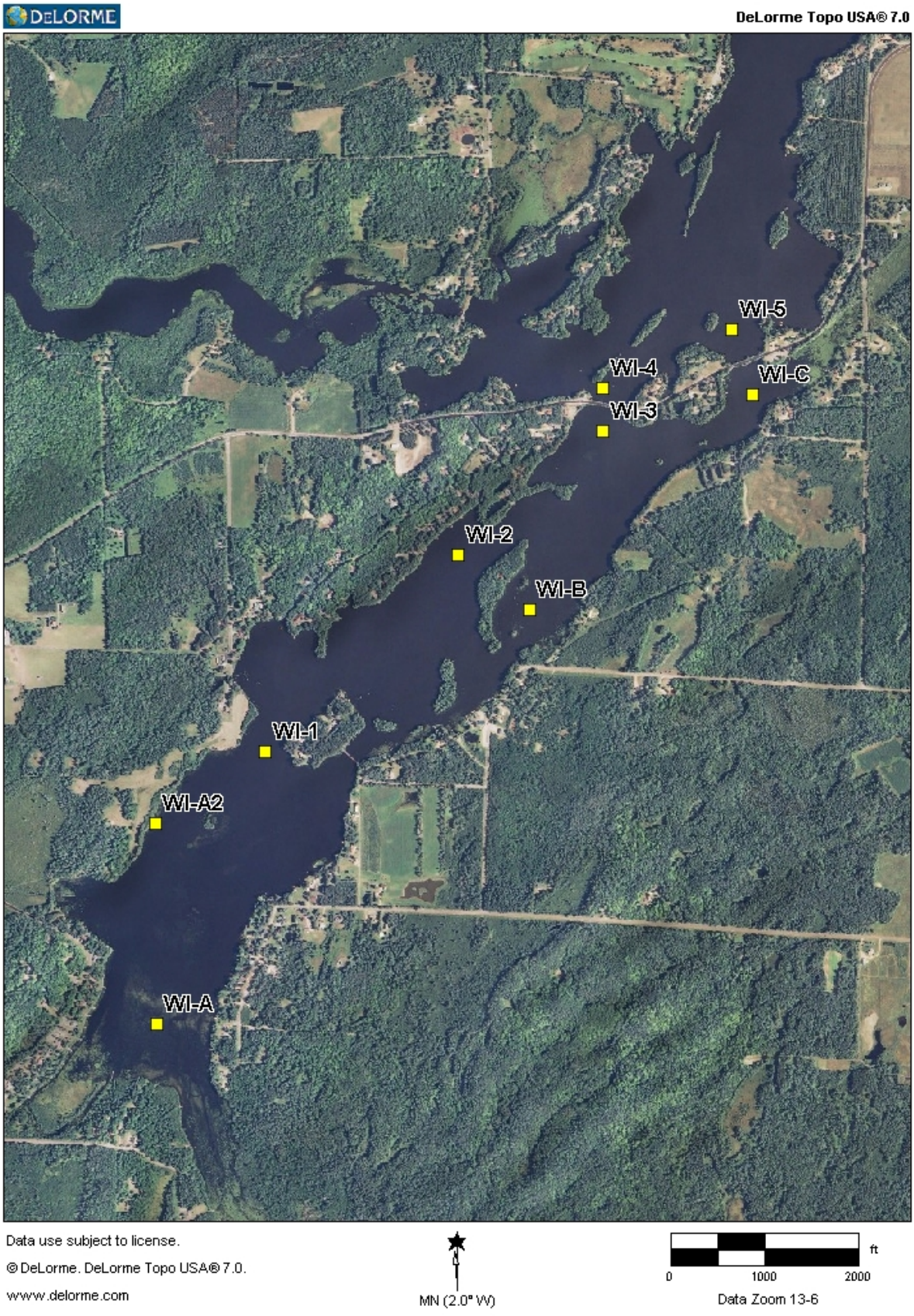

Figure 3

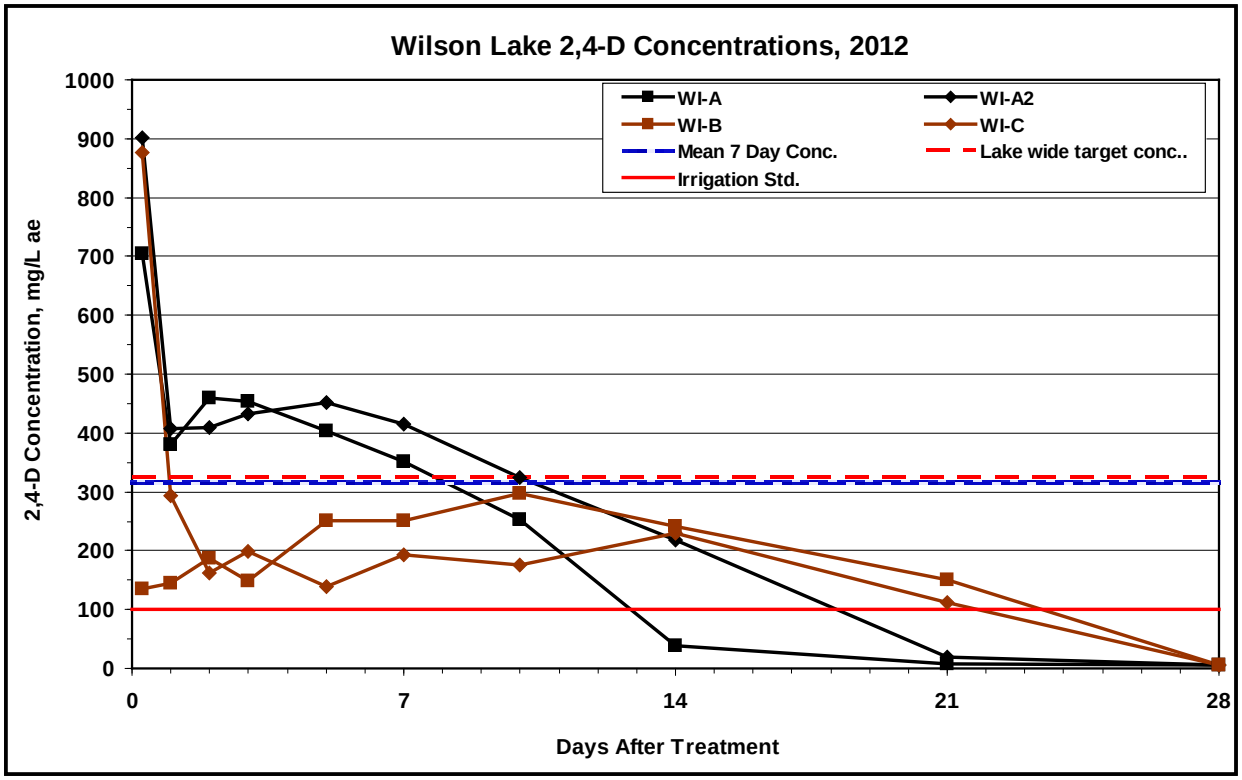

Figure 4