

**Draft: Cranberry Lake, Eagle River Chain, Vilas County (WBIC 1603800),
2,4-D Concentration Monitoring Summary, 2013**

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Cranberry Lake is a part of the Eagle River Chain of Lakes in Vilas County. The lake is 924 acres, the maximum depth is 23 ft, and the mean depth is 9 ft. The lake is listed as a eutrophic, drainage lake in the WI Department of Natural Resources (DNR) Lake Finder web page.

On 10 June 2013, three areas totaling 34.3 acres were treated with a liquid formulation of 2,4-D to control Eurasian watermilfoil (*Myriophyllum spicatum*) (Onterra, 2013 permit application). The 2,4-D was applied to all areas at a target concentration (application rate) of 3000 ug/L (3 mg/L) acid equivalent (ae). According to the Aquatic Plant Management Herbicide Treatment Record (APMHTR) the water temperature was 64.9°F (18.3°C) and the wind was 0 to 5 mph out of the southwest at the time of treatments. The wind in Eagle River, WI at the time of treatment was reported to be 0 to 5 mph from the south, south west at www.wunderground.com (Figure 1).

One water sample sites was established in treatment area Cran A-13 (CRA), three were established in treatment area Cran B-13 (CRB1, CRB2, and CRB3), and one was established in treatment area Cran C-13 (CRC) to quantify 2,4-D dissipation from the treatment areas (Figure 2). Additional water sample sites (CR1 and CR2) were established in untreated areas upstream and downstream to quantify dissipation into untreated areas.

Water samples were collected from each sample site using an integrated water sampler which collects water from most of the water column. Water samples were collected at intervals of approximately 1, 2, 4, 6, 8, 24, 48, 72, and 120 hours after treatment (HAT). 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 2,4-D and prevent degradation. Samples were then stored in a refrigerator, until shipped to the US Army Engineer Research and Development Center (ERDC) laboratory in Gainesville, FL for analysis of 2,4-D.

Concentrations of 2,4-D in samples collected from sample site CRA ranged from 64 to 781 ug/L ae from 1 to 8 HAT (Figure 3 and Figure 4). Concentrations of 2,4-D were 352 ug/L ae at 8 HAT but were less than the irrigation standard of 100 ug/L ae at 24 HAT.

Concentrations of 2,4-D in samples collected from sample sites CRC were 31 ug/L ae at 4 HAT and were 1686 ug/L ae at 4 HAT. (Figure 3 and Figure 4) Concentrations were less than the irrigation standard by 8 HAT, indicating that much of the 2,4-D exposure resulted from herbicide applied upstream.

Concentrations of 2,4-D ranged from 8 to 104 ug/L ae at sample site CRB1, 12 to 3108 ug/L ae at sample site CRB2, and 104 to 1957 ug/L ae at sample site CRB3 (Figure 5). Concentrations and exposure times appear to be very site specific and may be related to the proximity to the main flow channel.

Concentrations of 2,4-D in samples from the upstream site ranged from 9 to 27 ug/L ae from 1 to 8 HAT indicating that untreated upstream areas were likely not impacted by the herbicide

treatment (Figure 6). Concentrations of 2,4-D in samples from the down stream site (CR2) collected 1 to 8 HAT ranged from 278 to 1958 ug/L ae. Concentrations of 2,4-D were less than the irrigation standard by 24 HAT.

Dissipation of 2,4-D through the herbicide concentration monitored area is rapid and appears to be location related. Treatment areas in or near the main channel appear to show more rapid dissipation.

Figure 1. Weather Conditions at Eagle River on 10 June 2013 (wunderground.com)

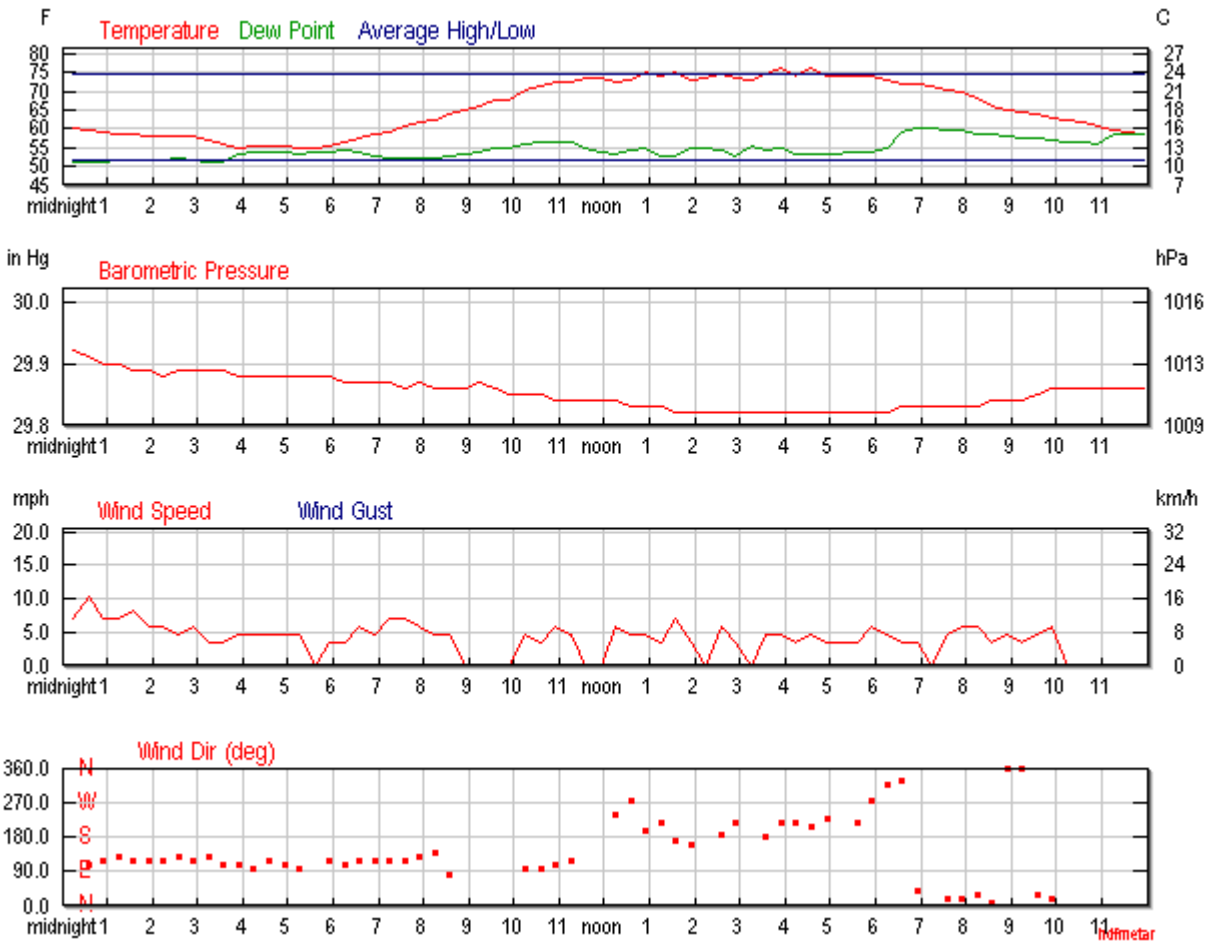


Figure 2. 2013 Cranberry Lake 2,4-D Sample Locations

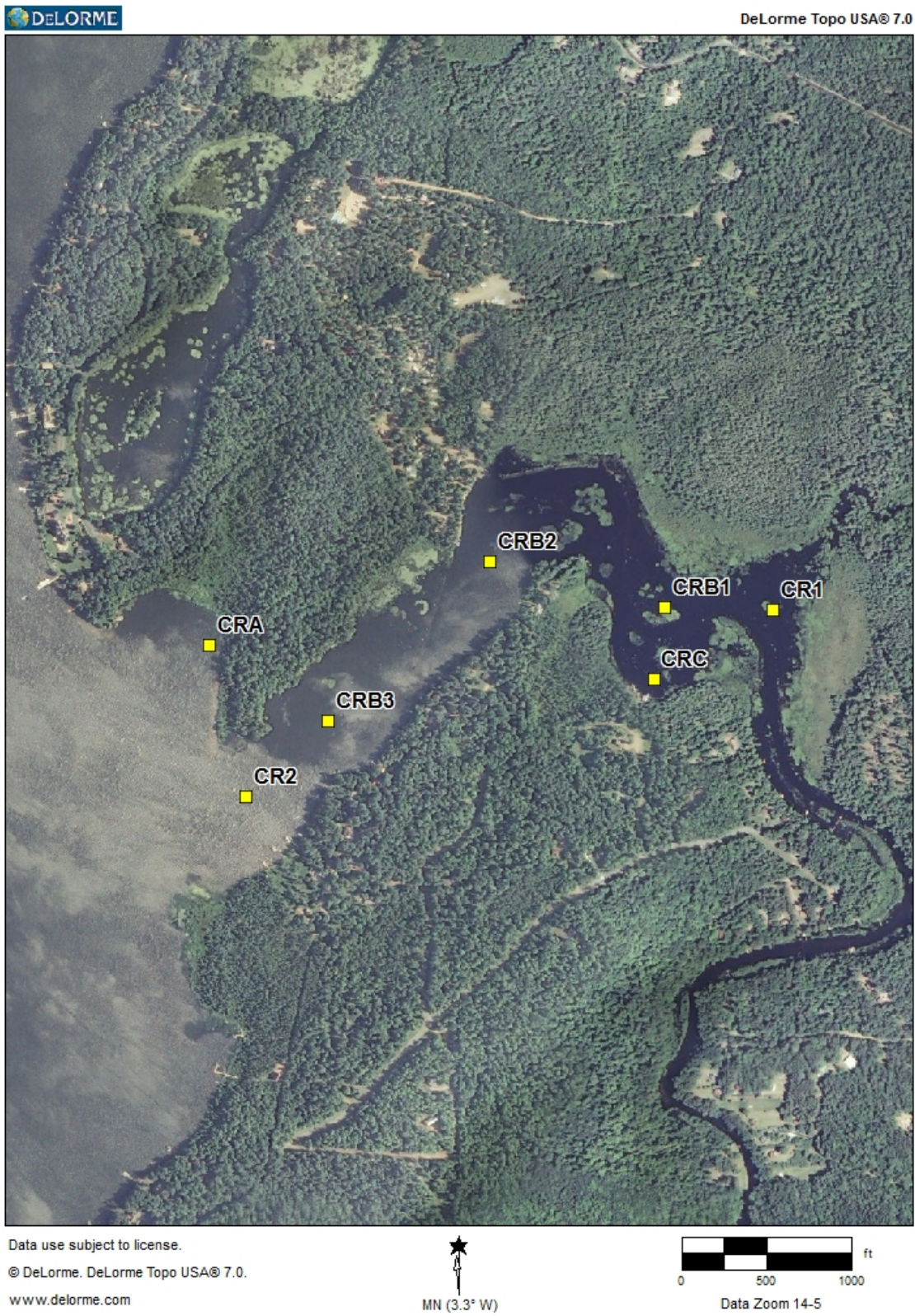


Figure 3

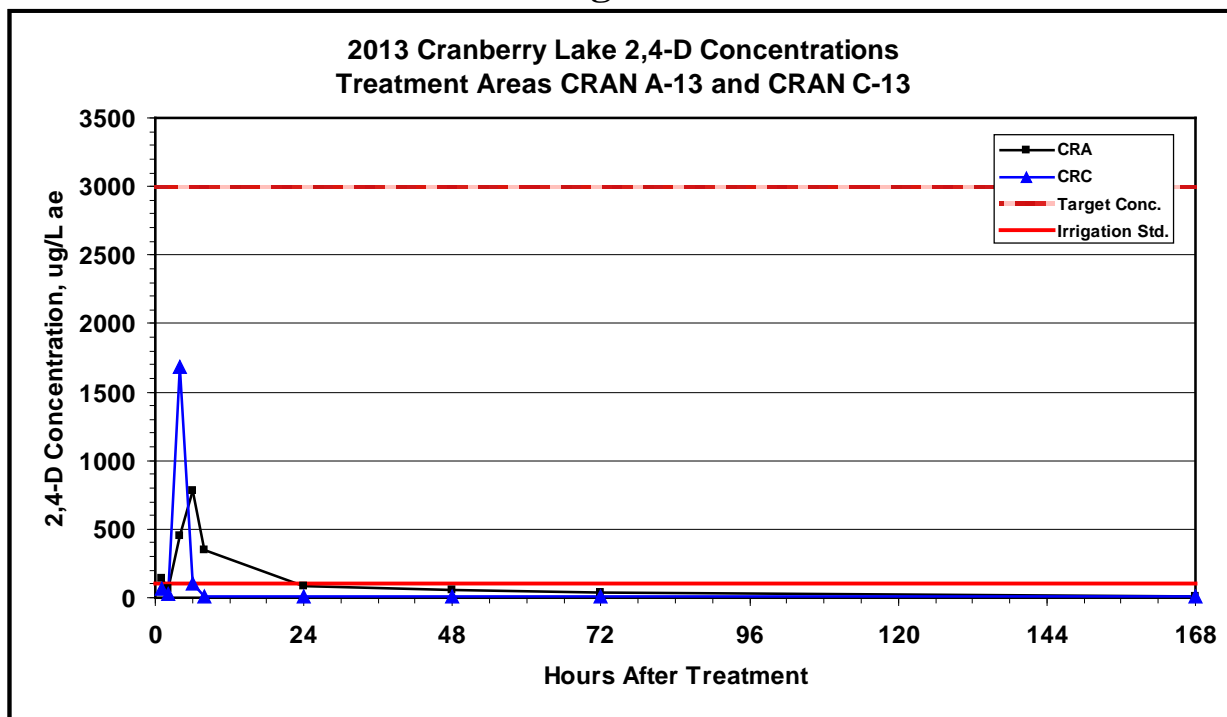


Figure 4

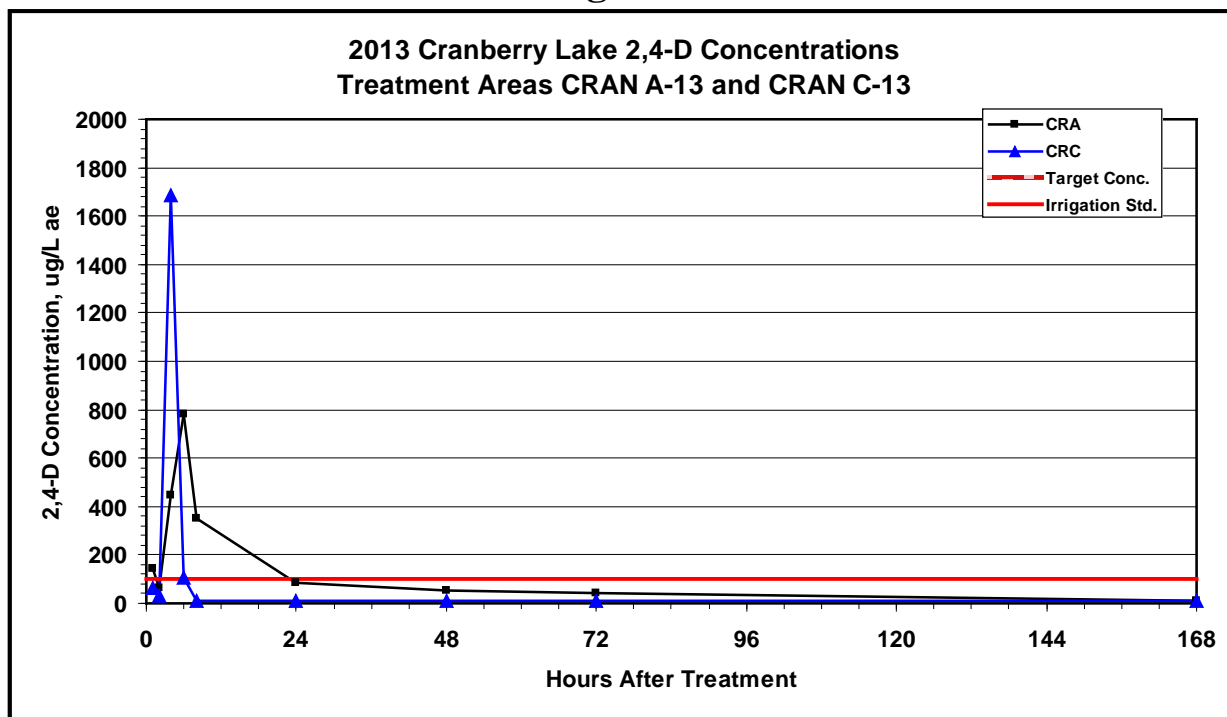


Figure 5

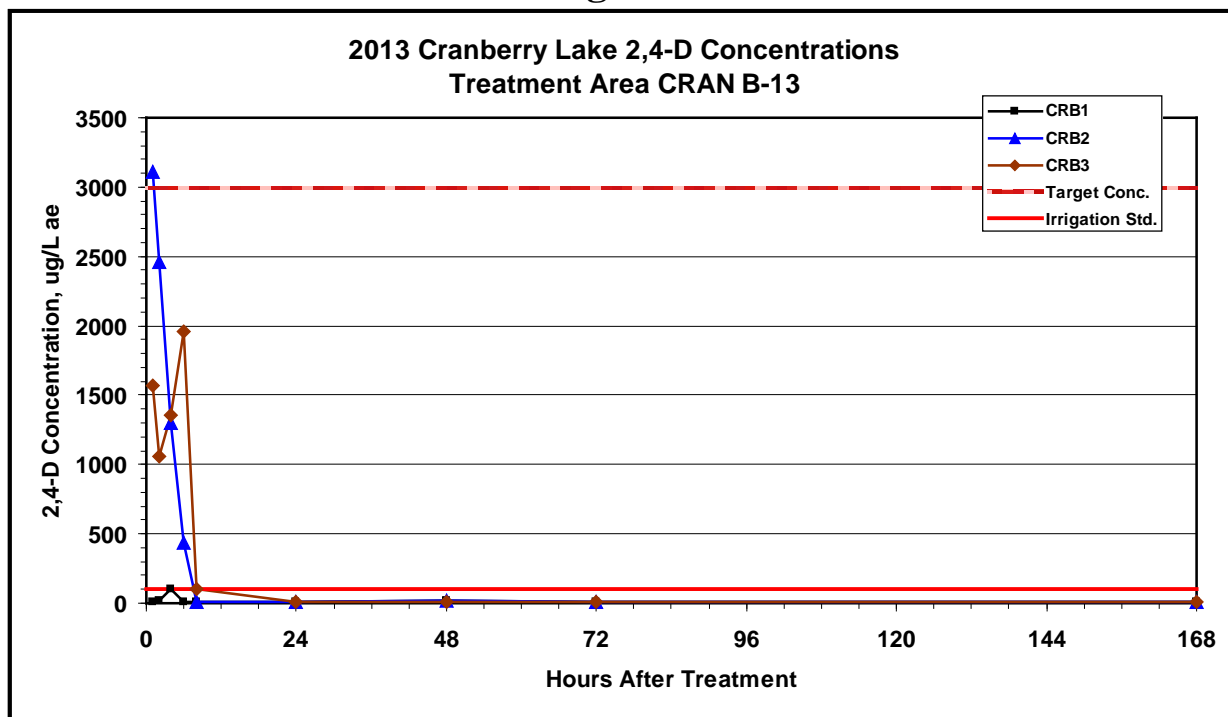


Figure 6

