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| DATE : | July 28, 2016 |
| TO : | Carol Sinden, Miranda Nichols, and Douglas Hansen  Water Assessment Section  Environmental Analysis and Outcomes Division |
| FROM : | Pam Anderson  Water Quality Monitoring Unit  Surface Water Monitoring Section  Environmental Analysis and Outcomes Division |
| PHONE : | (651) 757-2190 |
| SUBJECT : | Request to remove Otter Lake (43-0085-01) from the 303(d) Impaired Waters list |

Otter Lake (43-0085-01) was listed as impaired for aquatic recreation use during the 2010 listing cycle. At that time, the MPCA did not have sufficient information to determine whether the lake met residence time requirements for application to the standard. Minnesota Rules Chapter 7050.0150(4)states that in order to be considered a lake/reservoir, a water body must have a hydraulic residence time of at least 14 days which is to be determined using a flow equal to the 122-day ten-year low flow (122Q10) measured June 1st through September 30th.In June 2015, during TMDL development, bathymetry was determined (Figure 1) and residence time calculated. The calculations are attached (Table 1).  It looks like the 122Q10 residence time for the main basin is under 14 days (9.97 days). If we sort the minimum flows for the 10 year period (10 data points, one for each year) the highest low flow in any year had a residence time of 1.2 days and the mean of the 10 years is 3 days. It is well below the 14 days needed to be classified as a reservoir.

The reach is completely overlaid by a river reach, 07010205-659, which extends upstream into the South Fork Crow River and through the reservoir to the Hutchinson Dam (Figure 2). That reach had data upstream of the reservoir indicating a river eutrophication impairment existed. The lake eutrophication impairment for Otter Lake should be removed from the 2016 impaired waters list.

Table 1. Otter Lake Residence Time

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|  | Res Time (days) |
| 122Q10 | 9.97 |
| Maximum 122Q | 1.22 |
| Mean 122Q | 3.03 |
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Figure 1. Bathymetry for Otter Lake



Figure 2. Lake extent and the stream reach overlap.

