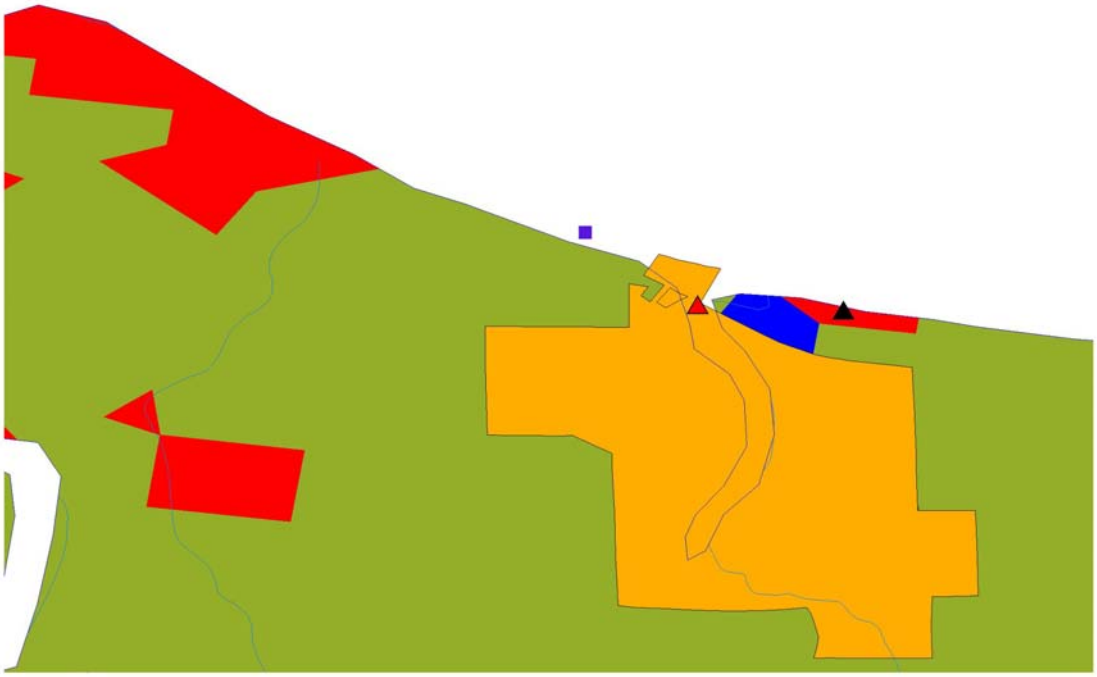
Old Woman Creek



YSI Sites
- Within NERR
- Not Within NERR

Rivers

NS&T Mussel Watch

NERR Management Zone
- Core

Land Use Group
- Agricultural Land
- Barren Land
- Forest Land
- Rangeland
- Urban or Built-up Land
- Water
- Wetland

Old Woman Creek, State Route 2 (OWCSU)

Characterization (Latitude = 41°21'45" N; Longitude = 82°30'25"W)
Water level at Old Woman Creek is normally regulated by Lake Erie water levels, except when the barrier beach is closed off, which results in isolation of Old Woman creek from Lake Erie. Water levels are dependent upon wind and wave activity on Lake Erie when the mouth is open. When the mouth is closed, watershed rainfall and evapo-transpiration rates are most important in determining changes in water levels in Old Woman Creek. Water level varies up to 2 m annually and ranges from 173.2 m to 175.6 m above sea level with a long-term average of 174.1 m (International Great Lakes Datum (IGLD) 1985). Old Woman creek is 24 km long (mainstream linear dimension), has an average depth of less than 0.5 m MHW, and an average width of 2-3 m. Creek bottom habitats are predominantly silt and clay, with no aquatic macrophytes within 100 m of the sampling site. At the sampling site the estuary is riverine and relatively deep (1.5 m) and narrow (8 m). The watershed is primarily agricultural, with about 2/3 of the watershed devoted to row-crop agriculture. Orchards, pastures, and forests comprise most of the other land uses. The town of Berlin Heights (pop. 600) is the only urban area in the watershed.

Descriptive Statistics
Forty-five deployments were made at this site between Apr-Oct 1996, 1997, and 1998 (Figure 67). Mean deployment duration was 13 days. Five deployments (May, Jul, Sep 1996; Jun 1997, 1998) were less than 10 days.

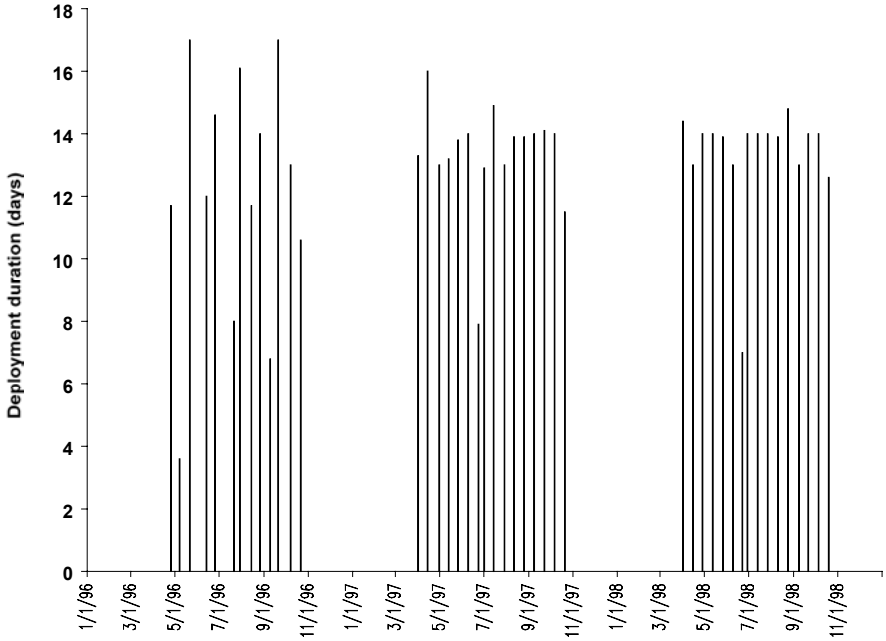


Figure 67. Old Woman Creek, State Route 2 deployments (1996-1998).

Fifty-two percent of seasonal depth data were included in analyses (42% in 1996, 55% in 1997, and 59% in 1998). Sensors were deployed at a mean depth of 0.6 m below the water surface. Scatter plots suggest minor fluctuations (≤ 0.5 m) in daily and bi-weekly water depth throughout most of the data set; however, moderate fluctuations (1 m) were observed during episodic events in Aug-Sep 1997 and

Apr 1998. Harmonic regression analysis attributed 69% of depth variance to interaction between 12.42 hour and 24 hour cycles, 27% of depth variance to 24 hour cycles, and 4% of depth variance to 12.42 hour cycles.

Fifty-one percent of seasonal water temperature data were included in analyses (38% in 1996, 55% in 1997, and 59% in 1998). Water temperature followed a seasonal cycle; however, annual minimum temperature was not known because data were not collected in winter (Figure 68). Mean water temperature was 22-23°C in summer and 10-14°C in spring and fall. Minimum and maximum water temperature between 1996-1998 was 4.3°C (Apr 1997) and 29.4°C (Jun 1996), respectively. Scatter plots suggest moderate fluctuations (≤ 2°C) in daily water temperature and strong fluctuations (≤ 10°C) in bi-weekly water temperature, particularly in spring. Harmonic regression analysis attributed 61% of temperature variance to interaction between 12.42 hour and 24 hour cycles, 34% of temperature variance to 24 hour cycles, and 5% of temperature variance to 12.42 hour cycles.

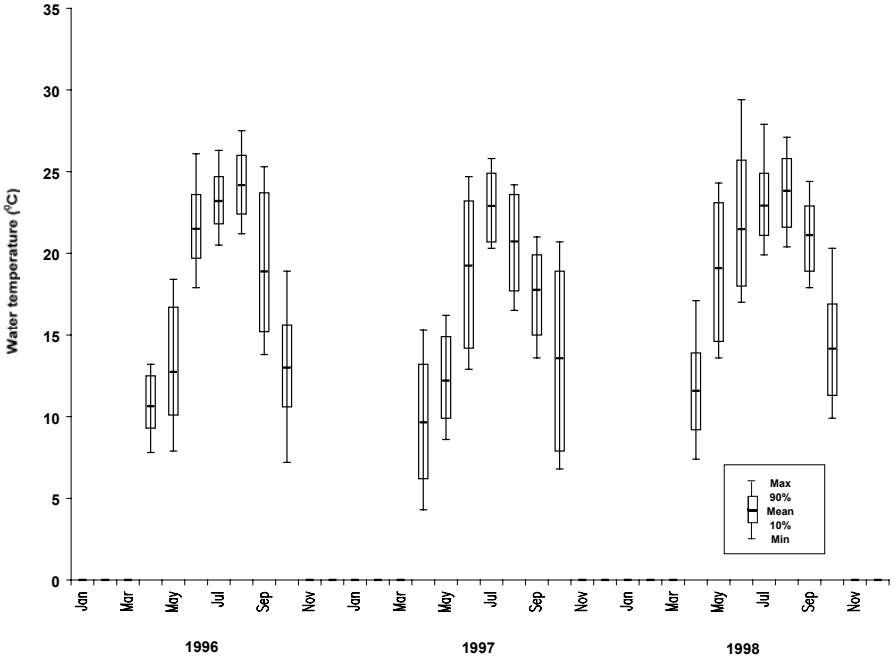


Figure 68. Water temperature statistics at State Route 2, 1996-1998.

Fifty percent of seasonal salinity data were included in analyses (37% in 1996, 55% in 1997, and 59% in 1998). Salinity ranged from 0.1-0.3 ppt, with no discernable seasonal cycle. Harmonic regression analysis attributed 66% of salinity variance to interaction between 12.42 hour and 24 hour cycles, 26% of salinity variance to 24 hour cycles, and 8% of salinity variance to 12.42 hour cycles.

Forty-four percent of seasonal dissolved oxygen (% saturation) data were included in analyses (25% in 1996, 51% in 1997, and 55% in 1998). Mean DO was greatest in spring (70-80% sat) and least in summer or fall (30-60% sat). Minimum and maximum DO between 1996-1998 was 0.4% saturation (Jul 1997) and 178.2% saturation (Aug 1998), respectively. Hypoxia was regularly observed in summer 1997 and infrequently observed in 1996 and 1998 and, when present, hypoxia persisted < 1% to 18% of the first 48 hours post-deployment (Figure 69). Supersaturation was only observed in 1998 and, when present, supersaturation lasted 7% of the first 48 hours post-deployment on average.

Scatter plots suggest minor fluctuations (20-40%) in percent saturation in spring and fall, with moderate fluctuations (40-80%) in summer. Harmonic regression analysis attributed 72% of DO variance to interaction between 12.42 hour and 24 hour cycles, 24% of DO variance to 24 hour cycles, and 4% of DO variance to 12.42 hour cycles.

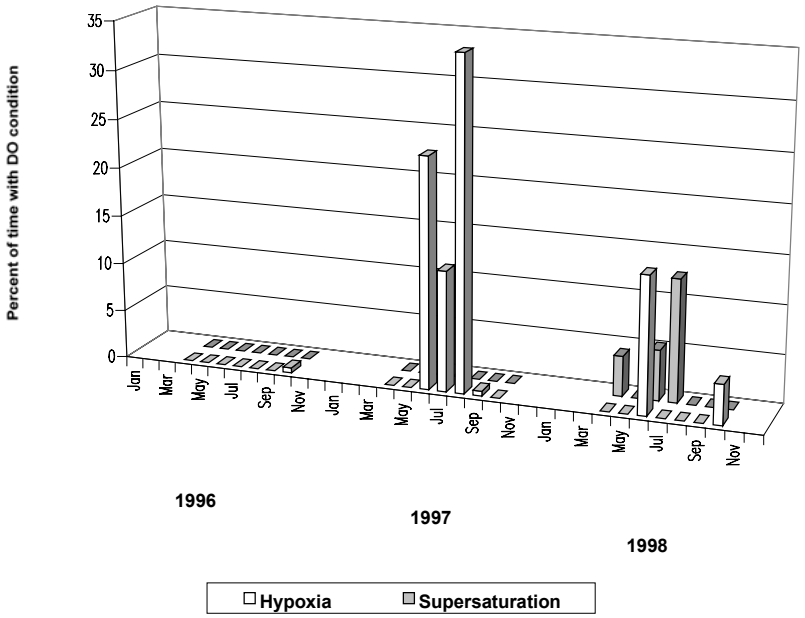


Figure 69. Dissolved oxygen extremes at State Route 2, 1996-1998.

Old Woman Creek, State Route 6 (OWCWM)

Characterization (Latitude = 41°23'15"N; Longitude = 82°30'50"W)

Water level at Old Woman Creek is normally regulated by Lake Erie water levels, except when the barrier beach is closed off, when Old Woman creek is isolated from Lake Erie. Water levels are dependent upon wind and wave activity on Lake Erie when the mouth is open. When the mouth is closed, watershed rainfall and evapo-transpiration rates are most important in determining changes in water levels in Old Woman Creek. Water level varies up to 2 m annually and ranges from 173.2 m to 175.6 m above sea level, with a long-term average of 174.1 m (International Great Lakes Datum (IGLD) 1985). Old Woman creek is 24 km long (mainstream linear dimension), has an average depth of less than 0.5 m MHW, and an average width of 2-3 m. At the sampling site, the depth is 0.5 m and the width is 30 m. At this point the estuary is lacustrine in character and is very broad (just upstream from the sampling point, the estuary is greater than 250 meters wide) and shallow (average depth above the sampling site is less than 0.5 meters). Creek bottom habitats are predominantly silt and clay. No aquatic vegetation occurs at the sampling site; however, extensive beds of *Nelumbo lutea* occur upstream.

Descriptive Statistics

Fifty-two deployments were made at this site between Apr-Oct in 1996, 1997, and 1998 (Figure 70). Mean deployment duration was 11 days. Only one deployment (Jun 1996) was less than five days.

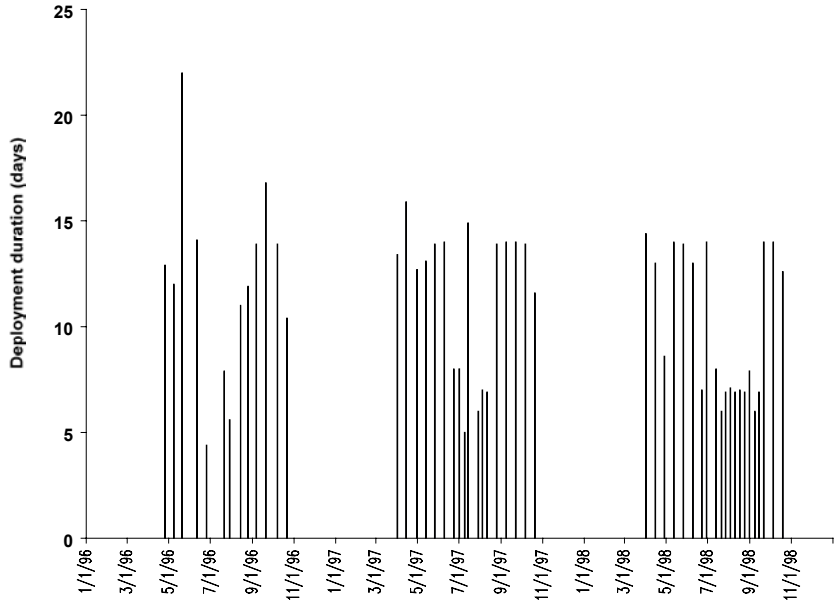


Figure 70. Old Woman Creek, State Route 6 deployments (1996-1998).

Fifty-one percent of seasonal depth data were included in analyses (42% in 1996, 55% in 1997, and 57% in 1998). Sensors were deployed at a mean depth of 0.6 m below the water surface and 0.05-0.32 m above the bottom sediment. Scatter plots suggest minor fluctuations (≤ 0.4 m) in water depth throughout the data set, with 1 m fluctuations observed in Oct 1996, Aug 1997, and Apr 1998. Harmonic regression analysis attributed 67% of depth variance interaction between 12.42 hour and 24 hour cycles, 26% of depth variance to 24 hour cycles, and 7% of depth variance to 12.42 hour cycles.

Fifty-two percent of seasonal water temperature data were included in analyses (43% in 1996, 55% in 1997, and 59% in 1998). Water temperature followed a seasonal cycle; however, annual minimum water temperatures were not known because data were not collected in winter (Figure 71). Mean water temperature was typically 23-25°C in summer and 10-15°C in spring and fall. Minimum and maximum water temperatures observed were 4.1°C (Oct 1996) and 31.7°C (Jun 1998), respectively. Scatter plots suggest moderate fluctuations (1-2°C) in daily water temperature, with strong fluctuations (3-10°C) in bi-weekly water temperature throughout the data set. Harmonic regression analysis attributed 53% of temperature variance to interaction between 12.42 hour and 24 hour cycles, 37% of temperature variance to 24 hour cycles, and 10% of temperature variance to 12.42 hour cycles.

Fifty-two percent of seasonal salinity data were included in analyses (43% in 1996, 55% in 1997, and 59% in 1998). Salinity was 0.1-0.3 ppt throughout the data set, with no discernable seasonal cycle. Harmonic regression analysis attributed 63% of salinity variance to interaction between 12.42 hour and 24 hour cycles, 25% of variance to 24 hour cycles, and 12% of variance to 12.42 hour cycles.

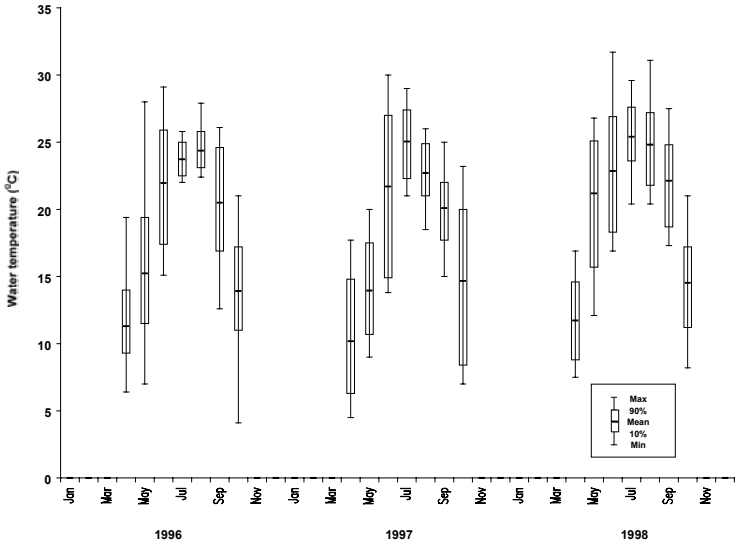


Figure 71. Water temperature statistics at State Route 6, 1996-1998.

Forty-three percent of seasonal dissolved oxygen (% saturation) data were included in analyses (32% in 1996, 47% in 1997, and 50% in 1998). Mean DO followed a seasonal cycle, with lowest DO (38-60% sat) in summer and greatest DO (70-120% sat) in spring and fall. Minimum and maximum DO between 1996-1998 was 0% saturation (Aug 1998) and 209.6% saturation (Jul 1998), respectively. Hypoxia was observed in Jul-Aug during all three years and, when present, hypoxia persisted for <5% of the first 48 hours post-deployment on average (Figure 72). Supersaturation was regularly observed in 1997-1998 and, when present, supersaturation persisted for 6.4% of the first 48 hours post-deployment on average. Scatter plots suggest strong DO fluctuations (≥ 80%) in summer 1996-1998. Harmonic regression analysis attributed 61% of DO variance to interaction between 12.42 hour and 24 hour cycles, 31% of DO variance to 24 hour cycles, and 31% of DO variance to 12.42 hour cycles.

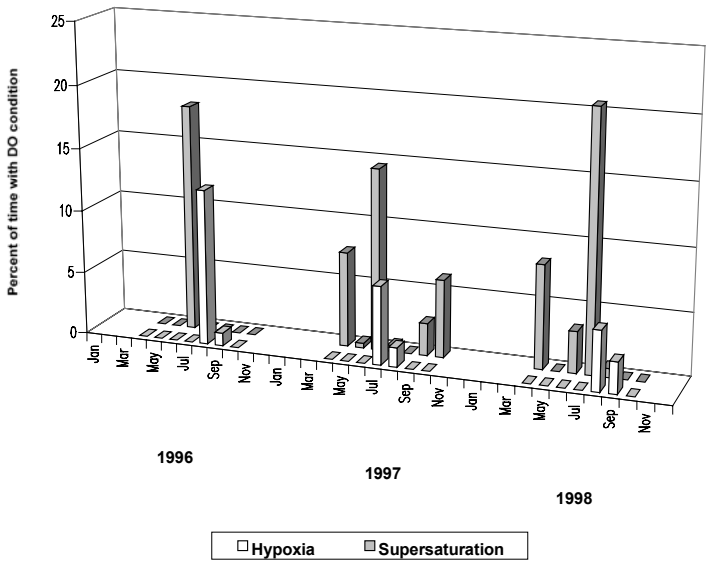


Figure 72. Dissolved oxygen extremes at State Route 6, 1996-1998.