APPENDIX F. Selected model equations used to predict *Escherichia coli* concentrations at three Lake Erie urban beaches and Mosquito Lake.

[These were determined to be the best model(s) for each beach and will be tested using data collected in 2002]

Edgewater Park--2000 and 2001 model

$$\log EC = 1.206 + 0.209(WAVEHT) + 0.103(HOPW72) + 0.006(BIRDS) + 0.238(CURRENT)$$

or

$$EC = 16.058 + 1.617^{WAVEHT} + 1.269^{HOPW72} + 1.013^{BIRDS} + 1.729^{CURRENT} \quad .$$

Villa Angela--1997, 2000, and 2001 model

$$\log EC = 1.552 + 0.332(WAVEHT) + 0.139(HOPW72) + 0.436(LOGTURB)$$

or

$$EC = 35.638 + 2.147^{WAVEHT} + 1.376^{HOPW72} + 2.731^{LOGTURB} \quad .$$

Huntington Reservation--2000 and 2001 model (based on wave height, rainfall, turbidity, and current direction)

$$\log EC = 1.188 + 0.166(WAVEHT) + 0.707(HOP24) + 0.011(TURB) + 0.261(CURRENT)$$

or

$$EC = 15.431 + 1.466^{WAVEHT} + 5.089^{HOP24} + 1.026^{TURB} + 1.825^{CURRENT} \quad .$$

Huntington Reservation--2000 and 2001 model (based on wave height, stream flow, turbidity, and number of birds)

$$\log EC = 1.201 + 0.2(WAVEHT) + 0.0002(CUYQ7) + 0.012(TURB) + 0.002(BIRDS)$$

or

$$EC = 16.179 + 1.584^{WAVEHT} + 1.0005^{CUYQ7} + 1.027^{TURB} + 1.005^{BIRDS} \quad .$$

For Mosquito Lake--2000 and 2001 model

$$\log EC = 0.592 + 0.01(STEP) + 0.1(SUMSIN) + 0.166(WTRAIN) + 0.092(SPEED99)$$

or

$$EC = 3.905 + 1.023^{STEP} + 1.259^{SUMSIN} + 1.464^{WTRAIN} + 1.236^{SPEED99} \quad .$$

In all these equations,

EC is the *Escherichia coli* concentration, in colonies per 100 milliliters.

WAVEHT is assigned a value 1, 2, 3, or 4 according to the following:
  1, when wave heights within a series vary between a minimum of 0 and a maximum of 2 feet,
  2, when wave heights within a series vary between a minimum of 1 and a maximum of 3 feet,
  3, when wave heights within a series vary between a minimum of 2 and a maximum of 4 feet, and
  4, when wave heights within a series vary between a minimum of 3 and a maximum of 6 feet.

HOPW72 is the rainfall amount at Hopkins International Airport, Cleveland, Ohio, in the 72-hour period preceding the 9:00 a.m. sampling, with the most recent rainfall receiving the highest weight. These variables were computed as the sum of following three values:
  3 × rainfall amount for the 0- to 24-hour antecedent period,
  2 × rainfall amount for the greater than 24- to 48-hour antecedent period,
  1 × rainfall amount for the greater than 48- to 72-hour antecedent period.

WTRAIN is calculated the same as *HOPW72*, except the rainfall amount is the amount at Youngstown International Airport, Youngstown, Ohio.

HOP24 is the amount of rain, in inches, that fell at Hopkins International Airport, Cleveland, Ohio,in the 24-hour period preceding the 9 a.m. sampling.

CUYQ7 is the instantaneous streamflow at 7 a.m. at the USGS gage on the Cuyahoga River at Independence, Ohio.

BIRDS is the number of birds on the beach at the time of sampling.

CURRENT is assigned by beach as follows:

For Edgewater, currents were placed into three categories in ascending order:
1 for currents to the east and northeast,
2 for currents to the west, northwest, and north,
3 for currents to the southeast.

For Huntington, currents were placed into two categories in ascending order:
1 for currents to the west, northeast, east, and southeast,
2 for current to the southwest.

TURB is defined as the turbidity in Nephelometric Turbidity Units (NTUs).

LOGTURB is defined as the $\log_{10}$ of the turbidity in NTUs.

STEP is based on the chronological day of year.

SUMSIN is the sums of the sines of the wind direction at 9 a.m. on the day of sampling, on the previous day, and two days previously.

SPEED99 is the instantaneous wind speed at 9 a.m. on the day of sampling.