

Chloride Impact Evaluation

Impacts of Harbor Deepening Only

The chloride impact evaluation input data was developed by the Savannah Harbor Expansion Water Quality Technical Evaluation Group. The group developed two model input scenarios for evaluation, see below.

Run Scenario	River Flow	Evaluation Period
Basic Evaluation	Critical Flow Conditions	1-May 1999 to 1-November 1999
Sensitivity Analysis #1	Average Flow Conditions	1-May 1997 to 1-November 1997

In addition to the scenarios recommended by the Technical Evaluation Group, we also evaluated Spring/Summer of 2001. 2001 has lower freshwater flows than that of 1999 and indicates a greater chloride impact on Abercorn Creek than the impact during 1999, as shown on Figure 1, pg. 17.

Run Scenario	River Flow	Evaluation Period
Sensitivity Analysis #2	Low Flow Conditions	1-May 2001 to 1-November 2001

Each of the three run scenarios were analyzed for each deepening condition: Existing, 44-ft, 45-ft, 46-ft, and 48-ft depths. A total of 15 runs were completed.

The chloride values were computed as described in the *Savannah Harbor Expansion Project- Chloride Data Analysis and Model Development* report dated November 15, 2006 prepared by Tetra Tech.

Results from each run are displayed in this report. The output for each scenario/deepening combination includes (1) a table showing percent exceedance and (2) maximum and minimum chloride values and (3) number of days the chloride at the intake is greater than 12 ppm. All output was measured at EFDC cell (I=8, J=130). This cell is representative of the water quality conditions at the location of the City of Savannah's water intake pipe on Abercorn Creek.

Basic Evaluation

Simulation Period: May 1, 1999 to November 1, 1999

Existing Conditions (42 ft Deep Navigation Channel)

% Exceedance	Chloride (ppm)
99	11.70
95	11.96
90	12.14
85	12.30
80	12.42
75	12.49
70	12.60
65	12.71
60	12.92
55	13.01
50	13.13
45	13.20
40	13.27
35	13.36
30	13.43
25	13.50
20	13.56
15	13.62
10	13.67
5	13.73
1	13.86

Maximum value: 13.88 ppm

Minimum value: 11.63 ppm

of days chloride values were above 12 ppm: **173**

44 ft Deep Channel

% Exceedance	Chloride (ppm)
99	11.70
95	11.96
90	12.14
85	12.30
80	12.42
75	12.49
70	12.60
65	12.71
60	12.92
55	13.01
50	13.13
45	13.20
40	13.27
35	13.36
30	13.43
25	13.50
20	13.56
15	13.62
10	13.67
5	13.73
1	13.86

Maximum value: 13.89 ppm

Minimum value: 11.63 ppm

of days chloride values were above 12 ppm: **173**

45 ft Deep Channel

% Exceedance	Chloride (ppm)
99	11.70
95	11.96
90	12.14
85	12.30
80	12.42
75	12.49
70	12.60
65	12.71
60	12.92
55	13.01
50	13.13
45	13.20
40	13.27
35	13.36
30	13.44
25	13.50
20	13.57
15	13.62
10	13.67
5	13.74
1	13.86

Maximum value: 13.89 ppm

Minimum value: 11.63 ppm

of days chloride values were above 12 ppm: 173

46 ft Deep Channel

% Exceedance	Chloride (ppm)
99	11.70
95	11.96
90	12.14
85	12.30
80	12.42
75	12.49
70	12.60
65	12.71
60	12.92
55	13.01
50	13.13
45	13.20
40	13.27
35	13.36
30	13.44
25	13.51
20	13.57
15	13.63
10	13.67
5	13.74
1	13.86

Maximum value: 13.89 ppm

Minimum value: 11.63 ppm

of days chloride values were above 12 ppm: **173**

48 ft Deep Channel

% Exceedance	Chloride (ppm)
99	11.70
95	11.96
90	12.15
85	12.30
80	12.42
75	12.49
70	12.60
65	12.71
60	12.92
55	13.01
50	13.13
45	13.20
40	13.28
35	13.36
30	13.44
25	13.51
20	13.57
15	13.63
10	13.68
5	13.75
1	13.86

Maximum value: 13.89 ppm
Minimum value: 11.63 ppm

of days chloride values were above 12 ppm: **173**

Sensitivity Analysis #1

Simulation Period: May 1, 1997 to November 1, 1997

Existing Conditions (42 ft Deep Navigation Channel)

% Exceedance	Chloride (ppm)
99	9.94
95	10.34
90	10.95
85	11.37
80	11.49
75	11.57
70	11.66
65	11.75
60	11.82
55	11.93
50	12.06
45	12.23
40	12.33
35	12.52
30	12.69
25	12.90
20	13.03
15	13.13
10	13.47
5	13.67
1	13.89

Maximum value: 13.98 ppm

Minimum value: 9.92 ppm

of days chloride values were above 12 ppm: **95**

44 ft Deep Channel

% Exceedance	Chloride (ppm)
99	9.94
95	10.34
90	10.95
85	11.37
80	11.49
75	11.57
70	11.66
65	11.75
60	11.82
55	11.93
50	12.06
45	12.23
40	12.33
35	12.52
30	12.69
25	12.90
20	13.03
15	13.13
10	13.47
5	13.67
1	13.89

Maximum value: 13.98 ppm

Minimum value: 9.92 ppm

of days chloride values were above 12 ppm: **95**

45 ft Deep Channel

% Exceedance	Chloride (ppm)
99	9.94
95	10.34
90	10.95
85	11.37
80	11.49
75	11.57
70	11.66
65	11.75
60	11.82
55	11.93
50	12.06
45	12.23
40	12.33
35	12.52
30	12.69
25	12.90
20	13.03
15	13.13
10	13.48
5	13.67
1	13.89

Maximum value: 13.98 ppm
Minimum value: 9.92 ppm

of days chloride values were above 12 ppm: **95**

46 ft Deep Channel

% Exceedance	Chloride (ppm)
99	9.94
95	10.34
90	10.95
85	11.37
80	11.49
75	11.57
70	11.66
65	11.75
60	11.82
55	11.93
50	12.06
45	12.23
40	12.33
35	12.52
30	12.69
25	12.90
20	13.03
15	13.13
10	13.48
5	13.68
1	13.89

Maximum value: 13.98 ppm
Minimum value: 9.92 ppm

of days chloride values were above 12 ppm: **95**

48 ft Deep Channel

% Exceedance	Chloride (ppm)
99	9.94
95	10.34
90	10.95
85	11.37
80	11.49
75	11.57
70	11.66
65	11.75
60	11.82
55	11.93
50	12.06
45	12.23
40	12.33
35	12.52
30	12.69
25	12.90
20	13.03
15	13.13
10	13.49
5	13.68
1	13.90

Maximum value: 13.98 ppm

Minimum value: 9.92 ppm

of days chloride values were above 12 ppm: **95**

Sensitivity Analysis #2

Simulation Period: May 1, 2001 to November 1, 2001

Existing Conditions (42 ft Deep Navigation Channel)

% Exceedance	Chloride (ppm)
99	11.48
95	12.90
90	13.36
85	13.51
80	13.65
75	13.74
70	13.83
65	13.90
60	13.96
55	14.00
50	14.04
45	14.07
40	14.13
35	14.17
30	14.22
25	14.28
20	14.35
15	14.45
10	14.50
5	14.53
1	14.58

Maximum value: 14.66 ppm

Minimum value: 11.28 ppm

of days chloride values were above 12 ppm: **180**

44 ft Deep Channel

% Exceedance	Chloride (ppm)
99	11.48
95	12.91
90	13.37
85	13.51
80	13.65
75	13.74
70	13.83
65	13.90
60	13.96
55	14.01
50	14.04
45	14.08
40	14.13
35	14.19
30	14.23
25	14.29
20	14.36
15	14.46
10	14.52
5	14.55
1	14.62

Maximum value: 14.71 ppm

Minimum value: 11.28 ppm

of days chloride values were above 12 ppm: **180**

45 ft Deep Channel

% Exceedance	Chloride (ppm)
99	11.48
95	12.91
90	13.37
85	13.52
80	13.65
75	13.74
70	13.83
65	13.90
60	13.97
55	14.01
50	14.05
45	14.08
40	14.14
35	14.19
30	14.24
25	14.30
20	14.37
15	14.47
10	14.53
5	14.56
1	14.63

Maximum value: 14.73 ppm
Minimum value: 11.28 ppm

of days chloride values were above 12 ppm: **180**

46 ft Deep Channel

% Exceedance	Chloride (ppm)
99	11.48
95	12.91
90	13.37
85	13.52
80	13.65
75	13.74
70	13.83
65	13.90
60	13.97
55	14.02
50	14.05
45	14.09
40	14.14
35	14.20
30	14.25
25	14.31
20	14.38
15	14.47
10	14.54
5	14.57
1	14.65

Maximum value: 14.77 ppm

Minimum value: 11.28 ppm

of days chloride values were above 12 ppm: **180**

48 ft Deep Channel

% Exceedance	Chloride (ppm)
99	11.48
95	12.91
90	13.38
85	13.52
80	13.66
75	13.75
70	13.84
65	13.91
60	13.97
55	14.03
50	14.06
45	14.10
40	14.15
35	14.22
30	14.27
25	14.32
20	14.40
15	14.48
10	14.56
5	14.61
1	14.71

Maximum value: 14.84 ppm
Minimum value: 11.28 ppm

of days chloride values were above 12 ppm: **180**

Figure 1

CHLORIDE IMPACT EVALUATION RESULTS

