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January 23, 2007

Mr. Tom Rogers
Department of Environmental Protection
Division of Air Resource Management
2600 Blair Stone Road
Mail Station #5500
Tallahassee, Florida 32399-2400

Dear Mr. Rogers

RE: Gulf Power BART Exemption Modeling Report
Crist Electric Generating Plant - 0330045

Pursuant to Rule 62-296.340 F.A.C, Gulf Power has completed the Best Available Retrofit Technology (BART) Exemption Modeling Report for the Crist Electric Generating Plant. The attached report utilized the revised BART modeling protocol previously submitted to the Department during December, 2006. The modeling results demonstrate that Plant Crist PM₁₀ emissions do not cause or contribute to visibility impairment. Therefore, Plant Crist is not subject to BART for PM₁₀ and no further BART analysis is required. A certification by the Responsible Official is enclosed.

If you have any questions or need further information regarding the Plant Crist BART Exemption Modeling Report, please call me at (850) 444.6527.

Sincerely,

G. Dwain Waters, Q.E.P.
Special Projects and Environmental Assets Coordinator

Cc/wo disks: James O. Vick, Gulf Power Company
Fred Ellis, Southern Company Services
John Jansen, Southern Company Services
Trina Vielhauer, FDEP - Tallahassee
Rick Bradburn, FDEP - Pensacola

**CRIST BART EXEMPTION
MODELING REPORT
CERTIFICATION BY RESPONSIBLE OFFICIAL**

“I, the undersigned, am the responsible official, as defined in Chapter 62-210.200, F.A.C., for the Title V source for which this report is being submitted. I hereby certify, based on information and belief formed after reasonable inquiry, that the statements made and data contained in this report are true, accurate and complete.”

Responsible Official Signature:



**Penny M. Manuel
Vice-President & Senior Production Officer**

1-23-07

Date:

BART Exemption Modeling Report:

Gulf Power Company

Plant Crist

Prepared by:

Southern Company Services and ENSR Corporation
for Gulf Power Company

December 2006

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1.0 Introduction

1.1 Objectives

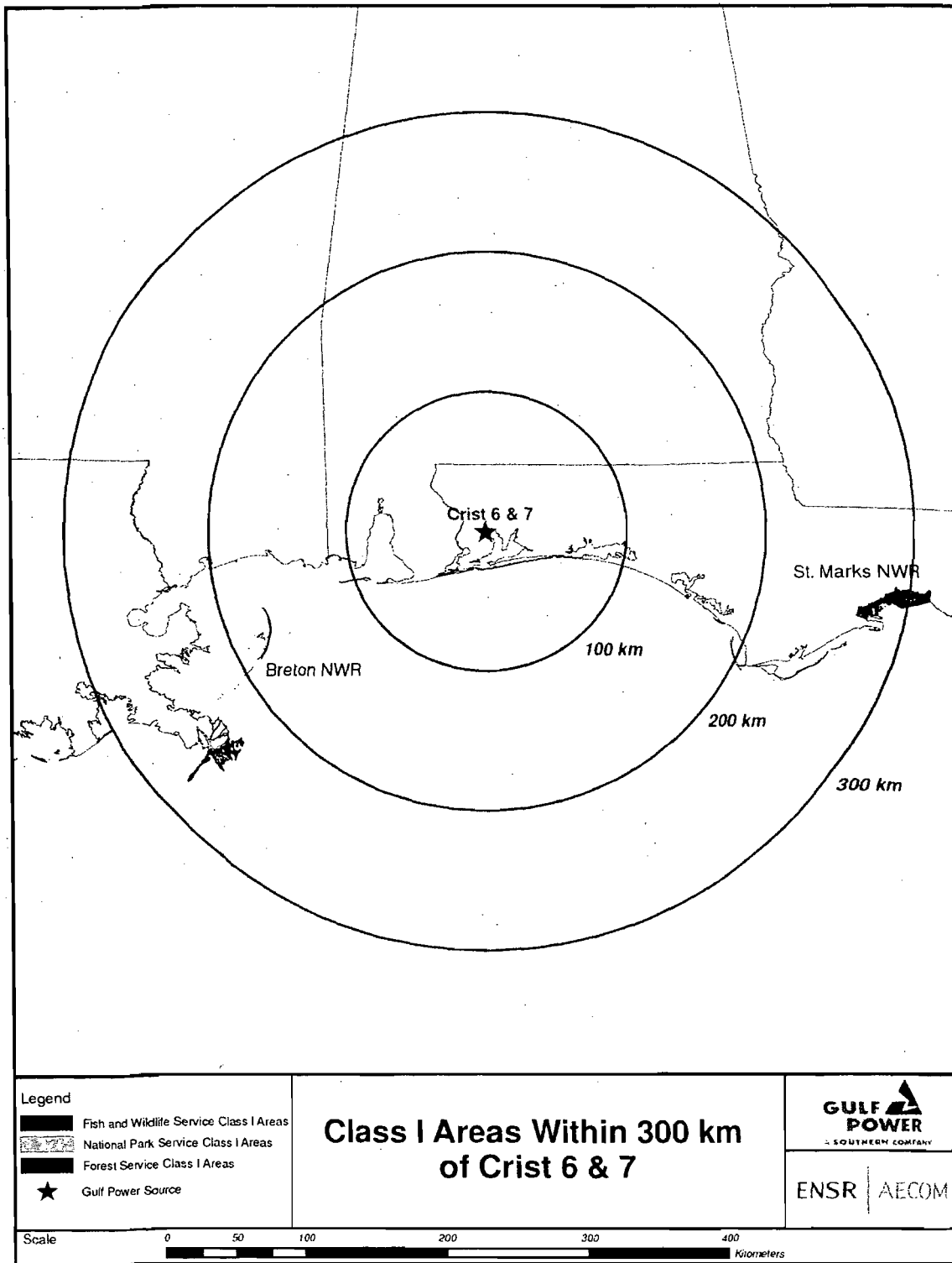
The Regional Haze Rule requires Best Available Retrofit Technology (BART) for any BART-eligible source that "emits any air pollutant which may reasonably be anticipated to cause or contribute to any impairment of visibility" in any mandatory Class I federal area. Pursuant to federal regulations, states have the option of exempting a BART-eligible source from the BART requirements based on dispersion modeling demonstrating that the source cannot reasonably be anticipated to cause or contribute to visibility impairment in a Class I area. In addition, the Environmental Protection Agency (EPA) has promulgated a rule allowing states subject to the Clean Air Interstate Rule (CAIR) to determine that CAIR satisfies the BART requirements for SO₂ and NO_x for electric generating units (EGUs). Feedback from the Florida Department of Environmental Protection indicates that CAIR satisfies BART for SO₂ and NO_x for EGUs. Therefore, this modeling report focuses on performing the BART modeling analysis for particulate matter (PM) only.

Units 6 and 7 at Plant Crist, located near Pensacola, which is owned and operated by Gulf Power Company, have been identified as a BART-eligible source. The modeling procedures outlined in the source-specific BART modeling protocol for Plant Crist were used to determine whether the source is subject to BART requirements (exemption modeling). The modeling procedures are consistent with those outlined in the updated final VISTAS common BART modeling protocol (dated December 22, 2005, revision 3.2 - August 31, 2006), available at http://www.vistas-sesarm.org/documents/BARTModelingProtocol_rev3.2_31Aug06.pdf. The source-specific BART modeling protocol references relevant portions of the common VISTAS modeling protocol.

1.2 Location of source vs. relevant Class I Areas

The Florida Department of Environmental Protection, which is in charge of the state's BART program, has determined that Units 6 and 7 at Plant Crist are BART-eligible for PM. Figure 1-1 shows a plot of Plant Crist relative to nearby Class I Areas. There are two Class I areas within 300 km of the plant: Saint Marks (268.2 km) and Breton Island (167.3 km). The BART exemption modeling was conducted for these Class I areas in accordance with the referenced VISTAS common BART modeling protocol and the procedures described in the source-specific BART modeling protocol.

Figure 1-1 Location of Class I Areas in Relation to Plant Crist



2.0 Source description and emissions data

2.1 Unit-specific source data

The emissions data used to assess the visibility impacts at the Class I areas within 300 km of Plant Crist are discussed in this section. The Florida Department of Environmental Protection has indicated that CAIR will satisfy BART for EGUs for SO₂ and NO_x. Therefore, this BART exemption modeling analysis focuses only on PM₁₀. Since various components of PM₁₀ emissions have different visibility extinction efficiencies, the PM₁₀ emissions are divided, or "speciated," into several components (VISTAS common protocol Sections 4.3.3 and 4.4.2). The VISTAS protocol (Section 5) allows for the use of source-specific emissions and speciation factors and/or default values from AP-42. The PM₁₀ emissions and speciation approach used for the modeling described in this report is indicated below. Where default speciation values are used, the data represents a unit where current (baseline) emission controls include electrostatic precipitators (ESPs), but no post-combustion NO_x or SO₂ control equipment exists.

- Total PM₁₀ is comprised of filterable and condensable emissions.
- Baseline filterable PM₁₀ emissions are based on the highest stack test for the most recent 3-year period (2003-2005). This stack test is combined with the highest 24 hour heat input value for this period from CEMS data to calculate the "maximum 24-hour average emission rate" as required by the VISTAS protocol.
- Filterable PM₁₀ has been subdivided by size category consistent with the default approach from AP-42 Table 1-1.6, and as noted on pages 43 and 44 of the VISTAS common BART modeling protocol. The AP-42 Table 1-1.6 specifies for the emission controls indicated above that 55.6% of filterable PM₁₀ emission is coarse (greater than 2.5 microns in size) and 44.4% is fine. Of the fine portion, 3.7% is elemental carbon and the remainder is inorganic fine particulates (soil).
- Condensable PM₁₀ consists of inorganic and organic compounds. The inorganic portion is by default assumed to be H₂SO₄, although other non-sulfate inorganic condensables could be present. The organic portion is modeled as organic aerosols.
- Baseline H₂SO₄ emissions are calculated consistent with the method used by Gulf Power to derive these emissions for TRI purposes. This approach assumes that the H₂SO₄ emissions released from the stack are proportional to SO₂ emissions from combustion and are dependent on the fuel type and the removal of H₂SO₄ by downstream equipment (i.e., ESP and air heater). For eastern bituminous coal the baseline H₂SO₄ release rate is in the range of 0.2 to 0.5% of the SO₂ emissions. Appendix A of the site-specific modeling protocol provides the basis for the site-specific values used.
- Baseline emissions of condensable organics (the remaining portion of condensable PM₁₀) are derived based on the supporting field observational information in Appendix B of the site-specific modeling protocol and is estimated as 0.32% of SO₂ emitted.
- Coarse filterable particles (between 2.5 and 10 microns in size) are modeled with a geometric mass mean diameter of 5 microns, while fine filterable and all condensable particles are modeled with a geometric mass mean diameter of 0.48 microns, consistent with the CALPUFF default value for fine particles. The geometric standard deviation for both fine and coarse particles are set to 2 microns, consistent with the CALPUFF default value. The 0.48 micron diameter value for fine particles comes from the default values in sample input files presented on the TRC web site. There is no default value presented for the coarse particles on the TRC web site. However, since 5 is the geometric mass mean diameter of 2.5 and 10 (the bounds of coarse particle sizes), it is a reasonable estimate for the geometric mass mean diameter for that class of particles.

In practice, CALPUFF allows for the user to input certain components of PM₁₀ as separate species and separate sizes, which will result in more accurate wet and dry deposition velocity results and also more

accurate effects on light scattering. As noted above, the particle size distribution information is provided in AP-42 Table 1-1.6, and was used for the BART exemption modeling.

Table 2-1 provides a summary of the modeling emission parameters used in the BART CALPUFF modeling, consistent with the source emissions data presented in Appendices A and B of the site-specific modeling protocol for the baseline. All of the emissions in Table 2-1 were derived from CEMS data for the 2003 to 2005 period and represent the maximum 24-hour average lb/hr rates (excluding days where startup, shutdown, or malfunctions occurred). For NO_x and SO₂ the values are directly from CEMS. Filterable PM₁₀ emissions were calculated using the highest stack test over the 2003 to 2005 period and multiplying these values times the maximum 24-hour average heat input derived from CEMS. These values were then adjusted using AP-42 factors from Table 1.1-6 that indicate that PM₁₀ is 67% of total PM for a pulverized coal unit with an ESP. PM₁₀ speciation was then performed as indicated above such that total Filterable PM₁₀ is made up of Coarse Soil plus total Fine PM and total Fine PM is made up of Fine Soil plus Elemental Carbon (EC).

Table 2-1 Plant Crist modeling emission parameters

Case	Source / Unit	Location UTM (Zone 16 NAD-83)		Actual Stack Ht	Base Elev.	Flue Dia-meter	Gas Exit Vel.	Stack Gas Exit Temp.	Emissions ¹			Particle Speciation ²								
		UTM East	UTM North						SO ₂	NO _x	PM ₁₀	Filt. PM ₁₀	Coarse Soil	Fine PM	Fine Soil	EC	Cond. PM ₁₀	H ₂ SO ₄	Organic	
		m	m	m	m	m	m/s	deg K	lbs/hr	lbs/hr	lbs/hr	lbs/hr	lbs/hr	lbs/hr	lbs/hr	lbs/hr	lbs/hr	lbs/hr	lbs/hr	lbs/hr
Baseline Data - Current Configuration (Unit Basis)																				
Baseline	Unit 6	478,435	3,381,482	137.2	27.4	7.0	35.8	430.8	5662.00	1882.00	59.57	24.80	13.79	11.01	10.60	0.41	34.77	16.66	18.12	
	Unit 7 (SCR)	478,435	3,381,482	137.2	27.4	7.0	35.8	430.8	10177.00	724.11	195.10	108.59	60.37	48.21	46.43	1.78	86.52	53.95	32.57	
Baseline Data - Current Configuration (Stack Basis)																				
				Modeled Stk Ht³																
		m	m	m	m	m	m/s	deg K	lbs/hr	lbs/hr	lbs/hr	lbs/hr	lbs/hr	lbs/hr	lbs/hr	lbs/hr	lbs/hr	lbs/hr	lbs/hr	lbs/hr
Stack 1	6 & 7(SCR)	478,435	3,381,482	137.2	27.4	7.0	35.8	430.8	15869.00	2606.11	254.68	133.38	74.16	59.22	57.03	2.19	121.29	70.61	50.38	
Stack Basis Emissions Converted to g/sec									g/sec	g/sec	g/sec	g/sec	g/sec	g/sec	g/sec	g/sec	g/sec	g/sec	g/sec	
Stack 1	6 & 7(SCR)	478,435	3,381,482	137.2	27.4	7.0	35.8	430.8	1995.71	328.37	32.09	16.81	9.34	7.46	7.19	0.28	15.28	8.90	6.39	

Notes:

¹ SO₂ and NO_x emissions are not BART-applicable for EGU sources in CAIR states, assuming FDEP agrees with EPA's interpretation of the BART final rule. The emissions for SO₂ and NO_x are provided for information purposes, and for reference in the computation of certain particle species such as H₂SO₄.

² Elemental carbon (EC) and Fine PM are a part of Filterable PM₁₀ and H₂SO₄ and Organics are a part of Condensable PM₁₀. Note that H₂SO₄ is input to CALPUFF as SO₄. The molecular weights of H₂SO₄ and SO₄ are 98 and 96, respectively, therefore the conversion factor from H₂SO₄ to SO₄ is 96/98.

³ Stack credit is equal to actual stack height since this stack is grandfathered under stack height regulations.

3.0 Modeling results

The exemption modeling results are provided in Table 3-1, and Appendix A lists delta-deciview results for the top 20 days for each year modeled and the top 25 days for the overall three years at each Class I area.¹ The table indicates that both the 8th highest day's impacts for each year and the 22nd highest day's impacts over all three years are below 0.5 delta-dv. These results demonstrate that Plant Crist's PM₁₀ emissions do not cause or contribute to visibility impairment. Therefore, the source is not subject to BART for PM₁₀, and no further BART analysis is required.

Electronic data related to this application are provided on the attached disk. They include all input (INP) and list (LST) files.

¹ For Breton, Gulf Power has included in the modeling analysis all of the receptors that the F&WS has identified. However, Gulf Power does not believe that all of the receptors are still valid receptors. As a result of hurricane activity, several of the receptors identified by the F&WS for Breton are now located over water, rather than over land. Pursuant to the Wilderness Act of 1964, which defines wilderness as "land," and because Congress made clear when it created the Breton wilderness area that only the land mass was designated as wilderness, receptors that are now over water are not relevant for assessing visibility impacts at Breton. Nevertheless, as shown later, because inclusion of all of the Breton receptors does not produce any impact of more than 0.5 deciviews, Gulf Power is including the invalid receptors for purposes of this analysis.

Table 3-1 Summary of Results – Plant Crist Refined BART Exemption Modeling

Class I area	Distance from source to Class I area boundary	2001			2002			2003			Highest of 8 th Highest delta-dv for the 3-years	22 nd Highest delta-dv over 3-year period
		# of days and receptors beyond 98 th percentile with impact > 0.5 delta-dv		8 th Highest delta-dv	# of days and receptors beyond 98 th percentile with impact > 0.5 delta-dv		8 th Highest delta-dv	# of days and receptors beyond 98 th percentile with impact > 0.5 delta-dv		8 th Highest delta-dv		
		km	Days	Rec	delta-dv	Days	Rec	delta-dv	Days	Rec		
Saint Marks												
New Improve	168.2	0	0	0.05	0	0	0.02	0	0	0.02	0.05	0.03
Old Improve	168.2	0	0	0.06	0	0	0.02	0	0	0.03	0.06	0.04
Breton Island												
New Improve	267.3	0	0	0.17	0	0	0.10	0	0	0.10	0.17	0.11
Old Improve	267.3	0	0	0.21	0	0	0.12	0	0	0.12	0.21	0.14

Appendix A

Delta-Deciview Values for the Top 20 Days – for Each Year/Each Class I Area and for the Top 25 Days – Over Three Years

New IMPROVE Equation - Ranked Daily Visibility Change for Saint Marks (Top 20 Days for Each Year)

YEAR	DAY	REC	DV(Total)	DV(BKG)	DELTA DV	F(RH)				% of Modeled Extinction by Species					Rank
						S	L	SS	% SO4	% NO3	% OC	% EC	% PMC	% PMF	
2001	222	11	8.41	8.33	0.08	4.9	3.5	5.1	80.15%	0.00%	12.23%	1.63%	1.63%	4.36%	1
2001	362	2	8.18	8.10	0.08	4.2	3.2	4.6	76.92%	0.00%	13.67%	1.76%	2.94%	4.71%	2
2001	138	7	7.99	7.94	0.05	3.8	2.9	4.3	75.37%	0.00%	15.23%	1.71%	2.56%	5.13%	3
2001	187	1	8.26	8.21	0.05	4.5	3.3	4.9	77.84%	0.00%	12.96%	1.67%	2.51%	5.02%	4
2001	193	99	8.26	8.21	0.05	4.5	3.3	4.9	78.49%	0.00%	13.07%	1.69%	1.69%	5.06%	5
2001	194	1	8.26	8.21	0.05	4.5	3.3	4.9	79.40%	0.00%	12.78%	1.74%	1.74%	4.34%	6
2001	139	7	7.99	7.94	0.05	3.8	2.9	4.3	74.69%	0.00%	14.57%	1.79%	3.58%	5.37%	7
2001	223	7	8.38	8.33	0.05	4.9	3.5	5.1	79.41%	0.00%	12.23%	1.86%	1.86%	4.64%	8
2001	101	11	7.91	7.87	0.04	3.6	2.8	4.1	73.06%	0.00%	14.91%	2.41%	3.61%	6.02%	9
2001	60	7	7.91	7.87	0.04	3.6	2.8	4.1	74.08%	0.00%	15.35%	2.64%	2.64%	5.29%	10
2001	76	11	7.91	7.87	0.03	3.6	2.8	4.1	75.07%	0.00%	15.15%	2.79%	1.40%	5.59%	11
2001	364	7	8.13	8.10	0.03	4.2	3.2	4.6	78.38%	0.00%	14.06%	1.51%	1.51%	4.54%	12
2001	195	7	8.24	8.21	0.03	4.5	3.3	4.9	77.70%	0.00%	13.08%	1.54%	3.07%	4.61%	13
2001	240	7	8.36	8.33	0.03	4.9	3.5	5.1	76.93%	0.00%	15.00%	1.61%	1.61%	4.84%	15
2001	151	1	7.97	7.94	0.03	3.8	2.9	4.3	80.25%	0.00%	12.00%	1.55%	1.55%	4.65%	14
2001	105	101	7.90	7.87	0.03	3.6	2.8	4.1	74.68%	0.00%	14.86%	1.74%	3.49%	5.23%	16
2001	80	7	7.90	7.87	0.03	3.6	2.8	4.1	74.97%	0.00%	15.77%	1.85%	1.85%	5.56%	17
2001	354	7	8.12	8.10	0.02	4.2	3.2	4.6	77.52%	0.00%	14.28%	2.05%	2.05%	4.10%	18
2001	325	7	8.04	8.02	0.02	4.0	3.0	4.5	77.03%	0.00%	13.96%	2.25%	2.25%	4.51%	19
2001	192	1	8.23	8.21	0.02	4.5	3.3	4.9	76.70%	0.00%	13.41%	2.47%	2.47%	4.95%	20
2002	198	1	8.26	8.21	0.05	4.5	3.3	4.9	76.27%	0.00%	11.67%	3.02%	3.02%	6.03%	1
2002	335	99	8.05	8.02	0.04	4.0	3.0	4.5	79.77%	0.00%	12.85%	1.84%	0.92%	4.61%	2
2002	220	1	8.37	8.33	0.03	4.9	3.5	5.1	75.97%	0.00%	14.23%	2.45%	2.45%	4.90%	3
2002	186	11	8.23	8.21	0.02	4.5	3.3	4.9	80.98%	0.00%	11.99%	1.41%	1.41%	4.22%	4
2002	185	7	8.23	8.21	0.02	4.5	3.3	4.9	79.14%	0.00%	13.25%	1.90%	1.90%	3.80%	5
2002	197	11	8.23	8.21	0.02	4.5	3.3	4.9	80.65%	0.00%	12.46%	2.30%	0.00%	4.60%	6
2002	155	7	8.23	8.21	0.02	4.5	3.3	4.9	78.83%	0.00%	12.18%	2.25%	2.25%	4.49%	7
2002	113	7	7.89	7.87	0.02	3.6	2.8	4.1	78.03%	0.00%	12.64%	2.33%	2.33%	4.66%	8
2002	239	7	8.35	8.33	0.01	4.9	3.5	5.1	74.74%	0.00%	16.26%	3.00%	0.00%	6.00%	9
2002	364	11	8.12	8.10	0.01	4.2	3.2	4.6	79.29%	0.00%	11.67%	3.01%	3.01%	3.01%	10
2002	272	11	8.35	8.33	0.01	4.9	3.5	5.1	79.68%	0.00%	13.40%	3.46%	0.00%	3.46%	11
2002	260	101	8.35	8.33	0.01	4.9	3.5	5.1	84.53%	0.00%	11.69%	0.00%	0.00%	3.78%	11
2002	10	1	8.03	8.02	0.01	4.0	3.0	4.5	84.53%	0.00%	11.69%	0.00%	0.00%	3.78%	13
2002	347	1	8.11	8.10	0.01	4.2	3.2	4.6	78.20%	0.00%	13.25%	0.00%	4.28%	4.28%	14
2002	42	99	7.88	7.87	0.01	3.6	2.8	4.1	78.02%	0.00%	13.36%	0.00%	4.31%	4.31%	15
2002	126	7	7.95	7.94	0.01	3.8	2.9	4.3	77.85%	0.00%	17.60%	0.00%	0.00%	4.55%	16
2002	261	7	8.34	8.33	0.01	4.9	3.5	5.1	83.83%	0.00%	11.30%	0.00%	0.00%	4.87%	17
2002	154	7	8.22	8.21	0.01	4.5	3.3	4.9	74.75%	0.00%	15.34%	0.00%	4.95%	4.95%	18
2002	73	7	7.88	7.87	0.01	3.6	2.8	4.1	82.70%	0.00%	12.09%	0.00%	0.00%	5.20%	19
2002	346	1	8.11	8.10	0.01	4.2	3.2	4.6	75.27%	0.00%	13.29%	0.00%	5.72%	5.72%	20
2003	60	7	7.95	7.87	0.07	3.6	2.8	4.1	74.25%	0.00%	15.65%	1.89%	2.53%	5.68%	1
2003	20	7	8.08	8.02	0.07	4.0	3.0	4.5	76.93%	0.00%	14.66%	2.10%	1.40%	4.91%	2
2003	295	1	8.16	8.10	0.05	4.2	3.2	4.6	77.00%	0.00%	13.72%	1.69%	2.53%	5.06%	3
2003	353	7	8.15	8.10	0.05	4.2	3.2	4.6	77.49%	0.00%	13.68%	1.96%	1.96%	4.91%	4
2003	9	7	8.05	8.02	0.03	4.0	3.0	4.5	78.07%	0.00%	14.26%	1.53%	1.53%	4.60%	5
2003	23	11	8.04	8.02	0.03	4.0	3.0	4.5	77.23%	0.00%	14.80%	1.59%	1.59%	4.78%	6
2003	151	1	7.96	7.94	0.03	3.8	2.9	4.3	75.34%	0.00%	15.54%	1.82%	1.82%	5.47%	7
2003	78	11	7.90	7.87	0.02	3.6	2.8	4.1	73.51%	0.00%	14.92%	1.93%	3.85%	5.78%	8
2003	150	1	7.96	7.94	0.02	3.8	2.9	4.3	74.55%	0.00%	15.47%	2.00%	2.00%	5.99%	9
2003	318	11	8.04	8.02	0.02	4.0	3.0	4.5	76.17%	0.00%	14.48%	2.34%	2.34%	4.67%	10
2003	153	101	8.23	8.21	0.02	4.5	3.3	4.9	74.86%	0.00%	15.27%	2.47%	2.47%	4.93%	11
2003	49	1	7.89	7.87	0.02	3.6	2.8	4.1	78.03%	0.00%	12.64%	2.33%	2.33%	4.66%	12
2003	288	1	8.12	8.10	0.02	4.2	3.2	4.6	75.34%	0.00%	14.19%	2.62%	2.62%	5.24%	13
2003	221	1	8.35	8.33	0.02	4.9	3.5	5.1	77.39%	0.00%	12.15%	2.61%	2.61%	5.23%	14
2003	7	11	8.03	8.02	0.02	4.0	3.0	4.5	79.29%	0.00%	12.58%	2.71%	0.00%	5.42%	15
2003	162	11	8.22	8.21	0.02	4.5	3.3	4.9	74.15%	0.00%	14.87%	2.74%	2.74%	5.49%	16
2003	161	11	8.22	8.21	0.02	4.5	3.3	4.9	79.29%	0.00%	12.58%	2.71%	0.00%	5.42%	16
2003	19	7	8.03	8.02	0.01	4.0	3.0	4.5	78.76%	0.00%	11.97%	3.09%	3.09%	3.09%	18
2003	224	7	8.35	8.33	0.01	4.9	3.5	5.1	73.39%	0.00%	14.30%	3.08%	3.08%	6.16%	19
2003	103	1	7.89	7.87	0.01	3.6	2.8	4.1	72.31%	0.00%	14.88%	3.20%	3.20%	6.41%	20

New IMPROVE Equation - Ranked Daily Visibility Change for Saint Marks (Top 25 Days Over 3 Years)

YEAR	DAY	REC	DV(Total)	DV(BKG)	DELTA DV	F(RH)			% of Modeled Extinction by Species						Rank
						S	L	SS	% SO4	% NO3	% OC	% EC	% PMC	% PMF	
2001	222	11	8.41	8.33	0.08	4.9	3.5	5.1	80.15%	0.00%	12.23%	1.63%	1.63%	4.36%	1
2001	362	2	8.18	8.10	0.08	4.2	3.2	4.6	76.92%	0.00%	13.67%	1.76%	2.94%	4.71%	2
2003	60	7	7.95	7.87	0.07	3.6	2.8	4.1	74.25%	0.00%	15.65%	1.89%	2.53%	5.68%	3
2003	20	7	8.08	8.02	0.07	4.0	3.0	4.5	76.93%	0.00%	14.66%	2.10%	1.40%	4.91%	4
2001	138	7	7.99	7.94	0.05	3.8	2.9	4.3	75.37%	0.00%	15.23%	1.71%	2.56%	5.13%	5
2003	295	1	8.16	8.10	0.05	4.2	3.2	4.6	77.00%	0.00%	13.72%	1.69%	2.53%	5.06%	6
2001	187	1	8.26	8.21	0.05	4.5	3.3	4.9	77.84%	0.00%	12.96%	1.67%	2.51%	5.02%	7
2001	193	99	8.26	8.21	0.05	4.5	3.3	4.9	78.49%	0.00%	13.07%	1.69%	1.69%	5.06%	8
2001	194	1	8.26	8.21	0.05	4.5	3.3	4.9	79.40%	0.00%	12.78%	1.74%	1.74%	4.34%	9
2001	139	7	7.99	7.94	0.05	3.8	2.9	4.3	74.69%	0.00%	14.57%	1.79%	3.58%	5.37%	10
2002	198	1	8.26	8.21	0.05	4.5	3.3	4.9	79.77%	0.00%	12.85%	1.84%	0.92%	4.61%	11
2001	223	7	8.38	8.33	0.05	4.9	3.5	5.1	79.41%	0.00%	12.23%	1.86%	1.86%	4.64%	12
2003	353	7	8.15	8.10	0.05	4.2	3.2	4.6	77.49%	0.00%	13.68%	1.96%	1.96%	4.91%	13
2001	101	11	7.91	7.87	0.04	3.6	2.8	4.1	73.06%	0.00%	14.91%	2.41%	3.61%	6.02%	14
2002	335	99	8.05	8.02	0.04	4.0	3.0	4.5	75.97%	0.00%	14.23%	2.45%	2.45%	4.90%	15
2001	60	7	7.91	7.87	0.04	3.6	2.8	4.1	74.08%	0.00%	15.35%	2.64%	2.64%	5.29%	16
2001	76	11	7.91	7.87	0.03	3.6	2.8	4.1	75.07%	0.00%	15.15%	2.79%	1.40%	5.59%	17
2002	220	1	8.37	8.33	0.03	4.9	3.5	5.1	80.98%	0.00%	11.99%	1.41%	1.41%	4.22%	18
2001	364	7	8.13	8.10	0.03	4.2	3.2	4.6	78.38%	0.00%	14.06%	1.51%	1.51%	4.54%	19
2003	9	7	8.05	8.02	0.03	4.0	3.0	4.5	78.07%	0.00%	14.26%	1.53%	1.53%	4.60%	20
2001	195	7	8.24	8.21	0.03	4.5	3.3	4.9	77.70%	0.00%	13.08%	1.54%	3.07%	4.61%	21
2003	23	11	8.04	8.02	0.03	4.0	3.0	4.5	77.23%	0.00%	14.80%	1.59%	1.59%	4.78%	22
2001	151	1	7.97	7.94	0.03	3.8	2.9	4.3	80.25%	0.00%	12.00%	1.55%	1.55%	4.65%	23
2001	240	7	8.36	8.33	0.03	4.9	3.5	5.1	76.93%	0.00%	15.00%	1.61%	1.61%	4.84%	24
2001	105	101	7.90	7.87	0.03	3.6	2.8	4.1	74.68%	0.00%	14.86%	1.74%	3.49%	5.23%	25

New IMPROVE Equation - Ranked Daily Visibility Change for Breton (Top 20 Days for Each Year)

YEAR	DAY	REC	DV(Total)	DV(BKG)	DELTA DV	F(RH)			% of Modeled Extinction by Species						Rank
						S	L	SS	% SO4	% NO3	% OC	% EC	% PMC	% PMF	
2001	267	138	8.59	8.33	0.26	4.9	3.5	5.1	79.26%	0.00%	12.10%	1.70%	2.54%	4.41%	1
2001	216	139	8.55	8.33	0.22	4.9	3.5	5.1	78.91%	0.00%	11.98%	1.78%	2.97%	4.36%	2
2001	320	133	8.24	8.02	0.22	4.0	3.0	4.5	75.24%	0.00%	14.05%	2.06%	3.50%	5.15%	3
2001	176	103	8.40	8.21	0.19	4.5	3.3	4.9	77.58%	0.00%	12.85%	1.87%	3.03%	4.67%	4
2001	266	111	8.50	8.33	0.17	4.9	3.5	5.1	79.15%	0.00%	12.13%	1.80%	2.57%	4.36%	5
2001	205	141	8.50	8.33	0.17	4.9	3.5	5.1	78.79%	0.00%	11.95%	1.80%	3.09%	4.37%	6
2001	322	123	8.18	8.02	0.17	4.0	3.0	4.5	75.85%	0.00%	14.19%	1.89%	2.96%	5.12%	7
2001	79	141	8.18	8.02	0.17	4.0	3.0	4.5	75.54%	0.00%	14.21%	1.89%	3.24%	5.12%	8
2001	294	107	8.18	8.02	0.17	4.0	3.0	4.5	75.80%	0.00%	14.13%	1.91%	2.99%	5.17%	9
2001	235	134	8.48	8.33	0.15	4.9	3.5	5.1	78.94%	0.00%	12.00%	1.75%	2.92%	4.38%	10
2001	259	105	8.48	8.33	0.15	4.9	3.5	5.1	78.83%	0.00%	11.97%	1.78%	2.97%	4.45%	11
2001	304	136	8.13	8.02	0.11	4.0	3.0	4.5	75.59%	0.00%	13.98%	2.01%	3.21%	5.21%	12
2001	274	131	8.44	8.33	0.11	4.9	3.5	5.1	79.18%	0.00%	11.92%	1.62%	2.83%	4.45%	13
2001	276	107	8.12	8.02	0.10	4.0	3.0	4.5	75.83%	0.00%	14.14%	1.82%	3.19%	5.02%	14
2001	51	112	8.03	7.94	0.10	3.8	2.9	4.3	74.72%	0.00%	14.94%	1.88%	3.29%	5.17%	15
2001	292	141	8.11	8.02	0.10	4.0	3.0	4.5	75.74%	0.00%	14.31%	1.90%	2.84%	5.21%	16
2001	311	125	8.11	8.02	0.09	4.0	3.0	4.5	75.74%	0.00%	14.16%	1.92%	2.89%	5.29%	17
2001	256	141	8.43	8.33	0.09	4.9	3.5	5.1	79.21%	0.00%	11.93%	1.87%	2.80%	4.20%	18
2001	217	141	8.42	8.33	0.09	4.9	3.5	5.1	79.59%	0.00%	11.95%	1.49%	2.49%	4.48%	19
2001	11	129	8.10	8.02	0.09	4.0	3.0	4.5	75.64%	0.00%	14.02%	2.07%	3.10%	5.17%	20
2002	242	141	8.51	8.33	0.17	4.9	3.5	5.1	79.02%	0.00%	12.06%	1.79%	2.81%	4.34%	1
2002	243	141	8.50	8.33	0.17	4.9	3.5	5.1	79.08%	0.00%	12.00%	1.57%	2.89%	4.46%	2
2002	143	140	8.27	8.10	0.17	4.2	3.2	4.6	76.47%	0.00%	13.47%	1.90%	3.26%	4.89%	3
2002	173	109	8.36	8.21	0.15	4.5	3.3	4.9	77.86%	0.00%	12.84%	1.74%	2.91%	4.65%	4
2002	342	107	8.12	8.02	0.11	4.0	3.0	4.5	75.08%	0.00%	14.09%	2.17%	3.46%	5.20%	5
2002	343	141	8.12	8.02	0.10	4.0	3.0	4.5	75.32%	0.00%	14.20%	2.18%	3.06%	5.24%	6
2002	344	133	8.12	8.02	0.10	4.0	3.0	4.5	75.82%	0.00%	14.28%	1.80%	3.15%	4.95%	7
2002	169	134	8.30	8.21	0.10	4.5	3.3	4.9	77.92%	0.00%	12.86%	1.84%	2.77%	4.61%	8
2002	296	134	8.11	8.02	0.10	4.0	3.0	4.5	75.92%	0.00%	14.05%	1.91%	2.86%	5.25%	9
2002	216	113	8.43	8.33	0.09	4.9	3.5	5.1	78.81%	0.00%	12.15%	1.90%	2.85%	4.28%	10
2002	267	106	8.42	8.33	0.09	4.9	3.5	5.1	79.49%	0.00%	12.16%	1.47%	2.45%	4.42%	11
2002	331	134	8.11	8.02	0.09	4.0	3.0	4.5	76.13%	0.00%	14.20%	2.04%	2.55%	5.09%	12
2002	313	137	8.10	8.02	0.08	4.0	3.0	4.5	75.53%	0.00%	14.03%	2.20%	3.29%	4.94%	13
2002	308	141	8.09	8.02	0.08	4.0	3.0	4.5	75.30%	0.00%	14.31%	1.73%	3.46%	5.20%	14
2002	174	103	8.28	8.21	0.08	4.5	3.3	4.9	77.92%	0.00%	12.70%	1.76%	2.93%	4.69%	15
2002	201	109	8.41	8.33	0.07	4.9	3.5	5.1	79.47%	0.00%	12.11%	1.80%	2.41%	4.21%	16
2002	337	131	8.09	8.02	0.07	4.0	3.0	4.5	75.49%	0.00%	14.31%	1.91%	3.19%	5.10%	17
2002	117	111	8.09	8.02	0.07	4.0	3.0	4.5	75.61%	0.00%	14.03%	1.94%	3.24%	5.18%	18
2002	256	141	8.40	8.33	0.07	4.9	3.5	5.1	79.36%	0.00%	12.14%	1.96%	1.96%	4.57%	19
2002	101	107	8.08	8.02	0.07	4.0	3.0	4.5	74.93%	0.00%	14.20%	2.04%	3.40%	5.43%	20
2003	251	141	8.47	8.33	0.14	4.9	3.5	5.1	79.25%	0.00%	12.12%	1.60%	2.55%	4.47%	1
2003	280	141	8.15	8.02	0.13	4.0	3.0	4.5	75.93%	0.00%	14.21%	2.04%	2.72%	5.10%	2
2003	347	113	8.15	8.02	0.13	4.0	3.0	4.5	75.34%	0.00%	14.13%	2.10%	3.16%	5.26%	3
2003	235	102	8.46	8.33	0.12	4.9	3.5	5.1	79.40%	0.00%	12.09%	1.77%	2.48%	4.26%	4
2003	250	125	8.45	8.33	0.12	4.9	3.5	5.1	79.21%	0.00%	11.96%	1.84%	2.57%	4.41%	5
2003	294	109	8.13	8.02	0.12	4.0	3.0	4.5	75.45%	0.00%	14.10%	1.94%	3.48%	5.03%	6
2003	27	141	8.13	8.02	0.11	4.0	3.0	4.5	76.13%	0.00%	14.14%	2.03%	2.43%	5.27%	7
2003	26	138	8.11	8.02	0.10	4.0	3.0	4.5	76.01%	0.00%	14.15%	1.87%	2.81%	5.15%	8
2003	361	141	8.11	8.02	0.10	4.0	3.0	4.5	75.83%	0.00%	14.26%	1.89%	2.83%	5.19%	9
2003	275	102	8.11	8.02	0.09	4.0	3.0	4.5	75.65%	0.00%	14.21%	1.93%	2.90%	5.31%	10
2003	319	134	8.10	8.02	0.09	4.0	3.0	4.5	76.14%	0.00%	14.03%	2.07%	2.59%	5.18%	11
2003	134	113	8.18	8.10	0.08	4.2	3.2	4.6	76.58%	0.00%	13.39%	1.67%	3.34%	5.02%	12
2003	290	120	8.09	8.02	0.08	4.0	3.0	4.5	75.63%	0.00%	13.93%	1.74%	3.48%	5.22%	13
2003	279	138	8.09	8.02	0.07	4.0	3.0	4.5	75.63%	0.00%	13.87%	1.85%	3.71%	4.94%	14
2003	261	107	8.41	8.33	0.07	4.9	3.5	5.1	79.43%	0.00%	12.14%	1.81%	2.41%	4.22%	15
2003	274	105	8.41	8.33	0.07	4.9	3.5	5.1	79.43%	0.00%	12.14%	1.81%	2.41%	4.22%	15
2003	315	141	8.08	8.02	0.06	4.0	3.0	4.5	75.87%	0.00%	14.44%	2.24%	2.24%	5.22%	17
2003	227	141	8.39	8.33	0.06	4.9	3.5	5.1	79.67%	0.00%	12.13%	1.49%	2.24%	4.47%	18
2003	145	102	8.15	8.10	0.05	4.2	3.2	4.6	76.70%	0.00%	13.63%	1.76%	2.64%	5.28%	19
2003	293	102	8.07	8.02	0.05	4.0	3.0	4.5	75.73%	0.00%	14.48%	1.78%	2.67%	5.34%	20

New IMPROVE Equation - Ranked Daily Visibility Change for Breton (Top 25 Days Over 3 Years)

YEAR	DAY	REC	DV(Total)	DV(BKG)	DELTA DV	F(RH)				% of Modeled Extinction by Species						Rank
						S	L	SS	% SO4	% NO3	% OC	% EC	% PMC	% PMF		
2001	267	138	8.59	8.33	0.26	4.9	3.5	5.1	79.26%	0.00%	12.10%	1.70%	2.54%	4.41%	1	
2001	216	139	8.55	8.33	0.22	4.9	3.5	5.1	78.91%	0.00%	11.98%	1.78%	3.50%	5.15%	2	
2001	320	133	8.24	8.02	0.22	4.0	3.0	4.5	75.24%	0.00%	14.05%	2.06%	2.97%	4.36%	3	
2001	176	103	8.40	8.21	0.19	4.5	3.3	4.9	77.58%	0.00%	12.85%	1.87%	3.03%	4.67%	4	
2002	242	141	8.51	8.33	0.17	4.9	3.5	5.1	79.02%	0.00%	12.06%	1.79%	2.96%	5.12%	5	
2001	266	111	8.50	8.33	0.17	4.9	3.5	5.1	79.15%	0.00%	12.13%	1.80%	3.09%	4.37%	6	
2001	205	141	8.50	8.33	0.17	4.9	3.5	5.1	78.79%	0.00%	11.95%	1.80%	3.24%	5.12%	7	
2001	322	123	8.18	8.02	0.17	4.0	3.0	4.5	75.85%	0.00%	14.19%	1.89%	2.99%	5.17%	8	
2001	79	141	8.18	8.02	0.17	4.0	3.0	4.5	75.54%	0.00%	14.21%	1.89%	2.57%	4.36%	9	
2002	243	141	8.50	8.33	0.17	4.9	3.5	5.1	79.08%	0.00%	12.00%	1.57%	2.92%	4.38%	10	
2001	294	107	8.18	8.02	0.17	4.0	3.0	4.5	75.80%	0.00%	14.13%	1.91%	2.97%	4.45%	11	
2002	143	140	8.27	8.10	0.17	4.2	3.2	4.6	76.47%	0.00%	13.47%	1.90%	3.21%	5.21%	12	
2002	173	109	8.36	8.21	0.15	4.5	3.3	4.9	77.86%	0.00%	12.84%	1.74%	2.83%	4.45%	13	
2001	235	134	8.48	8.33	0.15	4.9	3.5	5.1	78.94%	0.00%	12.00%	1.75%	3.19%	5.02%	14	
2001	259	105	8.48	8.33	0.15	4.9	3.5	5.1	78.83%	0.00%	11.97%	1.78%	3.29%	5.17%	15	
2003	251	141	8.47	8.33	0.14	4.9	3.5	5.1	79.25%	0.00%	12.12%	1.60%	2.84%	5.21%	16	
2003	280	141	8.15	8.02	0.13	4.0	3.0	4.5	75.93%	0.00%	14.21%	2.04%	2.89%	5.29%	17	
2003	347	113	8.15	8.02	0.13	4.0	3.0	4.5	75.34%	0.00%	14.13%	2.10%	2.80%	4.20%	18	
2003	235	102	8.46	8.33	0.12	4.9	3.5	5.1	79.40%	0.00%	12.09%	1.77%	3.10%	5.17%	19	
2003	250	125	8.45	8.33	0.12	4.9	3.5	5.1	79.21%	0.00%	11.96%	1.84%	2.49%	4.48%	20	
2003	294	109	8.13	8.02	0.12	4.0	3.0	4.5	75.45%	0.00%	14.10%	1.94%	3.24%	4.86%	21	
2001	304	136	8.13	8.02	0.11	4.0	3.0	4.5	75.59%	0.00%	13.98%	2.01%	2.64%	4.23%	22	
2003	27	141	8.13	8.02	0.11	4.0	3.0	4.5	76.13%	0.00%	14.14%	2.03%	2.81%	4.34%	23	
2001	274	131	8.44	8.33	0.11	4.9	3.5	5.1	79.18%	0.00%	11.92%	1.62%	2.89%	4.46%	24	
2002	342	107	8.12	8.02	0.11	4.0	3.0	4.5	75.08%	0.00%	14.09%	2.17%	3.26%	4.89%	25	

Old IMPROVE Equation - Ranked Daily Visibility Change for Saint Marks (Top 20 Days for Each Year)

YEAR	DAY	REC	DV(Total)	DV(BKG)	DELTA DV	F(RH)	% of Modeled Extinction by Species							Ranking
							% SO4	% NO3	% OC	% EC	% PMC	% PMF		
2001	222	11	7.771	7.669	0.103	4.4	80.62	0	13.02	1.43	1.27	3.66	1	
2001	362	2	7.763	7.669	0.095	3.8	77.58	0	14.51	1.59	2.24	4.08	2	
2001	138	7	7.736	7.669	0.068	3.5	76.16	0	15.46	1.69	2.34	4.35	3	
2001	187	1	7.736	7.669	0.067	4.1	79.16	0	13.72	1.5	1.75	3.86	4	
2001	193	99	7.735	7.669	0.066	4.1	79.56	0	13.79	1.51	1.27	3.88	5	
2001	194	1	7.734	7.669	0.065	4.1	79.3	0	13.74	1.51	1.58	3.87	6	
2001	139	7	7.733	7.669	0.064	3.5	75.89	0	15.41	1.69	2.68	4.33	7	
2001	223	7	7.728	7.669	0.06	4.4	80.47	0	13	1.42	1.46	3.66	8	
2001	101	11	7.716	7.669	0.048	3.4	75.43	0	15.77	1.73	2.64	4.43	9	
2001	60	7	7.713	7.669	0.044	3.4	75.86	0	15.85	1.74	2.09	4.46	10	
2001	76	11	7.71	7.669	0.042	3.4	76.7	0	16.03	1.76	1.01	4.51	11	
2001	364	7	7.706	7.669	0.037	3.8	78.25	0	14.63	1.6	1.39	4.12	12	
2001	195	7	7.705	7.669	0.037	4.1	78.89	0	13.67	1.5	2.09	3.85	13	
2001	240	7	7.705	7.669	0.036	4.4	80.38	0	12.98	1.42	1.57	3.65	14	
2001	151	1	7.705	7.669	0.036	3.5	76.65	0	15.56	1.7	1.71	4.38	15	
2001	105	101	7.702	7.669	0.033	3.4	75.64	0	15.81	1.73	2.38	4.45	16	
2001	80	7	7.7	7.669	0.032	3.4	76.3	0	15.95	1.75	1.52	4.49	17	
2001	354	7	7.696	7.669	0.027	3.8	77.96	0	14.58	1.6	1.76	4.1	18	
2001	325	7	7.694	7.669	0.026	3.7	77.29	0	14.84	1.63	2.07	4.18	19	
2001	192	1	7.691	7.669	0.023	4.1	79.22	0	13.73	1.5	1.68	3.86	20	
2002	198	1	7.73	7.669	0.062	4.1	79.74	0	13.82	1.51	1.05	3.89	1	
2002	335	99	7.715	7.669	0.046	3.7	77.6	0	14.9	1.63	1.67	4.19	2	
2002	220	1	7.709	7.669	0.04	4.4	80.65	0	13.02	1.43	1.24	3.66	3	
2002	186	11	7.699	7.669	0.03	4.1	79.1	0	13.71	1.5	1.83	3.86	4	
2002	197	11	7.694	7.669	0.025	4.1	79.94	0	13.85	1.52	0.8	3.9	5	
2002	185	7	7.694	7.669	0.025	4.1	79.38	0	13.76	1.51	1.49	3.87	6	
2002	155	7	7.692	7.669	0.024	4	79.14	0	14.06	1.54	1.31	3.95	7	
2002	113	7	7.688	7.669	0.02	3.4	76.8	0	16.05	1.76	0.87	4.52	8	
2002	239	7	7.687	7.669	0.019	4.4	80.22	0	12.96	1.42	1.75	3.64	9	
2002	364	11	7.685	7.669	0.017	3.8	78.34	0	14.65	1.6	1.29	4.12	10	
2002	272	11	7.684	7.669	0.015	4.2	79.8	0	13.5	1.48	1.42	3.8	11	
2002	260	101	7.683	7.669	0.015	4.2	79.97	0	13.53	1.48	1.21	3.81	12	
2002	10	1	7.683	7.669	0.014	3.7	77.45	0	14.87	1.63	1.85	4.18	13	
2002	347	1	7.682	7.669	0.013	3.8	77.65	0	14.52	1.59	2.15	4.08	14	
2002	42	99	7.682	7.669	0.013	3.4	76.77	0	16.04	1.76	0.92	4.51	15	
2002	261	7	7.68	7.669	0.012	4.2	80.06	0	13.55	1.48	1.08	3.81	16	
2002	126	7	7.68	7.669	0.012	3.5	75.98	0	15.43	1.69	2.57	4.34	17	
2002	154	7	7.68	7.669	0.011	4	79.05	0	14.04	1.54	1.42	3.95	18	
2002	346	1	7.679	7.669	0.01	3.8	77.05	0	14.41	1.58	2.91	4.05	19	
2002	73	7	7.679	7.669	0.01	3.4	75.15	0	15.71	1.72	3.01	4.42	20	
2003	60	7	7.76	7.669	0.092	3.4	76.09	0	15.9	1.74	1.8	4.47	1	
2003	20	7	7.751	7.669	0.082	3.7	77.82	0	14.95	1.64	1.39	4.2	2	
2003	295	1	7.735	7.669	0.066	3.8	77.82	0	14.55	1.59	1.94	4.09	3	
2003	353	7	7.725	7.669	0.057	3.8	78	0	14.59	1.6	1.72	4.1	4	
2003	9	7	7.706	7.669	0.038	3.7	77.94	0	14.97	1.64	1.25	4.21	5	
2003	23	11	7.705	7.669	0.036	3.7	78.2	0	15.02	1.65	0.91	4.22	6	
2003	151	1	7.7	7.669	0.031	3.5	76.61	0	15.55	1.7	1.76	4.38	7	
2003	78	11	7.699	7.669	0.03	3.4	75.24	0	15.73	1.72	2.89	4.42	8	
2003	150	1	7.697	7.669	0.028	3.5	76.6	0	15.55	1.7	1.77	4.37	9	
2003	318	11	7.693	7.669	0.025	3.7	76.99	0	14.79	1.62	2.44	4.16	10	
2003	49	1	7.693	7.669	0.024	3.4	75.31	0	15.74	1.72	2.8	4.43	11	
2003	153	101	7.692	7.669	0.023	4	79.33	0	14.09	1.54	1.06	3.96	12	
2003	288	1	7.689	7.669	0.021	3.8	78.27	0	14.64	1.6	1.36	4.12	13	
2003	221	1	7.689	7.669	0.021	4.4	80.11	0	12.94	1.42	1.89	3.64	14	
2003	162	11	7.689	7.669	0.021	4	79.37	0	14.1	1.54	1.01	3.97	15	
2003	161	11	7.689	7.669	0.021	4	79.39	0	14.1	1.55	0.99	3.97	16	
2003	7	11	7.689	7.669	0.02	3.7	77.04	0	14.8	1.62	2.38	4.16	17	
2003	224	7	7.687	7.669	0.018	4.4	80.19	0	12.95	1.42	1.81	3.64	18	
2003	223	1	7.687	7.669	0.018	4.4	80.14	0	12.94	1.42	1.86	3.64	19	
2003	103	1	7.686	7.669	0.018	3.4	75.4	0	15.76	1.73	2.7	4.43	20	

Old IMPROVE Equation - Ranked Daily Visibility Change for Saint Marks (Top 25 Days Over 3 Years)

YEAR	DAY	REC	DV(Total)	DV(BKG)	DELTA DV	F(RH)	% of Modeled Extinction by Species						Ranking
							% SO4	% NO3	% OC	% EC	% PMC	% PMF	
2001	222	11	7.771	7.669	0.103	4.4	80.62	0	13.02	1.43	1.27	3.66	1
2001	362	2	7.763	7.669	0.095	3.8	77.58	0	14.51	1.59	2.24	4.08	2
2003	60	7	7.76	7.669	0.092	3.4	76.09	0	15.9	1.74	1.8	4.47	3
2003	20	7	7.751	7.669	0.082	3.7	77.82	0	14.95	1.64	1.39	4.2	4
2001	138	7	7.736	7.669	0.068	3.5	76.16	0	15.46	1.69	2.34	4.35	5
2001	187	1	7.736	7.669	0.067	4.1	79.16	0	13.72	1.5	1.75	3.86	6
2001	193	99	7.735	7.669	0.066	4.1	79.56	0	13.79	1.51	1.27	3.88	7
2003	295	1	7.735	7.669	0.066	3.8	77.82	0	14.55	1.59	1.94	4.09	8
2001	194	1	7.734	7.669	0.065	4.1	79.3	0	13.74	1.51	1.58	3.87	9
2001	139	7	7.733	7.669	0.064	3.5	75.89	0	15.41	1.69	2.68	4.33	10
2002	198	1	7.73	7.669	0.062	4.1	79.74	0	13.82	1.51	1.05	3.89	11
2001	223	7	7.728	7.669	0.06	4.4	80.47	0	13	1.42	1.46	3.66	12
2003	353	7	7.725	7.669	0.057	3.8	78	0	14.59	1.6	1.72	4.1	13
2001	101	11	7.716	7.669	0.048	3.4	75.43	0	15.77	1.73	2.64	4.43	14
2002	335	99	7.715	7.669	0.046	3.7	77.6	0	14.9	1.63	1.67	4.19	15
2001	60	7	7.713	7.669	0.044	3.4	75.86	0	15.85	1.74	2.09	4.46	16
2001	76	11	7.71	7.669	0.042	3.4	76.7	0	16.03	1.76	1.01	4.51	17
2002	220	1	7.709	7.669	0.04	4.4	80.65	0	13.02	1.43	1.24	3.66	18
2003	9	7	7.706	7.669	0.038	3.7	77.94	0	14.97	1.64	1.25	4.21	19
2001	364	7	7.706	7.669	0.037	3.8	78.25	0	14.63	1.6	1.39	4.12	20
2001	195	7	7.705	7.669	0.037	4.1	78.89	0	13.67	1.5	2.09	3.85	21
2001	240	7	7.705	7.669	0.036	4.4	80.38	0	12.98	1.42	1.57	3.65	22
2001	151	1	7.705	7.669	0.036	3.5	76.65	0	15.56	1.7	1.71	4.38	23
2003	23	11	7.705	7.669	0.036	3.7	78.2	0	15.02	1.65	0.91	4.22	24
2001	105	101	7.702	7.669	0.033	3.4	75.64	0	15.81	1.73	2.38	4.45	25

Old IMPROVE Equation - Ranked Daily Visibility Change for Breton (Top 20 Days for Each Year)

YEAR	DAY	REC	DV(Total)	DV(BKG)	DELTA DV	F(RH)	% SO4	% of Modeled Extinction by Species					Ranking
								% NO3	% OC	% EC	% PMC	% PMF	
2001	267	138	8.004	7.692	0.312	4.2	79.15	0	13.39	1.47	2.23	3.77	1
2001	320	133	7.966	7.692	0.274	3.7	76.69	0	14.73	1.61	2.83	4.14	2
2001	216	139	7.964	7.692	0.273	4.3	79.28	0	13.1	1.44	2.5	3.69	3
2001	176	103	7.925	7.692	0.233	4	78.11	0	13.88	1.52	2.59	3.9	4
2001	322	123	7.903	7.692	0.211	3.7	77.06	0	14.8	1.62	2.36	4.16	5
2001	205	141	7.902	7.692	0.211	4.3	79.22	0	13.09	1.43	2.57	3.68	6
2001	79	141	7.902	7.692	0.21	3.7	76.91	0	14.77	1.62	2.55	4.16	7
2001	294	107	7.9	7.692	0.208	3.7	77.04	0	14.8	1.62	2.38	4.16	8
2001	266	111	7.899	7.692	0.208	4.2	79.16	0	13.39	1.47	2.22	3.77	9
2001	235	134	7.878	7.692	0.186	4.3	79.22	0	13.09	1.43	2.57	3.68	10
2001	259	105	7.871	7.692	0.179	4.2	78.95	0	13.36	1.46	2.47	3.76	11
2001	304	136	7.833	7.692	0.142	3.7	76.99	0	14.79	1.62	2.44	4.16	12
2001	274	131	7.824	7.692	0.132	4.2	78.88	0	13.35	1.46	2.55	3.75	13
2001	276	107	7.817	7.692	0.125	3.7	76.96	0	14.78	1.62	2.48	4.16	14
2001	51	112	7.813	7.692	0.122	3.5	75.92	0	15.41	1.69	2.65	4.34	15
2001	292	141	7.812	7.692	0.121	3.7	77	0	14.79	1.62	2.43	4.16	16
2001	311	125	7.81	7.692	0.118	3.7	77.14	0	14.82	1.62	2.25	4.17	17
2001	256	141	7.807	7.692	0.115	4.2	78.91	0	13.35	1.46	2.52	3.76	18
2001	217	141	7.802	7.692	0.11	4.3	79.54	0	13.14	1.44	2.17	3.7	19
2001	11	129	7.802	7.692	0.11	3.7	76.91	0	14.77	1.62	2.54	4.16	20
2002	242	141	7.904	7.692	0.212	4.3	79.41	0	13.12	1.44	2.34	3.69	1
2002	243	141	7.899	7.692	0.207	4.3	79.26	0	13.1	1.43	2.53	3.68	2
2002	143	140	7.895	7.692	0.203	3.8	77.22	0	14.44	1.58	2.7	4.06	3
2002	173	109	7.88	7.692	0.188	4	78.22	0	13.9	1.52	2.46	3.91	4
2002	342	107	7.823	7.692	0.131	3.7	76.76	0	14.74	1.61	2.74	4.15	5
2002	343	141	7.822	7.692	0.13	3.7	76.92	0	14.77	1.62	2.53	4.16	6
2002	344	133	7.819	7.692	0.127	3.7	76.92	0	14.77	1.62	2.54	4.16	7
2002	296	134	7.811	7.692	0.119	3.7	77.09	0	14.8	1.62	2.32	4.16	8
2002	169	134	7.811	7.692	0.119	4	78.22	0	13.9	1.52	2.45	3.91	9
2002	216	113	7.806	7.692	0.114	4.3	79.39	0	13.12	1.44	2.36	3.69	10
2002	331	134	7.804	7.692	0.112	3.7	77.26	0	14.84	1.63	2.09	4.17	11
2002	267	106	7.801	7.692	0.11	4.2	79.14	0	13.39	1.47	2.24	3.77	12
2002	313	137	7.796	7.692	0.104	3.7	76.78	0	14.75	1.62	2.71	4.15	13
2002	308	141	7.79	7.692	0.099	3.7	76.79	0	14.75	1.62	2.7	4.15	14
2002	174	103	7.786	7.692	0.094	4	78.19	0	13.89	1.52	2.49	3.91	15
2002	201	109	7.783	7.692	0.091	4.3	79.66	0	13.16	1.44	2.02	3.7	16
2002	337	131	7.781	7.692	0.089	3.7	76.9	0	14.77	1.62	2.56	4.15	17
2002	117	111	7.778	7.692	0.086	3.6	76.31	0	15.06	1.65	2.74	4.24	18
2002	256	141	7.774	7.692	0.082	4.2	79.47	0	13.44	1.47	1.83	3.78	19
2002	101	107	7.774	7.692	0.082	3.6	76.12	0	15.03	1.65	2.98	4.23	20
2003	280	141	7.859	7.692	0.167	3.7	77.14	0	14.81	1.62	2.25	4.17	1
2003	251	141	7.859	7.692	0.167	4.2	79.25	0	13.41	1.47	2.1	3.77	2
2003	347	113	7.853	7.692	0.162	3.7	76.88	0	14.76	1.62	2.58	4.15	3
2003	235	102	7.845	7.692	0.153	4.3	79.63	0	13.16	1.44	2.06	3.7	4
2003	294	109	7.839	7.692	0.147	3.7	76.62	0	14.72	1.61	2.91	4.14	5
2003	250	125	7.837	7.692	0.145	4.2	79.17	0	13.4	1.47	2.19	3.77	6
2003	27	141	7.832	7.692	0.14	3.7	77.49	0	14.88	1.63	1.81	4.19	7
2003	26	138	7.814	7.692	0.122	3.7	77.08	0	14.8	1.62	2.33	4.16	8
2003	361	141	7.812	7.692	0.121	3.7	77.25	0	14.84	1.63	2.12	4.17	9
2003	275	102	7.81	7.692	0.118	3.7	77.03	0	14.79	1.62	2.4	4.16	10
2003	319	134	7.802	7.692	0.11	3.7	77.39	0	14.86	1.63	1.94	4.18	11
2003	134	113	7.791	7.692	0.099	3.8	77.3	0	14.46	1.58	2.59	4.07	12
2003	290	120	7.79	7.692	0.098	3.7	76.78	0	14.75	1.62	2.71	4.15	13
2003	279	138	7.784	7.692	0.092	3.7	76.72	0	14.73	1.61	2.78	4.14	14
2003	274	105	7.781	7.692	0.089	4.2	79.26	0	13.41	1.47	2.08	3.77	15
2003	261	107	7.781	7.692	0.089	4.2	79.14	0	13.39	1.47	2.23	3.77	16
2003	315	141	7.769	7.692	0.077	3.7	77.26	0	14.84	1.63	2.1	4.17	17
2003	227	141	7.765	7.692	0.074	4.3	79.8	0	13.19	1.44	1.86	3.71	18
2003	293	102	7.756	7.692	0.064	3.7	76.95	0	14.78	1.62	2.49	4.16	19
2003	145	102	7.755	7.692	0.063	3.8	77.56	0	14.5	1.59	2.27	4.08	20

Old IMPROVE Equation - Ranked Daily Visibility Change for Breton (Top 25 Days Over 3 Years)

YEAR	DAY	REC	DV(Total)	DV(BKG)	DELTA DV	F(RH)	% of Modeled Extinction by Species						Ranking
							% SO4	% NO3	% OC	% EC	% PMC	% PMF	
2001	267	138	8.004	7.692	0.312	4.2	79.15	0	13.39	1.47	2.23	3.77	1
2001	320	133	7.966	7.692	0.274	3.7	76.69	0	14.73	1.61	2.83	4.14	2
2001	216	139	7.964	7.692	0.273	4.3	79.28	0	13.1	1.44	2.5	3.69	3
2001	176	103	7.925	7.692	0.233	4	78.11	0	13.88	1.52	2.59	3.9	4
2002	242	141	7.904	7.692	0.212	4.3	79.41	0	13.12	1.44	2.34	3.69	5
2001	322	123	7.903	7.692	0.211	3.7	77.06	0	14.8	1.62	2.36	4.16	6
2001	205	141	7.902	7.692	0.211	4.3	79.22	0	13.09	1.43	2.57	3.68	7
2001	79	141	7.902	7.692	0.21	3.7	76.91	0	14.77	1.62	2.55	4.16	8
2001	294	107	7.9	7.692	0.208	3.7	77.04	0	14.8	1.62	2.38	4.16	9
2001	266	111	7.899	7.692	0.208	4.2	79.16	0	13.39	1.47	2.22	3.77	10
2002	243	141	7.899	7.692	0.207	4.3	79.26	0	13.1	1.43	2.53	3.68	11
2002	143	140	7.895	7.692	0.203	3.8	77.22	0	14.44	1.58	2.7	4.06	12
2002	173	109	7.88	7.692	0.188	4	78.22	0	13.9	1.52	2.46	3.91	13
2001	235	134	7.878	7.692	0.186	4.3	79.22	0	13.09	1.43	2.57	3.68	14
2001	259	105	7.871	7.692	0.179	4.2	78.95	0	13.36	1.46	2.47	3.76	15
2003	280	141	7.859	7.692	0.167	3.7	77.14	0	14.81	1.62	2.25	4.17	16
2003	251	141	7.859	7.692	0.167	4.2	79.25	0	13.41	1.47	2.1	3.77	17
2003	347	113	7.853	7.692	0.162	3.7	76.88	0	14.76	1.62	2.58	4.15	18
2003	235	102	7.845	7.692	0.153	4.3	79.63	0	13.16	1.44	2.06	3.7	19
2003	294	109	7.839	7.692	0.147	3.7	76.62	0	14.72	1.61	2.91	4.14	20
2003	250	125	7.837	7.692	0.145	4.2	79.17	0	13.4	1.47	2.19	3.77	21
2001	304	136	7.833	7.692	0.142	3.7	76.99	0	14.79	1.62	2.44	4.16	22
2003	27	141	7.832	7.692	0.14	3.7	77.49	0	14.88	1.63	1.81	4.19	23
2001	274	131	7.824	7.692	0.132	4.2	78.88	0	13.35	1.46	2.55	3.75	24
2002	342	107	7.823	7.692	0.131	3.7	76.76	0	14.74	1.61	2.74	4.15	25