Technical Support Document Derivation of DO Criteria for Florida's Fresh and Marine Waters Appendix I:

Protection of Threatened and Endangered Species in Portions of the Suwannee, Withlacoochee, Santa Fe, New, and St. Johns Rivers

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Table of Contents

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1 Introduction

The purpose of the Endangered Species Act (ESA) passed by Congress in 1973 is to protect and promote recovery of imperiled species and the ecosystems upon which they depend. To accomplish this objective, the ESA affords additional protection to threatened and endangered species to prevent: 1) damage to, or destruction of, a species' habitat; 2) overutilization of the species for commercial, recreational, scientific, or educational purposes; 3) disease or predation; 4) inadequacy of existing protection; and 5) other natural or manmade factors that affect the continued existence of the species.

During the development of the proposed dissolved oxygen (DO) criteria, FDEP has worked with the U.S. Fish and Wildlife Service (FWS) and NOAA's National Marine Fisheries Service (NMFS) to assure that the threatened and endangered species occurring in Florida are provided adequate protection. During their review of the proposed freshwater criteria, FWS and NMFS determined that four endangered species may not be fully protected by the proposed DO criteria. These species are the young of the year Gulf sturgeon (*Acipenser oxyrinchus desotoi*) that can be found in portions of the Suwannee, Santa Fe, and Withlacoochee Rivers, the oval pigtoe mussel (*Pleurobema pyriforme*) that inhabits portions of the Santa Fe and New Rivers, and young Atlantic (*Acipenser oxyrinchus*) and shortnose sturgeon (*Acipenser brevirostrum*) that can inhabit the St. Johns River. The specific areas where the Gulf sturgeon and mussel may be found are illustrated in **Figure 1**.

The St. Johns River represents the southern extent of the range for the Atlantic and shortnose sturgeon. Even though the evidence suggests that the sturgeon occurring in the St. Johns River are transient individuals that do not spawn in the St. Johns, the ESA still requires that the portions of the river where spawning may occur in the future be afforded additional protection. A map showing the portions of the St. Johns River where the sturgeon could potentially spawn is provided in **Figure 2**.

2 Summary of Existing DO Conditions in Portions of the Suwannee, Santa Fe, New, and Withlacoochee Rivers

Because relatively little information is available concerning the specific DO requirements of these species, especially for the mussel, and since the populations of the sturgeon and mussel are stable and may actually be increasing in these river systems, it is reasonable to assume that maintaining the existing DO conditions would provide adequate protection in the future.

To summarize the existing DO conditions, data for each river segment in the potential range of the young sturgeon and mussel were obtained from the Impaired Waters Rule (IWR) database for the period since 1966. After reviewing the data for the entire period of record (*i.e.,* 1966 – 2011), the period from 1991 through 2011 was chosen for use in summarizing the existing conditions. The 1991 to 2011 period was selected because the 21-year period is long enough to

capture the expected range of temporal variability and covers a significant portion of the period when the sturgeon population in the region has been stable or increasing. Additionally, the monitoring conducted prior to 1991 was conducted less frequently and often only covered portions of the year. Data collection after 1990 was more consistent, with a greater amount of data being collected that generally covered all months of the year. Therefore, to avoid biasing the summary of the existing DO conditions, the data collected prior to 1991 were omitted from further data analyses.

A summary of the existing DO conditions during the period from 1991 through 2011 for the portions of the Santa Fe and New Rivers potentially utilized by the Oval Pigtoe mussel is provided in **Table 1** by river system and individual river segment (River km/WBID). Similarly, the summary statistics for the portions of the Suwannee, Santa Fe, and Withlacoochee Rivers potentially utilized by the gulf sturgeon are provided in **Table 2** by river system and individual river segment.

3 Determining Whether DO Values Have Decreased Below the Baseline Distribution

To evaluate whether DO values have decreased below the baseline distribution, it is recommended that a) no more than 10 percent of the daily average values be below the 10th percentile of the existing data distribution for that river segment, b) no more than 50 percent of the daily average values be below the median of the existing data distributionfor that river segment. The 10th percentiles and median DO values for each of the affected river segments are provided in **Table 3**.

The recommended rule language is:

> *In the portions of the Suwannee, Withlacoochee (North), and Santa Fe Rivers utilized by the Gulf Sturgeon, and in the portions of the Santa Fe and New Rivers utilized by the oval pigtoe mussel, DO levels shall not be lowered below the baseline distribution such that more than 50 percent of daily average values are below the median of the baseline distribution or more than 10 percent of the daily average values are below the 10th percentile of the baseline distribution for the applicable waterbody. The baseline distributions are provided in Appendix I of the Technical Support Document for the Derivation of Dissolved Oxygen Criteria to Protect Aquatic Life in Florida's Fresh and Marine Waters, which is incorporated by reference.*

When assessing these waters in the future, compliance with both the 10th percentile and median DO values will be evaluated using a binomial hypothesis test at the 80 percent and 90 percent confidence levels necessary to place a water segment on the Planning List and Verified Lists, respectively, for TMDL development. The use of the binomial hypothesis test is consistent with the assessment for other water quality parameters conducted under Chapter 62-303, F.A.C. The number of exceedances required to have 80 percent and 90 percent confidence that more than 10 percent of the daily average values are below the applicable 10th percentile value are provided in Chapter 62-303, F.A.C. Tables 1 and 3, respectively. The number of exceedances required to have 80 percent and 90 percent confidence that more than 50 percent of the daily average values are below the applicable median value for sample sizes up to 419 are provided in **Table 4**.

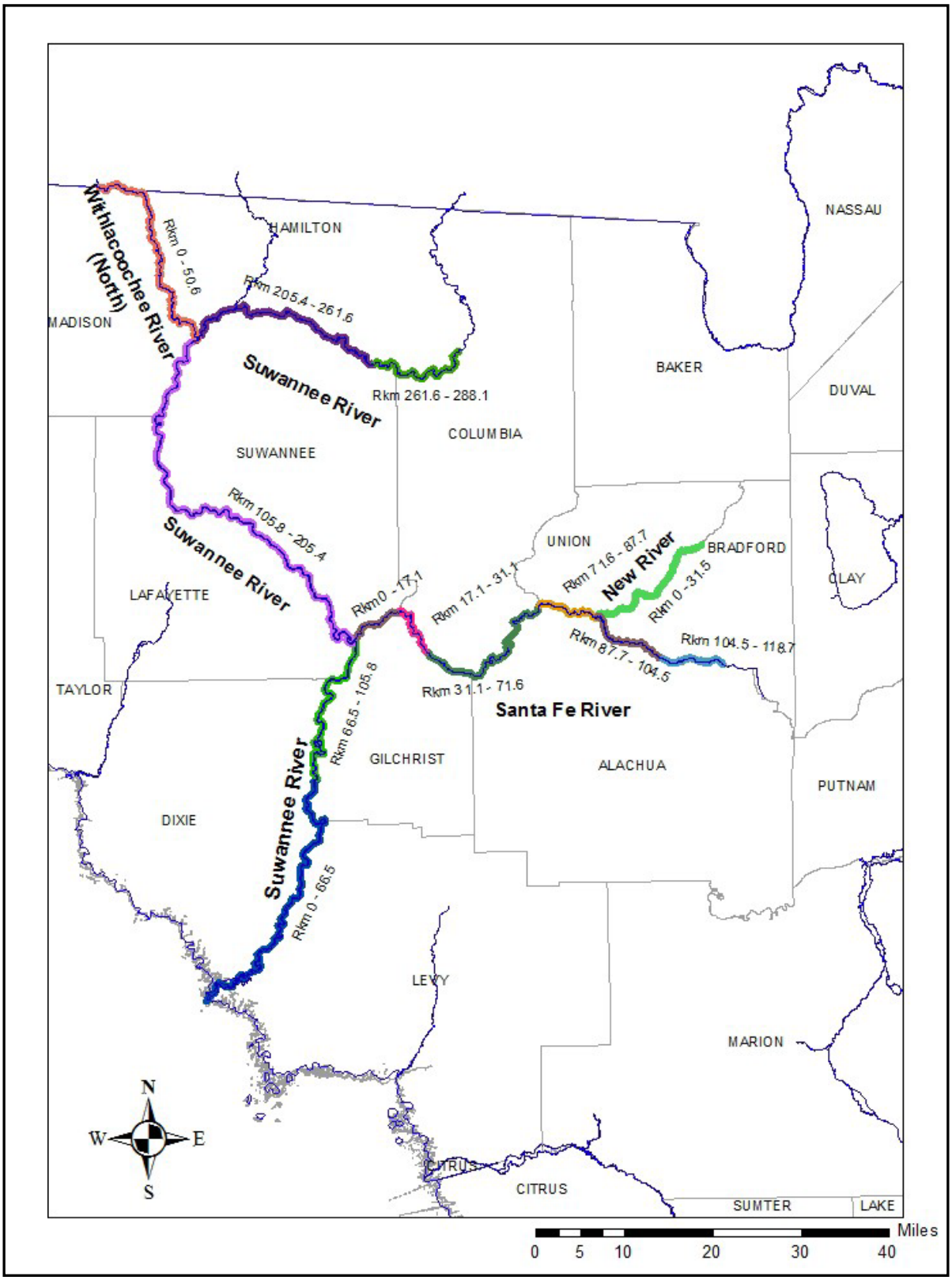

Figure 1. The portion of the Suwannee, Santa Fe, New, and Withlacoochee North Rivers utilized by the Gulf Sturgeon and oval pigtoe mussel requiring alternative DO criteria.

Table 1. Summary statistics for existing DO conditions in the portions of the Santa Fe and New Rivers utilized by the Oval Pigtoe mussel for the period from 1991 through 2011.

River System	WBID	River km	Statistic	DO Concentration (mg/L)	DO Percent Saturation
New	**3506**	**0 - 31.5 km**	Count	406	404
New	**3506**	**0 - 31.5 km**	Avg	6.42	67.14
New	**3506**	**0 - 31.5 km**	Std Dev	1.77	13.80
New	**3506**	**0 - 31.5 km**	10th percentile	4.60	52.48
New	**3506**	**0 - 31.5 km**	25th percentile	5.30	60.20
New	**3506**	**0 - 31.5 km**	50th percentile	6.29	67.65
New	**3506**	**0 - 31.5 km**	75th percentile	7.50	74.76
New	**3506**	**0 - 31.5 km**	90th percentile	8.62	80.62
Santa Fe	**3605D**	**71.6 - 87.7 km**	Count	269	269
Santa Fe	**3605D**	**71.6 - 87.7 km**	Avg	6.77	72.54
Santa Fe	**3605D**	**71.6 - 87.7 km**	Std Dev	1.69	11.96
Santa Fe	**3605D**	**71.6 - 87.7 km**	10th percentile	5.00	59.51
Santa Fe	**3605D**	**71.6 - 87.7 km**	25th percentile	5.60	65.49
Santa Fe	**3605D**	**71.6 - 87.7 km**	50th percentile	6.50	72.95
Santa Fe	**3605D**	**71.6 - 87.7 km**	75th percentile	7.80	79.40
Santa Fe	**3605D**	**71.6 - 87.7 km**	90th percentile	9.00	86.58
Santa Fe	**3605E**	**87.7 - 104.5 km**	Count	239	237
Santa Fe	**3605E**	**87.7 - 104.5 km**	Avg	6.32	67.33
Santa Fe	**3605E**	**87.7 - 104.5 km**	Std Dev	1.89	18.35
Santa Fe	**3605E**	**87.7 - 104.5 km**	10th percentile	4.00	46.06
Santa Fe	**3605E**	**87.7 - 104.5 km**	25th percentile	5.00	54.65
Santa Fe	**3605E**	**87.7 - 104.5 km**	50th percentile	6.20	69.16
Santa Fe	**3605E**	**87.7 - 104.5 km**	75th percentile	7.40	78.00
Santa Fe	**3605E**	**87.7 - 104.5 km**	90th percentile	8.58	85.32
Santa Fe	**3605**	**104.5 - 118.7 km**	Count	83	83
Santa Fe	**3605**	**104.5 - 118.7 km**	Avg	6.30	65.66
Santa Fe	**3605**	**104.5 - 118.7 km**	Std Dev	2.23	19.27
Santa Fe	**3605**	**104.5 - 118.7 km**	10th percentile	3.17	37.14
Santa Fe	**3605**	**104.5 - 118.7 km**	25th percentile	5.40	60.40
Santa Fe	**3605**	**104.5 - 118.7 km**	50th percentile	6.23	69.30
Santa Fe	**3605**	**104.5 - 118.7 km**	75th percentile	7.81	77.14
Santa Fe	**3605**	**104.5 - 118.7 km**	90th percentile	8.89	84.00

Table 2. Summary statistics for existing DO conditions in the portions of the Suwannee, Santa Fe and Withlacoochee Rivers utilized by the Gulf Sturgeon for the period from 1991 through 2011.

River System	WBID	River km	Statistic	DO Concentration (mg/L)	DO Percent Saturation
Santa Fe	3605A	0 - 17.1 km	Count	268	268
Santa Fe	3605A	0 - 17.1 km	Avg	5.85	66.17
Santa Fe	3605A	0 - 17.1 km	Std Dev	1.11	12.49
Santa Fe	3605A	0 - 17.1 km	10th percentile	4.50	50.90
Santa Fe	3605A	0 - 17.1 km	25th percentile	5.24	59.78
Santa Fe	3605A	0 - 17.1 km	50th percentile	5.90	66.04
Santa Fe	3605A	0 - 17.1 km	75th percentile	6.50	73.30
Santa Fe	3605A	0 - 17.1 km	90th percentile	7.13	80.82
Santa Fe	3605B	17.1 - 31.1 km	Count	52	49
Santa Fe	3605B	17.1 - 31.1 km	Avg	6.30	71.08
Santa Fe	3605B	17.1 - 31.1 km	Std Dev	1.52	16.46
Santa Fe	3605B	17.1 - 31.1 km	10th percentile	3.95	47.62
Santa Fe	3605B	17.1 - 31.1 km	25th percentile	5.56	61.00
Santa Fe	3605B	17.1 - 31.1 km	50th percentile	6.60	74.00
Santa Fe	3605B	17.1 - 31.1 km	75th percentile	7.34	85.00
Santa Fe	3605B	17.1 - 31.1 km	90th percentile	8.10	89.32
Santa Fe	3605C	31.1 - 71.6 km	Count	1201	1202
Santa Fe	3605C	31.1 - 71.6 km	Avg	4.79	53.70
Santa Fe	3605C	31.1 - 71.6 km	Std Dev	1.70	17.85
Santa Fe	3605C	31.1 - 71.6 km	10th percentile	2.66	30.69
Santa Fe	3605C	31.1 - 71.6 km	25th percentile	3.80	43.25
Santa Fe	3605C	31.1 - 71.6 km	50th percentile	4.70	53.56
Santa Fe	3605C	31.1 - 71.6 km	75th percentile	5.70	63.08
Santa Fe	3605C	31.1 - 71.6 km	90th percentile	7.05	76.96
Suwannee	3422	66.5 - 105.8 km	Count	290	290
Suwannee	3422	66.5 - 105.8 km	Avg	6.62	74.64
Suwannee	3422	66.5 - 105.8 km	Std Dev	1.29	13.75
Suwannee	3422	66.5 - 105.8 km	10th percentile	5.00	60.25
Suwannee	3422	66.5 - 105.8 km	25th percentile	5.62	65.22
Suwannee	3422	66.5 - 105.8 km	50th percentile	6.55	74.55
Suwannee	3422	66.5 - 105.8 km	75th percentile	7.60	81.70
Suwannee	3422	66.5 - 105.8 km	90th percentile	8.30	94.00
Suwannee	3422A	0 - 66.5 km	Count	1600	1598
Suwannee	3422A	0 - 66.5 km	Avg	6.71	76.40
Suwannee	3422A	0 - 66.5 km	Std Dev	1.43	14.88
Suwannee	3422A	0 - 66.5 km	10th percentile	4.90	58.90
Suwannee	3422A	0 - 66.5 km	25th percentile	5.80	68.40
Suwannee	3422A	0 - 66.5 km	50th percentile	6.76	76.69
Suwannee	3422A	0 - 66.5 km	75th percentile	7.62	83.90
Suwannee	3422A	0 - 66.5 km	90th percentile	8.40	93.16

Table 2. Continued.

River System	WBID	River km	Statistic	DO Concentration (mg/L)	DO Percent Saturation
Suwannee	3422B	105.8 - 205.4 km	Count	1898	1894
Suwannee	3422B	105.8 - 205.4 km	Avg	6.31	69.96
Suwannee	3422B	105.8 - 205.4 km	Std Dev	1.51	15.30
Suwannee	3422B	105.8 - 205.4 km	10th percentile	4.60	53.31
Suwannee	3422B	105.8 - 205.4 km	25th percentile	5.20	60.61
Suwannee	3422B	105.8 - 205.4 km	50th percentile	6.16	68.95
Suwannee	3422B	105.8 - 205.4 km	75th percentile	7.26	77.30
Suwannee	3422B	105.8 - 205.4 km	90th percentile	8.30	86.57
Suwannee	3341	205.4 - 261.6 km	Count	599	599
Suwannee	3341	205.4 - 261.6 km	Avg	5.91	64.04
Suwannee	3341	205.4 - 261.6 km	Std Dev	1.94	17.04
Suwannee	3341	205.4 - 261.6 km	10th percentile	3.55	41.07
Suwannee	3341	205.4 - 261.6 km	25th percentile	4.50	51.93
Suwannee	3341	205.4 - 261.6 km	50th percentile	5.70	66.40
Suwannee	3341	205.4 - 261.6 km	75th percentile	7.20	76.35
Suwannee	3341	205.4 - 261.6 km	90th percentile	8.60	84.24
Suwannee	3341A	261.6 - 288.1 km	Count	350	350
Suwannee	3341A	261.6 - 288.1 km	Avg	7.08	77.46
Suwannee	3341A	261.6 - 288.1 km	Std Dev	1.62	10.78
Suwannee	3341A	261.6 - 288.1 km	10th percentile	5.49	65.45
Suwannee	3341A	261.6 - 288.1 km	25th percentile	5.90	71.55
Suwannee	3341A	261.6 - 288.1 km	50th percentile	6.60	78.16
Suwannee	3341A	261.6 - 288.1 km	75th percentile	8.30	84.90
Suwannee	3341A	261.6 - 288.1 km	90th percentile	9.40	90.01
Withlacoochee	3315	0 - 50.6 km	Count	986	986
Withlacoochee	3315	0 - 50.6 km	Avg	6.51	69.93
Withlacoochee	3315	0 - 50.6 km	Std Dev	1.64	12.70
Withlacoochee	3315	0 - 50.6 km	10th percentile	4.71	54.90
Withlacoochee	3315	0 - 50.6 km	25th percentile	5.30	61.70
Withlacoochee	3315	0 - 50.6 km	50th percentile	6.13	68.20
Withlacoochee	3315	0 - 50.6 km	75th percentile	7.50	78.28
Withlacoochee	3315	0 - 50.6 km	90th percentile	8.90	86.30

Table 3. Baseline DO conditions for portions of the Suwannee, Santa Fe, New, and Withlacoochee Rivers utilized by the Gulf Sturgeon and Oval Pigtoe Mussel. The 10^{th} percentile and median percent DO saturation values were determined from data collected from 1991 through 2011.

Species	River System	River km	10th Percentile	Median
Oval Pigtoe Mussel	New River	0 - 31.5	52.5	67.7
Gulf Sturgeon	Santa Fe River	0 - 17.1	50.9	66.0
Gulf Sturgeon	Santa Fe River	17.1 - 31.1	47.6	74.0
Gulf Sturgeon	Santa Fe River	31.1 - 71.6	30.7	53.6
Oval Pigtoe Mussel	Santa Fe River	71.6 - 87.7	59.5	73.0
Oval Pigtoe Mussel	Santa Fe River	87.7 - 104.5	46.1	69.2
Oval Pigtoe Mussel	Santa Fe River	104.5 - 118.7	37.1	69.3
Gulf Sturgeon	Suwannee River	0 - 66.5	58.9	76.7
Gulf Sturgeon	Suwannee River	66.5 - 105.8	60.2	74.6
Gulf Sturgeon	Suwannee River	105.8 - 205.4	53.3	69.0
Gulf Sturgeon	Suwannee River	205.4 - 261.6	41.1	66.4
Gulf Sturgeon	Suwannee River	261.6 - 288.1	65.5	78.2
Gulf Sturgeon	Withlacoochee River	0 - 50.6	54.9	68.2

Table 4. Minimum number of samples not meeting applicable median criterion needed to put a water on the planning list with 80% confidence and on verified list with 90% confidence that more than 50% of daily average values are below median.

Number of Samples	*Number of exceedances required for 80% confidence that more than 50% of daily average values are below median*	*Number of exceedances required for 90% confidence that more than 50% of daily average values are below median*
10	7	8
11	8	9
12	8	9
13	9	10
14	10	10
15	10	11
16	11	12
17	11	12
18	12	13
19	12	13
20	13	14
21	13	14
22	14	15
23	15	16
24	15	16
25	16	17
26	16	17
27	17	18
28	17	18
29	18	19
30	18	20
31	19	20
32	19	21
33	20	21
34	20	22
35	21	22
36	22	23
37	22	23
38	23	24
39	23	24
40	24	25
41	24	26
42	25	26
43	25	27
44	26	27
45	26	28
46	27	28
47	27	29
48	28	29
49	28	30
50	29	31
51	30	31
52	30	32
53	31	32
54	31	33
55	32	33
56	32	34
57	33	34
58	33	35
59	34	35
60	34	36
61	35	37
62	35	37
63	36	38
64	36	38
65	37	39
66	37	39
67	38	40
68	38	40
69	39	41
70	40	41
71	40	42
72	41	42
73	41	43
74	42	44
75	42	44

Number of Samples	*Number of exceedances required for 80% confidence that more than 50% of daily average values are below median*	*Number of exceedances required for 90% confidence that more than 50% of daily average values are below median*
76	43	45
77	43	45
78	44	46
79	44	46
80	45	47
81	45	47
82	46	48
83	46	48
84	47	49
85	47	49
86	48	50
87	48	50
88	49	51
89	49	52
90	50	52
91	51	53
92	51	53
93	52	54
94	52	54
95	53	55
96	53	55
97	54	56
98	54	56
99	55	57
100	55	57
101	56	58
102	56	58
103	57	59
104	57	60
105	58	60
106	58	61
107	59	61
108	59	62
109	60	62
110	60	63
111	61	63
112	61	64
113	62	64
114	62	65
115	63	65
116	64	66
117	64	66
118	65	67
119	65	67
120	66	68
121	66	69
122	67	69
123	67	70
124	68	70
125	68	71
126	69	71
127	69	72
128	70	72
129	70	73
130	71	73
131	71	74
132	72	74
133	72	75
134	73	75
135	73	76
136	74	76
137	74	77
138	75	78
139	75	78
140	76	79
141	76	79

Table 4. Continued.

Number of Samples	Number of exceedances required for 80% confidence that more than 50% of daily average values are below median	Number of exceedances required for 90% confidence that more than 50% of daily average values are below median
142	77	80
143	78	80
144	78	81
145	79	81
146	79	82
147	80	82
148	80	83
149	81	83
150	81	84
151	82	84
152	82	85
153	83	85
154	83	86
155	84	86
156	84	87
157	85	88
158	85	88
159	86	89
160	86	89
161	87	90
162	87	90
163	88	91
164	88	91
165	89	92
166	89	92
167	90	93
168	90	93
169	91	94
170	91	94
171	92	95
172	93	95
173	93	96
174	94	96
175	94	97
176	95	97
177	95	98
178	96	99
179	96	99
180	97	100
181	97	100
182	98	101
183	98	101
184	99	102
185	99	102
186	100	103
187	100	103
188	101	104
189	101	104
190	102	105
191	102	105
192	103	106
193	103	106
194	104	107
195	104	107
196	105	108
197	105	108
198	106	109
199	106	110
200	107	110
201	107	111
202	108	111
203	108	112
204	109	112
205	110	113
206	110	113
207	111	114
208	111	114
209	112	115
210	112	115

Number of Samples	Number of exceedances required for 80% confidence that more than 50% of daily average values are below median	Number of exceedances required for 90% confidence that more than 50% of daily average values are below median
211	113	116
212	113	116
213	114	117
214	114	117
215	115	118
216	115	118
217	116	119
218	116	119
219	117	120
220	117	121
221	118	121
222	118	122
223	119	122
224	119	123
225	120	123
226	120	124
227	121	124
228	121	125
229	122	125
230	122	126
231	123	126
232	123	127
233	124	127
234	124	128
235	125	128
236	125	129
237	126	129
238	126	130
239	127	130
240	128	131
241	128	131
242	129	132
243	129	132
244	130	133
245	130	134
246	131	134
247	131	135
248	132	135
249	132	136
250	133	136
251	133	137
252	134	137
253	134	138
254	135	138
255	135	139
256	136	139
257	136	140
258	137	140
259	137	141
260	138	141
261	138	142
262	139	142
263	139	143
264	140	143
265	140	144
266	141	144
267	141	145
268	142	145
269	142	146
270	143	147
271	143	147
272	144	148
273	144	148
274	145	149
275	145	149
276	146	150
277	147	150
278	147	151
279	148	151

Table 4. Continued.

Number of Samples	Number of exceedances required for 80% confidence that more than 50% of daily average values are below median	Number of exceedances required for 90% confidence that more than 50% of daily average values are below median
280	148	152
281	149	152
282	149	153
283	150	153
284	150	154
285	151	154
286	151	155
287	152	155
288	152	156
289	153	156
290	153	157
291	154	157
292	154	158
293	155	158
294	155	159
295	156	160
296	156	160
297	157	161
298	157	161
299	158	162
300	158	162
301	159	163
302	159	163
303	160	164
304	160	164
305	161	165
306	161	165
307	162	166
308	162	166
309	163	167
310	163	167
311	164	168
312	164	168
313	165	169
314	165	169
315	166	170
316	166	170
317	167	171
318	168	171
319	168	172
320	169	172
321	169	173
322	170	173
323	170	174
324	171	175
325	171	175
326	172	176
327	172	176
328	173	177
329	173	177
330	174	178
331	174	178
332	175	179
333	175	179
334	176	180
335	176	180
336	177	181
337	177	181
338	178	182
339	178	182
340	179	183
341	179	183
342	180	184
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344	181	185
345	181	185
346	182	186
347	182	186
348	183	187
349	183	187
350	184	188
351	184	189
352	185	189
353	185	190
354	186	190
355	186	191
356	187	191
357	187	192
358	188	192
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360	189	193
361	189	194
362	190	194
363	191	195
364	191	195
365	192	196
366	192	196
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371	195	199
372	195	199
373	196	200
374	196	200
375	197	201
376	197	201
377	198	202
378	198	202
379	199	203
380	199	203
381	200	204
382	200	205
383	201	205
384	201	206
385	202	206
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4 Protection of the Atlantic and Shortnose Sturgeon

Based on discussions with NOAA's National Marine Fisheries Service (NMFS) staff responsible for the protection of the Atlantic and shortnose sturgeon, the area in the St. Johns River between the U.S. Highway 17 Bridge in Palatka north to the Shands Bridge (U.S. Highway 16) bridge near Green Cove Springs (**Figure 2)** is an area where both species could potentially spawn in the future. According to the NMFS, any future spawning of the sturgeon in the St. Johns River would occur during the period from February through March.

To assure no adverse effects on the Atlantic and shortnose sturgeon juveniles, the current 5.0 mg/L DO criterion (i.e., 53% saturation) will be maintained in the St. Johns River between the U.S. Highway 17 Bridge in Palatka north to the Shands Bridge (U.S. Highway 16) bridge near Green Cove Springs during the months of February and March. During the other times of the year when the sturgeon are less sensitive, the generally applicable (i.e., 34% saturation) DO criteria apply.

4.1 *Sturgeon in the St. Marys River*

Historically, Atlantic and shortnose sturgeon have occasionally been found in portions of the St. Marys River. According to NMFS staff, most of the sturgeon captures in the St. Marys have occurred between river km 26 and 44. However, there is no evidence that spawning has occurred in the St. Marys River due to natural conditions not being favorable. Even though the portions of the Marys River where sturgeon have been captured have very limited anthropogenic inputs, the DO levels are naturally low with significant portions of the river commonly exhibiting DO concentrations below 3 mg/L as a result of the natural conditions including wetland inputs, high color, high degree of shading/canopy cover, low flow, etc. Additionally, NMFS staff have indicated that sturgeon have been captured in the St. Marys at DO concentrations as low as 2.7 mg/L.

While the natural DO levels in the St. Marys may not be ideal for the widespread occurrence of the sturgeon, FDEP is prohibited by state statute from implementing regulations that would require natural background conditions to be ameliorated. Since the DO criteria proposed for the Northeast and Big Bend bioregion are protective of the natural DO levels found in the St. Marys River, no additional modification was deemed necessary.

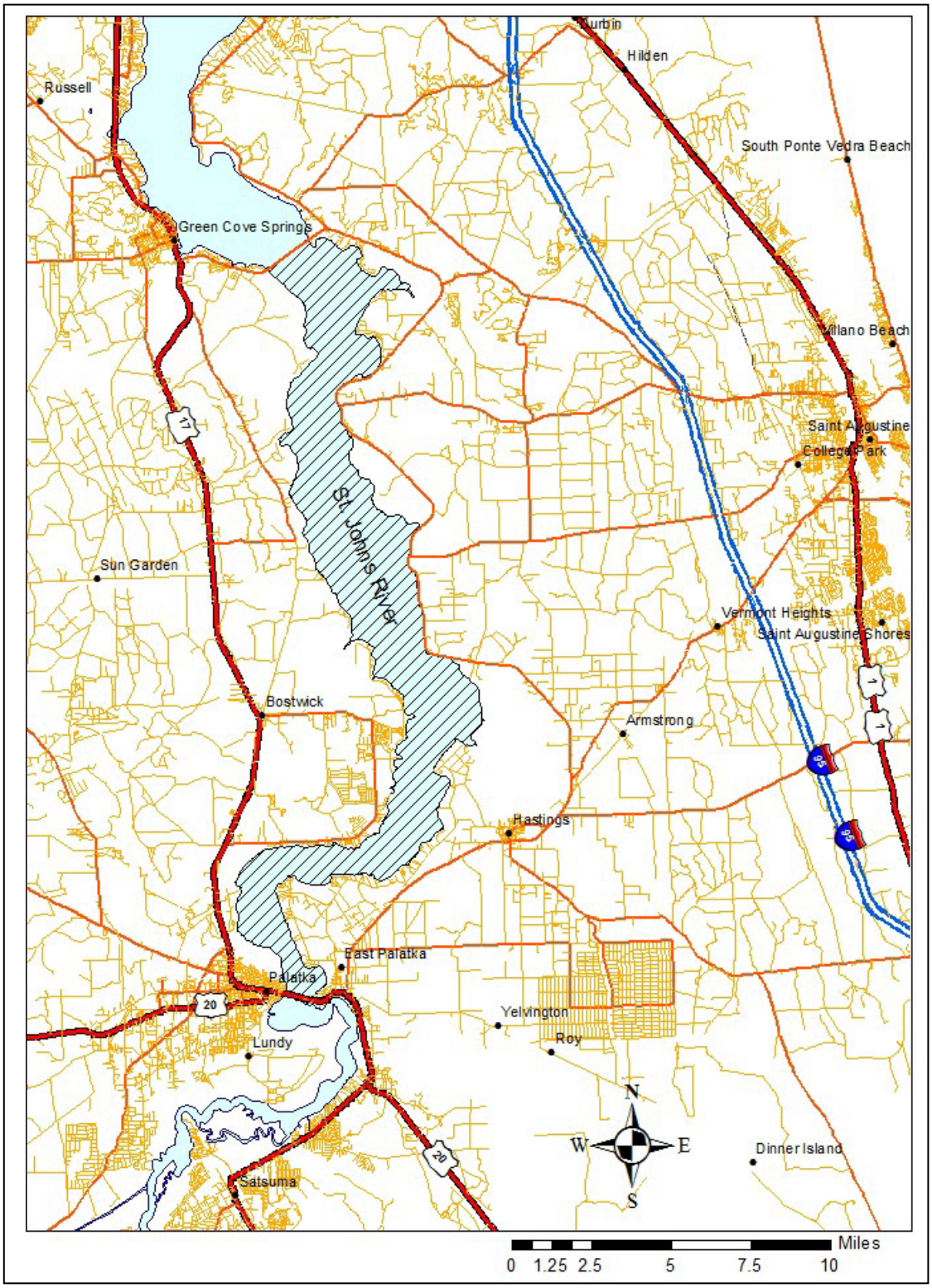

Figure 2. The portion of the St. Johns River between the U.S. Highway 17 Bridge in Palatka north to the Shands Bridge (U.S. Highway 16) bridge near Green Cove Springs (shown by hatching) requiring alternative DO criteria to assure potential sturgeon spawning habitat is protected.