

Table A. Controlling Error Rates by Defining the Number of Exceedances for Various Sample Sizes.

Number of Exceed/Samples	Current Listing Practice: Type 1 Error is controlled to be below 20% (current sample nonsupport is shaded)						Current Listing Practice: Type 1 Error is controlled to be below 50% for toxic criteria and for DO grabs which result in concerns that require 24-hr monitoring to verify impairment		
	Number of AUs for DO minimum	Number of AUs for pH	Type 1 Error (when 10% of the time the water body exceeds the criteria)	Type 2 Error (when 11% of the time the water body exceeds the criteria)	Number of AUs for E. coli	Type 1 Error (when 25% of the time the water body exceeds the criteria)	Type 2 Error (when 26% of the time the water body exceeds the criteria)	Number of AUs for acute criteria (Current nonsupporting AUs are shaded)	Number of AUs for grab DO (Current concerns requiring 24-hr monitoring are shaded)
1/10	4	2	65	31	0	94	05	2	5
2/10	2	0	26	70	3	76	22	0	2
3/10	0	1	07	91	2	47	50	0	2
4/10	0	0	01	98	1	22	75	0	0
5/10	0	0	00	100	0	08	91	0	2
1/11	5	3	67	28	6	96	04	2	5
2/11	1	0	30	65	3	80	18	1	2
3/11	1	0	09	89	1	54	42	0	3
4/11	1	0	02	97	0	29	69	0	0
5/11	0	0	00	100	0	11	87	0	2

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	Number of AUs for DO minimum	Number of AUs for pH	Type 1 Error (when 10% of the time the water body exceeds the criteria)	Type 2 Error (when 11% of the time the water body exceeds the criteria)	Number of AUs for E. coli	Type 1 Error (when 25% of the time the water body exceeds the criteria)	Type 2 Error (when 26% of the time the water body exceeds the criteria)	Number of AUs for acute criteria (Current nonsupporting AUs are shaded)	Number of AUs for grab DO (Current concerns requiring 24-hr monitoring are shaded)
1/12	2	1	72	25	3	97	03	2	5
2/12	2	1	34	61	2	84	14	0	4
3/12	1	0	11	86	2	61	36	0	2
4/12	0	0	03	96	0	35	62	0	3
5/12	0	0	00	99	0	16	82	0	0
1/13	3	2	75	22	0	98	02	0	9
2/13	1	2	38	57	0	87	11	0	2
3/13	0	0	13	83	1	67	30	0	2
4/13	0	1	03	95	1	42	55	0	0
5/13	0	0	01	99	0	21	77	0	0
6/13	1	0	00	100	0	08	91	0	1
1/14	5	3	77	20	1	98	01	1	12

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2/14	1	0	42	53	1	90	09	0	4
3/14	1	3	16	81	2	72	25	1	3
4/14	0	1	04	94	1	48	49	0	2
5/14	0	1	01	99	0	26	71	0	0
6/14	0	1	00	100	0	11	87	0	1
1/15	1	1	79	17	1	99	01	2	8
2/15	0	0	45	50	4	92	07	0	3
3/15	1	0	18	78	1	76	21	0	0
4/15	0	0	06	93	1	54	43	0	0
5/15	2	0	01	98	1	31	65	0	0
6/15	0	0	00	100	0	15	83	0	0
1/16	3	1	81	16	0	99	01	1	6

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2/16	0	0	49	46	0	94	05	0	3
3/16	0	0	21	75	0	80	17	0	1
4/16	0	0	07	91	1	60	37	0	0
5/16	0	0	02	98	2	37	59	0	0
6/16	0	0	00	99	0	19	78	0	0
1/17	2	1	83	14	0	99	01	0	10
2/17	2	1	52	43	0	95	04	0	4
3/17	0	0	24	71	0	84	14	0	1
4/17	1	0	08	89	0	65	32	0	0
5/17	0	0	02	97	0	43	54	0	1
6/17	2	0	00	99	0	23	73	0	0
7/17	1	1	00	100	0	11	87	0	3

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1/18	5	1	85	12	0	99	00	0	7
2/18	0	1	55	44	0	96	03	0	2
3/18	0	2	27	68	2	86	12	0	3
4/18	0	0	10	87	0	69	27	0	2
5/18	1	0	03	96	0	48	48	0	1
6/18	1	0	01	99	0	28	68	0	1
7/18	0	0	00	100	0	14	84	0	0
1/19	4	1	86	11	0	100	00	1	4
2/19	1	0	58	37	0	97	03	1	3
3/19	0	1	29	65	1	89	09	1	3
4/19	1	0	11	85	0	74	23	0	1
5/19	0	0	04	95	0	53	43	0	0

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6/19	0	0	01	99	0	33	63	0	0
7/19	0	0	00	100	0	17	80	0	2
1/20	1	1	88	10	0	100	00	0	12
2/20	3	2	61	34	0	98	02	0	5
3/20	2	0	32	62	1	91	08	0	2
4/20	1	0	13	83	0	77	20	0	1
5/20	2	1	04	94	0	59	38	0	0
6/20	0	0	01	98	1	38	58	0	0
7/20	0	0	00	100	0	21	75	0	0
8/20	0	0	00	100	0	10	88	0	3

Table B. Number of AUs with various combinations of samples and exceedances for DO grab minimum, pH, and E. coli grab (Handout #2)

Number of Samples	Parameter	Number of Exceedances																									
		0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	25	30	40	50	
4	DO	35	3	3																							
	pH	23	1	1																							
	E.coli	9		1																							
5	DO	30	3	1																							
	pH	25																									
	E.coli	11	3	2		1																					
6	DO	53	2		1																						
	pH	38			1																						
	E.coli	14	5	2	2	1																					
7	DO	47																									
	pH	31		1																							
	E.coli	7	5	3	2																						
8	DO	30	4		1																						
	pH	26		1																							
	E.coli	2	2	3		1																					
9	DO	35	1																								
	pH	18	3	3																							
	E.coli	6																									
10	DO	50	4	2																							
	pH	37	2		1																						
	E.coli	12	1	3	2	1		1	2																		

Number of Samples	Parameter	Number of Exceedances																								
		0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	25	30	40	50
11	DO	31	5	1	1	1																				
	pH	21	3																							
	E.coli	2	6	3	1																					
12	DO	35	2	2	1																					
	pH	22	1	1																						
	E.coli	3	3	2	2																					
13	DO	26	3	1				1																		
	pH	12	2	2		1																				
	E.coli	2			1	1																				
14	DO	44	5	1	1																					
	pH	34	3		3	1	1	1																		
	E.coli	2	1	1	2	1																				
15	DO	32	1		1		2																			
	pH	23	1																							
	E.coli	5	1	4	1	1	1		1																	
16	DO	34	3																							
	pH	31	1								1															
	E.coli	1				1	2																			
17	DO	37	2	2		1		2	1																	
	pH	33	1	1					1		1															
	E.coli									1	1															

Number of Samples	Parameter	Number of Exceedances																								
		0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	25	30	40	50
18	DO	25	5				1	1			1	1														
	pH	17	1	1	2							1														
	E.coli				2																					
19	DO	24	4	1		1																				
	pH	13	1		1																					
	E.coli	1			1																					
20	DO	27	1	3	2	1	2																			
	pH	21	1	2			1																			
	E.coli	2			1			1			1															
21	DO	23	7	2		1	2																			
	pH	13	2																							
	E.coli	1	1		2		1																			
22	DO	21	4	2	1		1		1																	
	pH	8		1																						
	E.coli	1	1										1													
23	DO	30	2	3	1		1		1																	
	pH	13	1		1																					
	E.coli		3	1											1											
24	DO	21						1																		
	pH	14				1		2																		

Number of Samples	Parameter	Number of Exceedances																								
		0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	25	30	40	50
	E.coli	6	1	1		1														1						
25	DO	27	4																							
	pH	19	4	4		1			1																	
	E.coli	10		4	1	1	3	2			1															
26	DO	18	4		2	1					1															
	pH	11	1	1		1	1																			
	E.coli	1	1	1	2	1	2			1					1											
27	DO	8	7			2																				
	pH	10	1		1	1																				
	E.coli	1		1																						
28	DO	17	2			1																				
	pH	12						1																		
	E.coli	2																								
29	DO	18	5				1																			
	pH	20	3			1																				
	E.coli														1		1									
30	DO	21	1	1				1	1																	
	pH	18	2				1			1																
	E.coli		1											1												

Number of Samples	Parameter	Number of Exceedances																								
		0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	25	30	40	50
31	DO	16	3																							
	pH	10	1			1								1												
	E.coli							1																		
39	DO	7	3																							
	pH	5																								
	E.coli																						1			
40	DO	8	2																							
	pH	4	2				1																			
	E.coli																									
41	DO	4	1	1						1																
	pH	2																								
	E.coli				1																					
49	DO	3	1																						1	
	pH	2																								
	E.coli												1													
50	DO	8	1						1																	
	pH	2	2																							
	E.coli																									
51	DO	4	1																							
	pH	5																								
	E.coli			1																						