APPENDIX

TABLE A1. TOTAL AND FECAL COLIFORM STANDARDS FOR PRIMARY CONTACT RECREATIONAL WATERS AS OF 1978

State[a]	Year Rev[b]	Water Type[c]	Total Coliform Limit per 100 ml			Fecal Coliform Limit per 100 ml		
			Average	Percentile	One Sample	Average	Percentile	One Sample
Alabama[1,2,3]	77	SW				LM[d] 100		
	77	SW				LM 200		
Alaska	79	ALL				Mean 20	90%≤40	
Arizona	73	FW				EPA	EPA	
Arkansas	77	FW				EPA	EPA	
California	78	SW	Ave 1000	80≤1000		EPA	EPA	
	76	FW	Med[e] 240		≤10,000	Med 50	90%≤400	
Colorado	75	FW				EPA	EPA	
Connecticut[4,5,6]	76	SW	Med 700	90%≤2300		EPA[f]	90%≤500[g]	
	76	FW	Med 1000	80%≤2400		EPA[f]	96%≤500[g]	
Delaware	75	ALL				EPA		
District of Columbia	Pro[h]	ALL				EPA	EPA	
Florida	74	ALL	LM 1000	80≤1000	≤2400	EPA	EPA	≤800
Georgia[1,2]	77	SW				LM 100[26]		
	77	FW				LM 200		
Hawaii	74	ALL	Med 1000	90%≤2400		EPA	EPA	
Idaho	Pro	FW				LM 50	90%≤200	≤500
Illinois	75	FW				EPA	EPA	
Indiana[7]	78	FW				EPA		≤400[a,i]
Iowa[8]	77	FW				EPA	EPA	
Kansas	78	FW				EPA	EPA	
Kentucky[9,10]	76	FW	Ave 1000	80%≤1000	≤2400	EPA[11]	EPA[11]	
Louisiana	77	ALL				EPA	EPA	

Table A1. (continued)

State[a]	Year Rev[b]	Water Type[c]	Total Coliform Limit per 100 ml Average	Percentile	One Sample	Fecal Coliform Limit per 100 ml Average	Percentile	One Sample
Maine	77	SW	Med 70	90%≤230		Med. 1000	90%≤200	
	77	FW				NTE 200[g,j]		
Maryland[12]	74	ALL				EPA	EPA	
Massachusetts[13]	78	SW	Med 700	90%≤1000				
	78	FW				EPA	EPA	
Michigan[27]	73	FW				EPA		
Minnesota[14]	77	FW				EPA	EPA	
Mississippi	77	ALL				EPA	EPA	
Missouri[i,8,15]	77	FW				EPA	EPA	
Montana	78	FW				EPA	EPA	
Nebraska	77	FW				EPA	EPA	
Nevada	74	FW				EPA	EPA	
New Hampshire[9]	77	ALL			240			
New Jersey[6]	74	ALL				EPA		
New Mexico[16]	77	FW				LM 100	90%≤200	
New York[9,17,18]	74	ALL	Med 2400	80%≤5000		EPA		
North Carolina[19,20]	77	ALL				EPA[16]	80%≤400	
North Dakota	77	FW				EPA	EPA	
Ohio[21]	78	FW				EPA	EPA	
Oklahoma	76	FW				EPA	EPA	
Oregon[22]	Pro	SW	Ave 240	80%≤240				
		FW	Ave 1000	80%≤2400				
Pennsylvania[18]	Pro	ALL				EPA		
Rhode Island	77	SW	Med 700	90%≤2300		Med 50		90%≤500
	77	FW	Med 100	80%≤2400		Med 200[g]		80%≤500[g]
South Carolina	77	ALL				EPA	EPA	
South Dakota	78	FW				EPA	80%≤200	≤400

Table A1. (continued)

State[a]	Year Rev[b]	Water Type[c]	Total Coliform Limit per 100 ml Average	Total Coliform Limit per 100 ml Percentile	Total Coliform Limit per 100 ml One Sample	Fecal Coliform Limit per 100 ml Average	Fecal Coliform Limit per 100 ml Percentile	Fecal Coliform Limit per 100 ml One Sample
Tennessee[1,23,24]	77	FW				EPA		≤1000
Texas[6]	76	ALL				EPA	EPA	
Utah	78	FW	LM 1000			EPA		
Vermont	78	FW	NTE 500			NTE 200		
Virginia	77	ALL				EPA	EPA	
Washington	77	SW				MED 14	90%≤43[25]	
	77	FW				LM 100	90%≤200[16]	
West Virginia	77	FW	Ave 1000	80%≤1000	≤2400	EPA	EPA	
Wisconsin[28]	78	FW				EPA	EPA	
Wyoming	78	FW				EPA	EPA	
Puerto Rico	76	ALL				EPA	80%≤400	
Virgin Islands	73	ALL				LM 70		
Trust Territory	73	ALL				EPA	EPA	
American Samoa	73	ALL				Ave 100	90%≤200	
Guam[9]	76	ALL				Ave 200	EPA	

[a] Does not include all the caveats, special requirements, limitations, etc.
[b] Year of latest revision.
[c] SW - seawater (estaurine and coastal); FW - freshwater.
[d] Log mean.
[e] Median.
[f] Geometric mean not to exceed 200/100 ml.
[g] Guideline.
[h] Proposed.
[i] In one month.
[j] Not to exceed.

[1] Waters in vicinity of STP outfall not suitable.
[2] Designated as "coastal" and "all other recreational waters."
[3] If standard exceeded, waters considered acceptable if a second sanitary survey and evaluation indicates no significant public health risk.
[4] For listed rivers, disinfection of STP effluents required; and standards only apply between months of May through September.
[5] "Coliform bacteria . . . are related to the probability of contamination by undisinfected sewage. High results may be due to soil bacteria or bacteria from the feces of warm-blooded animals which are not of sanitary significance."
[6] Sanitary surveys required.
[7] Applies only from April through October.
[8] Applies April 1 - October 31.
[9] Unless naturally occurring.
[10] If TC exceeded, then FC is used.
[11] Only applicable from May through October.
[12] Waters exceeding standard acceptable only if sanitary survey shows no significant public health risk.
[13] Except as provided in Regulation 2.1.
[14] Standards relate only to intrastate waters.
[15] Except when affected by stormwater runoff.
[16] Varies with body of water; standard as given used in most cases, EPA guideline used in a few.
[17] Applies only when disinfection is practiced.
[18] For "International Boundary Waters" under Great Lakes Water Quality agreement of 1972, log mean TC 1000/100 ml and FC 200/100 ml.
[19] Applicable only during May through September.
[20] Not applicable during or immediately following periods of rainfall.
[21] Where there are no lifeguards and/or bathhouse facilities, log mean of 1000/100 ml and 90% ≤2000/100 ml apply.
[22] "Bacterial pollution or other conditions deleterious to waters used for . . . bathing . . . or otherwise injurious to public health shall not be allowed."
[23] <1/100 ml set as 1/100 ml in calculating log mean.
[24] Individual samples cannot be collected within 12 hours of each other.
[25] Standard given is for Class A (Excellent) waters which ". . . shall meet or exceed the standards for all or substantially all uses . . ." Class AA (Extraordinary) fresh water standard is a median TC of 50/100, 90% ≤100/100 ml. Class B (Good) for fresh water is median FC of 200/100 ml, 90% ≤400/100 ml; for sea waters, the standard is the same as that for Class A fresh waters.
[26] If water quality and sanitary surveys show 200/100 ml exceeded occasionally due to "natural causes," log mean of 300/100 ml in lakes and reservoirs and 500/100 ml in free flowing FW streams becomes the limit.
[27] Limits may be exceeded if due to "uncontrollable non-point sources."
[28] Sanitary survey to assure protection is chief criterion; bacterial limits are guidelines.

TABLE A2. DEMOGRAPHIC CHARACTERISTICS OF THE FOUR SUBPOPULATIONS FOR 1974 NEW YORK CITY TRIALS

Demographic Group	Percent of Respondents by Category			
	BA Beach		RU Beach	
	Swim (N=1961)	Nonswim (N=1185)	Swim (N=2767)	Nonswim (N=4156)
Sex				
Male	44.0	33.5	46.9	27.1
Female	56.0	66.5	53.1	62.9
Age Group				
0-9	24.9	10.1	26.7	26.4
10-19	36.1	12.7	21.3	11.7
20-39	14.4	65.2	43.1	47.7
≥40	24.6	12.0	8.9	14.4
Ethnic Group				
Hispanic-American	47.8	33.5	52.6	53.1
White	36.8	37.4	30.1	29.6
Black	15.4	29.1	17.3	17.3
Persons/rooms ratio[1]				
≤0.9	26.2	21.8	21.3	29.5
1.0-1.3	32.7	40.8	40.6	39.2
≥1.4	41.1	37.4	38.1	31.3

[1]Number of persons in household divided by number of rooms in household, as an indicator of socioeconomic status (SES), 0.9 or less persons/rooms indicates higher SES; 1.0-1.3, middle SES; and 1.4 or more, lower SES.
BA — barely acceptable; RU — relatively unpolluted.

TABLE A3. MEAN INDICATOR DENSITIES AT THE CONEY ISLAND AND ROCKAWAY BEACHES DURING 1973 AND 1974 TRIALS

Indicator	Log_{10} Mean Recovery/100 ml			
	1973		1974	
	Coney Island	Rockaway	Coney Island	Rockaway
Total coliforms	983*	39.8	1213*	43.2
Fecal coliforms	165*	21.5	565*	28.4
Escherichia coli	174*	24.8	15.3*	2.4
Klebsiella	122*	13.7	59.2*	3.5
Enterbacter-Citrobacter	530*	11.1	434	6.6
Fecal Streptococci	91.2	21.8	16.4*	3.5
Pseudomonas aeruginosa	30.4	6.5	45.8*	3.1
Aeromonas hydrophila	25.3	26.5	9.6	4.9
Vibrio parahaemolyticus	ND	ND	54.5	32.8

*Significantly different from density at Rockaways at 95 percent confidence level.

TABLE A4. SWIMMING ASSOCIATED SYMPTOM RATES FOR NEW YORK CITY BEACHES IN 1973, 1974

Symptom	Swimming Assoc. (swim - nonswim) Sympt. Rates[1] Rockaway, NYC 1973 (484-197)[2]	Rockaway, NYC 1974 (2767-2156)[2]	Coney Island, NYC 1973 (474-167)[2]	Coney Island, NYC 1974 (1961-1185)[2]
Vomiting	0	0	21*	4
Nausea	15	−2	26*	−1
Diarrhea	18	0	28*	8**
Stomachache	41**	0	39**	9**
Sore throat	47**	−3	18	−2
Bad cough	20	1	6	5
Chest cold	−3	−1	−2	−2
Nose	21	5	8	3
Ear	−3	6	−1	6*
Eye	28	3	24	3
Skin (exclusive of sunburn)	64**	7	113**	9**
Fever (100°F)	15	6*	6	4
Headache	6	−6	10	2
Backache	−8	−6	2	−1
Home due to symptom	−10	4	6	9*
In bed due to symptom	−6	1	−3	4
Medical help due to symptom	0	2	5	3

[1] Rates in cases per 1000 persons.
[2] ( ) = swim, nonswim.
*p < .1; **p < .05.

TABLE A5. SWIMMING ASSOCIATED RATES FOR SYMPTOM GROUPS AT THE NEW YORK CITY BEACHES (1973-74)

Symptom Groups[1]	Swimming Associated Rate (Per 1000 Persons) Rockaway, NYC 1973	Rockaway, NYC 1974	Coney Island, NYC 1973	Coney Island, NYC 1974
Gastrointestinal	35	5	48*	16*
Highly Credible GI	15	0.0	28	6.7
Respiratory	63*	4	27	8
"Other"	5	9	33	6
Disabling	4	4	17	9
Skin	64[2]	7	113[2]	9*

[1] See text for symptoms included in each group.
[2] Partly due to jellyfish stings.
*p<.05; **p<.01 for differences between swimmer and nonswimmer rates.

TABLE A6. COMPARISON OF *Salmonella* AND TOTAL COLIFORM DENSITIES (PER 100 ML) AT CONEY ISLAND AND ROCKAWAY BEACHES (ARRANGED IN DESCENDING ORDER OF COLIFORM VALUES)

Coney Island			Rockaway		
Date	Total Coliforms[1]	*Salmonella*[2]	Date	Total Coliforms[1]	*Salmonella*[2]
11 Aug.	14500	0.020	18 Aug.	350	<0.018
12 Aug.	3300	0.045	22 July	205	<0.018
19 Aug.	1850[3]	0.020	29 July	185	0.040
18 Aug.	1550	0.020	19 Aug.	90	<0.018
22 July	900	0.040	12 Aug.	70[3]	0.020
29 July	435	0.020	14 July	30	<0.018
28 July	360	0.020			
14 July	145	0.020			

[1] mC estimate of total coliforms from low-tide samples collected concurrently with those for the *Salmonella* assays.
[2] Obtained from examination of 55.5 liters by S-HVS method (46).
[3] Estimate obtained by MPN method.