

State of Connecticut Guidelines for Monitoring Swimming Water and Closure Protocol



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INTRODUCTION

This is the fourth major revision of the Guidelines for Monitoring Swimming Waters and Closure Protocol, formally known as the Guidelines for Monitoring Bathing Waters and Closure Protocol, first published in May 1989. Development of the “Guidelines” was one of the primary recommendations contained in the Coastal Sanitation Report also published in May 1989. Both documents were products of the Public Health Workgroup¹, which was a working group of public health professionals convened by the CT DPH and DEEP in late 1988 in response to public concern and a rash of beach closures during the summer of 1988, mainly in western Long Island Sound. These conditions resulted from the mistaken public perception that incidents involving medical waste, “sewage slicks” and floatable trash (usually attributed to New York City) were common occurrences. The perception was further aggravated by the general lack of standardized beach monitoring and closure practices available to local public health officials. The original “Guidelines” were drafted to:

- Establish guidance for dealing with “medical waste”
- Adopt a better bacterial indicator (Enterococci vs. Total coliform in Beach Guidance and CT Water Quality Standards.)
- Adopt uniform swimming water criteria values (1986 EPA bathing water criteria)
- Standardize swimming water sampling methodology
- Improve interagency and public communication and notification practices
- Initiate an annual meeting on beach sanitation for state and local officials

In addition to the recommendation for development and adoption of these “Guidelines”, the Public Health Workgroup initiated an annual meeting of public health officials to promote the “Guidelines”. This annual beach sanitation meeting continues and has been instrumental in fostering communication between the CT DPH, DEEP and local officials in matters related to beach and shoreline sanitation.

On October 10, 2000, the “Beaches Environmental Assessment and Coastal Health Act” (a.k.a. Federal Beach Act) was signed into law and is administered by the US Environmental Protection Agency (USEPA). This Act provides considerable financial resources to state and local health agencies through the federal government. The Act is intended to promote comprehensive public beach monitoring and public notification to protect public health at coastal swimming beaches. The CT DPH and DEEP have applied for and received funds through the Act for FY 2002 through 2016.

¹Composed of: CT Dept. of Health, CT Dept. of Energy & Environmental Protection, Stamford Health Dept., Fairfield Health Dept. representing the CT Environmental Health Association, West Haven Health Dept. representing the CT Association of Directors of Health, Chesprocott Health District.

GUIDELINES FOR MONITORING
SWIMMING WATERS & CLOSURE PROTOCOL

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GUIDELINES FOR MONITORING SWIMMING WATERS & CLOSURE PROTOCOL

WATERSHED SURVEY:

1. The DPH recommends that, prior to each swimming season, the local health department should conduct a sanitary survey of any watershed which drains to a public swimming area. If any source of contamination which may adversely affect the swimming area is observed, the local director of health shall take appropriate action under his/her authority to correct the violation.
2. When conducting a watershed survey for a coastal swimming area special consideration should be given to sewage treatment plant location, pump station location, industrial plant discharge points and other areas that may impact the swimming area waters.
3. Large populations of waterfowl on a watershed can be a contributing factor to elevated bacterial levels in the swimming area. Therefore, this information should be noted on the watershed survey report.
4. Harmful Algal Blooms (HABs) may be a concern at beaches on lakes with a history of algal blooms because blue-green algae biomass can contain a mix of toxins, including skin irritants and potent liver toxins. DPH has guidance for local health departments that addresses how to manage a harmful algal bloom at a freshwater beach. This guidance is available on the DPH web site:
<http://www.ct.gov/dph/cwp/view.asp?a=3140&Q=535958&pp=12>.

INSPECTION AND SAMPLING:

1. The DPH recommends that, prior to each swimming season, the local health department should inspect each public swimming place and/or establishment within its jurisdiction. The inspection should include but not be limited to the beach, grounds, bathhouses, toilets, drinking water supply, sewage disposal, safety equipment and signage. Refer to Regulations of Connecticut State Agencies Sections 19a-36-B61 Public Swimming Areas for specific requirements (see Appendix 1).
2. All swimming water samples are to be collected under the auspices of the local director of health. **The recommended sampling frequency of both inland and tidal public swimming areas is weekly.** Samples shall be collected at fixed sampling stations to provide consistency of data. The recommended number of sampling stations per swimming area is dependent upon the size of the area among other factors.

Normally when an area is relatively small in size (300 linear feet of shoreline or less) only one sampling station will be necessary. The location of single sampling stations should be in the middle of the swimming area. A minimum of two sampling stations should be provided at beaches with shorelines up to 700 linear feet in length. Where beach shorelines exceed 700 linear feet, a minimum of three sampling stations is recommended. Multiple sampling stations should normally be located with approximately equal distances between stations and the boundaries of the beach.

Shorelines with unusual configurations or features may require that additional sampling stations be located to monitor these particular conditions (e.g. storm sewer outfalls, waterways discharging into the swimming area, configurations which disrupt the contiguity of the beach, etc.). Operational conditions such as heavy patron usage in one portion of the swimming area may also influence the selection of sample stations.

3. Indicator bacteria sample collection procedure should be as follows:

Samples should be collected at approximately 3 to 4 feet water depth. The 125ml bottle provided by the laboratory for surface water sampling must be used. Remove the cap from the sterile collection bottle, being careful not to contaminate either the inside of the cap or bottle. Grasp the bottle near its base and plunge it in a downward motion into the water to a depth of between 12 and 18 inches, always keeping the mouth of the container ahead of the hand so as not to contaminate the sample. In a sweeping motion invert the bottle to fill. Empty the bottle to approximately one inch from the top (if necessary) to provide air space for laboratory processing and carefully replace the cover. Store the samples on ice for transport to the laboratory.

At the time of sampling, the collector should make a visual observation of the tidal shoreline and tidal waters for any hazardous materials or contamination. If any medical debris is observed it is to be reported immediately to authorized beach personnel and the local health department.

4. Designated beach personnel (e.g. lifeguards) should physically inspect the entire beach shoreline from the high tide mark to the water's edge each morning for any evidence of hazardous debris such as broken glass, needles, wood with nails or debris indicating possible contamination, including but not limited to biomedical waste, medical waste, sewage grease balls, dispensed condoms, tampon applicators, and other floatable trash. The local health department is to be contacted if any biomedical or medical debris are observed. Other appropriate agencies are to be contacted based upon the local health department's evaluation of the situation.

Designated beach personnel who have access to a motorboat should make a daily inspection of the waters surrounding the beach for any signs of slicks, floatable or other debris which could impact the swimming waters at that beach. Any confirmed sightings should be reported to the local health department, for their inspection. Other appropriate agencies are to be contacted by the local health department if follow-up inspection results produce issues of concern.

5. Required information to be indicated on the laboratory sample submission forms, titled "Marine Bathing Water Submission Form" or "Fresh Bathing Water Submission Form" (see Appendix 2):

MARINE/FRESH BATHING WATER SUBMISSION FORM

- A. Affix DPH label in space provided.
- B. Complete collection information to include; collected by; town; town identification number; date and telephone number.
- C. Make sure you are using the correct form -**Marine** water or **Fresh** water.
- D. Complete sample information to include: time and collector's number, which will identify exactly where the sample was collected.
- E. Additional Information: should include but not be limited to, amount of rainfall during the past 24 hours, number of patrons at time of sampling, bird activity near sample site, clarity or turbidity of the water, wind direction, information such as, resample because last sample indicated criteria exceedance.

SANITARY WATER QUALITY (Effective May 20, 2002):

The indicator organisms to be used for monitoring swimming water quality as established by the Connecticut Department of Public Health are:

1. Freshwater

E. coli organism as determined by the Colilert -18 Method or any State of Connecticut or EPA approved method such as the membrane filter techniques: Modified EPA Method 1603 (Modified mTEC Medium) and EPA Method 1103.1 (mTEC medium). Bacterial standard to be used for interpretation of laboratory analyses of single or individual samples from freshwater swimming waters are as follows for the *E. coli* organism:

- A. A concentration of *E. coli* organisms less than or equal to 235 per 100 ml is generally considered satisfactory for a single sample from a swimming area.
- B. A single sample with a concentration of *E. coli* organisms greater than 235 per 100 ml is in excess of that which is normally considered acceptable for swimming. A resample is required. A sanitary survey of the surrounding watershed and areas that may impact the swimming area should be conducted immediately to evaluate suitability of the area for swimming if no known sources of contamination have already been identified.
- C. To determine swimming water quality when using the *E. coli* organism as an indicator, a running geometric mean for each sampling station is to be used.

An acceptable running geometric mean for *E. coli* indicator organism density for swimming waters is less than or equal to 126. A running geometric mean is to be used when evaluating the long-term microbiological suitability of recreation water quality. The geometric mean can provide a better indication of water quality over time. This holds especially true when evaluating a proposed swimming area where seasonal or incidental variations may impact on single sample results.

2. Marine Water

Enterococcal organism as determined by the Enterolert Method or any State of Connecticut or EPA approved method such as the membrane filter techniques: EPA Method 1600 (mEI Medium) and EPA Method 1106.1 (mE Medium). Bacterial standard to be used for interpretation of laboratory analyses of single or individual samples from marine swimming waters are as follows for the enterococcal organism:

- A. The DPH is developing a schedule to identify and use a revised beach notification threshold. Until the new beach notification threshold is derived, the DPH will continue to support the existing single-sample threshold (104 enterococci per 100 ml of water).
- B. A single sample with a concentration of enterococcal organisms greater than 104 per 100 ml is in excess of that which is normally considered acceptable for swimming. A resample is required. A sanitary survey of the surrounding watershed and areas that may impact the swimming area should be conducted immediately to evaluate suitability of the area for swimming if no known sources of contamination have already been identified.

- C. To determine swimming water quality when using the enterococcal organism as an indicator, a running geometric mean for each sampling station is to be used.

An acceptable running geometric mean for enterococcal indicator organism density for swimming waters is less than or equal to 35. A running geometric mean is to be used when evaluating the long-term microbiological suitability of recreation water quality. The geometric mean can provide a better indication of water quality over time. This holds especially true when evaluating a proposed swimming area where seasonal or incidental variations may impact on single sample results.

3. For the purpose of this document a running geometric mean should be based on at least 5 sample results per 30-day period. Therefore, when 5 sample results have been obtained from a sampling station in a 30-day period, a geometric mean can be performed.

The geometric mean can be defined as the n^{th} root of the product of n numbers:

$$G = \sqrt[n]{(X_1)(X_2)(X_3)\dots(X_n)}$$

4. An example of a running geometric mean is as follows:

Sampling Station #1	
<u>Sample Results</u>	<u>Date Collected</u>
20	06/04/01
40	06/11/01
15	06/18/01
30	06/25/01
29	07/02/01

Calculating a Geometric Mean

The geometric mean of your samples can be calculated using one of two methods; each one will provide an accurate answer. Taking into consideration that calculators differ and have different function keys, choose the method that is easier for you to follow.

Calculate the geometric mean for the following five samples taken within a 30-day period: 20, 40, 15, 30, and 29.

SOLUTION STEPS FOR CALCULATING GEOMETRIC MEAN

Method 1: Take the n^{th} root of n samples.

Step 1: Multiply all sample values together.

$$20 \times 40 \times 15 \times 30 \times 29 = 10,440,000$$

Step 2: Count the number of samples you are using.

$$= 5$$

Step 3: Make the value of *Step 2* the denominator in a fraction with '1' as the numerator.

$$= 1/5 = 0.2$$

Step 4: Take the answer from *Step 1* and raise it to the power of the answer from *Step 3*.

$$= (10,440,000)^{0.2}$$

This calculation can be performed on a scientific calculator in several ways. For example, enter 10,440,000 into the calculator. Press the "x^y" key and then enter "0.2." This calculation can also be performed by entering 10,440,000, pressing the "^" key, and entering 0.2.

$$\text{Answer: } = 25.336$$

If you have more than five samples collected during a 30-day period, the additional samples should be included in the calculation of the geometric mean (for both methods).

Method 2: Take the antilog of the mean of the logarithm of each sample.

Step 1: Take the log of each sample. (This calculation can be performed on a scientific calculator using the "log" key. For example, enter "20" into the calculator and then press the "log" key.)

$$\log(20) = 1.30$$

$$\log(40) = 1.60$$

$$\log(15) = 1.17$$

$$\log(30) = 1.47$$

$$\log(29) = 1.46$$

Step 2: Take the average, or mean, of the log samples.

$$1.40 = \frac{1.30 + 1.60 + 1.17 + 1.47 + 1.46}{5}$$

Step 3: Take the antilog of the answer from *Step 2*.

$$25.336 = \text{antilog}(1.40374)$$

This calculation can be performed on a scientific calculator in several ways. For example, enter “1.40,” press the “Inv” key, and then press the “log” key. This calculation can also be performed by pressing the “2nd” followed by the “log” key and then typing 1.40.

Answer: = 25.336

If the geometric mean of several bacteriological samples exceeds the acceptable limit, the swimming area should be reviewed with DPH.

BEACH/SWIMMING AREA CLOSURE:

1. If there is a known waste contamination event such as a sewage bypass or mechanical failure at a sewage treatment plant, pump station failure or ruptured sewer pipe, beach closures may be recommended by the local health department prior to receiving any sample results. Such decisions must be based on currents, tides, wind direction or other factors that would transport or direct the contamination into swimming waters.
2. If sampling was conducted in response to apparent or suspected waste contamination and the results exceed the standards, there may be sufficient justification to close a beach prior to receiving results of a resample.
3. When a single sample result exceeds the standards for swimming water quality established by this guidance document, a resample should be taken and a survey made to determine if raw or partially treated sewage is contributing to the elevated bacterial levels. If the survey reveals discharges of raw or partially treated sewage then the swimming area should be closed by the local director of health.
4. If sample results exceed the standards and a sanitary survey reveals no evidence of sewage contamination, the swimming area should be examined on an individual basis with consultation from DPH before any decision about closure is made. The swimming area may remain open.
5. If the swimming area is impacted by a mass of floating debris, the director of health may close the area to swimming for safety reasons even if the water quality is good. This especially holds true when there is evidence of grease balls or other indications of sewage treatment plant debris.

6. The director of health may also want to consider beach closures established by evaluating rainfall data. This can be accomplished by conducting a season long study where swimming water samples are collected after measurable rainfall events occurring within a 24 hour time period.

If the study data indicates that the bacterial level is elevated above the acceptable single sample standard after measurable rainfall events in a 24-hour period, then the director of health could recommend beach closures after each such rainfall event based on this study data.

If an actual study cannot be performed then the use of historical data at sampling stations may be used to make a determination as to the suitability of the swimming water after rainfall events occurring in a 24-hour period. For this reason it is very important to indicate rainfall information on the laboratory sample submission form.

7. The reopening of any beach after closure will be based on obtaining satisfactory sample results.

DILUTION WATER FOR INLAND SWIMMING AREAS:

It is generally recognized that inland swimming water quality is dependent on the amount of dilution water available.

The following formula is used to determine the number of patrons per day that should be allowed to utilize a water body: $N = (V/180 + F)/1,000$ [after Theodore C. Willerford, Connecticut Health Bulletin, June Vol 87, No.6, pp 162-163]

where: N = the number of patrons, V = the volume of the water body in gallons and F = the inflow in gallons per day provided by streams or other sources. 180 is an average turnover time in days for a typical lake. You can substitute 180 with a known turnover rate (days).

(See Appendix 3)

MEDICAL DEBRIS:

1. Handling Medical Debris

Syringes with needles or needles alone should be handled so as not to subject the handler to punctures. All such materials and other medical debris should be handled for proper disposal in accordance with OSHA blood borne pathogen requirements. These are located at federal regulations 29 CFR 1910.1030 and can be found at www.OSHA.gov website. Information can be obtained at Connecticut Department of Labor OSHA at (860) 263-6900.

2. Testing of Medical Debris

Testing of the contents of vials or syringes containing blood for Hepatitis or HIV is not generally recommended. Testing should only be considered in the event that there is a needle stick or other penetrating physical injury involving a person being exposed to the contents of that vial or syringe.

3. Reporting

If medical debris is found, this information is to be immediately reported to the local health department.

SAFETY AND INJURY CONTROL:

1. Lifeguards

When lifeguard service is in effect a minimum of one lifeguard for every 100 yards of beach immediately adjacent to the occupied swimming area is recommended.

Elevated lifeguard stands high enough to provide the lifeguard with a complete and unobstructed view of the swimming and beach area are required.

A first aid kit and lifesaving equipment are to be available at the lifeguard duty station. All lifeguards are required to be certified in cardiopulmonary resuscitation (C.P.R.) by the American Heart Association or the American Red Cross per the Regulations of Connecticut State Agencies Section 19a-113a-1. Communication devices should be provided to the lifeguards for emergency situations. Where lifeguard service is not provided, a warning sign shall be placed in plain view and shall state "WARNING – NO LIFEGUARD ON DUTY" with legible letters at least 4 inches high.

2. Signage

A sign, flag or other form of acceptable notification indicating when the beach is closed should be posted in a conspicuous location such as the beach entrance.

Signs shall be posted with directions to the nearest public telephone for emergency use. Emergency telephone numbers should also be posted which may simply be the 911 number or the telephone numbers of the closest emergency response service.

3. Injury Control

Each morning before normal hours of operation, beach personnel should clean the beach of any objects which could cause injury to beach patrons. If lifeguards are on duty, a brief but thorough inspection of the swimming area for submerged objects which may have been carried into the area during the night by currents, tides, wave action, wind or other means should be conducted.

No fishing or boat launching should be allowed in the swimming area to prevent the possibility of related accidents.

Inflatable or buoyant devices should not be allowed except for U.S. Coast Guard approved personal floatation devices worn by swimmers.

Glass containers, fires, charcoal or gas grills, ball or Frisbee playing, the possession or drinking of alcoholic beverages should be prohibited on the beach.

4. Notification of Beach/Swimming Area Closures

If the local director of health deems it necessary to close a beach and/or swimming area, the DPH should be advised of such closure. Please contact DPH at (860) 509-7758.

Information to be provided to the DPH concerning the closure should include but not limited to the following:

- The reason for such closure, i.e. bacterial water quality results, hazardous or medical debris on the beach, floatables in the water, bypass or mechanical failure at a sewage treatment plant.
- The names of the affected areas; name of beaches involved, entire coastline within the town boundaries.

5. Notification of Beach/Swimming Area Reopening

Likewise please advise the DPH when any beach and/or swimming area has been reopened at (860)509-7758.

6. Notification of Shellfish Bed Closures

The local health department should consult with the Connecticut Department of Agriculture, Aquaculture Division at (203) 874-0696 on appropriate action.

7. Notification of Sewage Bypass or Effluent Limit Violations:

A. The local health director will be notified when a sewage treatment plant or a sewer collection transport system experiences a bypass or there is an effluent violation of the effluent at a sewage treatment plant. Once notified, the local health director in that town shall notify the health department in neighboring towns whose waters may be impacted by the discharge.

B. Information which should be transmitted should include but not be limited to the following:

Type of incident, number of gallons that have been discharged, impacted water body, steps taken to contain the discharge and an estimate of the duration of the problem (if available). The neighboring towns should also be informed when the problem has been resolved.

APPENDICES

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Appendix 1

Regulations of Connecticut State Agencies Section 19a-36-B61 Public Swimming Areas

Section 19a-36-B61. Public swimming areas:

(a) **Definitions.** As used in this section:

- (1) "Public swimming area" means a designated location, together with any buildings, toilet facilities, the water and the land area used in connection therewith, at any natural or artificial pond, lake, stream, tidal water or other body of fresh or salt water that is advertised as a place for swimming and is accessible to the public. Public swimming area does not include: (A) swimming areas in connection with or appurtenant to single family dwellings and used solely by persons residing in such dwellings and such person's guests, including but not limited to those swimming areas accessible only as part of a lake association, beach association or condominium; (B) any state owned or operated swimming areas; and, (C) public swimming pools that are regulated under Section 19-13-B33b of the Regulations of Connecticut State Agencies.
- (2) "Department" means the Connecticut Department of Public Health.
- (3) "Director of Health" means the director of a local health department or district health department approved by the commissioner as specified in Connecticut General Statutes Sections 19a-200 and 19a-242.
- (4) "Notification system" means a public information system used to notify the public regarding lifeguard status and the opening or closing of a public swimming area, including but not limited to, signs or flags.

(b) **General requirements.** No city, town, borough, institution, person, firm, corporation or other entity shall designate or construct a public swimming area until the director of health for the municipality in which the public swimming area is located has approved the location of such public swimming area. A city, town, borough, institution, person, firm, corporation or other entity operating or maintaining a public swimming area shall comply with the following requirements:

- (1) Every public swimming area shall be provided with on-site toilet facilities unless the director of health determines that adequate toilet facilities are already provided elsewhere. Separate toilets for men and women shall be provided, with at least one toilet for every two hundred women and at least one toilet for every three hundred men, and at least one handwashing sink or hand sanitation station shall be provided with each required toilet. All toilets and restroom accommodations shall be constructed and located so that no contamination of the waters used by the swimmers will occur. Toilets shall be installed with the approval of the director of health so as not to create any health or safety issues. Toilets shall be kept in good repair and maintained at all times in a sanitary condition. The location of all toilets shall be plainly indicated by signs.

(2) The dressing rooms, hallways, toilet rooms, shower rooms or other rooms to which patrons have access shall be kept clean, well ventilated, and in good repair. The floors shall also be treated daily with a 0.5% chlorine solution, or other equivalent disinfectant.

(3) The area open for authorized swimming shall be clearly designated.

(4) Swimming in public swimming areas shall be restricted to designated areas and during assigned hours of operation.

(5) Diving shall be permitted only off a diving board. No diving boards greater than sixteen feet in length shall be permitted. The owner of the property shall ensure that the diving area is in compliance with the required water depths at all times.

(A) For diving boards of a height of no greater than one meter above the water surface, the diving area shall meet the following requirements:

- (i) Not have any submerged or overhead obstructions;
- (ii) Have a minimum water depth at all times of eleven feet for at least sixteen feet linear beyond the plummet of the diving board; and,
- (iii) Have a minimum water depth at all times of eleven feet for at least eight feet horizontal on each side of the plummet of the diving board.

(B) For diving boards of a height greater than one meter above the water surface, the diving area shall meet the following requirements:

- (i) Not have any submerged or overhead obstructions;
- (ii) Have a minimum water depth at all times of twelve feet for at least sixteen feet linear beyond the plummet of the diving board; and,
- (iii) Have a minimum water depth at all times of twelve feet for at least eight feet horizontal on each side of the plummet of the diving board.

(C) When no diving board is present, a sign stating the following shall be conspicuously posted: "No diving is permitted".

(6) Lifeguard services.

(A) When no lifeguard service is provided, one or more warning signs shall be posted in one or more visible locations. The warning sign shall state "Warning – No Lifeguard on Duty" with letters that are legible and at least four inches high.

(B) During the period when the swimming area is open for use, when lifeguard service is provided, the owner of the property shall provide the following:

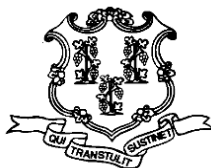
- (i) A notification system to alert patrons as to where and when lifeguard services are available;
- (ii) Each lifeguard on duty shall be provided with appropriate lifesaving equipment that the lifeguard has been trained to use, including but not limited to, a rescue tube;
- (iii) A telephone or equivalent emergency communication device for emergency use when the area is staffed by a lifeguard; and
- (iv) A raised stand at least four feet in height for the lifeguard, placed such that all areas of the public swimming area are visible from the stand to the one or more lifeguard on duty. The director of health may approve an appropriate alternative to the four foot high raised stand if said director of health determines that all points of the public swimming area can still be visible to the lifeguard on duty.

- (7) All public swimming areas shall have a sign posted in at least one visible location, with signage not less than a half-inch type in size, containing the following information:
- (A) Hours of lifeguard coverage if applicable;
 - (B) Emergency phone information indicating whether a phone is available; and
 - (C) Location of the nearest first aid unit if one is provided on the premises.
- (8) Whenever a public swimming area is closed or reopened pursuant to the provisions of this section, the director of health shall:
- (A) Closure: immediately have put in place a notification system, in one or more conspicuous location, including the immediate swimming area, notifying patrons of the sections of the public swimming area that are closed.
 - (B) Reopening: have removed all closure postings.
- (9) The following shall be prohibited in all public swimming areas: (A) boats, unless used for rescue purposes; (B) washing of persons and articles; (C) littering; and (D) glass containers.
- (10) Domestic animals shall be prohibited in the water and on the immediate shoreline associated with the water of a public swimming area when the public swimming area is open for use.
- (11) The director of health may:
- (A) Inspect all public swimming areas to determine compliance with the provision of this section.
 - (B) Issue an order which may result in a closure of the public swimming area, in part or in whole, to the owner of the public swimming area, when the director of health determines:
 - (i) There is a violation of the provisions of this section; or
 - (ii) The public swimming area is not being maintained in acceptable sanitary conditions; or
 - (iii) A condition is found that constitutes a public health hazard, safety hazard or a health nuisance to the patrons; or
 - (iv) There is evidence of communicable disease being transmitted in order to end the transmission of the disease.

The public swimming area shall remain closed until such time as the director of health determines that the cause for closure has been corrected.

Effective 3/17/2014

Appendix 2



MARINE BATHING WATER SUBMISSION FORM

Environmental Microbiology
Connecticut Department of Public Health
Katherine A. Kelley State Public Health Laboratory
395 West St., Rocky Hill, CT 06067
PH (860) 920-6699 FAX (860) 920-6703

For Lab Use Only:
Called significant results: _____
(Initials)
Contact name: _____
Voice mail: Yes No (circle one)
Date/Time: _____

<p>PROFILE NO./NAME AND ADDRESS:</p> <p>Sample Type: REGULAR RESAMPLE (Circle One)</p>	<p>COLLECTED BY: _____</p> <p>TOWN: _____</p> <p>DATE COLLECTED: _____</p> <p>CONTACT INFORMATION: _____</p> <p>PHONE # (____) _____</p>
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MARINE WATER Test A-Code: ENT-BW Enterolert/Enterococci

Date and Time Received

For Lab Use Only:	<p>Time Collected: _____</p> <p>Collector's No. _____</p> <p>Beach Name: _____</p> <p>Additional Info: _____</p>	For Lab Use Only:
Accession #	_____	_____Initials _____
Test:	_____	POSITIVE WELLS:
	_____	Enterococci Count/100ml:
	_____	_____
	_____	_____Initials _____
	_____	POSITIVE WELLS:
	_____	Enterococci Count/100ml:
	_____	_____
	_____	_____Initials _____
	_____	POSITIVE WELLS:
	_____	Enterococci Count/100ml:
	_____	_____

For Lab Use Only:	DATE AND TIME ANALYZED:
	ANALYZED BY:
	METHOD (Circled test performed): ENTEROLERT MF



FRESH BATHING WATER SUBMISSION FORM

Environmental Microbiology
 Connecticut Department of Public Health
 Katherine A. Kelley State Public Health Laboratory
 395 West St., Rocky Hill, CT 06067
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For Lab Use Only:
 Called significant results: _____
 (Initials)
 Contact name: _____
 Voice mail: Yes No (circle one)
 Date/Time: _____

PROFILE NO./NAME AND ADDRESS: Sample Type: REGULAR RESAMPLE (Circle One)	COLLECTED BY: _____ TOWN: _____ DATE COLLECTED: _____ CONTACT INFORMATION: _____ PHONE # (____) _____
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FRESH WATER
 Test A-Code: EC-BW
 Colilert/ E. coli

Date and Time Received

For Lab Use Only: Accession # Test:	Time Collected: _____ Collector's No. _____ Beach Name: _____ Additional Info: _____	For Lab Use Only: _____ Initials _____ POSITIVE WELLS: E. coli Count/100ml:
Accession # Test:	Time Collected: _____ Collector's No. _____ Beach Name: _____ Additional Info: _____	_____ Initials _____ POSITIVE WELLS: E. coli Count/100ml:
Accession # Test:	Time Collected: _____ Collector's No. _____ Beach Name: _____ Additional Info: _____	_____ Initials _____ POSITIVE WELLS: E. coli Count/100ml:
Accession # Test:	Time Collected: _____ Collector's No. _____ Beach Name: _____ Additional Info: _____	_____ Initials _____ POSITIVE WELLS: E. coli Count/100ml:
Accession # Test:	Time Collected: _____ Collector's No. _____ Beach Name: _____ Additional Info: _____	_____ Initials _____ POSITIVE WELLS: E. coli Count/100ml:

For Lab Use Only:	DATE AND TIME ANALYZED:			
	ANALYZED BY:			
	METHOD (Circled test performed):	COLILERT-18	COLILERT-24	COLISURE

Appendix 3

DILUTION WATER PER PATRONS PER DAY

Willerford argued in the Connecticut Health Bulletin (June Vol 87, No. 6, pp 162-163) that there are two contributors to daily dilution water at an inland swimming area. They are: 1) the natural turnover of a body of water as measured in gallons per day; and 2) any inflow coming from external sources also measured in gallons per day.

If you know the volume of a water body and the annual turnover rate in days, then you can calculate the daily turnover rate in gallons per day. For example: a 1,000 gallon waterbody with a 180 day turnover, would have $1,000/180$ or 5.56 gallons of turnover per day that could be counted toward the total daily dilution water for the waterbody. The daily turnover in gallons can be added to the inflow - also in gallons per day - to find the total gallons of daily dilution water for the water body.

Once you know the daily dilution water (turnover gallons per day plus daily inflow gallons), you can divide the daily dilution water by the recommended 1,000 gallons of dilution water per day per patron to find the allowable user loading.

Here are several examples based on the formula: $N = (V/180 + F)/1,000$

where: N = the number of patrons, V = the volume of the water body in gallons and F = the inflow in gallons per day provided by streams or other sources. 180 is an average turnover time in days for a typical lake. You can substitute 180 with a known turnover rate (days).

EXAMPLE 1: For a 2000 gallon water body with a 180 day turnover and 1,000 gallons/day inflow.

$$\begin{aligned} N &= (2,000/180 + 1,000)/1,000 \\ N &= (11.11 + 1,000)/1,000 \quad \text{Note: daily turnover is 11.11 gallons per day} \\ N &= (1,011.11)/1,000 \\ N &= 1.011 \text{ patrons} \end{aligned}$$

EXAMPLE 2: For a 180,000 gallon waterbody with 180 day turnover and a 1,000 gallons/day inflow.

$$\begin{aligned} N &= (180,000/180 + 1,000)/1,000 \\ N &= (1,000 + 1,000)/1,000 \quad \text{Note: daily turnover is 1,000 gallons per day} \\ N &= (2,000)/1,000 \\ N &= 2 \text{ patrons} \end{aligned}$$

EXAMPLE 3: For a 180,000 gallon waterbody with a 60 day turnover and a 1,000 gallons/day inflow.

$$\begin{aligned} N &= (180,000/60 + 1,000)/1,000 \\ N &= (3,000 + 1,000)/1,000 \quad \text{Note: daily turnover is 3,000 gallons per day} \\ N &= (4,000)/1,000 \\ N &= 4 \text{ patrons} \end{aligned}$$

Appendix 4

General Guidelines for Response and Administrative Closures at State Swimming Areas Due to Swimmer Fecal and Vomit Accidents.

During the 2011 swimming season, lifeguard staff from the Connecticut Department of Energy and Environmental Protection (DEEP) asked how they should respond to a fecal accident at State beaches. This started the process moving to best answer a question that has not previously been officially addressed in our various beach protocols. This process included discussions among DEEP staff, Connecticut Department of Public Health (DPH) staff, literature searches and contacting the Center for Disease Control. We found no existing procedures that we could just adopt for Connecticut State beaches. We ended up having three reported incidents this past season that fall under these guidelines. While these are not an official policy level yet, they have been reviewed by officials at both DEEP and DPH, and are the procedures that we followed this swimming season. The guidelines address swimmer accidents for vomit, solid fecal matter, and diarrhea. The closure procedures vary based on the type of accident and the characteristics of the swimming beach.

In smaller, inland beaches, for both vomit and fecal matter (solid & diarrhea), the lifeguard should:

- get swimmers out of the water, avoiding the affected area
- net solids from the water (only if lifeguard has the proper protection and equipment to do so), following their blood borne pathogen protocol
- close the swimming area for the rest of the day
- notify appropriate supervisor, so that staffs from DEEP Parks, DEEP Water and DPH are notified and can discuss re-opening steps and provide proper public notification, including notification to the local health authority

For Long Island Sound beaches and Indian Well State Park:

- get swimmers out of the water in a zone (100 feet or so each way), avoiding the affected area
- net solids from the water (only if lifeguard has the proper protection and equipment to do so), following their blood borne pathogen protocol
- determine direction of water flow
- get swimmers out of the water and close area down from affected area for the rest of the day
- if remaining beach area is not large enough to handle all swimmers, or closed area is too large to manage, consider closing the whole beach
- notify appropriate supervisor, so that staffs from DEEP Parks, DEEP Water and DPH are notified and can discuss re-opening steps and provide proper public notification, including notification to the local health authority

Based on discussions and supported by limited data from the 2011 incidents, most swimming areas would open the following day. Special considerations should be given to very small inland beaches, if they were closed due to a diarrhea accident since they have very limited dilution. Under this scenario, we would not open the beach until it was re-tested and indicator bacteria results met the criteria. We believe that the administrative closure for the rest of the day, for both types of accidents, provides a conservative approach, and best protects human health. Clearly exposure of swimmers to fecal matter poses a more extensive risk from pathogens than does an exposure to reverse peristalsis, but the major infectious disease related to exposure to reverse peristalsis, norovirus, is the most common cause of acute gastroenteritis. Also, the presence of norovirus is not detectable by our routine indicator bacteria sampling.

Appendix 5

CONNECTICUT DEPARTMENT OF PUBLIC HEALTH

Clam Digger's/Swimmer's Itch (Schistosome Dermatitis)

What is Clam Digger's/Swimmer's Itch?

Clam Digger's/Swimmer's Itch is a skin rash caused by a parasite. This parasite is released from infected snails and migrates through waters including those used for recreational swimming. Clam Digger's Itch is contacted in salt water and Swimmer's Itch in fresh water. Both occur during the summer and may be more common during periods of especially hot weather.

Who gets Clam Digger's/Swimmer's Itch?

People who swim or wade in water infested with the parasite may experience this itchy rash. All age groups and both sexes can be involved, but children are most often affected.

How is Clam Digger's/Swimmer's Itch Spread?

A person may get the skin rash by swimming or wading in infested water and then allowing water on the skin to air dry instead of drying off with a towel. Person to person transmission does not occur.

What are the Symptoms of Clam Digger's/Swimmer's Itch?

When water infested with the parasite is allowed to air dry, an initial tingling sensation may be felt when the parasite enters the skin. A mild itching may occur within one to two hours after exposure and last for around an hour. Ten (10) to fifteen (15) hours later the rash appears along with itching, which may be extremely intense. The rash reaches a peak in 3 to 4 days and usually disappears within a week.

A person's first exposure to infested water may not result in the itchy rash. Repeated exposures increase a person's sensitivity to the parasite and increase the likelihood of getting a rash.

What is the Treatment for Clam Digger's/Swimmer's Itch?

While all cases do not require treatment, some people may seek relief by applying specific skin lotions or creams to minimize the itching.

What can be done to Prevent Clam Digger's/Swimmer's Itch?

Prevention is limited to the protective measures taken by the person. The most practical solution is to avoid swimming in waters known to be infested with the parasite. The use of chemicals to control the snail population is neither feasible nor environmentally sound. Toweling off vigorously immediately after emerging from the water can prevent the rash. Do not air dry.

Cases of Clam Digger's/Swimmer's Itch should be reported to the local health department or the lifeguard on duty. Affected areas should be posted to warn patrons of the presence of the parasites and precautions for preventing the rash.