

Reference Manual – 83A

PUBLIC HEALTH: Protection and Prevention

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Public Health: Protection and Prevention

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DRINKING WATER POLICY

- 1.1 National Park Service (NPS) unit managers will reduce the risk of waterborne diseases and provide safe drinking water to employees, the visiting public, and park partners by ensuring that drinking water systems are properly operated, maintained, monitored, and deficiencies promptly corrected.
- 1.2 The NPS Office of Public Health (OPH) will assist in providing safe drinking water by conducting a survey of drinking water systems condition, operation and maintenance. The survey is part of a larger onsite assessment classified by NPS OPH as a public health assessment (PHA).
- 1.3 Policy Compliance -- Safe (Potable) drinking water systems will be regulated in accordance with:
 - the Safe Drinking Water Act, as amended (42 U.S.C. 300f¹ et seq.)
 - the Primacy Agency (e.g. the agency designated by Federal law as having oversight responsibility) requirements,
 - this NPS drinking water system policy, whichever is most stringent. Any waivers to this policy must be approved by the NPS OPH Director by completing the form in Appendix 4.0.

Note: If hyperlinks in this document are inactive, please contact your local public health consultant (PHC)². For additional information and reference, the United States Environmental Protection Agency (USEPA) has developed Drinking Water Rule Quick Reference Guides.³

2.0 WATER SYSTEM CLASSIFICATIONS

Water systems are defined as follows or as specified by any changes made in the Safe Drinking Water Act:

- 2.1 **Public Water System (PWS):** A system that, “provides water for human consumption through pipes or other constructed conveyances to at least 15 service connections or serves an average of at least 25 people for at least 60 days a year. A public water system may be publicly or privately owned.”
- 2.2 **Community Water System (CWS):** A public water system that supplies water to the same population year-round.
- 2.3 **Non-Transient Non-Community Water System (NTNC):** A public water system that regularly supplies water to at least 25 of the same people at least six months per year. Examples: Systems serving facilities such as schools or non-residential work

¹ <https://www.gpo.gov/fdsys/pkg/USCODE-2014-title42/pdf/USCODE-2014-title42-chap6A-subchapXII.pdf>

Accessed on 6/18/2019

² http://www.nps.gov/public_health/ Accessed on 6/18/2019

³ <http://www.epa.gov/dwreginfo/drinking-water-rule-quick-reference-guides> Accessed on 6/18/2019

sites where the same people use the water on a regular basis.

- 2.4 **Transient Non-Community Water System (TNC):** Any public water system that serves at least 25 persons per day at least 60 days out of the year. Examples: systems serving campgrounds or other non-residential uses, where people do not remain for long periods of time.
- 2.5 **Non-Public Water Systems (NP):** A water system that does not meet one of the above definitions of a public water system. This type of system has less than 15 service connections, or serves less than 25 persons per day on average. Examples could include systems serving ranger stations, individual residences and small campgrounds. The NPS requires NPS managers to follow EPA Drinking Water Standards for individual and/or non-public systems to ensure the health risks associated with contaminants are minimized for all systems.

3.0 PATHOGEN MONITORING

Bacteriological and chemical sampling will be performed in accordance with Federal, State and local laws/regulations along with NPS requirements. All water samples will be tested in laboratories certified by the Primacy Agency. The Total Coliform Rule (TCR) and the Revised Total Coliform Rule (RTCR) (effective April 1, 2016) provide details regarding bacteriological monitoring. Additional information can be found in the following links:

- National Primary Drinking Water Regulations RTCR⁴
- RTCR History⁵
- TCR/RTCR comparison⁶

If there are positive samples, refer to the RTCR for public notification requirements and for water system review requirements.

3.1 Number and Frequency of Samples:

3.1.1 Community Water Systems [CWS]: One sample per month, minimum, or as per Table 1. Samples must be taken at equally spaced intervals each month.

3.1.2 Non-Community Water Systems [NTNC & TNC]: One sample per month, minimum, or as per Table 1. Samples must be taken at equally spaced intervals each month.

3.1.3 Non-Public Water Systems [NP]: One sample per month. The sampling frequency may be changed if authorized in writing by the public health consultant. *Authorization to reduce sampling will only be given after a complete sanitary survey and review of the operational records indicates that reducing the sampling frequency would not result in an increased public health risk to end-users.*

⁴ <https://www.federalregister.gov/articles/2014/02/26/2014-04173/national-primary-drinking-water-regulations-minor-corrections-to-the-revisions-to-the-total-coliform> Accessed on 6/18/2019

⁵ <http://www.epa.gov/dwreginfo/revised-total-coliform-rule-and-total-coliform-rule#rule-history> Accessed on 6/18/2019

⁶ <https://www.epa.gov/dwreginfo/revised-total-coliform-rule-and-total-coliform-rule> Accessed on 4/29/2019

TABLE 1.0 NPS – TOTAL COLIFORM SAMPLE REQUIREMENT FOR PUBLIC WATER SYSTEMS

Population Served	Minimum Number of Samples per Month	Population Served	Minimum Number of Samples per Month
0 to 1,000	1	8,501 to 12,900	10
1,001 to 2,500	2	12,901 to 17,200	15
2,501 to 3,300	3	17,201 to 21,500	20
3,301 to 4,100	4	21,501 to 25,000	25
4,101 to 4,900	5	25,001 to 33,000	30
4,901 to 5,800	6	33,001 to 41,000	40
5,801 to 6,700	7	41,001 to 50,000	50
6,701 to 7,600	8	50,001 to 59,000	60
7,601 to 8,500	9	For populations > 59,000 see ⁷ (pg 10361)	

The population served (**p**) is defined as the sum of the residents (**r**) and the average daily transient population (total number of transients (**t**) served per month divided by the number of days (**d**) of the month during which the transients were served), i.e., $p = r + t/d$. (If the transient population changes significantly from month to month, utilize information from previous years of operation to calculate the average daily transient population for the current month). If there are questions regarding the transient population served consult with the primacy agency and PHC.

Note: the local, State or County jurisdiction may require an increased sampling protocol based on local regulations or a record of poor test results.

3.2 Special Sampling Requirements:

3.2.1 Seasonal systems: Seasonal systems must obtain two consecutive, **negative** samples prior to utilization of the system. Samples may be collected on the same day, but not at the same time and must be collected at different sampling sites according to the site-sampling plan, if applicable. Example shut-down and start-up guides are located in appendix 6.0 and on the NPS OPH website⁸. Also the RTCR requires that the primacy agency establishes a start-up procedure. Therefore, if the primacy agency has a start-up procedure that is required, utilize that and provide a copy to your PHC. Propylene glycol or other anti-freeze type liquids are not allowed unless approved through waiver process through regional PHC.

⁷ <https://www.gpo.gov/fdsys/pkg/FR-2013-02-13/pdf/2012-31205.pdf> Accessed on 6/18/2019

⁸ <https://sites.google.com/a/nps.gov/in2-protect-and-promote-health/home/drinking-water>

Accessed on 6/18/2019

- 3.2.2 Source water monitoring: Some Primacy Agencies require periodic source (raw) water monitoring. Sampling of source water must be in accordance with the Primacy Agency requirements.
- 3.2.3 Municipal supplies: National Park Service operated distribution systems serviced by municipal systems should be included in the municipality's bacteriological sampling programs whenever feasible. When the municipality does not monitor a distribution system, the PHC should be contacted to determine if and when the system requires sampling.
- 3.3 Site-sampling plan: Each system must have a written site-sampling plan (examples^{9,10}) available for review by the Primacy Agency, and/or the PHC. All bacteriological samples must be collected from identified sampling sites. An example plan can be found in appendix 5.0 or the NPS OPH website at: <https://sites.google.com/a/nps.gov/in2-protect-and-promote-health/home/drinking-water>. If links are inactive, please conduct a search in your web browser for, National Park Service Office of Public Health Drinking Water.
- 3.4 Positive samples: All positive total coliform samples require that the system operator obtain repeat samples in accordance with the Primacy Agency and, at a minimum, the following:
- 3.4.1 Public systems: Three repeat samples must be collected within 24 hours of laboratory notification of the positive result. (See Ground Water Rule (GWR) and RTCR for details on resampling and contact your PHC. Details can be found on page 17 & 18 of 40 CFR Parts 141 and 142¹¹.) **NOTE**: This includes public non-community systems.
- 3.4.2 Non-public systems: Two repeat samples must be collected and analyzed. One sample must be collected at the site of the positive sample. If possible, three samples should be collected, one at the positive sample location, one upstream, and one downstream. For example: on a residential system, one should be taken inside the residence and one should be taken outside the residence. Notify your PHC of initial positive and repeat samples results upon discovery.
- 3.5 Non-compliance - Public Systems: **If any repeat samples are positive (TC+)**, the park must notify the Primacy Agency and the PHC within 24 hours following receipt of notification of sample results. The Primacy Agency and the PHC must be contacted for assistance in determining the source of the contamination and in implementing corrective actions.
- 3.6 Non-compliance - Non-Public Systems: **If any repeat samples are positive (TC+)**, the park must notify the PHC within 24 hours following receipt of notification of sample results. The PHC must be contacted for assistance in determining the source of the contamination and in implementing corrective actions.

⁹ http://www2.epa.gov/sites/production/files/2015-04/documents/rtrc_siting_plan_template.pdf Accessed on 6/18/2019

¹⁰ <https://sites.google.com/a/nps.gov/in2-protect-and-promote-health/home/drinking-water> Accessed on 6/18/2019

¹¹ <https://www.gpo.gov/fdsys/pkg/FR-2013-02-13/pdf/2012-31205.pdf> Accessed on 6/18/2019

4.0 CHEMICAL MONITORING

Monitoring requirements are as shown in Table 5: Summary of Parameters and Testing Regime. Test results will be submitted to the Primacy Agency and PHC upon receipt. There are several federal rules, and state primacy agencies may establish additional monitoring requirements. Many of the rules are described below and in Table 5, however verify your particular sampling requirements with the Primacy Agency. Many states follow 40 CFR 141.23 – “Inorganic chemical sampling and analytical requirements” monitoring as listed below:

- Groundwater systems must take a minimum of one sample at every entry point to the distribution system, which is representative of each well after treatment (hereafter called a sampling point) beginning in the initial compliance period. The system must take each sample at the same sampling point unless conditions make another sampling point more representative of each source or treatment plant.
- Surface water systems must take a minimum of one sample at every entry point to the distribution system after any application of treatment or in the distribution system at a point, which is representative of each source after treatment (hereafter called a sampling point) beginning in the initial compliance period. The system must take each sample at the same sampling point unless conditions make another sampling point more representative of each source or treatment plant.

The EPA National Primary Drinking Water Regulations must be met for drinking water systems. Details about contaminants¹² can be found on Fact Sheets¹³ developed by the EPA.

4.1 Primary inorganics, secondary contaminants, and general minerals: Primary inorganic, secondary contaminants, and general mineral analyses must be conducted to meet regulatory requirements and/or to determine the most feasible treatment methodologies to provide water of satisfactory quality. Samples must be collected from the source before treatment. NOTE – Nitrates are required annually for all sources. Disinfection byproduct sampling is performed at locations within the distribution system, post treatment.

For more information on inorganic chemicals, specific rule information, compliance dates, and regulatory updates, see EPA Drinking Water contaminants and standards¹⁴.

4.2 Organics:

4.2.1 Pesticides, Herbicides & Polychlorinated Biphenyls (PCB)'s: All systems with community and non-transient users must be sampled annually unless a State or Primacy Agency waiver has been issued. All transient non-community and non-public systems must be sampled one time. Additional sampling requirements are dependent upon the

¹² <http://www.epa.gov/dwstandardsregulations> Accessed on 6/18/2019

¹³ <https://safewater.zendesk.com/hc/en-us/categories/201454937> Accessed on 6/18/2019

¹⁴ <https://safewater.zendesk.com/hc/en-us/categories/201454957> Accessed on 6/18/2019

initial sampling results and source vulnerability. Samples should be collected after treatment and prior to entry to the distribution system.

4.2.2 **Volatile Organic Chemicals (VOC):** There are fifty-five VOC's that have Maximum Contaminant Level (MCL's) (regulated or unregulated) that must be analyzed. Samples should be collected after treatment and prior to entry to the distribution system.

4.2.2.1 **Groundwater Supplies.** Public community and public non-transient non-community systems served by groundwater supplies should have collected a sample from each entry point to the distribution system for an initial analysis by **December 1990**. A single routine sample must be collected at three-year intervals thereafter, unless the Primacy Agency has issued a waiver.

4.2.2.2 **Surface Water Systems.** The initial sampling for public community and public non-transient non-community systems served by surface sources consists of four quarterly samples to be collected over a one-year period. The first sample should have been collected by **December 1990**. Sampling must be repeated at three-year intervals thereafter, unless the Primacy Agency has issued a waiver.

4.2.3 **All Other Public Systems (ground or surface water).** These systems should be sampled one time for baseline information. Contact the PHC for additional information and guidance.

4.2.4 **Non-public Systems.** These systems should be sampled in special situations only. Contact the PHC for additional information and guidance.

For more information on organic chemicals, specific rule information, contaminant candidate lists, compliance dates, and regulatory updates, search EPA Drinking Water contaminants and standards¹⁵.

Note: If the primacy agency grants a waiver for organic chemical monitoring for a public system, the PHC may also grant a waiver for those non-public systems not regulated by the State but lie within the same aquifer.

4.3 **Disinfectants/Disinfection Byproducts:** This rule is intended to balance the use of disinfectants with the potential health effects from long term exposure to byproducts formed by the reaction of disinfectants with natural organic and inorganic matter in drinking water.

4.3.1 This rule applies to all community and non-transient non-community water systems that add a chemical disinfectant to the water in any part of the treatment process. This includes surface water systems, groundwater systems under the direct influence of surface water, and groundwater systems.

4.3.2 **Surface Water and Ground Water Under the Direct Influence of Surface Water:**

¹⁵ <https://safewater.zendesk.com/hc/en-us/categories/201454957> Accessed on 6/18/2019

All surface water sources and any groundwater sources under the direct influence (GWUDI) of surface water, as determined by the Primacy Agency for public systems will be provided with approved treatment processes. Non-public surface water sources and groundwater sources under the direct influence of (GWUDI) surface water, as determined by the PHC, will be provided with approved treatment process. For additional detail see EPA GWUDI regulations.

4.3.3 Byproducts to be monitored:

- Total trihalomethanes (TTHM): The sum of chloroform, bromoform, bromodichloromethane, and dibromochloromethane.
- Haloacetic acids (HAA5): The sum of monochloroacetic acid, dichloroacetic acid, trichloroacetic acid, monobromoacetic acid, and dibromoacetic acid.
- Bromate: For those systems using ozone for disinfection.
- Chlorite: For those systems using chlorine dioxide for disinfection.

4.3.4 Residual Disinfectants to be monitored:

- Chlorine: for those systems using chlorine.
- Chloramine: for those systems using chloramine.
- Chlorine dioxide: for those systems using chlorine dioxide.

4.3.5 Monitoring requirements: Community and Non-Transient Non-Community water systems. Sample GWUDI sources with the same frequency as surface water sources.

- Large surface water systems (>10,000 persons/day): monitor 4 samples/plant/quarter for TTHMs and HAA5's.
- Small surface water systems (<10,000 persons/day): monitor 1 sample/plant/quarter for TTHMs and HAA5's.
- Very small surface water systems - serving less than 500 people each day: monitor 1 sample/plant/year for TTHMs and HAA5s.
- Large ground water systems - serving more than 10,000 people each day: monitor 1 sample/plant/quarter for TTHMs and HAA5s.
- Small ground water systems - serving less than 10,000 people each day: monitor 1 sample/plant/year for TTHMs and HAA5s.

4.3.6 Monitoring requirements: For transient and non-public water systems (also refer to section 7.3 in this document).

- Transient surface water and ground water systems: As required by PHC.*
- Non-public surface water and ground water systems: As required by PHC.*

**Note: Additional monitoring may be requested based on scientific reasoning to include water source type, contact time, total organic carbon (TOC) concentrations, past testing results, and/or other water quality factors.*

4.4 Chemical Monitoring Waivers

Potable drinking water systems connected to municipal supplies are not required to perform chemical monitoring if current analyses for the area are available from the municipality. If current analyses are not available, the Park may be directed by the PHC to perform the analyses.

The monitoring requirements in this section may be waived for non-public and/or unregulated systems if authorized, in writing, by the PHC. This authorization will only be given after a complete sanitary survey of the system and review of the operational records indicates a reduced sampling frequency or waiver would not increase risk to end-users.

For specific rule information, compliance dates, and regulatory updates, go to:

EPA Chemical Contaminant Rules¹⁶

5.0 LEAD AND COPPER

On June 7, 1991, final national primary drinking water regulations for lead and copper were adopted for public-community and public non-transient non-community water systems. The rule establishes maximum contaminant level goals (MCLG), and action levels for both lead and copper. It also sets forth treatment technique requirements and specifies monitoring requirements, analytical methods, public notification requirements, record keeping and reporting requirements, and compliance schedules. An EPA public education program is also required if an action level is exceeded. All community water systems (CWS) and non-transient non-community (NTNC) water systems are subject to the Lead and Copper Rule (LCR)¹⁷.

To comply with the rule and in order to assess for and reduce the health risks associated with lead and copper, parks will:

5.1 Surveillance for All NPS Water Systems:

5.1.2 All CWSs and NTNCs must collect first-draw samples at taps in homes/buildings

¹⁶ <http://www.epa.gov/dwreginfo/chemical-contaminant-rules> Accessed on 6/18/2019

¹⁷ <http://www.epa.gov/dwreginfo/lead-and-copper-rule> Accessed on 6/18/2019

that are at high risk of Lead (Pb)/ Copper(Cu) contamination as identified in the Code of Federal Regulations (40 CFR 141.86(a)). If parks have not completed this, it should be conducted immediately.

5.1.3 All non-public water systems should take first draw tap samples (one liter) at each Park Service owned non-public system and have them analyzed for lead and copper. If one or more first draw tap samples are elevated for lead or copper (>0.015 mg/l, >1.3 mg/l respectively), contact your PHC for further directives.

5.1.4 Assure that lead solder or flux is no longer used in domestic water plumbing.

5.1.5 Replace drinking fountains listed by EPA under the Lead Contamination Control Act.

5.2 Monitoring:

5.2.1 All CWSs and NTNCs must collect the number of samples as shown in Table 2.0 and 2.1 below, and systems must conduct monitoring every six months unless they qualify for reduced monitoring (Table 2.1). Water quality parameter (WQP) samples at entry points to distribution system (EPTDS) are collected every 6 months prior to any corrosion control treatment.

5.2.2 For TNC and Non-public systems, NPS operators should contact their regional PHC for directives on Pb and Cu monitoring.

5.2.3 Regional PHCs cannot contradict the primacy agency.

TABLE 2.0 LEAD AND COPPER TAP AND WQP TAP MONITORING (DOES NOT APPLY TO EPTDS WQP MONITORING.)¹⁸

Size Category	System Size (People)	Number of Pb/Cu Tap Sample Sites ³		Number of WQP Tap Sample Sites ⁴	
		Standard	Reduced	Standard	Reduced
Large	> 100K	100	50	25	10
	50,001 - 100K	60	30	10	7
Medium	10,001 - 50K	60	30	10	7
	3,301 - 10K	40	20	3	3
Small	501 - 3,300	20	10	2	2
	101 - 500	10	5	1	1
	≤ 100	5	5	1	1

³ With written State approval, PWSs can collect < 5 samples if all taps used for human consumption are sampled.

⁴ Two WQP tap samples are collected at each sampling site.

¹⁸ <http://nepis.epa.gov/Exe/ZyPDF.cgi?Dockey=60001N8P.txt> Accessed on 6/18/2019

TABLE 2.1 CRITERIA FOR REDUCED Pb/Cu TAP MONITORING	
Annual	<ol style="list-style-type: none"> 1 PWS serves $\leq 50,000$ people and is \leq both established action levels (ALs) for 2 consecutive 6-month monitoring periods; or 2 Any PWS that meets optimal WQPs (OWQPs) and is \leq Pb AL for 2 consecutive 6-month monitoring periods.
Triennial	<ol style="list-style-type: none"> 1. PWS serves $\leq 50,000$ people and is \leq both ALs for 3 consecutive years of monitoring; or 2. Any PWS that meets OWQP specifications and is \leq Pb AL for 3 consecutive years of monitoring; or 3. Any PWS with 90th percentile Pb and Cu levels ≤ 0.005 mg/L and ≤ 0.65 mg/L, respectively, for 2 consecutive 6-month monitoring periods (i.e., accelerated reduced
Every 9 years	PWS serves $\leq 3,300$ people and meets monitoring waiver criteria found at 40 CFR 141.86(g).

6.0 RADIONUCLIDES¹⁹

In 2000, EPA revised the radionuclides regulation²⁰, which had been in effect since 1977. The revisions required new monitoring provisions to ensure that all customers of community water systems will receive water that meets the Maximum Contaminant Levels for radionuclides in drinking water. EPA also issued a standard for uranium, as required by the 1986 amendments to the Safe Drinking Water Act. The current standards are: combined radium 226/228 of 5 pCi/L; a gross alpha standard for all alphas of 15 pCi/L (not including radon and uranium); a combined standard of 4 mrem/year for beta emitters. The new MCL for uranium is 30 μ g/L. Radionuclide sample should be taken before treatment.

Community water systems (CWSs), are required to meet the final MCLs and to meet the requirements for monitoring and reporting.

Non-transient, non-community water systems (NTNCWSs) with a ground water source will be tested one time, unless waived by the PHC.

For transient non-community (TNC) and non-public (NP) systems, NPS operators should contact their regional PHC for directives on radionuclides testing.

7.0 WATER TREATMENT

7.1 Filtration:

7.1.1 All surface water²¹ sources and any groundwater sources under the direct influence of surface water must be provided with approved filtration.

7.1.2 Compliance schedule for provision of filtration: For groundwater supplies that are determined to be under the influence of surface water, filtration must be in place and operational 18 months after the Primacy Agency officially issues the determination.

7.1.3 Parks with groundwater sources clearly under the direct influence of surface water should contact the PHC for assistance in developing a schedule to provide filtration or developing a new groundwater source.

¹⁹ <http://www.epa.gov/radiation/radionuclides> Accessed on 6/18/2019

²⁰ <http://www.epa.gov/dwreginfo/radionuclides-rule> Accessed on 6/18/2019

²¹ https://www.epa.gov/sites/production/files/documents/SWTR_Fact_Sheet.pdf Accessed on 6/18/2019

7.1.4 In those cases where it is not certain if a groundwater source is under the influence of surface water, parks should be aware that the criteria for making such determinations have not been developed by all Primacy Agencies. When these criteria are developed, parks should contact the PHC for assistance in developing and initiating a modification schedule. Microscopic Particulate Analysis (MPA) can be used to help assess whether a groundwater source is under the direct influence (GWUDI) of surface water.

7.1.5 On December 16, 1998, the EPA finalized an Interim Enhanced Surface Water Treatment Rule (IESWT)²², which became effective **February 16, 1999**. This rule is intended to improve control of microbial pathogens, including specifically the protozoan *Cryptosporidium*, by enhancing physical removal efficiencies in drinking water, and addresses risk trade-offs with disinfection byproducts.

7.1.6 In January 2004, the EPA Long Term 1 Enhanced Surface Water Treatment Rule (LT1ESWTR) became effective. This rule follows the IESWTR and regulates systems of less than 10,000 people. This rule includes the compliance with Stage 1 Disinfectants/Disinfection Byproducts Rule. These new rules affect public and non-public surface water treatment plants, including ground water systems under the influence of surface water.

7.1.7 In December 2005, the EPA Long Term 2 Enhanced Surface Water Treatment Rule (LT2ESWTR)²³ and the Stage 2 Disinfection Byproduct Rule²⁴ became effective. The Long Term 2 Enhanced Surface Water Treatment Rule and the Stage 2 Disinfection Byproducts Rule are the second phase of rules required by Congress. These rules strengthen protection against microbial contaminants, especially *Cryptosporidium*, and at the same time, reduce potential health risks of disinfection byproducts. The new regulations apply to public water systems that use surface water or ground water under the influence of surface water.

Under the LT2ESWTR, systems will monitor their water sources to determine treatment requirements. This monitoring includes an initial two years of monthly sampling for *Cryptosporidium*. To reduce monitoring costs, small filtered water systems will first monitor for *E. coli*—bacterium which is less expensive to analyze than *Cryptosporidium*—and will monitor for *Cryptosporidium* only if their *E. coli* results exceed specified concentration levels.

Monitoring start dates are staggered by system size, with larger systems being monitored before smaller systems. Systems must conduct a second round of monitoring six years after completing the initial round to determine if source water conditions have changed significantly. Systems may use (grandfather) previously collected data in lieu of

²² <https://www.epa.gov/dwreginfo/implementation-guidance-appendices-surface-water-treatment-rules> Accessed on 6/18/2019

²³ <https://www.epa.gov/dwreginfo/long-term-2-enhanced-surface-water-treatment-rule-documents> 6/18/2019

²⁴ <http://www.epa.gov/dwreginfo/stage-1-and-stage-2-disinfectants-and-disinfection-byproducts-rules> 6/18/2019

conducting new monitoring, and systems are not required to monitor if they provide the maximum level of treatment required under the rule.

Cryptosporidium treatment: Filtered water systems will be classified in one of four treatment categories (bins) based on their monitoring results. The majority of systems will be classified in the lowest treatment bin, which carries no additional treatment requirements. Systems classified in higher treatment bins must provide 90 to 99.7 percent (1.0 to 2.5-log) additional treatment for *Cryptosporidium*. Systems will select from a wide range of treatment and management strategies in the "microbial toolbox" to meet their additional treatment requirements. All unfiltered water systems must provide at least 99 or 99.9 percent (2 or 3-log) inactivation of *Cryptosporidium*, depending on the results of their monitoring. These *Cryptosporidium* treatment requirements reflect consensus recommendations of the Stage 2 Microbial and Disinfection Byproducts Federal Advisory Committee.

Other requirements: Systems that store treated water in open reservoirs must either cover the reservoir or treat the reservoir discharge to inactivate 4-log virus, 3-log *Giardia lamblia*, and 2-log *Cryptosporidium*. These requirements are necessary to protect against the contamination of water that occurs in open reservoirs. In addition, system operators must review their current level of microbial treatment before making a significant change in their disinfection practice. This review will assist to protect against microbial pathogens as they take steps to reduce the formation of disinfection byproducts under the Stage 2 Disinfection Byproducts Rule, which EPA is finalizing along with the LT2ESWTR.

The Stage 2 Disinfection Byproducts Rule (DBPR) strengthens public health protection for customers by tightening compliance monitoring requirements for two groups of Disinfection Byproducts (DBPs), trihalomethanes (TTHM) and haloacetic acids (HAA5). (Also refer to section 4.3 in this document.) The rule targets systems with the greatest risk and builds incrementally on existing rules. This regulation will reduce DBP exposure and related potential health risks and provide more equitable public health protection.

Under the Stage 2 DBPR, systems will conduct an evaluation of their distribution systems, known as an Initial Distribution System Evaluation (IDSE), to identify the locations with high DBP concentrations. These locations will then be used by the systems as the sampling sites for Stage 2 DBPR compliance monitoring.

Compliance with the maximum contaminant levels for two groups of DBPs (TTHM and HAA5) will be calculated for each monitoring location in the distribution system. This approach, referred to as the locational running annual average (LRAA), differs from current requirements, which determine compliance by calculating the running annual average of samples from all monitoring locations across the system.

The Stage 2 DBPR also requires each system to determine if they have exceeded an operational evaluation level, which is identified using their compliance monitoring results. The operational evaluation level provides an early warning of potential future maximum contaminant level (MCL) violations, which allows the system to take

proactive steps to remain in compliance. A system that exceeds an operational evaluation level is required to review their operational practices and submit a report to their state that identifies actions that may be taken to mitigate future high DBP levels, particularly those that may jeopardize their compliance with the DBP MCLs. Entities potentially regulated by the Stage 2 DBPR are community and nontransient noncommunity water systems that produce and/or deliver water that is treated with a primary or residual disinfectant other than ultraviolet light.

7.1.8 The EPA Ground Water Rule (GWR)²⁵ reduces the risk of exposure to fecal contamination that may be present in public water systems that use ground water sources. The rule establishes a risk-targeted strategy to identify ground water systems that are at high risk for fecal contamination. The GWR²⁶ also specifies when corrective action (which may include disinfection) is required to protect consumers from bacteria and viruses if they consume water from ground water systems. The rule addresses risks through a risk-targeting approach that relies on four major components:

7.1.8.1 Periodic sanitary surveys of ground water systems that require the evaluation of eight critical elements and the identification of significant deficiencies (e.g., a well located near a leaking septic system).

7.1.8.2 Source water monitoring to test for the presence of *E. coli*, *enterococci*, or *coliphage* in the sample. There are two monitoring provisions:

- *Triggered monitoring* for systems that do not already provide treatment that achieves at least 99.99 percent (4-log) inactivation or removal of viruses and that have a total coliform-positive routine sample under Total Coliform Rule sampling in the distribution system.
- *Assessment monitoring* - As a complement to triggered monitoring, a State has the option to require systems, at any time, to conduct source water assessment monitoring to help identify high risk systems.

7.1.8.3 Corrective actions required for any system with a significant deficiency or source water fecal contamination. The system must implement one or more of the following correction action options:

- correct all significant deficiencies,
- eliminate the source of contamination,
- provide an alternate source of water, or
- provide treatment which reliably achieves 99.99 percent (4-log) inactivation or removal of viruses.

7.1.8.4 Compliance monitoring to ensure that treatment technology installed to treat drinking water reliably achieves at least 99.99 percent (4-log) inactivation or removal of viruses.

²⁵ <http://www.epa.gov/dwreginfo/ground-water-rule> Accessed on 6/18/2019

²⁶ <http://nepis.epa.gov/Exe/ZyPDF.cgi?Dockey=P1001KJK.txt> Accessed on 6/18/2019

7.1.9 Filter Backwash Recycling²⁷: This rule requires systems that recycle to return specific recycle flows through all processes of the system's existing conventional or direct filtration system or at an alternate location approved by the state (66 FR 31086, June 8, 2001, Vol. 66²⁸).

7.2 Turbidity Monitoring:

7.2.1 All water systems requiring filtration under the Surface Water Treatment Rule, Interim Enhanced Surface Water Treatment Rule, Long Term 1 Enhanced Surface Water Treatment Rule and Long Term 2 Enhanced Surface Water Treatment Rule (7.1.6) must be analyzed for turbidity (cloudiness of water). The unit of measure for turbidity is the Nephelometric Turbidity Unit (NTU). The MCL is 1.0 NTU for diatomaceous earth and slow sand filtration and 0.3 NTU for conventional and direct filtration. The MCL for "other technology" filtration such as bag filtration is 1.0 NTU unless a more stringent requirement is established by the Primacy Agency. For systems that use conventional or direct filtration, at no time can turbidity go higher than 1 Nephelometric Turbidity Unit (NTU), and samples for turbidity must be less than or equal to 0.3 NTUs in at least 95 percent of the samples in any month. Systems that use filtration other than the conventional or direct filtration must follow state limits, which must include turbidity at no time exceeding 5 NTUs. Systems serving 500 or fewer persons per day must collect one grab sample per day. Systems serving more than 500 persons per day must collect one grab sample every four hours when water is served to the Public or continuous monitoring may be substituted for grab sampling.

7.2.2 The PHC must be informed of any violation. The issuance and content of public notification must be determined in consultation with the Primacy Agency and/or PHC.

7.3 Disinfection:

All public drinking water systems will be continuously disinfected with NSF/ANSI 60 Standard 60 for Drinking Water Treatment Chemicals. Sodium hypochlorite is the preferred disinfectant: primary disinfectants such as ozone and ultraviolet irradiation do not provide a residual and therefore an acceptable secondary disinfection will be required. Primary disinfection may be used for point of use treatment with low risk of recontamination by the user. Approval by the Primary Agency (if applicable) and the PHC is required. The PHC may specifically exempt *non-public* systems of primary and secondary disinfection after a complete sanitary survey of the system is made.

It is recommended that disinfection of groundwater systems achieve 4-log virus inactivation if not achieved by other methods (e.g., reverse osmosis (RO), ozone, ultraviolet). New construction should be designed to provide 4-log virus inactivation as specified by PHC. Drinking water systems and sources with several positive bacterial samples may need to be replaced or require 4- log virus inactivation. Parks with surface water systems must monitor the entry point to the distribution system

²⁷ <http://nepis.epa.gov/Exe/ZyPDF.cgi?Dockey=200025V5.txt> Accessed on 6/18/2019

²⁸ <https://www.gpo.gov/fdsys/pkg/FR-2001-06-08/pdf/01-13776.pdf> Accessed on 6/18/2019

for the presence of a chlorine residual. The minimum chlorine residual is 0.2 mg/l or a higher level determined using CT calculations. If the residual drops below 0.2 mg/l (or the value required for minimum CT, whichever is greater), it must be restored within four hours. Whenever the residual falls below the required value, the park must notify the Primacy Agency and the PHC as soon as possible but no later than the end of the next business day. For systems serving 3,300 persons or more, the chlorine residual must be monitored on a continuous basis. Systems serving fewer than 3,301 persons can take grab samples in lieu of continuous monitoring at the following frequencies:

System Population	Samples/day
< 500	1
501-1000	2
1001-2500	3
2501-3300	4

Acceptable secondary disinfection methods are those which provide a measurable disinfectant residual in the distribution system.

7.3.1 Distribution System Residual: All potable drinking water systems will be continuously disinfected, the PHC may specifically exempt *non-public* systems after a complete sanitary survey of the system is made. A disinfectant residual must be maintained (e.g. minimum 0.2 mg/L free chlorine) throughout the distribution system for all continuously disinfected drinking water systems. If disinfectants other than chlorine are used, the PHC or Primacy Agency must be contacted for residual levels required to be maintained. The absence of a residual indicates either an equipment failure or the presence of contamination in the system. If an equipment failure is not the cause, the park must contact the PHC or the Primacy Agency for assistance.

7.3.2 Routine Monitoring: All drinking water distribution systems must be monitored for the presence of an acceptable residual. For those park operated, public drinking water systems utilizing a chemical disinfectant, one (1) disinfectant residual sample will be measured and recorded per day from representative points unless advised otherwise by the PHC (also shown in table 5.0). Parks operating *non-public* drinking water systems or receiving water from municipalities should contact the PHC for residual monitoring guidance.

7.3.3 Redundancy of Disinfection Equipment: For surface water systems, replacement disinfection equipment must be available and in service within four hours of problem identification. For groundwater systems, replacement of disinfection equipment varies based off the results of the most frequent sanitary survey or public health assessment.

7.3.4 Special Monitoring - Bacteriological Sampling: The chlorine residual must be measured at the bacteriological sample site each time a bacteriological sample is collected. The monitoring results must be recorded on the operator's log and the laboratory form.

8.0 OPERATOR REQUIREMENTS

- 8.1 All parks that operate public drinking water systems will have certified operators as required by the primacy agency. If the park chooses to contract to have an operator, that operator must adhere to NPS policy and the Primacy Agency. All NPS drinking water systems that are treated or disinfected require a minimum of the lowest level of certification available through the State. If a waiver is issued through the OPH Director; operator certification may not be needed as determined by your local PHC.
- 8.2 The park must designate in writing, backup operators who have adequate training and skills to properly operate the system when the primary operator is not available. Equivalent backup operator certification and training is recommended and may be required by some Primacy Agencies.
- 8.3 NPS Unit Managers will develop training plans and assure that operators receive any required and/or appropriate training. The NPS OPH Field Services Branch, in partnership with NPS Facilities Management, provides training on an annual basis or as funding permits.
- 8.4 NPS Unit Managers and/or NPS operators must notify the regional PHC of any scheduled visits from the primacy agency to inspect NPS owned facilities and provide their contact information, along with the scheduled date and time of the visit from other authorities regulating public drinking water.

9.0 CROSS CONNECTION CONTROL

The Safe Drinking Water Act and International Plumbing Code require all public water systems to maintain an active cross connection control program to protect the health of the public. All cross connections must be protected to prevent contamination of drinking water systems. This is the responsibility of the owner/operator of the system, as well as the operator of each facility connected to the water system.

Each park must have a documented cross connection control program on file for review by the Primacy Agency and/or the PHC. An example policy for cross-connection and backflow control is available from your PHC consultant. For proper backflow prevention in your safe drinking water systems, please refer to Table 3.0 below.

TABLE 3.0 SUMMARY OF BACKFLOW PREVENTION ASSEMBLY APPLICATIONS*

Backflow Assembly	Non-Health Hazard (Pollutant)		Health Hazard (Contaminant)		Sewage	
	Backsiphonage	Backpressure	Backsiphonage	Backpressure	Backsiphonage	Backpressure
AIR GAP (AG)	X	X	X	X	X	X
Reduced Pressure Backflow Assembly (RPBA)	X	X	X	X		
Double Check Valve Assembly (DCVA)	X	X				
Pressure Vacuum Breaker(PVB)	X		X			
Air Vacuum Breaker (AVB)	X		X			

*Adapted from Manual of Cross-Connection Control²⁹, Univ.Southern CA Foundation for Cross-Connection Control and Hydraulic Research

a. Backflow Terminology

Cross-connection: Any unprotected actual or potential connection between a public water system and any other source through which it is possible to introduce any substance other than the intended potable water.

Non-Health Hazard: An impairment of the quality of water to a degree which does not create a hazard to the public but does adversely affect the aesthetic quality of water for domestic use.

Health Hazard: An impairment of the quality of the water, which creates an actual hazard to the public through poisoning or the spread of disease.

Backsiphonage: Backflow due to a reduction in system pressure which causes negative pressure to exist in the water system.

Backpressure: A rise in pressure in the downstream piping system above the supply pressure which would cause a reversal of the normal direction of flow.

Indirect Connection: A cross-connection which is subject to backsiphonage only.

Direct Connection: A cross-connection which is subject to both backsiphonage and backpressure.

²⁹ <http://www.manassascity.org/DocumentCenter/Home/View/2105> Accessed on 6/18/2019

10.0 POTABLE WATER HAULING

In the absence of State or local standards, the following standards must apply to NPS water hauling operations, whether conducted by the Park or a private contractor:

- 10.1 Water for all NPS water hauling operations, whether conducted by the park or a private contractor, will be obtained from an approved water source that meets the requirements of the Safe Drinking Water Act (SDWA and NPS requirements described in this document).
- 10.2 Containers must be: (1) constructed of non-toxic materials; (2) be non-porous; (3) have never been used for storing or hauling anything but potable water; and (4) be labeled "potable water only". NSF approved containers are recommended.
- 10.3 Before the container is filled, sufficient chlorine must be added in the water hauled to achieve a free chlorine residual of 1.0 ppm. A free chlorine residual sample must be taken, and recorded at each location where water is added to a different cistern.
- 10.4 All water haulers will maintain the following records and such records must be made available to the NPS representatives and NPS PHC upon request:
 1. When and where each load was picked up.
 2. When and where each load was delivered.
 3. A record of all chlorine residual tests.
 4. A record of types and quantities of any chemicals added to the load. (Sodium hypochlorite, etc.)
 5. A maintenance record for the tank and equipment showing method and frequency of cleaning.
 6. Any remarks the hauler feels are pertinent.
- 10.5 The container must be flushed each time water is hauled if it has not been used for more than one day. Water hauling truck must provide any procedures for hauling to the park and PHC upon request. Primary Agency protocols must be followed.
- 10.6 At no time during the water filling operation must a potential for backflow exist.
- 10.7 Hoses used to fill and empty tanks must be properly identified, and used only for potable water. The ends of the hoses must be capped, when not in use, and the caps must be attached to the hoses.
- 10.8 All containers, tanks, hoses, fittings, and other equipment used to store, haul, or transfer potable water must be constructed of approved food grade materials or coated with approved food grade coatings.
- 10.9 Hoses must be stored in such a manner that they are not subject to contamination from surface run-off, birds, rodents, and other sources of contamination.
- 10.10 All valves and fire hydrants (assure hydrant water source meets SDWA and RM83A-1 for nonpublic systems) must be flushed before the connection of any hoses.

10.11 No bacteriological testing will be required on water hauling tanks when source water systems and receiving water systems have a bacteriological monitoring program in place.

11.0 REPORTS AND RECORDS RETENTION

NPS Unit Managers will assure that required records are maintained in permanent files for periodic review by the Public Health Consultant (PHC) or Primacy Agency representatives, and that reports are submitted on a timely basis, as requested by the PHC and/or the Primacy Agency. The results for any testing that is mandated in this policy should be provided to the PHC if not reviewed during the onsite visit. Please consult your PHC for preferred reporting formats, and submission tools.

The park has the responsibility to maintain official records, to have them available in an organized manner for the review and inspection of various regulatory entities, and for periodic review by the PHC. Records must be retained as follows or as required by the Primacy Agency:

<u>RECORDS</u>	<u>RETENTION PERIOD</u>
Chemical Analyses	Indefinitely
Bacteriological Analyses	Five years
Turbidity Measurements	Five years
Public Notices, Administrative Orders, Variances and Exemptions	Five years
Sanitary Surveys	Ten years
Operating Records--includes water usage, water production, chemical usage, chlorine residuals, etc.	Five years
System History - includes well logs test pump data, system modifications, as-builts, operator designations, significant events	Indefinitely
Lead and Copper Rule Records	Twelve years

12.0 WATER CONSERVATION

NPS Management Policies (Chapter 9.1.5.1) requires that the NPS design, construct, manage, and maintain water supply systems in a fashion that promotes conservation. Conservation measures which should be considered include: metering, leak detection and correction, automatic irrigation systems, low-use water fixtures, low flush toilets, and programs which discourage wasteful use of water.

Water Reuse: NPS approves wastewater to be treated for non-potable reuse only, and does not allow the reuse for potable uses. Refer to RM83A-2 for wastewater reuse policy.

13.0 PAYMENT OF FEES FOR SERVICE

Many primacy agencies charge fees for services. Fees are charged for plan review, construction and operating permits, and for sanitary surveys conducted by the primacy agency. The Safe Drinking Water Act placed federally owned and operated systems under the jurisdiction of Primacy Agencies. Parks may be required to pay subject fees. Payment of fees should be included in annual budget and contracting plans, as appropriate.

14.0 PUBLIC NOTIFICATION

All parks will comply with the public notification requirements of the Safe Drinking Water Act³⁰ and the Primacy Agency. The public notification requirements of the Safe Drinking Water Act require water systems to notify persons relative to a three tier system. Tier 1 is an immediate notice, Tier 2 is notice as soon as possible, and Tier 3 is an annual notice (examples³¹).

15.0 PLAN REVIEW AND APPROVAL

When drinking water system modifications or new construction is proposed, parks will contact the Primacy Agency to determine if plans and specifications should be submitted for approval. A copy of the plans and specifications will be provided to the PHC for review. If no regulatory guidance is available for public or non-public systems, American Water Works Association (AWWA) Standards and/or Recommended Standards for Water Works (Ten States Standards) should be followed. The PHC may be contacted for technical review and guidance on public health related issues (e.g. treatment, backflow prevention, disinfection, etc.). The NPS Denver Service Center has accepted codes and standards³².

16.0 OPERATION AND MAINTENANCE PLAN

All parks operating drinking water systems will have a written Operations and Maintenance Plan and an Emergency Response Plan. A copy must be provided to the PHC for review upon completion. Operation and Maintenance Plan and Emergency Response Plan examples can be found on the NPS OPH website³³.

17.0 POTABLE WATER FOR BACKCOUNTRY OPERATIONS

See RM83A-5 for further details.

18.0 CONSUMER CONFIDENCE REPORTS

The Safe Drinking Water Amendments of 1996 require that Public Community Water Systems provide all consumers with a yearly Consumer Confidence Report which outlines all bacteriological, physical, and chemical monitoring results and Maximum Contaminant Levels for the preceding year.

19.0 DRINKING WATER SECURITY AND EMERGENCY PREPAREDNESS

Security and emergency response planning have always been a critical element of managing a drinking water system. Threat categories include physical destruction, bioterrorism/chemical contamination, cyber-attacks, and personnel disruption. Potential threats can come from vandals, disgruntled employees, insider sabotage, activist groups, or state-sponsored terrorist groups.

The Park should determine if there are any state mandated requirements for providing drinking water security assessments.

If there are no state requirements, the park can utilize the following list to protect the water supply from contamination and other harm:

³⁰ <http://water.epa.gov/lawsregs/rulesregs/sdwa/publicnotification/basicinformation.cfm> Accessed on 6/18/2019

³¹ <https://www.epa.gov/region8-waterops/reporting-forms-and-instructions-public-notification#> Accessed on 6/18/2019

³² <http://www.nps.gov/dscw/ds-civil-environmental.htm> Accessed on 6/18/2019

³³ <https://sites.google.com/a/nps.gov/in2-protect-and-promote-health/home/drinking-water> Accessed on 6/18/2019 Page 20 of 52

1. Prepare or update an emergency response plan. Ensure all level of involvement and that all staff receive training on the plan.
2. Post updated emergency 24-hour numbers in highly visible areas (pumphouses, vehicles, offices) and give them to key personnel and local response officials.
3. Get to know the Park Law enforcement staff and/or the local law enforcement personnel. Ask them to add your facilities to their routine patrols. Practice emergency response procedures with the rangers, emergency response and public health staff.
4. Fence and lock your drinking water facilities and vulnerable areas (e.g. wellhead, hydrants, manholes, pumphouses, and storage tanks).
5. Lock all entry gates and doors and set any alarms to indicate illegal entry. Do not leave keys in equipment or vehicles at any time.
6. Install good lighting around your pumphouse, treatment facility and parking lot.
7. Identify existing and alternate water supplies and maximize use of backflow prevention devices and minimize interconnections.
8. Use your Source Water Assessment information to lessen any threat posed by potential sources of contamination.
9. Lock monitoring wells to prevent vandals or terrorists from pouring contaminants directly into ground water near your source. Prevent pouring or siphoning contaminates through vent pipes by moving them inside the pumphouse or treatment plant. If that is not possible, fence or screen them.
10. In the event of an emergency, first call “911”, then activate your emergency response plan.

A self-assessment vulnerability checklist is available on the NPS OPH website to help parks identify potential vulnerability concerns for their systems. An in-depth vulnerability profile assessment can be found in the Association of State Drinking Water Administrators, National Rural Water Association “Security Vulnerability Self-Assessment Guide for Small Drinking Water Systems” document that is provided on the NPS OPH³⁴ website, along with other drinking water security references.

20.0 PROTECT SOURCES OF DRINKING WATER³⁵

There are many factors that impact drinking water sources. With climate change concerns drinking water facilities and sources need to assure that they are climate ready. The vulnerability assessment mentioned above is a tool that helps address some new emerging concerns. The following six steps provide water operators, park managers, and PHCs with information to help protect drinking water sources.

1. Delineate the source water protection area (SWPA).
2. Inventory known and potential sources of contamination.
3. Determine the susceptibility of the PWS to contaminant sources or activities within the SWPA.
4. Notify the public about the threats identified in the contaminant source inventory and what they mean for the PWS.
5. Implement management measures to prevent, reduce, or eliminate risks to your drinking water supply.
6. Develop contingency planning strategies that address water supply

³⁴ <https://sites.google.com/a/nps.gov/in2-protect-and-promote-health/home/drinking-water> Accessed on 4/29/2019

³⁵ <http://www.epa.gov/sourcewaterprotection>. Accessed on 6/18/2019

contamination or service interruption emergencies.

20.1 Disposition of Unused Wells:

Water wells that are in use are referred to as active wells, wells that are not in use (such as those that are being used as monitoring wells or that the Park wants to maintain for water rights) are referred to as an inactive well and maintained in accordance with the appropriate State standards. If the Park does not use or maintain an inactive well, the well is referred to as an abandoned well and must be destroyed in accordance with State standards. During the time the well is inactive the sanitary seal must be properly maintained to prevent any contamination of the aquifer.

21.0 NATIONAL PRIMARY DRINKING WATER STANDARDS³⁶

According to the EPA website “Under the Safe Drinking Water Act (SDWA), EPA sets legal limits on the levels of certain contaminants in drinking water. The legal limits reflect both the level that protects human health and the level that water systems can achieve using the best available technology. Besides prescribing these legal limits, EPA rules set water-testing schedules and methods that water systems must follow. The rules also list acceptable techniques for treating contaminated water. SDWA gives individual states the opportunity to set and enforce their own drinking water standards, if the standards are at least as strong as EPA's national standards. Most states and territories directly oversee the water systems within their borders.” The National Park Service Office of Public Health thereby follows state and local standards for public water systems and similar standards for non-public systems, if the state does not address those systems.

Information regarding chemical contaminants are referenced in the National Primary Drinking Water Regulations (NPDWRs or primary standards) and are legally enforceable standards that apply to public water systems. Primary standards protect drinking water quality by limiting the levels of specific chemical contaminants that can adversely affect public health and are known or anticipated to occur in public water systems. The link below divides these contaminants into Microorganisms, Disinfection Byproducts, Disinfectants, Inorganic Chemicals, Organic Chemicals, and Radionuclides.

22.0 NATIONAL SECONDARY DRINKING WATER REGULATIONS

National Secondary Drinking Water Regulations (NSDWRs or secondary standards) are non-enforceable guidelines regulating contaminants that may cause cosmetic effects (such as skin or tooth discoloration) or aesthetic effects (such as taste, odor, or color) in drinking water. EPA recommends secondary standards to water systems, but does not require systems to comply. However, states may choose to adopt them as enforceable standards.

- National Secondary Drinking Water Regulations - The complete regulations regarding these contaminants, known as secondary contaminants, is available from the Code of Federal Regulations Web Site³⁷ and appendix 3.

³⁶ <http://water.epa.gov/lawsregs/rulesregs/sdwa/currentregulations.cfm> Accessed on 6/18/2019

³⁷ <https://www.ecfr.gov/cgi-bin/text-idx?SID=b93f32c4706de73b0b048c13273412b9&mc=true&node=pt40.25.143&rgn=div5>

Accessed 4/29/2019

- For more information and a list of secondary drinking water regulations see the EPA website³⁸.

TABLE 4.0 GENERAL MINERALS*

Contaminant	(mg/L)
Sodium	200 or less is preferred. 20 is considered the level for concern for people with the need to control intake.
Alkalinity	30-500
Calcium	75-200
Hardness	<200
Hydrogen Sulfide	Test at source only when necessary
Magnesium	50-150
Phosphate	<0.2
Potassium	For corrosion control
Specific Conductance	For corrosion control
Temperature (At Source)	For corrosion control

- Values listed are for information only. No limits are established.

³⁸ <https://www.epa.gov/dwstandardsregulations/secondary-drinking-water-standards-guidance- nuisance-chemicals> Accessed on 6/18/2019

TABLE 5.0 SUMMARY OF PARAMETERS AND TESTING REGIME

SYSTEM TYPE	SOURCE TYPE	BACTERIOLOGICAL ANALYSIS	CHLORINE RESIDUAL ANALYSIS	TURBIDITY (SURFACE WATER ONLY)	CHEMICAL ANALYSIS						
					PRIMARY INORGANIC	SECONDARY CONTAMINANTS/ GENERAL MINERAL	ORGANICS		RADIO-NUCLIDE	LEAD AND COPPER	DISINFECTATION BY-PRODUCTS
							PESTICIDE/ HERBICIDE	VOLATILE			
COMMUNITY WATER SYSTEM (CWS) NON-TRANSIENT NON-COMMUNITY (NTNC)	GW	ONE/MONTH OR PER TABLE 1	ONE/DAY More maybe be required by GWR (see section 7.1.8)	POPULATION <=500 ONE/DAY POPULATION >500 CONTINUOUS OR EVERY 4 HOURS	EVERY THREE YEARS Annual Nitrates	EVERY THREE YEARS	ANNUAL UNLESS STATE WAIVER ISSUED	EVERY THREE YEARS UNLESS STATE WAIVER ISSUED	Quarterly by the end of 2007, then every 3,6, or 9 years depending on results	INITIAL SAMPLE ALL WATER SOURCES AND HOUSING MONITOR EVERY NINE YEARS PWS <=3,300 PEOPLE AND MEETS MONITORING WAIVER IN 40 CFR 141.86(g)	ONE/YEAR
	SW		SEE TABLE PAGE 15		ANNUALLY Annual Nitrates						ANNUALLY
Transient Non-Community Water System (TNC)	GW		ONE/DAY		EVERY NINE YEARS Annual Nitrates	EVERY NINE YEARS					ONE TIME AND AS REQUIRED BY PHC
NON-PUBLIC (NP)	GW	ONE/MONTH	THREE/ WEEK or AS REQUIRED BY PHC	DETERMINE ON INDIVIDUAL BASIS	EVERY NINE YEARS Annual Nitrates	EVERY NINE YEARS	ONE TIME AND AS REQUIRED BY PHC	SPECIAL SITUATIONS AS REQUIRED BY PHC	AS REQUIRED BY PHC	AS REQUIRED BY PHC	AS REQUIRED BY PHC
	SW										

GLOSSARY OF COMMONLY USED TERMS

Item	Definition
Aquifer	A natural underground layer, often of sand or gravel, which contains water.
Bioterrorism	An agent defined as organisms (including bacteria, viruses, and protozoa) and biotoxins that may be found in natural environmental surroundings or may be weaponized in such a way to increase their virulence and/or increase their resistance to vaccination or antibiotic treatment.
CT-value (Concentration X Time)	The product of "residual disinfection concentration" in mg/L determined before or at the first customer, and the corresponding "disinfection contact time" in minutes.
Cryptosporidium	Coccidian protozoan shed in the feces of man and animals in the form of oocysts, which can survive under adverse environmental conditions for long periods of time. Responsible for a severe gastrointestinal disease called cryptosporidiosis.
<i>Escherichia coli (E.coli)</i>	One of the species of bacteria in the fecal coliform group. It is found in large numbers in the gastrointestinal tract and feces of warm-blooded animals and man. Its presence is considered indicative of fresh fecal contamination, and it is used as an indicator organism for the presence of less easily detected pathogenic bacteria.
Fecal Coliforms	Aerobic and facultative, gram-negative, non-spore-forming rod-shaped bacteria capable of growth at 44.5 degrees C., and associated with fecal matter of warm-blooded animals.
<i>Giardia lamblia</i>	Flagellate protozoan shed in the feces of man and animals, usually in the cyst stage, and responsible for a severe gastrointestinal disease called giardiasis.
Ground water under the direct influence of surface water (GWUDI)	Water beneath the surface of the ground with (1) significant occurrence of insects or other macroorganisms, algae, or large-diameter pathogens such as <i>Giardia lamblia</i> ; or (2) significant and relatively rapid shifts in water characteristics such as turbidity, temperature, conductivity, or pH which closely correlate to climatological or surface water conditions.

Item	Definition
Heterotrophic Plate Count (HPC)	Number of colonies of heterotrophic bacteria grown on selected solid media at a given temperature and incubation period, usually expressed in number of colony forming units per milliliter of sample (CFU/ml).
Heterotrophic microorganisms	Bacteria and other microorganisms that utilize organic matter synthesized by other organisms for energy and growth.
Inorganic Chemicals (IOC)	Chemical substances of mineral origin not having carbon in their molecular structure.
Maximum Contaminant Levels (MCL)	The highest permissible concentration of a substance allowed in drinking water, as established by EPA.
Maximum Contaminant Level Goals (MCLG)	The highest permissible concentration of a substance allowed in drinking water at which no known or anticipated health effects will occur. They are health goals and are not enforceable.
Minimum Detection Limit (MDL)	The lowest achievable concentration of a contaminant that can be measured under ideal laboratory conditions. A more technical definition is the minimum concentration of a substance that can be identified, measured, and reported with 99% confidence that the concentration of the substance being measured is greater than zero.
Non-Potable	Water that may contain objectionable pollution, contamination, minerals, or infective agents and is considered unsafe and/or unpalatable for drinking. If water is non-potable, a clear statement that the water is non-potable and should not be used for drinking, food or beverage preparation, hand washing, teeth brushing, or any other consumptive use should be stated.
Pathogen	A variety of bacteria, protozoan parasites, and viruses
Potable Water	Water that meets the standards for drinking purposes of the State or local authority having jurisdiction, or water that meets quality standards prescribed by the U.S. Environmental Protection Agency.
Potable Water Hauling:	The transportation of potable water as a primary, a supplemental, or an emergency source in containers greater than 50 gallons.
Primacy Agency	Generally a State agency authorized by the EPA to

Item	Definition
	administer provisions of Safe Drinking Water Act. (Note: Not all States have requested this authorization. If authorization is not requested, EPA is the Primacy Agency).
Public Health Assessment	A combination of on-site sanitary surveys of safe drinking water systems, wastewater systems, disease surveillance, food safety inspections, recreational water surveys, public health in backcountry operations, and promoting health in park units.
Radionuclide	A material with an unstable atomic nucleus, which spontaneously decays or disintegrates, producing radiation.
Sanitary Survey	An onsite review of the water source, facilities, equipment, operation and maintenance of a public water system for the purpose of evaluating the adequacy of such source, facilities, equipment, operation and maintenance for producing and distributing safe drinking water.
Source Water	Surface water (streams, rivers, and lakes) or ground water (aquifers) can serve as sources of drinking water, referred to as source water . Source water provides water for public drinking water supplies and private water wells.
Synthetic Organic Chemicals (SOC)	Man-made organic chemicals, many of which have been detected in drinking water. This group includes the VOCs.
Trihalomethanes (THM)	A group of volatile organic compounds formed when chlorine reacts with naturally occurring humic substances. Individual Compounds are not regulated under THM's.
Total Coliforms (Pathogens)	A group of bacteria predominantly inhabiting the intestines of man or animals but occasionally found elsewhere. Presence in water is used as indication of possible pathogen contamination. Pathogens include various types of bacteria, viruses, protozoan parasites, and other organisms.
Total Trihalomethanes (TTHM)	A term used to designate the total concentration of chloroform, bromoform, dibromochloromethane, and

Item	Definition
	bromodichloromethane in the National Primary Drinking Water Regulations. Combination of THM compounds is regulated.
Volatile Organic Compounds (VOC)	Lightweight, man-made organic compounds that vaporize, or evaporate, easily.
Waiver	The relinquishing of the requirements to perform certain monitoring and/or sampling procedures.

APPENDIX 2.0 FREQUENTLY USED ABBREVIATIONS AND ACRONYMS

AWWA: American Water Works Association
CFR: Code of Federal Regulations
CT: value (Concentration X Time)
CWS: Community Water System
DBP: Disinfection Byproduct
DBPR: Disinfection Byproduct Rule
GW: Ground Water
GWR: Ground Water Rule
GWUDI: Ground water under the direct influence of surface water
HAA5: Haloacetic acids
HPC: Heterotrophic Plate Count
IOC: Inorganic Chemicals
MCL: Maximum Contaminant Level
MCLG: Maximum Contaminant Level Goals
MDL: Minimum Detection Limit
NPS: National Park Service
NSF: formerly known as National Science Foundation and NSF International as of 1990
NTNC: Non-Transient Non-Community
NTU: Nephelometric Turbidity Unit
NP: Non-Public
OPH: Office of Public Health
PHC: public health consultant
PWS: Public Water System
PWS: Public Water System
RM: Reference Manual
RTCR: Revised Total Coliform Rule
SDWA: Safe Drinking Water Act
SOC: Synthetic Organic Chemicals
SW: Surface Water
SWPA: Source Water Protection Area
TC+: Total Coliform positive
THM: Trihalomethanes
TNC: Transient Non-Community
TTHM: Total Trihalomethanes
USC: United States Code
USEPA: United States Environmental Protection Agency

VOC: Volatile Organic Compounds

WQP: Water quality parameter

APPENDIX 3.0 TABLE OF SECONDARY DRINKING WATER STANDARDS

Contaminant	Secondary MCL	Noticeable Effects above the Secondary MCL
Aluminum	0.05 to 0.2 mg/L*	colored water
Chloride	250 mg/L	salty taste
Color	15 color units	visible tint
Copper	1.0 mg/L	metallic taste; blue-green staining
Corrosivity	Non-corrosive	metallic taste; corroded pipes/ fixtures staining
Fluoride	2.0 mg/L	tooth discoloration
Foaming agents	0.5 mg/L	frothy, cloudy; bitter taste; odor
Iron	0.3 mg/L	rusty color; sediment; metallic taste; reddish or orange staining
Manganese	0.05 mg/L	black to brown color; black staining; bitter metallic taste
Odor	3 TON (threshold odor number)	"rotten-egg", musty or chemical smell
pH	6.5 - 8.5	low pH: bitter metallic taste; corrosion
		high pH: slippery feel; soda taste; deposits
Silver	0.1 mg/L	skin discoloration; graying of the white part of the eye
Sulfate	250 mg/L	salty taste
Total Dissolved Solids (TDS)	500 mg/L	hardness; deposits; colored water; staining; salty taste
Zinc	5 mg/L	metallic taste

*mg/L is milligrams of substance per liter of water.

APPENDIX 4.0 NPS OFFICE OF PUBLIC HEALTH DRINKING WATER MONITORING WAIVER APPLICATION

The National Park Service Office of Public Health understands that there may be specific situations where a waiver for water sampling may be necessary. However, public health will not be compromised to issue a waiver and the application below is necessary to help assure proper public health can be maintained within the water system if a waiver is permitted. In order to be considered for a monitoring waiver, the complete application must be submitted at least sixty (60) days prior to system startup (seasonal only) or January 1 of the request year of implementation. Filling out this form does not automatically grant a waiver.

Monitoring Waiver Form

Date:	Park Name:	Name of Person Filling out Application and Title:			
Address:	City/State/ZIP:	County:	Phone number		
Waiver Requested for the Following: Use (X) to select and explain if other.		Bacteriological	, Disinfection by-Products	, Radionuclides	, Other

	NAME OF SYSTEM/PWSID	2	3	4	5	6
Please write the system name and public water system ID (PWSID) (if applicable) in the spaces provided to the right. → Have all NPS Reference Manual 83A testing requirements been met? NA means not applicable. Note: The PHC may not issue waivers for items that are regulated by Primacy Agency (see RM83A for questions). *No does not mean omit the possibility of a waiver.						
1. System type per RM83A (CWS, NTNC, TNC, NP)						
2. Primary Inorganic chemicals (IOCs), Secondary Contaminants, & General Minerals (Yes, No*, or NA)						
3. Nitrate and Nitrites (Yes, No*, or NA)						
4. Organics: Pesticides and Herbicides (Yes, No*, or NA)						
5. Organics: Volatile Organic Chemicals (VOCs) (Yes, No*, or NA)						
6. Radionuclides (Yes, No*, or NA)						
7. Lead and Copper (Yes, No*, or NA)						
8. Disinfection by-products (Yes, No*, or NA)						
9. Bacteriological (Yes, No*, or NA)						
10. Chlorine Residuals (Yes, No*, or NA)						
11. Type of Source (Check or "X" under the appropriate source)						
a. Ground Water (including springs)						
b. Surface Water (including ground water sources under the influence of surface water)						
12. Land use and system characteristics (Write in appropriate number under each source)						
a. Land use within 2-mile radius of source (round to the nearest 5% and list all known land uses and total up to 100%): 1. Residential 2. Agricultural—livestock 3. Agricultural—crop land 4. Industrial/Manufacturing 5. Undeveloped 6. Mining 7. Other (describe on separate paper and attach						

b. System has a source water/drinking water protection plan. Yes or No*						
c. Is the source influenced by geothermal waters?						
d. Have there been any changes to the system's configuration or pumping rates within the past year? If yes, please submit a description of the changes along with the application.						
e. Are there any other land use practices (farming, industrial, mining) within a 10 mile radius that would create public health concerns for the water source? If yes, approximate distances and list uses						
13. Well characteristics (Only fill out this portion if the source is a well)						
a. Please indicate the depth of the well in feet at the right (Depth to end of casing, 1 st screen or perforation in casing) Check well log or source water assessment. Leave blank or write "NA" if not known.						
c. Construction date and description of well.						
b. Approximate distance in miles to nearest active/inactive dump or landfill. NA if not known or >5 mi						
d. Are there any of the following potential sources of contamination within 300 feet of the wellhead (write Yes or No) If yes, please attach a description and an estimated location of the facility to the wellhead. Service stations, dry cleaners, small or large machinery repair shops, electronics repair shops, other light/heavy industry, or wastewater systems.						
e. Did the most recent public health assessment indicate that the well meets minimum construction standards for flood protection? (write Yes or No or UNK for unknown)						
f. Indicate by number the best description of the soil type around the well from about 0-20 feet below the surface: 1. Topsoil rich in humus 2. Topsoil with heavy clay 3. Sand or silt 4. Fractured rock or gravel 5. Solid rock 6. Other 7. Unknown						
14. Surface water characteristics (Only fill out this portion if the source is surface water)						
a. Has the watershed been inspected in the past year for signs of contamination? Yes or No .						

The information provided is true and accurate to the best of my knowledge:

NPS Office of Public Health Regional Consultant:

NPS Office of Public Health Director:



Signature of Authorized Agent and Title Date

Signature and Title Date

Signature and Title Date

Determining vulnerability for possible monitoring waiver

For Source vulnerability, we try to identify potential contamination from activities that may occur in the area from which the source draws its water. Two factors influence used to access vulnerability are:

- 1. Physical susceptibility to contaminant infiltration:** Physical susceptibility is determined by examining conditions that affect the movement of contaminants from the land surface into a water supply. This includes the depth of the well, its construction, the geology of the area, the pumping rate, the source(s) of groundwater recharge, and the aquifer material.
- 2. Contaminant exposure:** The risk of contaminant exposure is based on what contaminants, if any, are used in the water supply area.

NOTE: This waiver will be accompanied by a memo that outlines what the park will do to still ensure potable water is provided. As a reminder, this waiver is valid for one year and can be canceled at any time if a public health issue is identified and confirmed throughout the waiver year.

It can be difficult to predict groundwater pollution from surface exposure accurately because each contaminant type may act differently in the environment. Therefore, physical susceptibility helps to determine vulnerability. If physical susceptibility data is incomplete, or contaminant use is highly unlikely, we base the vulnerability assessment on risk of exposure to contaminants. If there are questions or comments, please contact your regional public health specialist (https://www.nps.gov/public_health/)

APPENDIX 5.0 DRINKING WATER EXAMPLE SITE SAMPLING PLAN (FROM EPA REGION 8)

Sample Siting Plan Instructions

22.1 **Why do I need to develop a Revised Total Coliform Rule (RTCR) sample siting plan?**

The purpose of this plan is to specify where in the distribution system routine bacteriological samples will be collected to ensure they are representative of the water quality in your system. The original siting plan should be kept on-site for use by sampling personnel. Beginning April 1, 2016, under the RTCR, every water system will be required to collect bacteriological samples monthly. Prior to that date, your system will remain on the schedule as indicated in the annual Monitoring and Reporting Requirements list that EPA sends to your system.

The RTCR requires EPA to collect and review every public water system's RTCR sample siting plan prior to April 1, 2016, so please review, revise and submit your plan before that date. You will need to submit:

1. A list of sampling locations (a blank chart can be found in **Addendum C**):
 - You will need to indicate the sites for routine and repeat bacteriological monitoring in your distribution system; and
 - Any source water sampling sites if subject to the Ground Water Rule.
2. A map of the distribution system showing locations of your sample sites as described in the sample siting plan. You can use a diagram, distribution system map, aerial photo, etc. Clearly indicate if there are multiple distribution systems and if those distribution systems are connected to each other.

22.2 **Where to submit your plan:**

Send a copy of your RTCR sample siting plan via mail, e-mail, or fax to:

The Primacy Agency
and/or
The regional National Park Service Office of Public Health Public Health Consultant

22.3 **How to choose a laboratory:**

Not all laboratories have been approved and certified to analyze for all the required drinking water contaminants. You must send your samples to a laboratory that is certified for the specific samples that you are submitting. For a list of certified labs, visit the EPA Region 8 website: <http://www2.epa.gov/region8-waterops> and click the certified lab link.

General Requirements

22.4 *Process for selecting sample sites and rotation:*

Review the layout of your distribution system and choose RTCR sample sites that will represent each area of the distribution system if sampled on a monthly rotating basis throughout an entire year or open season. Be sure to take into account non-permanent sources (seasonal or interim). These sources need to be represented within your siting plan. If your water system has multiple (completely separated) distribution systems, you must select sample sites within each separate distribution system. Samples can be rotated among the different distribution systems in different months, or you can collect samples in each distribution system each month, even if that means collecting more samples than are required. See Addendum B, example 3.

The siting plan may need to be updated periodically to account for system changes (such as population changes, new sources, or change in treatment, etc). The plan should be reviewed annually and during your sanitary survey to incorporate any changes. Submit any revisions to the EPA regional office as soon as they occur.

22.5 *Routine Monitoring Requirement*

Unless otherwise specified in your monitoring and reporting requirements, most systems will be placed on the monitoring schedule seen in **Addendum A** of this document.

Use the chart below as an example for formatting the sample siting plan. The following must be included in the plan:

- Routine sampling location(s);
- Repeat sampling locations (only necessary if your routine sample is TC+);
- Ground Water Rule (GWR) source sample locations for systems using ground water sources. (GWR source samples are only required if your routine sample is TC+. You must sample every ground water source operating at the time of the TC+ routine sample).

22.6 *Repeat Monitoring*

After April 1, 2016 under the RTCR, systems must collect no fewer than three repeat samples for each TC+ routine sample. This requirement will apply to all systems.

- All repeat samples need to be taken within 24 hours of notification of a TC+ routine sample. If you cannot make this timeframe, be sure to contact EPA Region 8 as soon as possible;
- One repeat sample is required to be taken from the same tap as the original TC+ sample;
- One repeat sample should be taken within five taps upstream of the original TC+ sample, and one should be taken within five taps downstream;

22.7 **Take note of your routine sample locations. Can you take proper repeats based on your current choices of routine sampling sites? If not, you will need to reevaluate your routine sites and choose another location. If you do not have a distribution system, upstream and downstream locations may not exist. In this case, you would need to collect multiple samples at the original location to count as repeat samples.**

Follow this same format but expand as necessary if your system would need to take more than one sample per month. (Seasonal systems only have to sample during their operating season). See **Addendum B** for examples and **Addendum C** for blank pages.

1 sample/month	<u>Routine sample location</u>	<u>Repeat sample locations</u>	<u>GWR sample location (any ground water sources operating at the time of a routine TC+)</u>
January	1)	1) (same as routine location)	
	(within 5 taps upstream)	2)	
	(within 5 taps downstream)	3)	
February	1)	1) (same as routine location)	
		2)	
		3)	
March	1)	1) (same as routine location)	
		2)	
		3)	

E. coli Testing and E. coli MCL Compliance Determination

Any TC+ sample result is automatically analyzed for *E. coli* (EC) by your lab. Any EC+ repeat sample or any total coliform-positive repeat sample following an EC+ routine sample constitutes an *E. coli* MCL violation. All *E. coli* MCL violations are situations that require you to contact EPA Region 8 immediately and distribute public notice including a boil order to your customers.

Disinfectant (chlorine) residual monitoring:

If you chlorinate, your system may need to conduct residual disinfectant monitoring in the distribution system for the Disinfection By-Product Rule and/or the Surface Water Treatment Rule. Review your Monitoring and Reporting Requirements sheet to verify if disinfectant monitoring is necessary. If you need to conduct this monitoring, keep the following in mind:

- The residual disinfectant must be measured at the same time and the same location as each total coliform bacteria sample.
- These measurements must be conducted in the field by a certified operator (or under the direction of the certified operator).
- Residual disinfectant measurements must be written on each total coliform sample slip when it is submitted to the laboratory.
- Ask your laboratory to forward this information to EPA along with the sample results.

Depending on the disinfectant used in the distribution system, ensure you are measuring the proper disinfectant residual:

- ❖ If chlorine is used, the disinfectant residual must be measured as free, total, or combined chlorine
- ❖ If chloramines are used, the disinfectant residual must be measured as total chlorine

Ground water source sampling:

22.8 **Triggered Source Water Monitoring Requirement**

Your system may need to conduct triggered source water sampling if you use a ground water source and have a TC+ routine sample result. Review your Monitoring and Reporting Requirements sheet to verify if source water monitoring is necessary. If you need to conduct this monitoring, keep the following in mind:

- Within 24-hours of notification that a *routine* Total Coliform Rule distribution system sample is TC+, you must collect a raw water sample from each groundwater source that was in use at that time for every routine TC+ sample (e.g. if you have three routine TC+ samples, you will need to collect three source samples from *each* ground water source). This sample must be analyzed for E. coli.
- You will need to report this data using the “Source Water Sampling-Triggered Source Monitoring Sample Collection and Reporting Form” found on our website at: <http://www2.epa.gov/region8-waterops/wyoming-and-tribal-triggered-groundwater-source-sampling-form>
- If you need further assistance on the Ground Water Rule and the required steps after a routine TC+ sample, please consult: <http://www2.epa.gov/region8-waterops/epa-region-8-drinking-water-unit-tech-tips-follow-unsafetotal-coliform-positive>

If the system received EPA Region 8 approval to use a sampling site that represents more than one groundwater source, please indicate that on the sample collection and monitoring form mentioned above that is submitted with your samples.

22.9 **Addendum A:** *Required number of monthly routine samples under the Revised Total Coliform Rule*

Sampling requirements for all water systems:

Population served/day	Routine Samples/Month	Population served/day	Routine Samples/Month
25-1,000	1	8501-12900	10
1001-2500	2	12901-17200	15
2501-3300	3	17201-21500	20
3301-4100	4	21501-25000	25
4101-4900	5	25001-33000	30
4901-5800	6	33001-41000	40
5801-6700	7	41001-50000	50
6701-7600	8	50001-59000	60
7601-8500	9	59001-70000	70

22.10 **Addendum B:** *Examples of RTCR Sample Siting Plans*

- 1) Your water system is a town serving 550 people year around. One routine TCR sample per month is required. Repeating the same set of three rotating locations every quarter is acceptable. Repeat this pattern to finish the monitoring year.

1 sample/month	<u>Routine sample location</u>	<u>Repeat sample locations</u>	<u>GWR sample location (any sources running at the time of a routine TC+)</u>
January	1) Town Hall	1) (same as routine location)	Well #1
	(within 5 taps upstream)	2) Senior Center	Well #2
	(within 5 taps downstream)	3) Big A Truck Stop	
February	1) 123 Main St	1) (same as routine location)	Well #1
		2) Oskar's Bar	Well #2

		3) Fire Station	
March	1) 456 Center St.	1) (same as routine location)	Well #1
		2) 789 Center St.	Well #2
		3) 1010 Grand Ave	
April	1) Town Hall	1) (same as routine location)	Well #1
		2) Senior Center	Well #2
		3) Big A Truck Stop	
May	1) 123 Main St	1) (same as routine location)	Well #1
		2) Oskar's Bar	Well #2
		3) Fire Station	
June	1) 456 Center St	1) (same as routine location)	Well #1
		2) 789 Center St.	Well #2
		3) 1010 Grand Ave	

2) You have a seasonal campground/RV park open from June to August that serves 50 people per day but has two separate distribution loops (one for the campground and one for the RV section). Your system would only be required to monitor one sample per month. You could rotate the single sample each month between the two distribution loops, but we recommend collecting a sample from each section each month to ensure both loops are functioning properly. If you opt to take a secondary sample in addition to your routine sample, be sure to label that as “special” when submitting to the lab:

1 sample/month	<u>Routine sample location</u>	<u>Repeat sample locations</u>	<u>GWR sample location (any sources running at the time of a routine TC+)</u>
June	1) CG Loop Tent #1	1) (same as routine location)	Resort Well #1
	2) Optional RV loop sample (special)	2) Shower House	
		3) Rec Room	
July	1) RV loop Space #6	1) (same as routine location)	Resort Well #1
	2) Optional CG loop sample (special)	2) RV loop Space #1	
		3) RV loop Space #10	
August	1) CG Loop Tent #1	1) (same as routine location)	Resort Well #1
	2) Optional RV loop sample (special)	2) Shower House	
		3) Rec Room	

3) You have a system that serves 7,000 people per day. A total of eight samples are required per month and should be collected at regular time intervals throughout the month. For example, you might opt to take a set of four samples on the 1st and 3rd weeks of each month.

First week of the month:

- Sample 1) Senior Center
- Sample 2) Hospital
- Sample 3) 789 Old Hwy
- Sample 4) 123 Main St.

Third week of the month:

- Sample 1) Senior Center
- Sample 2) Hospital
- Sample 3) 789 Old Hwy
- Sample 4) 123 Main St.

Use the sample siting form to indicate the repeat locations and any required source water sample locations for each sample site.

Addendum C: Example forms. Expand the following table as necessary. Feel free to detach and use this example form:

	<u>PWS NAME:</u>	<u>PWS ID #:</u>	<u>GWR sample location (any sources running at the time of a routine TC+)</u>
(1 sample/mo)	<u>Routine sample location</u>	<u>Repeat sample locations</u>	
January	1)	1) (same as routine location)	
		2)	
		3)	
February	1)	1) (same as routine location)	
		2)	
		3)	
March	1)	1) (same as routine location)	
		2)	
		3)	
April	1)	1) (same as routine location)	
		2)	
		3)	
May	1)	1) (same as routine location)	
		2)	
		3)	
June	1)	1) (same as routine location)	
		2)	

		3)	
July	1)	1) (same as routine location)	
		2)	
		3)	
August	1)	1) (same as routine location)	
		2)	
		3)	
September	1)	1) (same as routine location)	
		2)	
		3)	
October	1)	1) (same as routine location)	
		2)	
		3)	
November	1)	1) (same as routine location)	
		2)	
		3)	
December	1)	1) (same as routine location)	
		2)	
		3)	

APPENDIX 6.0 GENERAL TNC WATER SYSTEM SEASONAL START-UP AND SHUT-DOWN

Key Principles and Procedures for Start-Up

- Review all system manuals and job-hazard-analyses prior to start-up activities.
- Follow lock-out and tag-out procedures for electrical service to pumping system during start-up and operational periods.
- Resupply chemicals following MSDS requirements and store properly onsite.

- ✓ ***Prevent damage to system.***
 - Operate all valves in the system for proper operation and orientation.
 - Read gauges, meters and panels upon system start-up to ensure correct settings.
 - Inspect all exposed plumbing joints, taps, fixtures for leaks or incorrect orientation.
 - Inspect reservoir/tanks and lines for leaks or damage. Check pressure tanks for waterlogging or pressure issues.
 - Inspect connection of chemical injection pumps.
 - Check that electrical components are properly grounded.
 - Check that doors, fencing and locks are working properly.
 - Inspect housing of facilities for rodent or insect infestation.

- ✓ ***Prevent contamination of water.***
 - Flush and disinfect lines and reservoir/tanks. For chlorination and dechlorination procedures, please use the references found at: [https://portal.doi.net/nps/PHP/DW/Shared%20Documents/Disinfection%20of%20Potable%20Water%20Storage%20Tanks,%20distribution%20lines,%20and%20wells%20FINAL%2012-12-2018\(508\).pdf](https://portal.doi.net/nps/PHP/DW/Shared%20Documents/Disinfection%20of%20Potable%20Water%20Storage%20Tanks,%20distribution%20lines,%20and%20wells%20FINAL%2012-12-2018(508).pdf) or <http://www.vita-d-chlor.com/>
 - Assure disinfectant residuals are at least 0.2 mg/L and less than 4 mg/L (for chlorine), and report results to the public health consultant, state, and others as required.
 - Conduct two consecutive bacteriological tests (Per NPS R M83A-1).
 - Assure quality is met in all main legs of the distribution sys. see Revise Total Coliform Rule
 - Test reservoir level controls and automatic systems.
 - Test backflow preventions devices. Ensure all vacuum breakers are in place.
 - Replace defective screens and seals around pipe and reservoir/tank openings.
 - Inspect well protection area (100 feet) for any sources of contamination.
 - Inspect well cap and vent for any openings allowing debris, precipitation or animals access.
 - Check secondary containment around backup power system or fuel containers.

- ✓ ***Communicate system status to stakeholders***
 - Notify concessioners, visitors, partners, park staff and regional public health consultant at least one week prior to system start-up.
 - Complete necessary forms required by State to indicate system has restarted.
 - Place orders for water analysis tests as needed.
 - Record initial meter readings and any other tracked data.
 - Start-up each system with ample time to allow for bacteria testing results and all of the above areas to be addressed before the system is in service

References

[Ohio EPA Seasonal Noncommunity Public Water Systems Start-up and Shut-down Checklist](#)
[Washington State DOH Small Water System Start-up Shut-down Self-Inspection Checklist](#)

Key Principles and Procedures for Shut-Down

- Review all system manuals and job-hazard-analyses prior to shut-down activities.
 - Follow lock-out and tag-out procedures for lock-out and tag-out electrical service to pumping system during draining and seasonal shut-down.
 - Move stored chemicals following MSDS requirements to proper ventilated storage area.
- ✓ ***Prevent damage to system.***
- Drain reservoirs/tanks and lines. Drain and deactivate water appliances, such as hot water tanks, ice makers, etc.
 - Properly dispose of remaining chemical injection vat contents.
 - Run fresh water through chemical injection pumps and drain.
 - Check that electrical components are properly grounded.
 - Check that doors, fencing and locks are working properly.
 - Inspect housing of facilities for rodent or insect infestation.
- ✓ ***Prevent contamination of water.***
- Replace defective screens and seals around pipe and reservoir/tank openings.
 - After draining and removing equipment as needed, close all valves and cap all openings to lines, chemical vats and reservoir/tanks.
 - Do not add anti-freeze to any parts of the system. This include propylene glycol see section 3.2.1 above.
 - Inspect well protection area (100 feet) for any sources of contamination.
 - Inspect well cap and vent for any openings allowing debris, precipitation or animal access.
 - Check secondary containment around backup power system or fuel containers.
- ✓ ***Communicate system status to stakeholders***
- Notify concessioners, visitors, partners, park staff and regional public health consultant at least one week prior to system shut down.
 - Complete necessary forms required by State to indicate system will be shutdown.
 - Ensure final water analysis tests are complete and sent to the public health consultant and others as needed.
 - Record final meter readings and any other tracked data.

References

[Ohio EPA Seasonal Noncommunity Public Water Systems Start-up and Shut-down Checklist](#)
[Washington State DOH Small Water System Start-up Shut-down Self-Inspection Checklist](#)

APPENDIX 7.0 TEMPLATE POLICY FOR THE CONTROL OF BACKFLOW AND CROSS-CONNECTIONS

1.0 Section 1. Cross-Connection Control Policy

1.1 **Purpose.** The purpose of this policy is:

- 1.1.1 To protect the public and non-public water supply of **[Name of Park Here]** from the possibility of contamination or pollution.
- 1.1.2 To promote the elimination or control of existing cross-connections, actual or potential, between the potable water system(s) and non-potable water system(s), plumbing fixtures and industrial piping systems; and,
- 1.1.3 To provide for the maintenance of a continuing program of cross-connection control which will systematically and effectively prevent the contamination or pollution of all potable water systems.

1.2 **Responsibility.** The **[Park Position - Chief of Maintenance./Facilities Management suggested here]** is responsible for the protection of the public and non-public potable water distribution systems from contamination or pollution through the water service connections. If, in the judgment of the **[Park Position - Chief of Maintenance./Facilities Management suggested here]**, Regional Public Health Consultant, or appropriate regulatory officials, an approved backflow prevention assembly is required for the safety of the water system, The **[Park Position - Chief of Maintenance./Facilities Management suggested here]** must install, or have installed, such an approved backflow prevention assembly.

2.0 Section 2. Definitions.

2.1 **Park Chief of Maintenance/Facilities Manager.** The **[Park Position - Chief of Maintenance./Facilities Management suggested here]** is in charge of the park maintenance and is invested with the authority and responsibility for the implementation of an effective cross-connection control program and for the provisions of this policy.

2.2 **Approved.** Accepted by the **[Park Position - Chief of Maintenance/Facilities Management suggested here]** as meeting an applicable specification stated or cited in this ordinance, or as suitable for the proposed use.

2.3 **Auxiliary Water Supply.** Any water supply on or available to the premises, other than the National Park Service approved potable water system, will be considered an auxiliary water supply. These auxiliary waters may include water from another purveyor's public potable water supply or any natural source(s) such as a well, spring, river, stream, lake, etc., or "used waters" or "industrial Fluids". These waters may be contaminated or polluted or they may be objectionable and constitute an unacceptable water source over which the National Park Service has no sanitary control.

2.4 **Backflow.** The reversal of the normal flow of water caused by either backpressure or

backsiphonage.

- 2.5 Backpressure.** The flow of water or other liquids, mixtures or substances under pressure into the pipes of a potable water supply system from any source(s) other than the intended source.
- 2.6 Backsiphonage.** The flow of water or other liquids, mixtures or substances into the distribution pipes of a potable water supply from any source(s) other than its intended source caused by the reduction of pressure in the potable water supply system.
- 2.7 Backflow Preventer.** An assembly or means designed to prevent backflow.
- 2.7.1 Air gap.** The unobstructed vertical distance through the free atmosphere between the lowest opening from any pipe or faucet supplying water to a tank, plumbing fixture, or other device and the flood level rim of the vessel. An approved air gap must be at least double the diameter of the supply pipe, measured vertically, above the overflow rim of the vessel; and in no case less than one inch.
- 2.7.2 Reduced Pressure Principle Assembly.** An assembly of two independently acting approved check valves together with a hydraulically operating, mechanically independent differential pressure relief valve located between the check valves and at the same time below the first check valve. The unit must include properly located resilient seated test cocks and resilient seated shut-off valves at each end of the assembly. The entire assembly must meet the design and performance specifications as determined by the Foundation for Cross Connection Control and Hydraulic Research at the University of Southern California (USC), University Park, Los Angeles, CA 90089., for backflow prevention assemblies. The assembly must operate to maintain the pressure in the zone between the two check valves at an acceptable level less than the pressure on the potable water supply side of the assembly. At cessation of a normal flow the pressure between the two check valves must be less than the pressure on the public supply side of the assembly. In case of leakage of either of the check valves, the differential relief valve must operate to maintain the reduced pressure in the zone between the check valves by discharging to the atmosphere. When the inlet pressure is two pounds per square inch or less, the relief valve must be open to the atmosphere. To be approved, these assemblies must be readily accessible for in-line testing and maintenance and be installed in a location where no part of the assembly will be submerged.
- 2.7.3 Double Check Valve Assembly** An assembly of two independently operating approved check valves with resilient seated shut-off valves on each end of the check valves, plus properly located resilient seated test cocks for the testing of each check valve. The entire assembly must meet the design and performance specifications as determined by the aforementioned Foundation for Cross Connection Control at USC for backflow prevention assemblies. To be approved, these assemblies must be readily accessible for in-line testing and maintenance.
- 2.8 Contamination.** Means an impairment of the quality of the potable water by sewage, industrial fluids or waste liquids, compounds or other materials to a degree which creates an actual or potential hazard to the public health through poisoning or through the spread of disease.
- 2.9 Cross Connection.** Any physical connection or arrangement of piping or fixtures between two otherwise separate piping systems one of which contains potable water and the other

nonpotable water or industrial fluids of questionable safety, through which, or because of which, backflow may occur into the potable water system. This would include any temporary connections, spools, dummy section of pipe, swivel or change-over devices or sliding multipoint tube.

- 2.10 Cross Connections** - Controlled. A connection between a potable water system and a nonpotable assembly properly installed and maintained so that it will continuously afford the protection commensurate with the degree of hazard.
- 2.11 Cross Connection Control by Containment.** The installation of an approved backflow prevention assembly at the water service connection to any building where it is physically and economically infeasible to find and permanently eliminate or control all actual or potential cross connections within the building owner's water system; or, it means the installation of an approved backflow prevention assembly on the service line leading to and supplying a portion of a building's water system where there are actual or potential cross connections which cannot be effectively eliminated or controlled at the point of the cross connection.
- 2.12 Hazard, Degree of.** The term is derived from an evaluation of the potential risk to public health and the adverse effect of the hazard upon the potable water system.
- 2.12.1 Hazard - Health.** Any condition, device, or practice in the water supply system and its operation which could create, or in the judgement of the **[Park Position - Chief of Maintenance./Facilities Management suggested here]**, Regional Public Health Consultant, or the appropriate area regulatory officials, may create a danger to the health and well-being of the water consumer.
- 2.12.2 Hazard - Plumbing.** A plumbing type cross-connection in a consumer's potable water system that has not been properly protected by an approved air gap or approved backflow prevention assembly.
- 2.12.3 Hazard - Pollution.** An actual or potential threat to the physical properties of the water system or the potability of the water supply which would constitute a nuisance, be aesthetically objectionable, or could cause damage to the system or its appurtenances, but would not be dangerous to health.
- 2.12.4 Hazard - System.** An actual or potential threat of severe damage to the physical properties of the potable water system, or of a pollution or contamination which would have a protracted effect on the quality of the potable water in the system.
- 2.13 Industrial Fluids System.** Any system containing a fluid or solution, which may be chemically, biologically or otherwise contaminated or polluted in a form or concentration such as would constitute a health, system, pollution or plumbing hazard if introduced into an approved water supply. This may include, but not be limited to: pollution or contaminated waters, all types of processed waters and "used waters" originating from the public potable water system which may be deteriorated in sanitary quality; chemicals in fluid form; plating acids and alkalies; circulating cooling waters connected to an open cooling tower and/or cooling towers that are chemically or biologically treated or stabilized with toxic substances; contaminated natural waters such as from wells, springs, streams, rivers, irrigation canals, or

systems, etc; oils gases, gaseous fluids used in industrial or other purposes or for firefighting purposes, recirculating hot water systems, hot water heating systems, solar systems with antifreeze solutions, and charged fire systems.

2.14 Pollution. Means the presence of any foreign substance (organic, inorganic or biological) in the water which tends to degrade the water quality so as to constitute a hazard or impair the usefulness or quality of the water to a degree which does not create an actual hazard to the public health but which but which does adversely and unreasonably affect such waters for domestic use.

2.15 Water - Potable. Any water which, according to recognized standards, is safe for human consumption.

2.16 Water - Nonpotable. Water which is not safe for human consumption or which is of questionably quality.

3.0 Section 3. Requirements.

3.1 Water System

3.1.1 The water system is made up of two parts: the utility system and the building system.

3.1.2 The utility system consists of the source facilities and the distribution system; and includes all those facilities of the water system up to the point where the building system begins.

3.1.3 The source includes all components of the facilities utilized in the production, treatment, storage, and delivery of water to the distribution system.

3.1.4 The distribution system includes the network of conduits used for the delivery of water from the source to the building system.

3.1.5 The building system includes those parts of the facilities beyond the termination of the distribution system which are utilized in conveying delivered domestic water to points of use.

3.2 Policy

3.2.1 No water service connection to any premises should be installed or maintained by the National Park Service unless the water supply is protected by State laws and regulations and this Cross Connection and Backflow Prevention Policy. Service of water to any premises must be discontinued by the National Park Service if a backflow prevention assembly required by this Cross Connection and Backflow Prevention Policy is not installed, tested and maintained, or if it is found that a backflow prevention assembly has been removed, by-passed, or if any unprotected cross connection exists on the premises. Service will not be restored until such conditions or defects are corrected.

3.2.2 The building system should be open for inspection at all reasonable times to authorized

representatives of the National Park Service to determine whether cross connections or other structural or sanitary hazards, including violations of these regulations exist. When such a condition becomes known, the **[Park Position - Chief of Maintenance./Facilities Management suggested here]** must deny or immediately discontinue service to the premises by providing for a physical break in the service line until the building owner has corrected the condition(s) in conformance with the State and Local statutes relating to plumbing and water supplies and the regulations adopted pursuant thereto.

3.2.3 An approved backflow prevention assembly must also be installed on each service line to a building water system at or near the property line if relevant, or immediately inside the building being served, but , in all cases, before the first branch line leading off the service line whenever the following conditions exist:

3.2.3.1 In the case of premises having an auxiliary water supply which is not or may not be of safe bacteriological or chemical quality and which is not acceptable as an additional source by the **[Park Position - Chief of Maintenance./Facilities Management suggested here]** or Regional Public Health Coordinator, the public water system must be protected against backflow from the premises by installing an approved backflow prevention assembly in the service line appropriate to the degree of hazard.

3.2.3.2 In the case of premises on which industrial fluids, sewage, or any other objectionable substance is handled in such a fashion as to create an actual or potential hazard to the public water system, the public water system must be protected against backflow from the premises by installing an approved backflow prevention assembly in the service line appropriate to the degree of hazard. This includes the handling of process waters and waters originating from the utility system which have been subjected to deterioration in quality.

3.2.3.3 In the case of premises having (1) an internal cross connection that cannot be permanently corrected or controlled, or (2) intricate plumbing and piping arrangements or where entry to all portions of the premises is not readily accessible for inspection purposes, making it impracticable or impossible to ascertain whether or not dangerous cross connections exist, the public or nonpublic water system must be protected against backflow from the premises by installing an approved backflow prevention assembly in the service line.

3.2.4 The type of protective assembly required under subsections 3.2.3.1 - 3.2.3.3 depends upon the degree of hazard which exists as follows:

3.2.4.1 In the case of any premises where there is an auxiliary water supply as stated in subsection 3.2.3.1 of this section and it is not subject to regulation by the National Park Service, the public or nonpublic water system must be protected by an approved air gap separation or an approved reduced pressure principle backflow prevention assembly.

3.2.4.2 In the case of any premises where there is water or a substance(s) that would be objectionable but not hazardous to health if introduced into the public or nonpublic water system, the public or nonpublic water system must be protected by an approved double check valve assembly.

3.2.4.3 In any case of any premises where there are “uncontrolled” cross connections, either actual or potential, the public or nonpublic water system must be protected by an approved air gap separation or an approved reduced pressure principle backflow prevention assembly at the service connection.

3.2.5 Any backflow prevention assembly required herein must be a model and size approved by the **[Park Position - Chief of Maintenance./Facilities Management suggested here]**. The term “approved backflow assembly” means an assembly that has been manufactured in full conformance with the latent standard established by the American Water Works Association entitled:

AWWA C506 Standards for Reduced Pressure Principle and Double Check Valve Backflow Prevention Device and, has met the laboratory and field performance specifications of the Foundation for Cross Connection Control and Hydraulic Research of the University of Southern California established by:

Specifications of Backflow Prevention Assemblies - Section 10 of the most current issue of the Manual of Cross Connection Control.

Said AWWA and FCCC&HR standards and specifications have been adopted by the **[Park Position - Chief of Maintenance./Facilities Management suggested here]**. Final approval must be evidenced by a “Certificate of Approval” issued by an approved testing laboratory certifying full compliance with the said AWWA standards and FCCC&HR specifications.

The following testing laboratory has been qualified by the **[Park Position - Chief of Maintenance./Facilities Management suggested here]** to test and certify backflow preventers:

Foundation for Cross Connection Control and Hydraulic Research
University of Southern California
University Park
Los Angeles, CA 90089

Testing laboratories other than the laboratory listed above will be added to an approved list as they are qualified by the **[Park Position - Chief of Maintenance./Facilities Management suggested here]**

Backflow preventers, which may be subjected to backpressure or backsiphonage, that have been fully tested and have been granted a Certificate of Approval by said qualified laboratory and are listed on the laboratory’s current list of “Approved backflow prevention assemblies”, may be used without further qualification. However, annual testing by a state certified backflow prevention specialist is required to ensure proper continual operation.

3.2.6 It is the duty of the building owner at any premises where backflow prevention assemblies are installed to have certified inspections and operational tests made upon installation and at least once per year. In those instances where the **[Park Position - Chief of Maintenance./Facilities Management suggested here]** deems the hazard to be great enough he may require certified inspectors at more frequent intervals. These inspections and tests are at the expense of the building owner and must be performed by a state certified tester. It is

the duty of the **[Park Position - Chief of Maintenance./Facilities Management suggested here]** to see that these tests are made in a timely manner. The building owner must notify the **[Park Position - Chief of Maintenance./Facilities Management suggested here]** in advance when the tests are to be undertaken so that an official representative may witness the tests if so desired. These assemblies must be repaired, overhauled or replaced at the expense of the building owner whenever said assemblies are found to be defective. Records of the such tests, repairs and overhaul must be kept and made available to the **[Park Position - Chief of Maintenance./Facilities Management suggested here]** or the Regional Public Health Consultant.

- 3.2.7** All presently installed backflow assemblies which do not meet the requirements of this section but were approved assemblies for the purpose described herein at the time of installation and which have been properly maintained are, except for the inspection and maintenance requirements under subsection 3.2.6, excluded from the requirements of these rules so long as the **[Park Position - Chief of Maintenance./Facilities Management suggested here]** and the Regional Public Health Consultant are assured that they will satisfactorily protect the utility system. Whenever the existing assembly is moved from its present location or requires more than the minimum maintenance or when the **[Park Position - Chief of Maintenance./Facilities Management suggested here]** or Regional Public Health Consultant finds that the maintenance constitutes a hazard to health, the unit must be replaced by an approved backflow prevention assembly meeting all the requirements of this section.

Date:

State Certified Cross Connection Control Program Specialists

Last Name	First Name	Certification Number	Certification Expiration Date
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REFERENCE MANUAL 83A
CHAPTER 2
WASTEWATER TREATMENT SYSTEMS

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1. WASTEWATER TREATMENT SYSTEM POLICY

- 1.1 National Park Service (NPS) unit managers will reduce the risk of waterborne disease and provide safe wastewater disposal by ensuring wastewater systems are properly operated, maintained, monitored, and deficiencies promptly corrected.
- 1.2 The NPS Office of Public Health (OPH) will assist park units providing safe wastewater disposal by providing an assessment survey on the operation and maintenance of wastewater systems. The survey is part of a larger onsite assessment classified by the NPS OPH as a public health assessment (PHA).
- 1.3 Policy Compliance
 - 1.3.1 Wastewater systems must be in compliance with:
 - 1.2.1.1 Clean Water Act, as amended (33 U.S.C. 1251¹ et seq);
 - 1.2.1.2 Safe Drinking Water Act, as amended (42 U.S.C. 300f² et seq.); or,
 - 1.2.1.3 Primacy Agency (e.g. the agency designated by Federal law as having oversight responsibility).
 - 1.3.2 Unregulated systems must be maintained in a manner similar to regulated systems and following best management practices.
 - 1.3.3 Wastewater systems will be designed, constructed, and operated in accordance with local, state, NPS, and federal codes pertaining to wastewater systems.
 - 1.3.4 Any new or modified wastewater systems will be reviewed and approved by Director, Office of Public Health or their designee before construction starts.

Note: If hyperlinks in this document are inactive, please contact your local public health consultant (PHC) listed at [National Park Service - Public Health](#).

2. PLAN REVIEW AND APPROVAL

- 2.1 When wastewater system modifications or new construction is proposed, parks will contact the PHC to determine if plans and specifications should be submitted to the Primacy Agency for approval. A copy of the plans and specifications will be provided to the PHC for approval prior to any construction. If no known codes exist for the systems, NPS Standard ([Denver Service Center Workflows - Design Standards](#)), American Water Works Association (AWWA), and / or Ten State Standards should be followed.

3. OPERATOR REQUIREMENTS

- 3.1 NPS Park managers will ensure operators are adequately trained and certified in accordance with operator requirements of the Primacy Agency. Park managers will designate, in writing, primary operators, and backup operators who have adequate training and skills to operate the system(s). Parks that operate only individual, on-site wastewater systems with no operator certification requirements will have appropriately

¹ [Federal Water Pollution Control Act](#) Accessed 6/18/2019

² [Title 42—The Public Health AND Welfare](#) Accessed 6/18/2019

trained operators. Appropriate training will be described in and approved by the regional PHC.

- 3.2 All systems requiring an NPDES discharge permit, or all onsite treatment systems, as required by the state, must have certified operators. All other treatment systems must have staff with adequate training and skills to operate the system. The park should consult with the PHC and or Primacy Agency to determine operator certification requirements.
- 3.3 NPS Park Managers will develop training plans and assure that operators receive any required and/or appropriate training. The NPS OPH Field Services Branch in partnership with NPS Facilities Management provides training on an annual basis or as funding permits.

4. FRONT COUNTRY WASTEWATER SYSTEMS

- 4.1 Recommended front country waste systems include:
 - 4.1.1 Centralized or decentralized wastewater systems that incorporate properly plumbed flush toilets and are sized to accommodate designed flows;
 - 4.1.2 SST Vault toilets; and,
 - 4.1.3 Chemical toilets (temporary use only).
- 4.2 All new vault toilets will at a minimum incorporate the U.S. Forest Service Sweet Smelling Toilet (SST) design features and include some wildlife exclusion device in all vent stacks. Vault toilets will be pumped as necessary. The U.S. Forest Service *In-Depth Design and Maintenance Manual for Vault Toilets* is provided as a separate workbook.

5. BACKCOUNTRY WASTEWATER SYSTEMS

- 5.1 Backcountry waste systems include:
 - 5.1.1 Centralized or decentralized wastewater system that incorporates and is sized to accommodate properly plumbed flush toilets;
 - 5.1.2 Composting toilets;
 - 5.1.3 Barrel toilets;
 - 5.1.4 Evaporator toilets;
 - 5.1.5 Pit privies;
 - 5.1.6 Moldering toilets; and,
 - 5.1.7 Urine Diversion toilets (see NPS Reference Manual 83A-Chapter 5 Backcountry Operations for more information on backcountry waste disposal guidance).

- 5.2 Pit privies should only be used as a last resort where other types of facilities are not possible. The Park Sanitarian or the PHC should approve the siting of pit privies.
- 5.3 Adequate sanitation facilities should be provided by Park or Concessioner for group trips to remote areas such as river rafting trips, horseback riding trips, backcountry biking, or backpacking groups in accordance with Reference Manual 83A- Chapter 5 Backcountry Operations.
- 5.4 Examples for proper sanitation facility operation, maintenance and design required for the number of facilities required for campgrounds, picnic areas, etc. are included in "Environmental Health Practices in Recreational Areas" by the U.S. Public Health Service, Centers for Disease Control and Prevention³.
- 5.5 All facilities should be in compliance with NPS Reference Manual 83A- Chapter 5 Backcountry Operations.

6. MONITORING REQUIREMENTS

6.1 Permitted Facilities

6.1.1 The NPDES program's regulations (EPA 40 CFR 122⁴) dictate basic monitoring requirements for systems, which discharge into "waters of the United States."

6.1.1.1 Systems that do not discharge any effluent are not affected by the NPDES regulations. NPDES discharge permits are issued by the Primacy Agency (EPA or the State) and the permit describes the specific monitoring requirements of a given system.

6.1.1.2 In addition to wastewater discharges, the requirements include sludge disposal, water treatment facility discharges, non-point discharges, and stormwater drainage systems constructed after October 1, 1992.

6.1.2 The permit program is operated by the Primacy Agency and applies to owners or operators of any facility, which discharges effluent. The Primacy Agency issues permits for a fixed term not to exceed five years. At the end of that time period, the application is reviewed and the permit is reissued, as is, with new monitoring criteria or canceled.

6.1.3 The permit application forms are available from the Primacy Agency. It may request information on estimated daily maximum flows, daily average flows and source of information for each outfall for the pollutants mentioned in the NPDES permit. The permit may require influent and effluent monitoring of BOD, COD, TOC, total solids, suspended solids, coliforms, flow, phosphorus, ammonia as nitrogen, and temperature (winter and/or summer). Permits may also require monitoring of groundwater (monitoring wells) and/or adjacent surface waters. The Primacy Agency may grant waivers.

³ [US Department of Health, Education, and Welfare: Environmental Health Practices in Recreational Areas](#)
Accessed 6/18/2019

⁴ [Electronic Code of Federal Regulations: TITLE 40—Protection of Environment](#) Accessed 6/18/2019

6.1.4 Other Non-discharging permitted facilities may have additional monitoring requirements determined by the Primacy Agency and operating permit. The PHC may require monitoring of the sludge levels if determined appropriate.

6.2 Class V Underground Injection Control Registered Facilities

6.2.1 The Primacy Agency can require any well owner to obtain a permit, monitor injectate or close the well if there is a potential to endanger Underground Sources of Drinking Water.

6.2.2 Regulatory Citation

6.2.2.1 The Underground Injection Control Program does not regulate individual residential septic systems and cesspools and non-residential septic systems and cesspools with the capacity to serve fewer than 20 persons per day and inject only sanitary waste. (EPA 40 CFR 144 Subpart G⁵.)

6.2.2.2 See Appendix 3.0 “Guidance to Determine Whether Your Septic System is regulated by the EPA Class V Underground Injection Control Program Rule.”

6.2.2.3 Smaller onsite systems may be regulated by a State and / or county, which may have specific monitoring requirements.

6.3 Wastewater Treatment for Water Reuse

6.3.1 NPS approves wastewater to be treated for non-potable reuse only, and does not allow the reuse for potable reuse.

6.3.2 All wastewater treated for reuse should meet any state or local regulations where applicable. When no state or local regulations exist, the wastewater treatment must meet at a minimum the 2012 EPA Guidelines for Water Reuse⁶ monitoring requirements.

6.3.3 Operator certification and/or approved training may be required by the PHC when State or local regulations do not exist.

6.4 Other Treatment Facilities

6.4.1 Depending upon the jurisdiction, a residential or small onsite wastewater facility may be permitted by the State and / or county, which may have specific monitoring requirements.

6.4.2 Non-permitted facilities do not require regular monitoring unless specifically requested by the PHC or park sanitarian to determine operational performance.

⁵ [CFR 2011: Title40 Vol23 - Part 144](#) Accessed 6/18/2019

⁶ [EPA Guidelines for Water Reuse 2012](#) Accessed 6/18/2019

7. WASTEWATER SYSTEM OPERATIONAL REQUIREMENTS

7.1 These guidelines are provided to give NPS operators basic guidance on common systems. However, these guidelines are not all inclusive and do not address proper operating procedures for operation of advanced treatment systems, including: activated sludge plants; trickling filters; tertiary treatment; sludge digestion; physical chemical treatment; etc. For these types of facilities, the following references should be consulted along with the manufacturers Operation and Maintenance manual. If these references are not available, contact the PHC.

7.1.1 *Manual of Septic Tank Practice*, USPHS Publication No. 526, Reprinted 1969, Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20201⁷.

7.1.2 *Wastewater Treatment/Disposal for Small Communities*⁸, EPA/625/R-92/005, September 1992.

7.2 Wastewater Treatment Ponds (Lagoons)

7.2.1 Lagoons should be monitored at least every two weeks for liquid coloration, presence of septic odors, properly operating aerators, materials floating on the surface, insect breeding, and vegetation growth. The dikes should be free of rodent burrows. Vegetation on the dikes and at the waterline should be controlled.

7.2.2 All lagoons should be signed and fenced in such a manner to exclude unauthorized entry.

7.2.3 An all-weather road should be constructed to each lagoon facility. These roads should be periodically graded and maintained to facilitate access for operation and maintenance purposes.

7.3 Septic Tank and Drainfield Systems

7.3.1 Septic tanks should be inspected annually at minimum to determine the amount of accumulated scum and sludge.

7.3.2 Risers with appropriate covers should be provided for septic tank inspection ports to facilitate location, inspection and pumping. Effluent filters are recommended for all septic tank applications. These filters will be installed on all septic tank outlets and will be cleaned per manufacturer's instructions annually.

7.3.3 Septic tanks should be pumped when the scum and/or sludge levels in the tank dictate (generally every 3-5 years). The bottom of the scum mat should never be any closer than 3 inches to the bottom of the outlet device, and the top of the

⁷ [US Department of Health Education and Welfare: Manual of Septic Tank Practice](#) Accessed 6/18/2019

⁸ [EPA: Manual Wastewater Treatment/Disposal for Small Communities](#) Accessed 6/18/2019

sludge layer should never be less than 8 inches from the bottom of the outlet device. Additives to enhance bacterial growth in septic tank systems generally are not recommended.

- 7.3.4 Records of septic tank measurements, inspections and pumping should be maintained and be available for review by the PHC. See Appendix 4.0 for a recommended septic tank log sheet and diagram, Septic Tank Sewage Disposal Maintenance and Inspection Log.
- 7.3.5 Drainfields should be surveyed annually during a high use period to identify system failures such as odors and surfacing wastewater.
- 7.3.6 If a drainfield is determined to have “failed” (typically determined by the Primacy Agency) or if surfacing sewage is observed on site by the operator, owner, or concessioner, the park will:
 - 7.3.6.1 Immediately shut down the system and notify the PHC and the Primacy Agency if applicable.
 - 7.3.6.2 Secure the site and restrict access by the public.
 - 7.3.6.3 Not be permitted to open the facility temporarily until a mitigation plan has been presented and approved by the PHC and or Primacy Agency.
 - 7.3.6.4 Not be permitted to operate the system until it is replaced or repaired in accordance with applicable standards.
 - 7.3.6.5 Develop a plan or project, to be at a minimum reviewed and approved by park, the PHC, local or regional park engineer, and if applicable the Primacy Agency.
- 7.3.7 The drainfield area is required to be kept free of trees, large bushes, or deep rooted vegetation, which may send roots into the drain field piping system resulting in clogging and premature failure of the field.
- 7.3.8 Inspection ports should be installed at the termination of each drain line to determine the depth of the wastewater effluent in the drainfield. This water level should be measured several times during the year and at peak flow.
- 7.3.9 Septic tank drainfield systems should be surveyed to determine whether they fall into the Class V Underground Injection Control Program. The Class V systems should then be registered with the Primacy Agency. See Appendix 3.0 “Guidance to Determine Whether Your Septic System is Regulated by the EPA Class V Underground Injection Control Program Rule.”
- 7.3.10 Cesspools must be surveyed to identify whether they meet the definition of a Class V Injection Well. If the cesspools meet the definition they must be registered as such by the Primacy Agency. Additionally, the park must work toward a timely closure of the cesspool and replacement with an approved onsite

system.

7.4 Alternative Onsite Treatment and Disposal Technologies

- 7.4.1 A qualified engineer or onsite wastewater system designer should prepare or review plans for installation of alternative onsite wastewater systems.
- 7.4.2 Extensive field data gathering and alternative analyses of technologies and costs should be performed due to the high initial cost and long-term operational burdens.
- 7.4.3 Select systems that are approved by Primacy Agency to ensure appropriate fit to environment, availability of parts and experienced local installers or maintenance personnel.
- 7.4.4 Operation and maintenance training and manuals are required for designated system operators.
- 7.4.5 Refer to EPA technical factsheets, case studies and onsite design manuals at EPA Onsite/Decentralized Systems Page at [EPA: Septic Systems Factsheets](#) for more information.

7.5 Vault Toilets

- 7.5.1. Vault toilets should be pumped as needed.
- 7.5.2. All new installations should incorporate the U.S. Forest Service *In-Depth Design and Maintenance Manual for Vault Toilets* which is provided as a separate workbook.
- 7.5.3 All new installations should include a wildlife exclusion device in vent stacks to prevent nesting birds from entering and ensure proper operation of the vent. For existing vault toilets, it is recommended that an exclusion device be added to each vent stack. The PHC can provide guidance in the selection of a wildlife exclusion device.

7.6 Urine diversion/Composting/Evaporator/Incinerator Toilets

- 7.6.1. Urine diversion/Composting/Evaporator/Incinerator Toilets should be operated in accordance with manufacturer's recommendations and/or meet NSF/ANSI standard 41 (Non-liquid saturated treatment systems).
- 7.6.2. If land applied the final product must meet pathogen reduction requirements and be disposed of in accordance with primacy agency regulations/requirements.

7.7 Chemical Toilets

- 7.7.1 Chemical toilets should only be used temporarily. In situations where there are permanent facilities, every effort should be made to replace permanent chemical

toilet facilities with vault or flush toilets. In no case should chemical toilets be installed as permanent facilities.

7.7.2. Chemical toilets should be pumped as needed to prevent objectionable odors.

7.7.3 Chemical toilets will be cleaned as necessary to minimize the risk of contact with waste material.

7.8 Grease Interceptors and Grease Traps

7.8.1 Installations for New Facilities

7.8.1.1 Food processing or food service facilities which are newly proposed or constructed, or existing facilities which will be expanded or renovated to include a food service facility that may have grease-laden waste, where such facility did not previously exist, is required to design, install, operate and maintain a grease interceptor in accordance with International Plumbing Codes (IPC)⁹ or other local ordinances.

7.8.1.2 Grease interceptors will be installed and inspected prior to occupying the building.

7.8.2 Grease interceptors at existing facilities must be operated and maintained in accordance with the manufacturer's recommendations and in accordance with this policy, unless specified in writing and approved by the PHC.

7.8.3 All grease interceptor waste should be properly disposed of in accordance with federal, state, or local regulation.

7.8.4 Cleaning and Maintenance

7.8.4.1 Grease interceptors are required to be maintained in an efficient operating condition at all times. Each grease interceptor when cleaned should be fully evacuated.

7.8.4.2 Grease interceptors must be cleaned as often as necessary to ensure that sediment and floating materials do not accumulate to impair the efficiency of the grease interceptor; to ensure the discharge is in compliance with local discharge limits; and to ensure no visible grease is observed in discharge. Grease interceptors must be completely evacuated when:

7.8.4.2.1 Twenty-five (25) percent or more of the wetted height of the grease trap or grease interceptor, as measured from the bottom of the device to the invert of the outlet pipe, contains floating materials, sediment, oils or greases; or

7.8.4.2.2 The discharge exceeds BOD, COD, TSS, FOG, pH, or other

⁹ [International Plumbing Code](#) Accessed 6/18/2019

pollutant levels established by the PHC; or

7.8.4.2.3 As recommended by PHC or park management if there is a history of non-compliance.

7.9 Sewage Spills

7.9.1 In the event of a sewage spill, the PHC and Primacy Agency will be notified within one business day. Facilities and equipment contaminated with sewage as a result of leaks, spills, and sewage system backflow will be thoroughly washed down with water and park-approved detergent. Further guidance is provided in Appendix 5.0, “Raw Sewage Spill Notification and Cleanup Guidance”

7.9.2 Workers cleaning up wastewater spills will wear Level D personal protective equipment (including coveralls, rubber boots, and rubber gloves). On completion of the cleanup, personnel will complete the following:

7.9.2.1 Take a hot shower using sufficient soap and water.

7.9.2.2 Remove contaminated clothing and place it in a plastic bag for laundering. This clothing will not be re-worn until it has been laundered.

7.9.2.3 Rubber boots, gloves and any other protective equipment will be cleaned with hot water and detergent and rinsed with a 100 ppm disinfectant solution of hypochlorite. The hypochlorite solution consists of two tablespoons of sodium hypochlorite (such as Purex, Clorox or other household bleach) per gallon of water. All vaccinations requirements should be identified through Job Hazard Analysis needs.

7.10 Other Operational Requirements

7.10.1 NPS Park Managers will assure that required records are maintained in permanent files for periodic review by the PHC or Primacy Agency representatives, and that reports are submitted on a timely basis as requested by the PHC and/or required by the Primacy Agency.

7.10.2 All wastewater facilities will be installed, operated and monitored in accordance with Primacy Agency requirements or NPS policy.

7.10.3 All toilet facilities will be cleaned and re-supplied as often as necessary to maintain an appropriate level of sanitation. The U.S. Forest Service guidance manual Cleaning Recreation Sites and a Sample Restroom Cleaning Protocol are provided as supporting documents.

7.10.4 Personnel who routinely come into contact with sewage or who work in or inspect wastewater treatment facilities, lagoons, etc. will have a current immunization for tetanus. All vaccinations requirements should be identified through Job Hazard Analysis needs.

7.10.5 Wastewater treatment plant personnel will not eat, drink or smoke when performing maintenance or inspecting equipment, which may be contaminated with human sewage.

APPENDIX 1.0 GLOSSARY OF COMMONLY USED TERMS

Advanced Treatment septic system: See Alternative Onsite Treatment and Disposal Systems.

Aerobic Wastewater Treatment: A mechanical onsite treatment unit that provides secondary wastewater treatment by mixing air (oxygen) and aerobic and facultative microbes with the wastewater. ATUs typically use a suspended growth treatment process (similar to activated sludge extended aeration) or a fixed film treatment process (similar to trickling filter).

Alternative Onsite Treatment and Disposal Systems: An onsite treatment system that includes components different from those used in a conventional septic tank and drain field system. An alternative system is used to achieve acceptable treatment and dispersal/discharge of wastewater where conventional systems may not be capable of meeting established performance requirements to protect public health and water resources. (e.g., at sites where high groundwater, low-permeability soils, shallow soils, or other conditions limit the infiltration and dispersal of wastewater or where additional treatment is needed to protect groundwater or surface water quality). Components that might be used in alternative systems include sand filters, aerobic treatment units, disinfection devices, and alternative subsurface wastewater infiltration systems (SWISs) such as mounds, gravelless trenches, and pressure and drip distribution.

Anaerobic Wastewater Treatment: Waste stabilization brought about through the action of microorganisms in the absence of oxygen.

Backcountry: Determinations of “backcountry” will be made on a park-by-park basis, taking into account the park area’s geographic circumstances. Backcountry water and wastewater systems are most often found in areas that are remote from developed areas and are not readily serviceable by motorized vehicles.

Barrel Toilet: A toilet that collects waste in a barrel or drum that can be sealed when full and transported by truck or helicopter to a treatment plant for proper disposal.

Biochemical Oxygen Demand (BOD): The amount of oxygen required to stabilize decomposable organic matter.

Biosolids: Treated sewage sludge that meets the EPA pollutant and pathogen requirements for land application and surface disposal. Federal regulations governing biosolids and composting process can be found in the 40 CFR Part 503¹⁰, Standards for the Use and Disposal of Sewage Sludge (Part 503). The regulation defines time and temperature requirements for both Class A and Class B products.

Cesspool: Covered, open-joint, walled pits that receive raw sewage.

Chemical Oxygen Demand (COD): The amount of oxygen required to stabilize decomposable organic and oxidizable inorganic material.

Chemical Toilet: A toilet that collects wastes in a small storage container filled with a chemical disinfectant, which destroys microorganisms and controls odor. A chemical toilet is usually covered with an enclosed insect proof structure.

Class V Injection Well: Class V injection wells are typically shallow “wells,” such as shallow disposal systems (drain fields) and dry wells, used to place a variety of fluids directly below the land surface EPA (40 CFR 144.80 (e)¹¹).

Coliform: A group of bacteria commonly found in soil and intestines of man and other warm-blooded animals. The presence of coliforms in surface and/or ground waters is a general indicator of recent human and/or animal fecal contamination.

Composting Toilet: A toilet that promotes managed (thermophilic) aerobic decomposition of organic waste into stable, mature, and sanitized end-product low in contaminants and foreign matter, which would not cause deleterious environmental impacts if land applied. (Haug 1993, Wichuk and McCartney, 2010, Hill and Baldwin 2012¹²).

Confined Space: Any space that by design has limited openings for entry and exit; unfavorable natural ventilation which could contain or produce dangerous air contaminants, and which is not intended for continuous employee occupancy. Confined spaces include but are not limited to storage tanks, ship compartments, process vessels, pits, vats, silos, degreasers, reaction vessels, boilers, ventilation and exhaust ducting, sewers, manholes, tunnels, trenches, underground utilities, septic tanks, wet wells, and pipelines.

Dissolved Solids: The material contained in a liquid, which can pass through a glass fiber filter. Examples include iron, calcium, magnesium, potassium and sodium in combination with chloride, sulfate, bicarbonate, carbonate and nitrate.

Effluent: Wastewater flowing out of a reservoir, basin, sewage treatment plant, industrial treatment plant or marine sanitation device.

Effluent Filter: A removable, cleanable device inserted into the outlet piping of the septic tank designed to trap excessive solids due to tank upsets that would otherwise be transported to the subsurface wastewater infiltration system or other downstream treatment components.

Evaporator Toilet: A toilet that evaporates liquid from human waste to decrease the weight prior to removal from the site.

Fecal Coliform: A group of bacteria in the coliform group, which inhabits the intestines of all warm-blooded animals. The presence of fecal coliforms in surface and/or ground waters is a good indicator of recent human and/or animal fecal contamination.

Front Country Systems: Those systems easily accessible by motorized vehicle and boat.

Grease Interceptor: An appurtenance or appliance that is installed in a sanitary drainage system to intercept non- petroleum fats, oils and grease (FOG) from a wastewater. There

¹¹ [CFR 2002: Title 40 - Vol19 - Sec 144-80](#) Accessed 6/18/2019

¹² [The Effectiveness and Safety of Vermi-Versus Conventional](#) Accessed 6/18/2019

are two types of Grease interceptors, Gravity Grease Interceptors and Hydromechanical Grease Interceptors. Grease interceptors have a flow rate of greater than 50 gallons per minute.

Grease Interceptor, Gravity: A plumbing appurtenance or appliance that is installed in a sanitary drainage system to intercept non-petroleum fats, oils, and greases (FOG) from a wastewater discharge and is identified by volume, 30-minute retention time, baffle(s), a minimum of two compartments, a minimum total volume of 300 gallons, and gravity separation. These interceptors are designed by a registered professional engineer. Gravity Grease Interceptors are generally installed outside.

Grease Interceptor, Hydromechanical: A plumbing appurtenance or appliance that is installed in a sanitary drainage system to intercept nonpetroleum fats, oils, and grease (FOG) from a wastewater discharge and is identified by flow rate, and separation and retention efficiency. The design incorporates air entrainment, hydromechanical separation, interior baffling, and/or barriers in combination or separately, and an external flow control, with air intake (vent).

Grease Trap: An appurtenance or appliance that is installed in a sanitary drainage system to intercept non- petroleum fats, oils and grease (FOG) from a wastewater. Grease traps have a flow rate of less than 50 gallons per minute. Grease traps are generally used on an individual sink basis or for kitchens with little water or grease use. These units generally require more servicing: either daily by staff or up to a month by specialists.

Intrinsically Safe: Equipment or space designed so that there is no possibility of creating an ignition source. Such equipment and spaces are typically used and/or required when highly flammable material is being used.

Lagoon: A pond containing raw or partially treated wastewater in which aerobic, facultative and/or anaerobic stabilization occurs.

Large Capacity Cesspool as defined by EPA's Class V Underground Injection Control Program: Residential multiple-dwelling, community, or regional systems (e.g., townhouse complexes or apartment buildings) that dispose of sanitary waste, or non-residential cesspools that have the capacity to serve 20 or more persons per day (e.g., rest areas or churches) if they receive solely sanitary waste.

Large Capacity Septic System (LCSS) as defined by EPA's Class V Underground Injection Control Program: LCSSs are an on-site method for partially treating and disposing of sanitary wastewater. Only those septic systems having the capacity to serve 20 or more persons-per-day are included within the scope of the underground injection control (UIC) regulations with the exception of septic systems introducing chemicals to a drain field. LCSSs consist of a gravity fed, underground septic tank or tanks, effluent distribution system, and a soil absorption system. LCSSs may also include grease interceptors, several small septic tanks, a septic tank draining into a well, connections to one large soil absorption system, or a set of multiple absorption systems that can be used on a rotating basis.

Large On-Site Septic Systems: On-site septic tank and drainfield systems that receive more than 3,300 gallons of wastewater on a daily basis.

NPDES: The National Pollutant Discharge Elimination System is a permit system developed by the EPA to regulate discharge of pollutants into waters of the United States. Legislative discussion is found at EPA 40 CFR 122¹³.

Permit: An authorization, license, or equivalent control document issued by EPA or an "approved State" to implement the requirements of NPDES (National Pollutant Discharge Elimination System), or an operating permit unique to the state or according to the size of the system for example a Large Onsite Septic Tank.

Primacy Agency: A Federal, State, or County agency authorized by the Environmental Protection Agency (EPA) to administer the program. If a state has not requested this authorization, the EPA is the Primacy Agency.

Primary Treatment: The physical removal of solids from wastewater involving settling or flotation.

Privy: A hole dug in the ground for the disposal of human waste and covered by an insect proof building.

Public Health Assessment: A public health assessment is a combination of on-site sanitary surveys of safe drinking water systems, wastewater systems, disease surveillance, food safety inspections, recreational water surveys, public health in backcountry operations, and promoting health in park units.

Sanitary Survey: A detailed investigation of the features of a wastewater system and conditions, which may impact the ability of the system to adequately, treat wastewater.

Secondary Treatment: Biological treatment of wastewater which produces an effluent with a monthly average of 30 mg/l of BOD and suspended solids, 200 fecal coliform/100 ml and a pH between 6 and 9.

Septage: The liquid and solid material removed from a septic tank, cesspool, vault toilet or similar domestic wastewater treatment system, or holding tank when the system is cleaned or maintained.

Septic Tank: A watertight, covered tank designed and constructed to receive sewage from a building sewer. It separates solids from the liquid, digests organic matter; stores digested solids through a period of detention, and allows clarified liquids to discharge.

Sludge Digestion: The further decomposition and stabilization of solids removed from primary and secondary treatment processes. This process uses microorganisms, which can be either aerobic or anaerobic.

Suspended Solids: Those solids that are visible and in suspension in water.

Tertiary Treatment: Additional treatment following secondary treatment designed to achieve a specific effluent quality determined by the Primacy Agency.

¹³ [Electronic Code of Federal Regulations: Title 40 - Protection of Environment](#) Accessed

Total Organic Carbon (TOC): A measure of the total carbon as carbon dioxide in a liquid after all inorganic carbon has been removed or accounted for.

Total Solids: The combined sum of the suspended and the dissolved solid material in wastewater.

Urine Diversion Toilet - This is a waterless toilet designed to divert urine away from human feces either by gravity or mechanical means. The diverted urine is treated by an engineered method acceptable to the local jurisdiction, the NPS Sanitarian, or PHC. The resulting solid waste is removed for disposal after the material decomposes and stabilizes. Some urine may contact the fecal matter indirectly, but effective urine diversion systems should redirect the majority of the urine away from and prior to the fecal material. Improper drainage of urine through the active pile of fecal waste will liquefy the fecal material creating odors and making the removal of solids very difficult.

Vault Toilet: A toilet designed to completely retain all waste materials deposited into it. The tank must be emptied periodically and the wastes properly disposed. It requires adequate ventilation to control odor and should be easily pumped out. The tank is usually covered with an enclosed, insect proof structure. The toilet should incorporate the U.S. Forest Service *In-Depth Design and Maintenance Manual for Vault Toilets*, which is provided as a separate workbook.

Wastewater: Liquids and water borne solids from domestic, industrial or commercial uses that have been used in man's activities. If improperly controlled or inadequately treated can cause human illness and/or pollution of the environment.

Waters of the United States: All natural ground and surface waters that meet the criteria of 40 CFR 122.2¹⁴.

Water Reuse: The use of wastewater that has been treated to meet specific water quality criteria with the intent of being used for a range of purposes.

¹⁴ [Electronic Code of Federal Regulations: Title 40 - Protection of Environment](#) Accessed

APPENDIX 2.0 FREQUENTLY USED ABBREVIATIONS AND ACRONYMS

ANSI: American National Standards Institute
ATU: Aerobic Treatment Unit
AWWA: American Water Works Association
BOD: Biological Oxygen Demand
CDC: Centers of Disease Control and Prevention
CFR: Code of Federal Regulations
CWA: Clean Water Act
COD: Chemical Oxygen Demand
DO: Directors Order
FOG: Fats, Oils, and Grease
FSB: Field Services Branch
IPC: International Plumbing Codes
LCC: Large Capacity Cesspool
LCSS: Large Capacity Septic System
NPS: National Park Service
NPDES: National Pollutant Discharge Elimination System
NSF: National Science Foundation
OPH: Office of Public Health
PHA: Public Health Assessment
PHC: Public Health Consultant
RM: Reference Manual
SDWA: Safe Drinking Water Act
SST: Sweet Smelling Toilet
SWIS: Subsurface Wastewater Infiltration System
TOC: Total Organic Carbon
UIC: Underground Injection Control
USC: United States Code
USEPA: United States Environmental Protection Agency
USPHS: United States Public Health Service

APPENDIX 3.0 GUIDANCE TO DETERMINE WHETHER YOUR SEPTIC SYSTEM IS REGULATED BY THE EPA CLASS V UNDERGROUND INJECTION CONTROL PROGRAM RULE

Answer the following questions to determine if you have a Septic System Regulated by the Class V UIC regulations.

Questions:	No	Yes
1. Does your system have a capacity to serve 20 or more persons per day?	You are not affected by the rule.	You must register your system with the primacy agency.
2. Does your system introduce any form of chemical to a drain field?	You are not affected by the rule.	You must register your system with the primacy agency regardless of the

A septic system is considered a Large Capacity Septic System (LCSS) if it receives *solely sanitary waste* either from *multiple dwellings*, or from a *nonresidential establishment*, where the system has the total capacity to *serve 20 or more persons per day*. In addition to the typical gravity-fed underground septic tank, effluent distribution system, and soil absorption area, LCSSs may have grease traps or other pre-treatment technologies, several small septic tanks, septic tanks that drain into a dry well, and connections to one large soil absorption system or multiple absorption areas that can be used on a rotating basis.

In general, LCSSs may be found serving the following facilities in our parks:

- residential housing clustered or septic tank effluent pumping systems
- office and commercial buildings (visitor centers)
- campgrounds
- recreation vehicle (RV) parks
- rest areas with comfort stations
- concession facilities including hotels and restaurants
- septic systems receiving waste from an industrial facility, including vehicle maintenance buildings

Owners and/or operators of large capacity septic systems (LCSS), are required to meet State* and Federal requirements. The minimum Federal requirements for Class V wells are:

1. Obey the non-endangerment performance standard prohibiting injection that allows the movement of fluids containing any contaminant into underground sources of drinking water, if the presence of that contaminant may cause a violation of any primary drinking water regulation or adversely affect public health; and
2. Provide inventory information (including facility name and location, legal contact name and address, ownership information, nature and type of injection wells, and operating status of the injection wells) to the state or EPA regional UIC Program.

* States may have additional or more stringent requirements.

APPENDIX 4.0 SEPTIC TANK SEWAGE DISPOSAL MAINTENANCE AND INSPECTION LOG

Name of System: _____

Location of System: _____

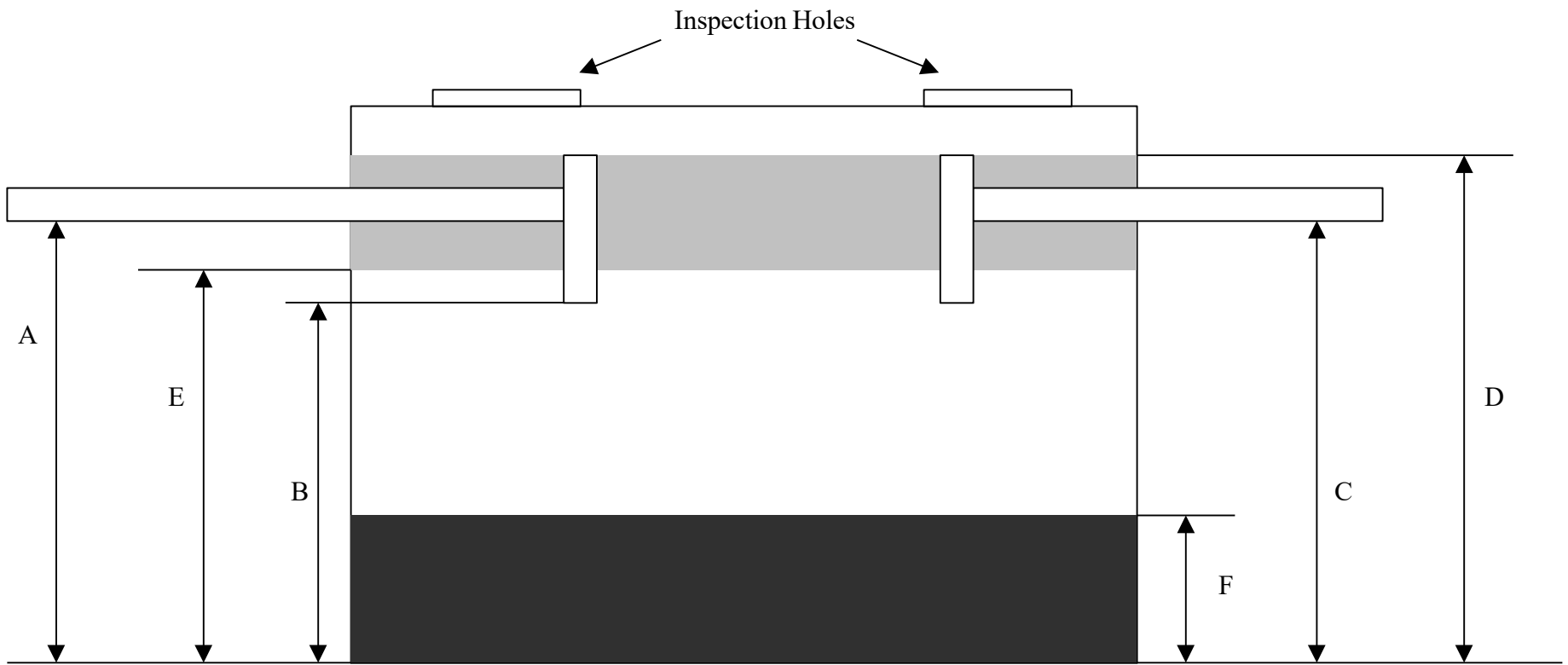
Inside Tank Dimensions **See Back of Sheet for Illustration**					ID	Clay	CI	PVC	Wood	Concrete
Width:	Length:	Depth:	Gallons:	Tank						
Distance from inlet to Tank Bottom:			(A)	Baffle						
Distance from Tee (or Baffle) to Tank Bottom:			(B)	D Box						
Distance from Outlet Pipe Invert to Tank Bottom:			(C)	Inlet						
				Outlet						

Date	Septic Tank Measurements					Remarks	Distribution Box	Absorption Field	Remarks
	D	E	F	G	H				

D = Distance from Scum Top to Tank Bottom
 G = E-B (If less than 3" Tank is to be pumped)

E = Distance from Scum Bottom to Tank Bottom

F = Sludge Depth
 H = B-F (If less than 6-8" Tank is to be pumped)



Typical Tank Diagram

APPENDIX 5.0 RAW SEWAGE SPILL NOTIFICATION & CLEANUP GUIDANCE

Raw Sewage Spill Notification

- All raw sewage spills and overflows require a verbal notification within one business day to the Superintendent, Occupational Health and Safety office, and the Public Health Consultant (PHC). The NPS Unit Manager is responsible for notifying State and local authorities.
- Any raw sewage spills or overflows exceeding 1,000 gallons require a written follow-up report within two working days to the Park Superintendent, PHC, Primacy Agency (usually the State/Local Health Authority) and anyone else the NPS Unit Manager deems necessary.
- In the event of a fish kill, immediately notify the appropriate divisions within the park as well as the appropriate primacy department/division/agency. Provide updates as needed.
- When leaving a message please provide your name, return phone number, location of spill/overflow (include cross streets and nearest address), rate of flow, volume, surface water bodies impacted, agencies that have responded if known, cause of spill and the repair and cleanup actions undertaken.
- If there are known downstream drinking water sources all potentially affected individuals and system operators should be contacted of spills that may effect their water quality.

The written report must include:

Include all of the above information and the duration of the incident, size of the affected area, and the agency contacts made during the notification. Also, provide a detailed description of the repair and cleanup actions taken, and a statement on what steps will be taken to minimize/prevent a spill or overflow recurrence.

Dry Weather Cleanup & Posting:

1. Post sign(s) warning the public of the release with at least the wording of "raw sewage." Restrict public access to spill affected area. The public should be advised of the potential health risks and warn them not to enter the affected area.
2. Health warnings must remain posted until PHC and/or Primacy Agency authorizes their removal or sampling results indicate that there is no risk to human health.
3. Contain and divert the flow to the nearest sanitary sewer or collect with a vacuum truck.
4. After the flows have been stopped and repairs made, rake or vacuum up raw sewage solids. The solids should be bagged and disposed of in a landfill. Workers must wear appropriate PPE (disposable gloves, disposable tyvex suits, rubber boots, face shield or splashguard) and thoroughly wash off after clean up has been completed.
5. Flush the affected area with clean water and divert runoff into the nearest sewer. If there is potential human contact to the raw sewage, such as a campground, the affected area should be roped-off and quarantined until the Park/PHC/Primacy Agency deems it is safe. Treatment of the site may include dusting of granular HTH or the application of a weak anhydrous lime/water mixture. However, the general use of disinfectants is not

recommended for all raw sewage spills due to potential toxicity to fish and wildlife. Contact the PHC for more information.

6. Sampling should be conducted upstream and downstream in receiving water per Primacy Agency requirements. If there are no Primacy Agency requirements, samples should be analyzed for fecal coliform.

Wet Weather Cleanup & Posting:

The same as Dry Weather Cleanup & Posting, flushing with water and sampling may be omitted if storm water flow is high and sampling is impractical.

Please insert emergency phone numbers here:

Contact	Phone Number
NPS Unit Manager	
Public Health Consultant	
Park office (after hours)	
Local Primacy Agency	
Other	
Other	

Raw sewage Spill Notification and Minimum Cleanup Procedures is a re-write of the San Francisco Bay Regional Water Quality Control Board's "Sewage Spill Notification and Cleanup Response Requirements for Sewage Collection Agencies."

REFERENCE MANUAL 83A
CHAPTER 3
FOOD SAFETY

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1.0 GENERAL POLICY

NPS unit managers will minimize the risk of foodborne illness by assuring food service operations within park boundaries are in compliance with the relevant sections of the most recent version of the Model Food Code provided by the U.S. Food and Drug Administration.

The Food Code is available for download at:

<https://www.fda.gov/Food/GuidanceRegulation/RetailFoodProtection/FoodCode/ucm595139.htm>¹

Or for public sale by:

U.S. Department of Commerce
National Technical Information Service
5301 Shawnee Road, Alexandria, VA 22312
Phone: 1-800-553-6847

2.0 OPERATIONAL RATINGS FOR FOOD ESTABLISHMENTS

The Public Health Consultant (PHC) will assign a Satisfactory, Marginal or Unsatisfactory rating for each Food Service Sanitation Report based on an operational score that may be adjusted by the level of Policies, Training, and Verification (PTV) exhibited by the food facility.

The operational score will begin with a zero and increase as violations are noted. Violations will have a point range between 1 and 20 points. Priority violations will have a point value of 15 or 20 points; Priority Foundation violations will be weighted as 5 or 10 points; and Core violations will be either 1 or 3 points. The total number of points will be summed to determine the operational score. Appendix A contains a complete list of point values.

The operational score will determine the rating. If an imminent health hazard exists an “Unsatisfactory” rating will be issued regardless of the point total. An imminent health hazard is a significant threat or danger to health that is considered to exist when there is sufficient evidence to show that a product, practice, circumstance, or event creates a situation requiring immediate correction or cessation of operation to prevent injury based on: (a) The number of potential injuries, and (b) The nature, severity, and duration of the anticipated injury.

The rating will be assigned as indicated in Table 1.

Table 1. Operational Rating Criteria for Food Establishments

Rating	Criteria
Satisfactory	<ul style="list-style-type: none">Operational score between 0 – 48, andNo imminent health hazards, andGeneral compliance with timeframes for correction that have been approved and directed by the PHC
Marginal	<ul style="list-style-type: none">Operational score between 49-68, and

¹ Last accessed on April 29, 2019

Rating	Criteria
	<ul style="list-style-type: none"> • No imminent health hazards, and • General compliance with timeframes for correction that have been approved and directed by the PHC
Unsatisfactory	<ul style="list-style-type: none"> • Operational score of 69 or greater, and/or • Imminent health hazards, and/or • Failure to comply with timeframes for correction of previous violations that have been approved and directed by the PHC

Operators are eligible to have the final rating of any Food Service Sanitation Report raised by one operational level if they submit a formal written Food Safety Plan (FSP) to their PHC and their FSP is approved by the PHC. The FSP must be submitted annually to the PHC for review and approval in order to be eligible for this program.

For restaurants and snack bars, the PHC will gather sufficient information to rate the level of control that an operation exhibits over the risk factors for foodborne illness utilizing the guidance in Appendix B. Information may be gathered from the observation of practices, interviewing of staff management or review of policies and records. The individual ratings will be averaged to create an overall management index score. A management index score of 4.0 (well-developed) or higher may be used to raise the overall facility rating one category.

3.0 TEMPORARY FOOD EVENTS

In addition to the items listed below, temporary food events, within park jurisdiction, are required to comply with all of the relevant sections of the Model Food Code.

- 3.1 The Person in Charge will have a current Food Safety Manager Certification.
- 3.2 The application for the food event must be submitted and approved at a minimum of two weeks prior to the start of the event. Applications may be required to be submitted earlier than two weeks depending upon the number of vendors or the specific park region.
- 3.3 The menu will be limited to only the approved items in the application.
- 3.4 If food is prepared offsite, it may only be done in a pre-approved licensed food establishment. A copy of the facility permit to operate from the local health department, a copy of the most recent health inspection report (less than 1 year old), and an establishment agreement, along with how the food will be transported must be submitted with the application.
- 3.5 If cooling of food items will occur, a completed cooling log must accompany the food product.
- 3.6 An appropriate handwashing facility must be readily accessible at all times that foodhandling is occurring.
- 3.7 A three-compartment sink (or equivalent) must be provided for warewashing.
- 3.8 Counter protection (sneeze guards) must be provided if food is to be held on the counter for serving.
- 3.9 Tables, stands, pallets or other devices must be used to keep all food, utensils, single-service/use, equipment, food preparation, and other operations off the ground or pavement.
- 3.10 Liquid waste is disposed of in an approved manner and not on the ground or in storm drains.
- 3.11 Sufficient trash receptacles are provided and serviced to preclude the accumulation of refuse outside of these containers.

Appendix A


Operational Score Point Values

Code	Violation	Points	Code	Violation	Points
PRIORITY VIOLATIONS					
2-201.12	Exclude sick or ill employees	20	2-301.14	When to wash hands	20
3-301.11	Contamination from Employee's Hands	20	3-401.11	Cooking to Proper Temperatures	20
3-401.14	Non-Continuous Cooking of Raw Animal Foods	20	3-402.11	Freezing Food for Parasite Destruction	20
3-501.14	Improper Cooling	20	3-501.18	Ready-to-Eat Potentially Hazardous Food disposition	20
3-501.19	Time as a Public Health Control	20	3-502.12	Reduced Oxygen Packaging	20
3-701.11	Discarding Contaminated Food	20	4-501.111	Warewashing Sanitizer Water Temperature	20
4-501.114	Improper Sanitizer Method	20	4-602.11	Food Contact Surfaces cleaning frequency	20
4-702.11	Equipment sanitizing frequency	20	4-703.11	Improper Sanitizer Concentration	20
5-102.12	Using non-Potable water	20	5-201.11	Using unapproved materials plumbing materials	20
5-202.13	Not having an air gap when required	20	5-202.14	Using an unapproved backflow preventer	20
5-203.14	Not having a backflow device when required	20	5-205.12	Creating a cross-connection	20
5-205.15	Not maintaining a plumbing system in good repair	20	5-301.11	Use of approved materials in a mobile water tank	20
5-302.16	Identifying potable water hoses	20	5-303.11	Mobile water tanks – filter to remove oil from pressurized air	20
5-304.14	Mobile systems dedicating equipment	20	5-402.11	No cross connections with the sewage system	20
5-403.11	Approved sewage disposal facility	20	7-201.11	Storage of poisonous or toxic chemicals	20
7-203.11	No reuse of chemical containers for food	20	8-404.11	Imminent Health Hazard	20
ALL OTHER PRIORITY VIOLATIONS 15 Points					
PRIORITY FOUNDATION VIOLATIONS					
2-102.11	Demonstration of Knowledge	10	2-301.15	Where to wash hands	10
3-202.18	Shellstock Identification	10	3-401.13	Plant Foods for Hot Holding	10
3-501.15	Cooling Methods	10	4-202.11	Food Contact Surfaces Cleanability	10
4-204.112	Equipment Thermometers Present	10	4-301.11	Sufficient Cooling, Hot and Cold Holding Facilities	10
4-302.14	Sanitizer test kit Present	10	4-501.17	Warewashing cleaning agents	10
4-501.110	Warewasher wash solution temperature	10	4-501.112	Warewasher sanitizer water temperature	10
4-601.11	Food contact surfaces clean to sight and touch	10	5-102.13	Water System sampling is conducted	10
5-104.11	Water is received from an approved system	10	5-202.12	Handwashing sink is properly installed	10
5-203.11	Enough Handsinks are installed	10	5-204.11	Handsinks are properly located	10
5-402.14	Removing of mobile food establishment wastes	10	6-301.11	Hand soap is available at handsinks	10
6-301.12	Hand drying device available at handsink	10	6-302.11	Toilet tissue available at toilet	10
ALL OTHER PRIORITY FOUNDATION VIOLATIONS 5 Points					
CORE VIOLATIONS					
2-301.13	Special handwash procedures	3	2-401.11	Eating, Drinking or Using Tobacco near food or a food contact surface	3
4-402.11	Hair restraint effectiveness	3	3-302.15	Washing fruits and vegetables prior to use	3
3-401.12	Microwave cooking procedures	3	3-501.13	Improper Thawing	3
4-101.12	Improper use of cast iron	3	4-101.16	Improper use of sponges	3
4-201.11	Equipment designed to be durable	3	4-202.13	Improper use "V" type threads	3
4-204.17	Separation of drains from ice units	3	4-501.16	Use limitation of warewashing sinks	3
5-203.12	Sufficient toilets and urinals are present	3	5-203.15	Carbonator backflow device design	3
5-401.11	Mobile sewage holding tank is sufficient size	3	6-202.13	Insect control devices are properly designed and installed	3
6-303.11	Sufficient Lighting	3	6-501.112	Removing dead or trapped pests	3
8-201.13	When a HACCP plan is required	3	8-404.12	Resumption of Operations	3
ALL OTHER CORE VIOLATIONS 1 Points					

Appendix B

Description of Policy, Training, Verification (PTV) Ratings

The ratings will use the following general criteria in assessing the level of control of a particular risk factor. Specific examples are attached below.

LOW 	1	Non-Existent No system is in place or the risk factors are observed out of control or are at an imminent risk of being out of control
	2	Underdeveloped System is in early development. Efforts are being made, but there are crucial gaps
	3	Basic System has been developed that meets minimum requirements. It may be in written or oral form.
	4	Well-Developed System is fully developed and meets minimum requirements. Procedures are written, training is regularly provided, and regular self- assessments are performed.
	5	Proactive System goes above and beyond minimum requirements. The facility uses the self- assessments and ongoing training to further tighten control over the risk factors.

Below is a non-exhaustive list of examples of actions that would meet the criteria. Depending upon the nature of the food facility and staff other options could be implemented.

Risk Factor	Rating	Policy	Training	Verification
Employee Health	Non-Existent	No Procedure	No Training	No Verification Occurring
	Underdeveloped	Procedures either written or verbal do not address Basic level of criteria.	Training does not address Basic level of criteria.	Verification does not address procedures or is inconsistent
	Basic	Procedure either written or verbal that covers: <ul style="list-style-type: none"> • Reporting of illness by current or prospective employees • Exclusion/Restriction of ill employees • Reporting diagnosed employee illnesses to NPS 	Training covers Basic procedure criteria and occurs at least at initial hire.	Verification of daily compliance with Basic level procedures occurs periodically.
	Well-Developed	Procedure is written and includes Basic level of criteria plus: Examples: <ul style="list-style-type: none"> • Written employee reporting agreements • Employee sign off sheets 	Training covers Well-Developed procedure criteria plus: <ul style="list-style-type: none"> • Employees can verbalize or demonstrate procedures • A training record is maintained • Periodic refresher training is provided 	Written verification of well-developed criteria occurs on a frequent basis. Examples: <ul style="list-style-type: none"> • Logging employee symptom reports

	Proactive	Procedures cover Well-Developed level of criteria plus: Examples: <ul style="list-style-type: none"> Incentives for employees not to work while ill Regular interview and updating procedure 	Training covers Proactive procedure criteria plus: Examples: <ul style="list-style-type: none"> Utilizing a variety of training materials/methods Reinforce training regularly Training program is reviewed/revised regularly to meet needs 	Written verification covers Proactive criteria and information gained from verification is used to minimize foodborne illness risk. Examples: <ul style="list-style-type: none"> Analysis of trends and action plans to provide long term corrections to deficiencies
Risk Factor	Rating	Policy	Training	Verification
Preventing Contamination from Hands	Non-Existent	No Procedure	No Training	No Verification Occurring
	Underdeveloped	Procedures either written or verbal do not address Basic level of criteria.	Training does not address Basic level of criteria.	Verification does not address procedures or is inconsistent
	Basic	Procedure either written or verbal that covers: <ul style="list-style-type: none"> Where handsinks are located and directing employees to wash hands in handsink only How to wash hands When to wash hands No bare hand contact with Ready-to-eat food items 	Training covers Basic procedure criteria and occurs at least at initial hire.	Verification of daily compliance with Basic level procedures occurs periodically.
	Well-Developed	Procedure is written and includes Basic level of criteria plus: Examples: <ul style="list-style-type: none"> Addresses use of hand sanitizers (if used) 	Training covers Well-Developed procedure criteria plus: Examples: <ul style="list-style-type: none"> Employees can verbalize or demonstrate procedures for these criteria Keeps a training record Periodic refresher training offered 	Written verification of well-developed criteria occurs on a frequent basis.
	Proactive	Procedures cover Well-Developed level of criteria plus: Examples: <ul style="list-style-type: none"> Use of signs and posters Regular review and updating of procedure Regular opportunities for employees to wash their hands Creating a culture of handwashing 	Training covers Proactive procedure criteria plus: Examples: <ul style="list-style-type: none"> Utilizing a variety of training materials/methods Reinforce training regularly Training program is reviewed/revised regularly to meet needs 	Written verification covers Proactive criteria and information gained from verification is used to minimize foodborne illness risk. Examples: <ul style="list-style-type: none"> Use of a handwash counter Analysis of trends and action plans to provide long term corrections to deficiencies

Risk Factor	Rating	Policy	Training	Verification
Approved Source	Non-Existent	No Procedure	No Training	No Verification Occurring
	Underdeveloped	Procedures either written or verbal do not address Basic level of criteria.	Training does not address Basic level of criteria.	Verification does not address procedures or is inconsistent
	Basic	Procedure either written or verbal that covers: <ul style="list-style-type: none"> • Obtaining food only from approved sources • Storing PHF promptly • Inspecting deliveries for signs of spoilage, damage, etc. • Receiving Potentially Hazardous Food (PHF) at 41F or less 	Training covers Basic procedure criteria and occurs at least at initial hire.	Verification of daily compliance with Basic level procedures occurs periodically.
	Well-Developed	Procedure is written and includes Basic level of criteria plus: Examples: <ul style="list-style-type: none"> • Specific position designated for doing receiving 	Training covers Well-Developed procedure criteria plus: Examples: <ul style="list-style-type: none"> • Employees can verbalize or demonstrate procedures for these criteria • Keeps a training record • Periodic refresher training offered 	Written verification of well-developed criteria occurs on a frequent basis. Examples <ul style="list-style-type: none"> • Lists of approved vendors • Records of receiving temperatures
	Proactive	Procedures cover Well-Developed level of criteria plus: Examples: <ul style="list-style-type: none"> • Supplier audits/certifications to ensure they are meeting food safety requirements 	Training covers Proactive procedure criteria plus: Examples: <ul style="list-style-type: none"> • Utilizing a variety of training materials/methods • Reinforce training regularly • Training program is reviewed/revised regularly to meet needs 	Written verification covers Proactive criteria and information gained from verification is used to minimize foodborne illness risk. Examples: <ul style="list-style-type: none"> • Analysis of trends and action plans to provide long term corrections to deficiencies

Risk Factor	Rating	Policy	Training	Verification
Protection from Contamination	Non-Existent	No Procedure	No Training	No Verification Occurring
	Underdeveloped	Procedures either written or verbal do not address Basic level of criteria.	Training does not address Basic level of criteria.	Verification does not address procedures or is inconsistent
	Basic	Procedure either written or verbal that covers: <ul style="list-style-type: none"> • Washing, rinsing, and sanitizing of food-contact surfaces • Protection and separation of food • Proper disposition of returned, previously served, reconditioned, and unsafe food 	Training covers Basic procedure criteria and occurs at least at initial hire.	Verification of daily compliance with Basic level procedures occurs periodically.
	Well-Developed	Procedure is written and includes Basic level of criteria plus: Examples: <ul style="list-style-type: none"> • Sanitizing schedule for food-contact surfaces • Food storage charts 	Training covers Well-Developed procedure criteria plus: Examples: <ul style="list-style-type: none"> • Employees can verbalize or demonstrate procedures for these criteria • Keeps a training record • Periodic refresher training offered 	Written verification of well-developed criteria occurs on a frequent basis. Examples <ul style="list-style-type: none"> • Log of returned food • Record of sanitizer concentration checks
	Proactive	Procedures cover Well-Developed level of criteria plus: Examples: <ul style="list-style-type: none"> • Designated storage areas for food items • Use of color coded utensils for specific items 	Training covers Proactive procedure criteria plus: Examples: <ul style="list-style-type: none"> • Utilizing a variety of training materials/methods • Reinforce training regularly • Training program is reviewed/revised regularly to meet needs 	Written verification covers Proactive criteria and information gained from verification is used to minimize foodborne illness risk. Examples: <ul style="list-style-type: none"> • Analysis of trends and action plans to provide long term corrections to deficiencies

Risk Factor	Rating	Policy	Training	Verification
Cooking of Potentially Hazardous Food	Non-Existent	No Procedure	No Training	No Verification Occurring
	Underdeveloped	Procedures either written or verbal do not address Basic level of criteria.	Training does not address Basic level of criteria.	Verification does not address procedures or is inconsistent
	Basic	Procedure either written or verbal that covers: <ul style="list-style-type: none"> • Cooking PHF to appropriate temperatures • Consumer advisory for raw/undercooked PHF 	Training covers Basic procedure criteria and occurs at least at initial hire.	Verification of daily compliance with Basic level procedures occurs periodically.
	Well-Developed	Procedure is written and includes Basic level of criteria plus: Examples: <ul style="list-style-type: none"> • Use of thermocouple with appropriate probe to check temperatures 	Training covers Well-Developed procedure criteria plus: Examples: <ul style="list-style-type: none"> • Employees can verbalize or demonstrate procedures for these criteria • Keeps a training record • Periodic refresher training offered 	Written verification of well-developed criteria occurs on a frequent basis. Examples: <ul style="list-style-type: none"> • Maintain a cooking temperature log • Thermometer calibration logs
	Proactive	Procedures cover Well-Developed level of criteria plus: Examples: <ul style="list-style-type: none"> • No raw meat on the premises • No PHF deliberately served raw/undercooked 	Training covers Proactive procedure criteria plus: Examples: <ul style="list-style-type: none"> • Utilizing a variety of training materials/methods • Reinforce training regularly • Training program is reviewed/revised regularly to meet needs 	Written verification covers Proactive criteria and information gained from verification is used to minimize foodborne illness risk. Examples: <ul style="list-style-type: none"> • Analysis of trends and action plans to provide long term corrections to deficiencies

Risk Factor	Rating	Policy	Training	Verification
Hot Holding of Potentially Hazardous Food	Non-Existent	No Procedure	No Training	No Verification Occurring
	Underdeveloped	Procedures either written or verbal do not address Basic level of criteria.	Training does not address Basic level of criteria.	Verification does not address procedures or is inconsistent
	Basic	Procedure either written or verbal that covers: <ul style="list-style-type: none"> • Holding hot PHF at 135F or greater • If used, Time as a Public Health Control procedure addresses all pertinent criteria 	Training covers Basic procedure criteria and occurs at least at initial hire.	Verification of daily compliance with Basic level procedures occurs periodically.
	Well-Developed	Procedure is written and includes Basic level of criteria plus: Examples: <ul style="list-style-type: none"> • Use of thermocouple to check temperatures 	Training covers Well-Developed procedure criteria plus: Examples: <ul style="list-style-type: none"> • Employees can verbalize or demonstrate procedures for these criteria • Keeps a training record • Periodic refresher training offered 	Written verification of well-developed criteria occurs on a frequent basis. Examples <ul style="list-style-type: none"> • Maintain a time as a public health control log • Thermometer calibration logs • Hot holding unit temperature logs
	Proactive	Procedures cover Well-Developed level of criteria plus: Examples: <ul style="list-style-type: none"> • Maintaining hot held PHF over 140F 	Training covers Proactive procedure criteria plus: Examples: <ul style="list-style-type: none"> • Utilizing a variety of training materials/methods • Reinforce training regularly • Training program is reviewed/revised regularly to meet needs 	Written verification covers Proactive criteria and information gained from verification is used to minimize foodborne illness risk. Examples: <ul style="list-style-type: none"> • Analysis of trends and action plans to provide long term corrections to deficiencies

Risk Factor	Rating	Policy	Training	Verification
Cold Holding of Potentially Hazardous Food	Non-Existent	No Procedure	No Training	No Verification Occurring
	Underdeveloped	Procedures either written or verbal do not address Basic level of criteria.	Training does not address Basic level of criteria.	Verification does not address procedures or is inconsistent
	Basic	Procedure either written or verbal that covers: <ul style="list-style-type: none"> • Holding cold PHF at 41F or lower • If used, Time as a Public Health Control procedure addresses all pertinent criteria 	Training covers Basic procedure criteria and occurs at least at initial hire.	Verification of daily compliance with Basic level procedures occurs periodically.
	Well-Developed	Procedure is written and includes Basic level of criteria plus: Examples: <ul style="list-style-type: none"> • Use of thermocouple to check temperatures 	Training covers Well-Developed procedure criteria plus: Examples: <ul style="list-style-type: none"> • Employees can verbalize or demonstrate procedures for these criteria • Keeps a training record • Periodic refresher training offered 	Written verification of well-developed criteria occurs on a frequent basis. Examples <ul style="list-style-type: none"> • Maintain a time as a public health control log • Thermometer calibration logs • Cold holding temperature logs
	Proactive	Procedures cover Well-Developed level of criteria plus: Examples: <ul style="list-style-type: none"> • Performing preventive maintenance on refrigeration units to ensure they are operating properly • Not using ice baths as a means of cold holding 	Training covers Proactive procedure criteria plus: Examples: <ul style="list-style-type: none"> • Utilizing a variety of training materials/methods • Reinforce training regularly • Training program is reviewed/revised regularly to meet needs 	Written verification covers Proactive criteria and information gained from verification is used to minimize foodborne illness risk. Examples: <ul style="list-style-type: none"> • Analysis of trends and action plans to provide long term corrections to deficiencies

Risk Factor	Rating	Policy	Training	Verification
Cooling of Potentially Hazardous Food	Non-Existent	No Procedure	No Training	No Verification Occurring
	Underdeveloped	Procedures either written or verbal do not address Basic level of criteria.	Training does not address Basic level of criteria.	Verification does not address procedures or is inconsistent
	Basic	Procedure either written or verbal that covers: <ul style="list-style-type: none"> • Use of rapid cooling methods • Ensuring food is rapidly cooled within the allowable timeframes • Marking food with the date and time of cooling • Arrangement in cooler to allow for maximum heat transfer 	Training covers Basic procedure criteria and occurs at least at initial hire.	Verification of daily compliance with Basic level procedures occurs periodically.
	Well-Developed	Procedure is written and includes Basic level of criteria plus: Examples: <ul style="list-style-type: none"> • Use of thermocouple to check temperatures 	Training covers Well-Developed procedure criteria plus: Examples: <ul style="list-style-type: none"> • Employees can verbalize or demonstrate procedures for these criteria • Keeps a training record • Periodic refresher training offered 	Written verification of well-developed criteria occurs on a frequent basis. Examples <ul style="list-style-type: none"> • Maintain a cooling log
	Proactive	Procedures cover Well-Developed level of criteria plus: Examples: <ul style="list-style-type: none"> • Use a properly functioning blast chiller 	Training covers Proactive procedure criteria plus: Examples: <ul style="list-style-type: none"> • Utilizing a variety of training materials/methods • Reinforce training regularly • Training program is reviewed/revised regularly to meet needs 	Written verification covers Proactive criteria and information gained from verification is used to minimize foodborne illness risk. Examples: <ul style="list-style-type: none"> • Analysis of trends and action plans to provide long term corrections to deficiencies

**REFERENCE MANUAL 83A
CHAPTER 4
RECREATIONAL WATER**

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TABLE 5.0 RECREATIONAL WATER QUALITY CRITERIA SUMMARY

1. SWIMMING POOLS, HOT TUBS, AND SPAS

1.1 CDC Model Aquatic Health Code

NPS will reduce the risk of waterborne diseases by ensuring that the NPS and concessioners who run swimming pools, spas and hot tubs within NPS jurisdiction properly operate, maintain, monitor, and promptly correct deficiencies identified in these systems in accordance with applicable state and local regulations. In the absence of applicable state/local regulations, swimming pools operated on NPS property will follow guidance outlined in latest version of the Centers for Disease Control (CDC) Model Aquatic Health Code (MAHC). The complete MAHC is available at <http://www.cdc.gov/mahc/>.

1.1.1 Compliance:

Swimming pools will have until March 1, 2020 to fully implement the MAHC. Until such date, the NPS and concessioners may continue to use *The National Pool and Spa Institute's ANSI Standard for Public Swimming Pool*" as policy for swimming pools and *The National Pool and Spa Institute's ANSI Standard for Public Spas* for hot tubs and spas as policy. These documents are authorized for use in the previous version of *Director's Order 83 D2 Swimming Pools* and *Director's Order 83 D3 Hot Tubs and Spas*.

1.2 Construction and Facility Design

NPS will follow the latest version of the International Code Council (ICC) International Swimming Pool and Spa Code (ISPSC) to ensure the NPS and concessioner operated swimming pools, spas, and hot tubs are properly constructed and designed. The ISPSC is available at <https://codes.iccsafe.org/content/ISPSC2018/effective-use-of-the-international-swimming-pool-and-spa-code>.

1.3 Virginia Graeme Baker Pool & Spa Safety Act

The Virginia Graeme Baker Pool & Spa Safety Act became effective in December of 2008. All swimming pools on NPS property are required to be compliant with this law. Under the law, all public pools and spas must have ANSI/ASME A112.19.8 performance standard, or the successor standard ANSI/APSP-16 2011 compliant drain covers installed and a second anti-entrapment system installed, when there is a single main drain other than an unblockable drain. This law is available at <http://www.poolsafely.gov/pool-spa-safety-act/>.

2. BATHING BEACHES

NPS Unit Managers will reduce the risk of waterborne diseases by ensuring designated bathing beaches are properly operated, maintained and monitored. Deficiencies will be promptly corrected, in compliance with the *Beaches Environmental Assessment and Coastal Health Act of 2000* and applicable state/local regulations. In the absence of applicable state or local regulations, the following NPS policies will apply. Bathing beaches can be located at lakes, rivers, oceans, hot springs, and other bodies of water. Additional guidance is provided below. Further information regarding beach monitoring and EPA guidance can be accessed at <http://water.epa.gov/beaches>.

2.1 Compliance:

Parks located in states that have bathing beach water quality standards will comply with those standards or, in the absence of state standards, comply with DO-83A.

2.1.1 Bathing beach monitoring is required for each designated bathing beach. Designated bathing beaches are those that the Park has identified (using signs, brochures, etc.) for primary contact recreational water activities. Monitoring is recommended for other areas that are heavily used (40 or more people per 100 linear feet of shoreline). Specific requirements of the monitoring program include:

2.1.1.2 Conducting a sanitary survey;

2.1.1.3 Preparing a water quality monitoring protocol. This protocol includes the names of areas to be sampled; sampling station locations (GPS); a map or sketch of each area showing the location of each sampling station; the bacteriological standard used; and the name of the laboratory performing the analyses;

2.1.1.4 Sampling for enterococcus or *Escherichia coli* bacteria levels; and issuing swimming advisories when bathing beach waters exceed the specified standards.

2.1.1.5 A copy of the bathing beach monitoring plan and current bathing beach sanitary survey report will be sent to the Regional Public Health Consultant (PHC) for review and concurrence approximately one month before the beginning of the recreational season. The plan does not have to be resubmitted annually if there are no changes in beach conditions or the monitoring plan.

2.2 Samples:

2.2.1 Samples will be collected in conformance with the most recent edition of Standard Methods for the Examination of Water and Wastewater. **Appendix 2.0** is a

recommended sampling procedure.

2.2.2 Parks are required to use a state certified lab for testing.

2.2.3 Parks will submit bacteriological sampling results to the PHC.

2.3 Sanitary Surveys:

2.3.1 A sanitary survey of all bathing beaches must be performed. The survey can be completed by the Park staff, State/Local health department personnel, or the PHC utilizing the assessment criteria outlined in this document (see 2.3.1 below). There is no formal report format; a 2-3 page submittal is sufficient. The assessment criteria may also be accessed using the EPA performance standards (<https://www.epa.gov/beach-tech/beach-sanitary-surveys>).

2.3.2 Potential sources of human-caused bacterial contamination include (but are not restricted to): commercial and agricultural activities, sewage outfalls; storm drains; raw sewage overflows from manholes, septic tanks and sewage treatment plants; boating activities and people using the beach. Potential sources of animal-caused microbial contamination include (but are not limited to): streams, animal enclosures, and feedlots and forage areas for both domestic and wild animals.

2.3.3 Physical factors that have a bearing on water quality include precipitation, topography, runoff patterns, prevailing winds, tides and currents. Water quality is also affected by characteristics of the receiving water such as thermal and salinity stratification, water depth, and surface area. An initial site assessment should consider potential sources of pollution and the physical attributes of the beach area. Should the initial site assessment note any potential sources of pollution, a more in-depth evaluation may need to be undertaken which will provide pollution characterization, epidemiology data linking illness to the area, and dilution factors.

2.3.4 The beach site assessment should also consider user hazards such as; excessive vegetation, infectious snails, poisonous or dangerous aquatic organisms, currents, tides, submerged objects, beach slope, sharp drop-offs, uneven/unstable wading area surfaces, depth in diving areas, and overhead power lines.

2.3.5 The Park should conduct an initial sanitary survey at each designated beach site. The results of the survey will inform which locations to sample the beach- monitoring program. The survey will also help the Park identify potential source(s) and pathway(s) of contamination if the beach water quality subsequently falls below the applicable standard. Subsequent surveys should be performed if any of the risk factors change. Contact your PHC if you have questions about, or need assistance in, conducting the sanitary survey.

2.4 Beach Monitoring Protocol

2.4.1 Sampling Location

Sample locations should reflect the water quality within the entire recreational zone. The majority of samples should be taken in areas of heaviest use. They should include sites that potentially can be affected by point discharges and surface runoff. Examples are locations adjacent to drains and natural contours that could discharge storm water collections or septic waste. The total number of samples taken at a bathing beach will depend on the size and intensity of use. A minimum of 3 sampling stations per beach is recommended.

2.4.2 Sampling Frequency

Water samples should be collected as early as possible in the morning to accurately reflect the baseline bacterial quality. The first set of samples should be collected approximately two weeks before the beginning of the recreational season. This will provide sufficient time to re-sample if the initial samples indicate the bacterial standards have been exceeded. Sampling frequency will be based on the sanitary survey which reflects the periods of recreational use, the nature and extent of use during certain periods, the proximity of the recreational waters to known point and non-point sources of pollution, and any effect of storm events on the waters. In any event, the water quality monitoring will follow the relevant state's sampling frequency protocol.

2.4.3 **Table 2.0** is a recommended form for consolidating beach monitoring data. It includes information about the location, time, date and bacterial densities of each water sample. At the end of each month during the bathing beach season, send a copy of the current month's data form to your PHC.

2.5 Bacterial Standards:

2.5.1 NPS units are required to use state standards for bacterial testing of recreational waters. In the absence of state standards, parks are required to follow the EPA's 2012 Recreational Water Quality Criteria (RWQC) for protecting human health in all coastal and non-coastal areas designated for primary contact recreation use (designated bathing beaches). The EPA's RWQC offers Recommendation guidelines. Recommendation 1 has an illness rate of 36/1000 bathers, Recommendation 2 has an illness rate of 32/1000 bathers. In the absence of state standards, parks are required to adhere to Recommendation 2. NPS OPH recommends the EPA recreational water

CFU levels that correlate with an estimated illness rate of 32/1000 to help assure maximum health and safety of recreational water users.

2.5.2 The 2012 RWQC consists of three components: magnitude, duration, and frequency. The magnitude of bacterial indicators are described by both the **geometric mean (GM)** and the **statistical threshold value (STV)**.

The STV approximates the 90th percentile of the water distribution and is intended to be a value that should not be exceeded by more than 10 percent of the samples taken.

The GM should be calculated weekly for each sampling station beginning with week five. It is a running mean calculated using the most recent five weekly samples.

2.5.3 Recommendation 2 Magnitude:

Enterococci: Culturable enterococci at GM of **30 cfu/100 mL** and an STV of **130 cfu/100mL** measured using *EPA method 1600*, or any equivalent method that measures culturable enterococci.

E. Coli: Culturable E. Coli at a GM of **100 cfu/100mL** and an STV of **320 cfu/100mL** measured using *EPA method 1603*, or any equivalent method that measures culturable E. coli.

2.5.6 Duration and Frequency:

The waterbody GM should not be greater than the selected GM magnitude in any 30 day interval. There should not be greater than a ten percent excursion frequency of the selected STV magnitude in the same 30 day interval.

2.5.7 Beach Closures:

When the applicable bacterial standards are exceeded, Park managers will report the results to the PHC and the applicable state agency. Advise the PHC, applicable state agency, and the local news media when a health advisory regarding the affected area will be posted. The advisory will notify the public of the potential health risks from swimming at the designated beach. The affected beach will be re-sampled immediately by taking two samples each day at each sampling location where the bacterial standard was exceeded. Re-sampling should continue until the bacterial standard is not exceeded for two consecutive days. The PHC can waive this re-sampling requirement. Resume routine monitoring and notify the PHC, the local public health agency and the news media of the decision to reopen the beach. All signs should be removed. **Table 1** of this document is an example of a beach advisory sign.

3. HOT SPRINGS

Many National Parks have natural hot springs that are frequented by visitors. It is up to park management to identify whether or not a natural hot springs is a designated bathing beach or not using the guidance provided in section 2.1.1 of RM83A Chapter 4 Recreational Water. If a natural hot springs has been identified as a designated bathing beach it must undergo designated bathing beach water quality monitoring as outlined in section 2 of this chapter.

3.1 *Naegleria fowleri*

Certain hot springs within the National Park Boundaries have tested positive for *Naegleria fowleri*. *Naegleria fowleri* is a free-living amoeba that can infect humans when it enters through the nose and can cause primary amebic meningoencephalitis, a disease of the central nervous system that is almost always fatal. If hot springs water have testing confirmation of the presence of *Naegleria fowleri* amoeba, the park should work with the Public Health Consultant (PHC) to ensure that the public is properly notified. Testing for the presence of *Naegleria fowleri* is not typically recommended since it is found in many bodies of warm, freshwater and results in very few cases of infection.

FREQUENTLY USED ABBREVIATIONS AND ACRONYMS

ANSI: American National Standards Institute
APSP: Association of Pool and Spa Professionals
ASME: American Society of Mechanical Engineers
CDC: Centers of Disease Control and Prevention
CFU: Colony Forming Units
EPA: Environmental Protection Agency
GM: Geometric Mean
ICC: International Code Council
ISPSC: International Swimming Pool and Spa Code
MAHC: Model Aquatic Health Code
PHC: Public Health Consultant
RWQC: Recreational Water Quality Criteria
STV: Statistical Threshold Value

TABLE 1.0 NOTIFICATION, ADVISORY AND CLOSURE PROCEDURES

Bacterial levels in water samples taken from this body of water exceed Local, State and National Park Service standards for recreational activity.

Due to the increased human health risk, the National Park Service warns to avoid contact with these waters until further notice.

Please contact the Park at telephone no. XXX-XXXX for updates on this advisory.

Table 3.0 RECOMMENDED SAMPLING PROCEDURES

1. Collect samples using bottles provided by your laboratory.
2. Collect samples as early as possible in the morning before visitors begin using the beach.
3. Wade out into the surf about thigh deep and face the current, if any.
4. Collect the sample from an incoming wave, taking care to avoid getting debris into the sample.
5. The object is to avoid capturing surface water, and to collect from at least 1-foot depth. Grasp the bottle near its base with one hand and remove the cap with the other. Be careful to avoid touching the inside of the cap or the rim of the bottle. Rotate your wrist so the mouth of the bottle is pointing downward at about a 45-degree angle. Rapidly plunge the bottle to a depth of about one foot. Rotate your wrist so the mouth of the bottle points up, loses its air bubble, and fills with water. Replace the bottle cap while still under water.
6. Lift the capped bottle out of the water. Remove the cap and pour out enough water to leave a 1/2-inch air space. Replace the cap. Be careful not to touch the lip of the bottle or the inside of the cap.
7. Immediately place the bottle in an upright position in a covered cooler containing sufficient ice to keep the samples cool until they arrive at the laboratory.
8. Record the sample bottle number, station name, date and time of sampling, sampler's name, and other appropriate information on the field data sheet (See Enclosure 1).
9. Transport the sample to the laboratory on ice, in a covered cooler preferably within six hours, but no longer than twenty-four hours of sampling.

¹

See most recent edition of Standard Methods for the Examination of Water and Wastewater, 18th Edition, Part 9060 for additional information about sample collection, preservation and storage.

Table 4.0 Geometric Mean Examples

Two Geometric Mean (GM) Sample Calculations Using the Results of 5 Weekly Samples Taken From the Same Sampling Station

GM = antilog [1/n (log sample 1 + log sample 2 + log sample 3 + log sample 4 + log sample 5)]

Example 1: Week 1 = 23 enterococci/100 ml
 Week 2 = 33 enterococci/100 ml
 Week 3 = 33 enterococci/100 ml
 Week 4 = 37 enterococci/100 ml
 Week 5 = 47 enterococci/100 ml

Example 2: Week 2 = 33 enterococci/100 ml
 Week 3 = 33 enterococci/100 ml
 Week 4 = 37 enterococci/100 ml
 Week 5 = 47 enterococci/100 ml
 Week 6 = 53 enterococci/100 ml

Step 1: log 23 = 1.36172
 log 33 = 1.51851
 log 33 = 1.51851
 log 37 = 1.56820
 log 47 = 1.67209
 7.63903

Step 1: log 33 = 1.51851
 log 33 = 1.51851
 log 37 = 1.56820
 log 47 = 1.67209
 log 53 = 1.72458
 8.00189

Step 2: [1/n (7.63903)] = [1/5 (7.63903)] = 1.52781

Step 2: [1/n (8.00159)] = [1/5 (8.00189)] = 1.60003

Step 3: Antilog 1.52781 = 33.7 = 34 colonies/100 ml

Step 3: Antilog 1.60003 = 39.8 = 40 colonies/100 ml

Conclusion: The GM of 34-colonies/100 ml **does not exceed** the marine beach standard of 35 enterococci colonies/100 ml. **Conclusion:** The GM of 40-colonies/100 ml **does exceed** the marine beach standard of 35 enterococci colonies/100 ml.

*Note: n = the number of samples

Table 5.0 Recreational Water Quality Criteria Summary

Criteria Elements	EPA RWQA Recommendation 2 (Estimated Illness rate of 32/1000)	
Indicator	GM (CFU/100mL)	STV (CFU/100mL)
Enterococci (Marine & Fresh)	30	110
E. coli (Fresh)	100	320

REFERENCE MANUAL 83A
CHAPTER 5
BACKCOUNTRY OPERATIONS

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1. GENERAL OPERATIONS

- 1.0.1 National Park Service (NPS) will reduce the risk of disease transmission to park visitors, partners, and staff while providing opportunities to enjoy experiences in the backcountry. These guidelines are intended for NPS partners and NPS operations to ensure minimum standards for public health are maintained in the backcountry where front country standards are not in alignment with the operational conditions.
- 1.0.2 All backcountry operations will drink potable water obtained from an approved drinking water system that meets NPS policy in RM83A Chapter 1 (Water Systems), or obtained from a source known to be free of chemical contamination and appropriately filtered and disinfected or boiled for a sufficient length of time to kill pathogens.
- 1.0.3 Food service will comply with the relevant portions of the United States Food and Drug Administration’s (FDA) most current Model Food Code. Where strict application of the code is not possible, this Reference Manual will identify permissible changes, in compliance with any rules of the local NPS management.
- 1.0.4 Park managers will safely dispose of human waste in an approved manner and in compliance with the requirements of the local NPS management.
- 1.0.5 Backcountry visitors will be informed by local NPS of known specific vector-borne diseases to which they may be exposed and provided with risk reduction strategies. Activities will be modified as appropriate to reduce the risk of disease transmission.

2. FOOD OPERATIONS

2.0.1 The safe storage, transport, preparation and service of food in the backcountry is quite challenging due to the inherent nature of the environment under which the parks and park partners are operating. Despite these challenges, food service must be in compliance with the relevant portions of the FDA's most current Food Code. Where a strict application of the code is not possible, the changes detailed in 2.1.0 through 2.7.2 are permitted.

2.1.0 Food Handlers:

2.1.1 At least one guide on each excursion will be a certified food handler and will be responsible for overseeing the storage, preparation, and serving of food. It is strongly recommended, however, that this one guide on each excursion be certified on a manager level. All guides are encouraged to become certified food handlers.

2.1.2 No persons who are ill will be allowed to prepare food. A person with a gastrointestinal illness will be restricted from food handling and water treatment activities until 72 hours after symptoms have resolved.

2.1.3 Guest volunteers will not be allowed to prepare or handle food other than their own. They may be allowed to perform other duties attendant to food preparation.

2.1.4 Bare hand contact should be minimized with ready to eat food products. Gloves or utensils are strongly encouraged when handling foods that will not be cooked.

2.1.5 Food handlers will not eat while preparing food.

2.2.0 Handwashing:

2.2.1 Handwashing setups will be conveniently located near the food area.

2.2.2 Handwashing setups which involve the repeated dipping of hands into the treated water container may not be used. Only gravity feed or foot pump pressurized portable handwashing systems that dispense treated water from a flow-controlled nozzle over the hands and into a grey water catchment basin below during the handwashing process are approved.

2.2.3 Foodhandlers will wash their hands immediately before engaging in food preparation, after using the bathroom, smoking, sneezing or coughing into hands and as frequently as needed to prevent contamination of food and utensils.

2.2.4 Water used for handwashing will be as specified in section 3.1.0 below or treated with 100 mg/L Parts Per Million (PPM) chlorine.

If this method is used chlorine test strips will be used to check the concentration. Extra chlorine might be required to achieve 100 PPM in turbid water. The handwash container must be covered to prevent potential re-entry of contaminants and to minimize the potential for chlorine to off-gas once the above treatment process is complete.

2.2.5 In extreme circumstances where sufficient treated water is not available, food handlers must use hand sanitizers containing 70% ethyl alcohol per the manufacturer's directions after preliminarily washing hands with untreated water.

2.3.0 Food Storage:

2.3.1 Time/Temperature Control for Safety (TCS) foods (including raw eggs) will be stored at or below 45°F.

2.3.2 Foods will be stored so that they do not contaminate one another. Whenever possible, raw TCS foods should be stored in a separate cooler. When this is not possible (e.g. single cooler trips), raw TCS foods must be stored at the bottom of the cooler in durable leak proof containers. Double bagging is not adequate when storing raw TCS foods in the same cooler as ready to eat foods.

2.3.3 Menus should be simplified and ingredients selected to minimize the amount of raw TCS foods that are needed on each trip.

2.3.4 Dry foods will be stored in sealed containers to protect them from moisture and rodents.

2.3.5 Food will be stored separately from cleaning supplies, fuel, human waste receptacles or solid waste receptacles.

2.4.0 Food Preparation:

2.4.1 TCS food left over from a meal will not be held for re-service.

2.4.2 TCS food will not be prepared in advance in the backcountry and then cooled down for later service. All TCS foods cooked on site will be consumed or discarded within four hours of preparation.

2.5.0 Food Service:

2.5.1 Guest handwashing facilities will be available near the food service area. Air drying of hands is acceptable for guests. Individuals involved in preparation or service of food will use clean, disposable paper towels for hand drying.

2.6.0 Facilities:

2.6.1 If possible, a tarp will be laid down on the ground before setting up the kitchen to aid in later cleanup activities.

2.6.2 Food preparation surfaces will be in good repair without cracks or holes and easily cleanable. All tables and food preparation contact surfaces must be sanitized before and after meals with 100 PPM chlorine.

2.6.3 Food handlers will provide necessary measures to prevent environmental contaminants from affecting the food.

- 2.6.4 This may mean overhead and/or side protection during periods of inclement weather.
- 2.6.5 A 3-compartment dish washing setup is required in the order of Wash-Rinse-Sanitize. Hot wash water must be used with detergent. Sanitizer must have 100 PPM chlorine residual and be checked with chlorine test strips. Air dry dishes and utensils before storage.

2.7.0 Unused Food:

- 2.7.1 Any food product that has been opened must be discarded at the end of the trip. Non-TCS items that will be cooked (e.g. dry pancake batter and seasonings) are exempt from this requirement.
- 2.7.2 Unopened TCS foods will be discarded at the end of a trip (i.e. they cannot be taken on more than one trip).

3. **POTABLE WATER OPERATIONS**

- 3.0.1 Filtration and disinfection are both required for the treatment of water unless the water is obtained from an NPS approved drinking water source. Appropriate park staff should ensure backcountry users understand that non-potable water is not safe to drink following filtration without disinfection. Failure to add disinfectant after filtration or boiling has resulted in a number of illness outbreaks at times affecting hundreds of people.
- 3.1.0 There are only three pre-approved methods of providing potable water for drinking and culinary uses:
 - 3.1.1 Potable Water System: Water will be obtained from an NPS approved drinking water system and will be stored in containers that are free from contamination and are disinfected between every reuse. Transport container disinfection will be provided by placing 2 tablespoons or 6 teaspoons of 8.25% NSF approved chlorine bleach in a 5 gallon container of water, mixing and allowing to stand for 30 minutes. The container will then be emptied, rinsed with potable water, and then filled with water from the NPS approved drinking water system (see RM83A Chapter 1 for further details). Note that leaving the disinfected water in direct sunlight will consume the chlorine and reduce the effectiveness. Thus, shade is recommended for proper container storage.
 - 3.1.2 Boiling: Obtain water from a source free of known chemical contamination and bring to a rolling boil for 1 minute (or 3 minutes for elevations over 6,500 ft). If the water is not consumed within 6 hours after boiling and is placed in a sanitized container, that water should be disinfected with a 1 mg/L (PPM) chlorine bleach solution.
 - 3.1.3 Filtration and Disinfection: Obtain water from a source free of known chemical contamination and then filter and disinfect the water. If sediment is present in the water, settle overnight or use a settling agent such as alum.

Filtering will be through an “absolute” 1 micron filter, or one labeled as meeting the NSF International Standard #53 for “Cyst Removal”. The filtration must be followed by disinfection. If a chlorine residual test kit is available, add drops of unscented NSF-60 approved 8.25% chlorine bleach until a strength of at least 1 mg/L (PPM) is achieved.

- 3.1.4 If no test kit is available, follow the guidance in the table below. Mix and let stand for at least 30 minutes before drinking.

Volume of Water	Amount of Bleach to Add*
1 quart/liter	2 drops
1 gallon	6 drops
2 gallons	12 drops (1/8 teaspoon)
4 gallons	1/4 teaspoon
8 gallons	1/2 teaspoon

*Bleach contains up to 8.25% sodium hypochlorite.

If the bleach solution contains a different concentration of sodium hypochlorite the above noted values will need to be modified. Please contact your Public Health Consultant (PHC) for assistance in the conversion.

Alternative disinfection methods must be approved by the PHC. Use of ultraviolet light as an alternative to adding disinfectant will not be approved. UV disinfection does not provide a residual to deal with post-treatment contamination.

4. HUMAN WASTE MANAGEMENT OPERATIONS

- 4.0.1 All human waste will be disposed of in an approved manner. Approved methods must conform to local NPS policy which may include one of the methods outlined below. Whenever there is human access into the backcountry, the problem of safely disposing of fecal waste must be addressed. In all cases, appropriate measures will be taken to protect the health of visitors and staff by minimizing risk of disease transmission as well as protecting park resources.

- 4.1.0 The preferred option for human waste disposal is always to use permanent facilities provided by the park. These are most often located in high use or environmentally sensitive areas. Failure to use these facilities can result in significant degradation of park resources. Permanent waste facilities are covered in the RM83A Chapter 2 (Wastewater Systems).

- 4.2.0 There are several methods by which the NPS allows backcountry fecal waste to be collected and disposed of. Allowable methods depend on the NPS park and may differ depending on location of travel. Methods of handling human feces in the backcountry can be divided into two categories: Collection/Removal and On-Site Treatment/Disposal.
- 4.3.0 Collection/Removal alternatives will be used in parks that have either high visitation and/or poor soil for fecal decomposition in the backcountry and cannot sustain the On Site Disposal method. This is typical of high alpine and mountainous areas where there is little soil available and the decomposition is slow, but may also include other areas such as along rivers. There are three types of methods for collection and removal:
- 4.3.1 Bag Containers: Bag containers may only be used for the collection and disposal of fecal matter when an approved collection system is implemented by the park, or a commercially available product approved for disposal in landfills is used. Where park units have established a collection system, plastic bags are collected from those who have visited the backcountry and deposited in specially labeled containers (55-gallon drums). The drums are sealed and removed from the backcountry via pack animal or motorized device. The bagged wastes are then collected, labeled, and transported to a licensed and inspected facility for proper disposal. Commercially available bagged waste receptacles such as, but not limited to, the “Rest Stop” and “Wag Bag” are also approved for use in the parks. These bags contain an absorbent material that absorbs all the liquid much like a diaper and can be disposed of in landfills. No special handling procedures are required; licensed disposal of this waste is allowed as long as there is no free flowing liquid.
- 4.3.2 Simple Containers: Simple containers include pickle pails (5-gallon buckets with tight fitting lids) rocket boxes (20-mm ammo cans), scat packer, brief relief, clean mountain cans or other similar products approved by the park unit. The pickle pails and rocket boxes are common devices seen on the river trips in Grand Canyon National Park and Cataract Canyon in Canyonlands National Park. Another alternative is the clean mountain cans recently developed and used in Denali National Park and Preserve by mountaineers. The full containers are typically transported to a central site and then dumped into a septic tank/wastewater treatment plant for final treatment and disposal. Any container must be sealable and able to be easily emptied, cleaned and sanitized for use on the next trip.
- 4.3.3 Urine diversion toilet: Fecal matter is deposited in the container and urine is diverted to a drain field or similar subsurface disposal area. The primary function of the unit is to reduce weight and allow for the safe handling and transportation of the solid material.

- 4.4.0 On Site Disposal (Cat Holes) may only be used if approved by the park. The site used for disposal will be located at least 100 feet (30 meters) from freshwater in an inconspicuous site not traveled frequently by people. The area should be elevated where water would not pool during storms, where adequate soil is available, and preferably in an area that receives maximum sunlight. Excavate a hole that is at least 6 inches (15 centimeters) deep and 4 inches (10 centimeters) in diameter. Deposit and cover the fecal material with soil and other native materials. Decomposition of fecal matter is increased if it is mixed with the soil, this can be accomplished with a stick. Toilet paper is slow to decompose and may be dug up by animals, therefore some backcountry operations require users to collect toilet paper in a separate container and carry it out for disposal, especially in arid areas. If this is required, make sure to place used toilet paper in a bag without touching the outside of the container.
- 4.5.0 Urine should be disposed of in a permanent facility if available. However, if one is not available, pick an area at least 100 feet (30 meters) from freshwater and in an inconspicuous site not traveled frequently by people. Urinate on rocks, pine needles, or gravel, as animals are less likely to be attracted to these areas and defoliate plants or dig up soil because of the salts in the urine. If allowed by the park, urination directly into a river with a high flow of water may be the preferred alternative.
- 4.6.0 It is extremely important for users to wash hands with soap and water after each use. If handwashing facilities are not available hands may be cleaned with disposable hand wipes or hand sanitizer.

5. VECTOR-BORNE AND ZOO NOTIC DISEASE PREVENTION OPERATIONS

- 5.1 Backcountry visitors are at risk for vector borne disease exposure. In order to reduce risk to the park visitors, partners, and staff in the backcountry, the park unit will:
- 5.1.1 Communicate to backcountry users effective vector-borne disease prevention strategies that may be prevalent in and around the park. Contact the PHC for assistance.
 - 5.1.2 Establish lines of open communication – this may simply consist of open communication between backcountry users and park staff to identify areas of concern, including, but not limited to: high mosquito population, rodent infestation, and die-off of rodents. Parks should maintain regular communication with the NPS Office of Public Health to stay informed of new, expanding, and re-emerging disease risks.
 - 5.1.3 Provide appropriate risk reduction strategies to backcountry visitors, partners, and staff.

- 5.1.4 Additional information may be obtained from RM83A Chapter 6, the NPS One Health website (<http://www.nps.gov/onehealth>), and the NPS Disease Prevention and Response website (<https://www.nps.gov/subjects/healthandsafety/disease-prevention.htm>).

5.2 Risk Reduction Strategies

5.2.1 Mosquito-Borne Diseases

- 5.2.1.1 Wear long sleeved shirts and pants if conditions allow, particularly during periods of high mosquito activity.
- 5.2.1.2 Use of an insect repellent containing DEET, Picaridin, or oil of lemon eucalyptus on skin or permethrin on clothing is effective against mosquitoes and should be used during periods of high mosquito activity.
- 5.2.1.3 Avoid campsites that have high mosquito populations or are near areas of stagnant waters. When possible utilize enclosed tents for sleeping, use mosquito netting treated with permethrin as an additional protective barrier.

5.3.1 Plague

- 5.3.1.1 Closure or modified use of high risk area during active epizootic events.
- 5.3.1.2 When possible, consider conducting surveillance for plague activity in rodent populations by public health workers, citizens reporting rodents found sick or dead, or surveys by biologists.
- 5.3.1.3 Apply insect repellents containing DEET or Picaridin to clothing and skin, according to label instructions, to prevent flea bites if you anticipate being exposed to rodent fleas.

5.4.1 Tick-borne diseases

- 5.4.1.1 Wear light-colored clothing to allow you to see ticks crawling on your clothing.
- 5.4.1.2 Tuck pant legs into socks so that ticks cannot crawl up the inside of your pants legs. Spraying boots with permethrin can prevent ticks from attaching to the body. The use of tall rubber boots may also provide additional protection.
- 5.4.1.3 Apply insect repellants containing DEET or Picaridin and wear permethrin treated clothing to discourage tick attachment.
- 5.4.1.4 Scan body after exposure to tick-infested areas, paying special attention to the backs of the knees, groin, armpits and neck and remove any tick you find on your body. Parents should check their children for ticks, especially in the hair, when returning from potentially tick-infested areas. When possible shower or bathe within 2 hours of returning from tick habitat.

- 5.4.1.5 Avoid sitting on logs in areas with significant leaf litter and hike in the center of trails. Ticks must crawl directly onto a host, so avoiding direct contact with tick habitat will prevent tick attachment.
- 5.5.1 Rodent-borne diseases
 - 5.5.1.1 Avoid contact with live or dead rodents, their burrows, dens, nests, or droppings.
 - 5.5.1.2 Do not use cabins or other enclosed shelters that are potentially rodent-infested until they have been appropriately cleaned and disinfected. Follow the risk reduction guidelines found on the NPS Integrated Pest Management website (<https://sites.google.com/a/nps.gov/in2-preserve-landscapes-and-natural-systems/home/biological-resources/lrab/ipm/ipm-training/rodents>) to properly disinfect enclosed areas.
 - 5.5.1.3 Do not pitch tents or place sleeping bags in proximity to rodent feces or burrows or near possible rodent habitat (e.g., dense brush or woodpiles).
 - 5.5.1.4 Keep food and trash in rodent-proof containers.
 - 5.5.1.5 Wear insect repellent when camping or hiking in areas with rodent habitat.
 - 5.5.1.6 Supervise children and keep pets on leash.
 - 5.5.1.7 Report any dead rodents to park resource staff immediately and consider leaving the area if signs of abandoned burrows, carrion flies, fleas at burrow openings, or multiple dead animals exist.
 - 5.5.1.8 Consider submitting any rodent carcasses to the NPS Wildlife Health Branch for diagnostic testing to surveil for plague and tularemia. Instructions and guidance can be found here: <https://sites.google.com/a/nps.gov/in2-preserve-landscapes-and-natural-systems/home/biological-resources/wildlife-health/surveillance>.
- 5.6.1 Rabies
 - 5.6.1.1 Educate visitors and employees about the importance of preventing direct contact with wildlife. Wildlife should not be handled, fed, or unintentionally attracted with open containers or litter.
 - 5.6.1.2 Since bat bites and scratches are difficult to detect, anyone who has slept in a cabin or other sleeping quarters where a bat was found or woke with a bat on them or their sleeping gear should undergo a risk assessment, as soon as possible, for the need for rabies post-exposure prophylaxis.

5.6.1.3 After any suspect exposure to a potentially rabid animal, safely capture and euthanize the animal for testing, wash the wound thoroughly with soap and water, and seek medical attention as soon as possible. The following information will be collected if possible to assist in assessment of risk:

- The geographic location of the incident
- The type of animal that was involved
- How the exposure occurred
- Whether the animal has or can be safely collected and tested for rabies

5.6.1.4 Please contact the Wildlife Health Branch or an NPS epidemiologist for guidance on euthanasia and testing of the carcass. Carcasses with known human exposure should be sent to the nearest state lab to expedite the testing process.

6. ILLNESS REPORTING PROCEDURES

6.1.0 The trip leader will complete a separate Gastrointestinal (GI) Illness Report Form (See Appendix 3) for each person who becomes ill with a GI illness on a trip.

6.2.0 The forms will be submitted within the appropriate time frame described below. For commercial trips, reports will be sent to the park concession specialist. For all other trips, reports will be sent to the park superintendent. All reported GI reports will be forwarded to the Public Health Consultant for further review.

6.3.0 Reporting timeframe

6.3.1 If 1 or 2 persons (visitors or employees) experience GI illness during a trip, the illnesses and GI Report Form can be reported to the NPS at the end of the trip.

6.3.2 If 3 or more persons (passengers or employees) experience GI illness during a trip, the trip leader must do the following:

6.3.2.1 Complete a GI Form at the time of illness for each person who becomes ill.

6.3.2.2 Notify NPS within 24 hours of the illnesses (via satellite phone, if needed) and include the following information:

- Illness symptoms
- Dates and times of illness onset
- Suggestions as to the cause of the illness
- Trip itinerary
- Water treatment (includes sources and treatment)
- Specific menu (includes snacks and beverages) for the entire trip
- Food suppliers
- Passenger manifests with contact information
- If there was any illness at the company prior to the trip

- Provide daily updates via satellite phone of new illnesses and progress of cases that have stabilized
- 6.3.3 Submit all GI Forms to NPS at the end of the trip.
- 6.3.3.1 If a GI complaint is received after a trip has been completed, a GI report form will still be completed and forwarded to NPS.

7. FURTHER INFORMATION AND REFERENCES

- 7.1.0 NPS Disease Prevention and Response – Internet Site
(<https://www.nps.gov/subjects/healthandsafety/disease-prevention.htm>)
- 7.2.0 NSF International (<http://www.nsf.org>)
- 7.3.0 The Centers for Disease Control and Prevention (<https://www.cdc.gov/>)
- 7.4.0 Food and Drug Administration’s (FDA) Food Code
(<http://www.fda.gov/Food/GuidanceRegulation/RetailFoodProtection/FoodCode/ucm374275.htm>)
- 7.5.0 State and Local Health Departments
(<https://www.cste.org>)
(<https://www.naccho.org/membership/lhd-directory>)

APPENDIX 1 FREQUENTLY USED ABBREVIATIONS AND ACRONYMS

DEET: Diethyl-Meta-Toluamide or Diethyltoluamide, the most common active ingredient in insect repellents
 FDA: United States Food and Drug Administration
 GI: Gastrointestinal
 NPS: National Park Service
 NSF: NSF International
 OPH: Office of Public Health
 PHC: Public Health Consultant
 PPM: Parts Per Million
 RM: Reference Manual
 TCS: Time/Temperature Control for Safety Food
 UV: Ultraviolet Light

APPENDIX 2 GLOSSARY OF COMMONLY USED TERMS

DEFINITIONS

Backcountry: Determinations of “backcountry” will be made on a park-by-park basis, taking into account the park area’s geographic circumstances. Backcountry water and wastewater systems are most often found in areas that are remote from developed areas and are not readily serviceable by motorized vehicles.

Certified Food Handler: An individual who has completed an approved food safety training course and successfully passed the certification examination. Approved courses and exams may be from local and state health departments, or a nationally recognized certification program. The certification must be renewed upon expiration, or if more than three years have passed since the date of issuance.

FDA Food Code: Guidelines of the United States Public Health Service Food and Drug Administration regarding the most current guidance and strategies for safeguarding public health and ensuring food is unadulterated and honestly presented when offered to the consumer.

Non-Potable Water: Water that does not meet NPS drinking water policy in RM83A or water that may contain objectionable pollution, contamination, minerals, or infective agents and is considered unsafe and/or unpalatable for drinking. If water is non-potable, a clear statement that the water is non-potable and should not be used for drinking, food or beverage preparation, handwashing, teeth brushing, or any other consumptive use should be stated.

National Sanitation Foundation: NSF International is a product testing, inspection and certification organization. NSF International independently tests, audits, certifies, trains and consults for the food, water, health science, sustainability and consumer product sectors.

Potable Water: Water that meets the standards for drinking purposes of the State or local authority having jurisdiction, or water that meets quality standards prescribed by the U.S. Environmental Protection Agency.

Public Health Consultant: The local or regional NPS Office of Public Health employee assigned to assist the NPS site with all public health needs.

Time/Temperature Control for Safety Food (TCS): food that requires time/temperature control for safety to limit pathogenic microorganism growth or toxin formation.

Vector: an agent (e.g. insect, tick, mite, rodent, bird, etc.) that transfers an infective agent from one host (which can include itself) to another.

APPENDIX 3
GASTROINTESTINAL (GI) ILLNESS REPORT FORM
 National Park Service - Public Health Program



Park Identifier: _____

Personal Information

First Name _____ Last Name _____

Date of Birth ____/____/____ (mm/dd/yy) Sex: Female Male

Parent's Name (if child<18): First Name _____ Last Name _____

Address _____ City _____

State/Province _____ County _____ Country _____

Postal Code _____ Telephone _____ Alternate Phone _____

Email _____

Check One: Park Visitor NPS Employee Concessionaire Employee Park Resident

Race/Ethnicity: White Hispanic Black or African American Asian
 Native Hawaiian or Pacific Islander American Indian or Alaska Native

Symptoms Experienced During this Illness

Nausea	<input type="checkbox"/> Yes	<input type="checkbox"/> No	Sweats/Chills	<input type="checkbox"/> Yes	<input type="checkbox"/> No	Hives	<input type="checkbox"/> Yes	<input type="checkbox"/> No
Vomiting	<input type="checkbox"/> Yes	<input type="checkbox"/> No	Fatigue	<input type="checkbox"/> Yes	<input type="checkbox"/> No	Metallic Taste	<input type="checkbox"/> Yes	<input type="checkbox"/> No
Diarrhea	<input type="checkbox"/> Yes	<input type="checkbox"/> No	Muscle Aches	<input type="checkbox"/> Yes	<input type="checkbox"/> No	Numb/Tingling	<input type="checkbox"/> Yes	<input type="checkbox"/> No
Blood in stool	<input type="checkbox"/> Yes	<input type="checkbox"/> No	Headache	<input type="checkbox"/> Yes	<input type="checkbox"/> No	Blurred Vision	<input type="checkbox"/> Yes	<input type="checkbox"/> No
Stomach cramps	<input type="checkbox"/> Yes	<input type="checkbox"/> No	Sore Throat	<input type="checkbox"/> Yes	<input type="checkbox"/> No	Constipation	<input type="checkbox"/> Yes	<input type="checkbox"/> No
Difficult to Swallow	<input type="checkbox"/> Yes	<input type="checkbox"/> No	Difficult to Breathe	<input type="checkbox"/> Yes	<input type="checkbox"/> No	Burning in Mouth	<input type="checkbox"/> Yes	<input type="checkbox"/> No
Jaundice	<input type="checkbox"/> Yes	<input type="checkbox"/> No	Paralysis	<input type="checkbox"/> Yes	<input type="checkbox"/> No	Other	<input type="checkbox"/> Yes	<input type="checkbox"/> No
Fever	<input type="checkbox"/> Yes	<input type="checkbox"/> No	Difficult to Speak	<input type="checkbox"/> Yes	<input type="checkbox"/> No	Did animal or insect bite occur prior to symptoms	<input type="checkbox"/> Yes	<input type="checkbox"/> No
Highest Temp _____ °F								

If yes to "other" symptom or animal/insect bite describe: _____

Date of Illness onset: ____/____/____
 (mm/dd/yy)

Time of onset: _____ AM PM

Location of onset: _____

Has person recovered: Yes No

Date of recovery: ____/____/____ (mm/dd/yy)

APPENDIX 3
GASTROINTESTINAL (GI) ILLNESS REPORT FORM
 National Park Service - Public Health Program



Medical Treatment

Has the person experiencing illness symptoms sought medical treatment? Yes No

If Yes: Clinic name _____ Date of clinic visit ___/___/___ (mm/dd/yy)

Diagnosis _____

Was the person hospitalized? Yes No What was length of stay? _____ Number of days

Date of admission ___/___/___ (mm/dd/yy) Date of discharge ___/___/___ (mm/dd/yy)

Does the person attribute the illness to a non-infectious cause (e.g., chronic medical condition (irritable bowel syndrome, inflammatory bowel disease, stomach ulcers, etc.), alcohol consumption, pregnancy, medication, menstruation, etc.)? Yes No Unknown

Did the person take any medications for this illness (e.g., antibiotics, anti-diarrheal medications, etc.)? Yes No

Were diagnostic tests performed? Yes No

Specimens submitted: Stool Vomit Urine Blood Saliva/Oral Swab Drinking Water

Test performed: _____ Test result: _____

Results: Detect Non-Detect

Exposure Event Details

A 72-hour detailed history of food, water, locations visited and activities a person participated in during that time will help the epidemiology team determine most likely cause of illness.

1. List your travel history over the past 7 days, include lodging, and outdoor locations:

Day	Starting location	Travel history (stops, activities, duration)	Ending location
1			
2			
3			
4			
5			
6			
7			

2. Did you go swimming in a pool, or soak in a hot tub during your travel dates? Yes No

3. Did you swim/bathe in recreational waters during your travel dates? Yes No
 (hot springs, lake beach, creek, river, waterfalls, ocean beach)

4. Were others in your party visibly sick or did anyone report feeling sick or recently recovering from illness? Yes No

5. Did you overnight in a rustic and remote cabin site? Yes No

APPENDIX 3
GASTROINTESTINAL (GI) ILLNESS REPORT FORM
 National Park Service - Public Health Program



Exposure Event Details (continued)

6. Identify sources of drinking water (check all that apply)

Day	Commercial Bottled	Tap water	Natural water sources (stream, spring, creek, river)	Were natural water sources *filtered	Were natural water sources *treated
1					
2					
3					
4					
5					
6					
7					

*Describe methods of filtration and treatment process that natural water sources drinking water underwent:

7. List daily food items consumed

Day	breakfast	lunch	dinner
1			
2			
3			
4			
5			
6			
7			

Trip Specific Information

Start Date: ____/____/____ (mm/dd/yy)	End Date: ____/____/____ (mm/dd/yy)	Comments:
Starting location: _____	Ending location: _____	

Form Completed by (person's name): First Name _____ Last Name _____

Telephone: _____ Email: _____

Please specify reporting agency/company:

NPS (program division and job title) _____

Concessionaire (company name) _____

REFERENCE MANUAL 83A
CHAPTER 6
DISEASE MONITORING, SURVEILLANCE AND RESPONSE

TABLE OF CONTENTS:

- 1.0 BACKGROUND AND PURPOSE
- 2.0 AUTHORITY
- 3.0 POLICIES, STANDARDS, AND PROCEDURES

1.0 BACKGROUND AND PURPOSE

Prompt reporting of infectious disease cases and appropriate, science-based response is critical for limiting transmission and protecting the health of employees and visitors. The purpose of this reference manual is to provide guidelines for how to report and manage infectious disease cases or outbreaks that occur at NPS units.

2.0 AUTHORITY

With variations over time and across jurisdictions, infectious disease and condition reporting for a range of diseases/conditions is mandated at the state, territory and local levels by legislation or regulation. Within the National Park system, U.S. Public Health Service Commissioned Corps officers assigned to the Office of Public Health (OPH) are the primary resource for responding to infectious disease cases. These Corps Officers are authorized to handle and share identifiable health data in order to address public health issues and reduce or eliminate associated hazards (NPS Management Policies 2006, 8.2.5.5., Health Insurance Portability and Accountability Act of 1996). OPH staff typically conduct investigations in partnership with local/state health departments and/or the Centers for Disease Control and Prevention (CDC).

3.0 POLICIES, STANDARDS, AND PROCEDURES

3.1. How to report cases

3.1.1. Park managers should report all suspected or confirmed cases of infectious diseases to the regional or park public health consultant, the OPH Epidemiology Branch Chief or the One Health Coordinator.

3.1.2. Infectious diseases of interest are broad and include but are not limited to:

- Foodborne/waterborne diseases (e.g. E. coli, Salmonella, hepatitis A)
- Zoonotic/vectorborne diseases (e.g. plague, hantavirus, Lyme disease)
- Airborne/dropletborne diseases (e.g. measles, influenza)
- Bloodborne diseases (e.g. HIV, hepatitis B, hepatitis C)
- Vaccine-preventable diseases (e.g. measles, chickenpox)
- Diseases transmitted person-to-person (e.g. norovirus, influenza)
- Outbreaks of any condition involving 3 or more persons

3.1.3. Rumors about potential infectious diseases should also be reported, so OPH can assist with initial data gathering.

3.1.4. Most cases should be reported by phone or email no later than 24 hours after park management first becomes aware of the incident.

3.1.5. Cases that result in severe outcomes (e.g. hospitalization or death) or which pose significant public health threats (e.g. infectious diseases that have high fatality rates or demonstrate a rapid rate of spread) should be reported immediately by phone.

3.1.6. For each incident, one individual (a park or OPH employee) should be designated as the primary point of contact for gathering and recording accurate information about the case(s). Collecting this information may involve reviewing records and/or conducting interviews. Additional information may be gathered by OPH staff after reviewing medical records and test results and consulting with staff from local/state health departments.

3.1.7. Health information and personally identifiable information (PII) will be handled securely and confidentially.

3.1.8. Names and other Personal Identifying Information (PII) will be shared with others on a need-to-know basis only.

3.1.9. The Health Insurance Portability and Accountability Act of 1996 (HIPAA) Privacy Rule recognizes the legitimate need for public health authorities and others responsible for ensuring public health and safety to have access to protected health information to carry out their public health mission. The Privacy Rule permits covered entities to disclose protected health information, without authorization, to public health authorities who are legally authorized to receive such reports for the purpose of preventing or controlling disease, injury, or disability. For more details, see 45 CFR 164.512(b).

3.1.10. OPH staff will review all information about the case(s) and will determine the need to send a summary, including a provisional investigation plan, by email to leadership. This may include the park superintendent, OPH Director, Deputy Director, VRP Associate Director, Regional Director, Deputy Regional Director, and other relevant parties.

3.2. What to expect during a case investigation

3.2.1. Once a report is received, the park will continue to manage the incident, and OPH staff will serve as subject matter experts and consultants. The OPH will also assist the park in coordinating with local, state, and federal public health authorities.

3.2.2. Case/outbreak investigations are not one-size-fits-all. Investigations vary depending on many factors, including how a pathogen is transmitted. Common modes of transmission include foodborne, waterborne, airborne/dropletborne zoonotic/vectorborne, bloodborne, and pathogens transmitted via close person-to-person contact.

3.2.3. Specific investigative actions the OPH might assist with include the following:

- Verifying the diagnosis—OPH staff will coordinate and lead discussions with local/state health departments and the CDC. Test results will be reviewed and, if needed, requests will be made for additional confirmatory testing. In-depth interviews will be conducted with cases to determine if a park is the likely source of exposure. This step can take time and is an important sorting process to determine if reported cases are true cases and/or park-associated events.
- Finding additional cases—OPH and park staff may use questionnaires, interviews with contacts of cases, and queries of local clinics to identify other visitors or employees with similar symptoms.
- Identifying risk factors for illness—Patterns suggesting which populations are at risk may be identified by analyzing detailed information on cases. Sometimes, additional studies are necessary (e.g. studies comparing differences between people who were sick and people who were well; environmental sampling; disease testing in wildlife).
- Implementing control measures—Based on presumed or laboratory-confirmed diagnoses, recommended prevention and control measures will be implemented. During this stage of the investigation, the situation is frequently re-assessed to see how well control measures are working and if additional interventions are needed. Common control measures include providing educational materials and emphasizing actions people can take to decrease risk. Occasionally, more aggressive control measures are considered (e.g. prophylactic antibiotics or vaccines; park closure); such interventions will be implemented only after careful consideration of the facts and consultation with park managers, OPH staff, and local/state health authorities.
- Disseminating findings—Throughout the investigation, OPH staff will communicate key findings (e.g. briefing statements) to park, region, and WASO managers; OPH staff can also assist with developing, reviewing, and disseminating educational materials and media communications.
- Improving Prevention – Disease transmission and outbreak response investigations are conducted in a no-fault approach with a central goal of learning from the event to improve long-term prevention; if warranted, findings may be translated into service-wide actions and scientific publications.

3.2.4. For significant public health events (e.g. large outbreaks; fatalities), a final investigation summary will be submitted to the park superintendent no later than 120 days after the last case associated with the incident is reported. After-action reviews with park managers and public health partners may be scheduled to identify strengths and weaknesses of the response.

3.3. Protection of Visitor Lodging

Inspection of visitor lodging to assess and manage risk for vector borne diseases will follow a three tiered approach.

3.3.1. Tier 1 of inspection, and ultimate responsibility for day-to-day adherence to prevention protocols, is the responsibility of the concessioner. These inspections are conducted on a periodic basis as determined by the concessioner as well as on a day-to-day basis throughout the season as part of standard maintenance and housekeeping functions. Concessions companies are required, per the concessions contract to provide safe facilities and services and provide documentation to park staff as requested to ensure health and safety requirements are met.

3.3.2. Tier 2 involves oversight of concessioners operations through the "Concessioner Review Program". Park concessions specialists conduct periodic inspections of a sampling of facilities as part of the "Concession Review Program". These inspections focus on the quality of the visitor services. Concession specialists also look for easily identifiable key indicators of performance in various program areas such as safety and public health. The NPS, through its Integrated Pest Management (IPM), Public Health and other relevant programs, provides guidance, checklists and training to assist concession specialists to conduct these inspections. Concession specialists also review documentation such as concessioner inspection logs and reports for various programs including IPM, as part of the Concessioner Review Program oversight function.

3.3.3. Tier 3 of the process involves augmentation of this Park-level inspection process through the unplanned spot inspections and concessions document review by Integrated Pest Managers, Public Health Consultants and/or Safety Officers. These spot inspections provide professional oversight of lodging facilities to check that safety and health obligations are being met by the concessioner. The number and locations for such spot inspections may be prioritized based on the known instances of or potential for particular safety or public health risk. These inspections are in addition to any inspections that may occur in direct response to a disease investigation.

3.4. Disease Prevention and Response Team (DPRT)

3.4.1. The OPH and the Biological Resources Division, Wildlife Health Branch (WHB) have partnered to provide interdisciplinary disease response relying on a One Health approach to disease investigation, response and management. This OPH and WHB partnership provides parks and regions with the option of requesting a Disease Prevention and Response Team (DPRT) to provide on-site support to address a potential or actual serious health threat, particularly zoonotic and vectorborne diseases, but also to include issues related to water, waste water and food systems.

3.4.2. DPRT is a flexible, customizable team of subject matter experts and public health officials that may consist of an environmental health officer, a wildlife veterinarian, a

physician, and a veterinary epidemiologist representing both human and veterinary health, for example. The DPRT team is intended to supplement park-based resources and lead personnel in response to emergent health and resource concerns. DPRT may act as a remote resource for parks, assisting with technical expertise and communications, or provide on-ground assistance and resources, depending on the scale and needs of the requesting park. Potential triggers for formal DPRT activation include:

- Unusual wildlife mortality or morbidity event
- Event that overwhelms local capacity to respond
- Event with significant potential to impact natural resources, either in scope, protected or charismatic species, or irreversible consequences
- Water, waste water or food system that may pose emergent threat to human and/wildlife health
- Detection of a previously absent agent with significant cross-species infection potential or potential for large environmental reservoir
- Event with significant political or public attention
- Human infection with an organism with high fatality rate or actual death
- Detection of a novel pathogen, either as a new organism or new geographic location
- Any event at the discretion of park or One Health Network leadership

Once a DPRT is activated, specific investigative actions may include any or all of the following:

- **Communicate with stakeholders**—Ensuring NPS and relevant partner agencies and offices are informed of the situation and information is shared in a timely manner; assisting with press releases and visitor and employee education as the situation evolves
- **Verify the diagnosis**—Appropriate laboratory testing and discussions with local and state health departments and the Centers for Disease Control and Prevention (CDC); request for additional testing and/or consultation; this step can take time and is an important “sorting” process with many reported cases turning out to be a non-event or an non-park exposure
- **Find additional cases**—Active efforts to find other visitors or employees with similar symptoms
- **Conduct thorough system assessment (water, waste water, food)**—Conduct an on site evaluation of particular system that has been identified by park, region as high risk for potential harm to human/animal health.
- **Describe risk factors for illness**—Among case-patients, identify commonalities and patterns that suggest which populations are at risk; may involve more detailed studies (e.g. standardized interviews, environmental samples)
- **Implement control measures**—Based on presumed or laboratory-confirmed diagnoses, initiate prevention and control measures; the situation is frequently re-assessed to see how well control measures are working and if additional interventions are needed

- **Disseminate findings**—Throughout the investigation, staff will communicate key findings (e.g. briefing statements to park, region, and WASO management) with the park superintendent and other designated park officials; we can assist with educational material development, review, and dissemination to visitors, employees, concessioners, and partners
- **Improve Prevention** – Disease transmission and outbreak response investigations are conducted in a no fault approach with a central goal of learning from the event and working with park staff to implement long term improvements in prevention; findings may be translated into service wide actions if warranted

3.4.3. To request a DPRT, park managers must contact the OPH Director who will coordinate with partners to assess need and identify the appropriate team and response methodology to include time in the field, number and professional background of on-site and off-site support and length of response.

3.4.4. Once affirmed the DPRT is necessary, the Superintendent (or Regional Director, or designee) request a formal DPRT response from the OPH Director. The OPH and WHB will issue a memorandum of agreement outlining the DPRT purpose, objectives and team assigned to be signed by the park/region to ensure resources are in place for the DPRT response.

3.4.5. The requesting entity must cover any travel, lodging, and per diem costs associated with the DPRT deployment.

3.4.6. Corps Officers will not require reimbursement for their regular salary, and do not receive any additional compensation or overtime pay for participating in a DPRT deployment.

REFERENCE MANUAL 83A
CHAPTER 7
COMMISSIONED CORPS SUPPORT FOR
ALL HAZARDS INCIDENT AND EVENT MANAGEMENT

TABLE OF CONTENTS:

- 1.0 BACKGROUND AND PURPOSE
- 2.0 AUTHORITY
- 3.0 POLICIES, STANDARDS, AND PROCEDURES

1.0 BACKGROUND AND PURPOSE

The U.S. Public Health Service Commissioned Corps (Corps) is one of the seven Federal uniformed services of the United States Government. The Corps is comprised of an elite team of more than 6,700 full-time, well-trained, highly qualified public health professionals who are presidentially appointed and serve under the United States Surgeon General in the Department of Health and Human Services (HHS). Since 1921, when a formal agreement was established between the National Park Service and HHS, the Department of the Interior has had a cadre of U.S. Public Health Service Commissioned Corps officers (Corps Officers) assigned to the agency with a responsibility to perform a range of public health tasks required to support the mission of the DOI and its bureaus, including the National Park Service (NPS).

In addition to the routine tasks performed at their regularly assigned duty stations within DOI, Corps Officers can be called upon by DOI leadership, NPS regional or park managers, or other bureau leaders to provide all hazards incident and event management support in response to incidents impacting the agency. Corps Officers are highly trained and prepared to provide federal public health and medical assistance in accordance with the National Incident Management System, National Response Framework, Emergency Support Function (ESF) #8 – Public Health and Medical Services, and coordinating ESFs, such as, ESF #11– Agriculture and Natural Resources.

As part of their duty as uniformed officers, Corps Officers are assigned to serve on a preconfigured, deployable HHS response team. This has the added benefit of Corps Officers being trained and prepared to also provide all hazards incident and event management support to their assigned agency or department. This document discusses Commissioned Corps capabilities and how to request assistance within the DOI from the Commissioned Corps for all hazards incident and event management support outside of a Corps Officer’s routine role.

2.0 AUTHORITY

Corps Officers serve in positions throughout HHS and certain non-HHS federal agencies and programs in accordance with the Public Health Service Act (42 U.S. Code Chapter 6A). As such, a long standing Memorandum of Agreement (MOA) has existed between NPS and the Commissioned Corps, which allows for the official assignment of Corps Officers from HHS to NPS. In 2009, the MOA was expanded to the whole of DOI and its bureaus. The Office of Public Health (OPH) is the designated operational division for the purpose of carrying out the agreement on behalf of DOI.

3.0 POLICIES, STANDARDS, AND PROCEDURES

3.1. Corps Officer Capabilities and Skill Sets

3.1.1. At minimum, Corps Officers maintain “Basic Ready” status and are prepared to deploy within 24 or 72 hours of notification for deployments lasting two weeks or longer depending on the situation.

Commissioned Corps “Basic Ready” requirements include:

- Medical and physical fitness standards met
- Up-to-date immunization status
- Current Basic Life Support (BLS) certification
- Current license/certification/registration appropriate for their discipline
- Incident Management Training
 - IS-100.B: Introduction to Incident Command System (ICS)
 - IS-200.B: ICS for Single Resources and Initial Action Incidents
 - IS-700.A: National Incident Management System (NIMS), An Introduction
 - IS-800.B: National Response Framework (NRF), An Introduction
 - Additional online courses in infectious disease, disaster response, triage, terrorism, safety and security awareness

3.1.2. Professional disciplines represented among Corps Officers assigned to the Department of the Interior include but are not limited to:

- Registered Environmental Health Specialist
- Registered Sanitarian
- Certified Industrial Hygienist
- Professional Engineer
- Licensed Veterinarian
- Registered Nurse
- Medical Doctor
- Physician Assistant
- Epidemiologist

Corps Officers possess a diverse skill set. Assistance can consist of personnel and technical related to a variety of public health and medical topics.

Areas of Assistance Include:

- Drinking water, recreational water, wastewater and solid waste management
- Worker health and safety
- Compliance with the nation’s environmental protection laws
- Public health surveillance and epidemiology
- Disease surveillance
- Outbreak investigation

- Public health and medical information
- Risk communication and public information
- Engineering and project management services
- Facilities condition assessments
- Vector-borne and zoonotic disease management
- Veterinary or animal health issues
- All hazards incident management systems

3.2. How to Submit a Request for Assistance

3.2.1. To request assistance for all hazards incident and event management from the Commissioned Corps, the requesting bureau representative or NPS park or regional manager must contact the OPH Director or Deputy Director.

3.2.2. The OPH Director or Deputy will coordinate with requestor to further assess the need and identify appropriate and available Corps Officers.

3.2.3. The requesting entity must cover any travel, lodging, and per diem costs associated with the deployment.

3.2.4. Corps Officers will not require reimbursement for their regular salary, and do not receive any additional compensation or overtime pay for participating in a deployment. Requests for assistance from the assigned bureau, the department, or program will receive preference over outside requests for assistance.

REFERENCE MANUAL 83A
CHAPTER 8
SANCTIONED PUBLIC CONTACT WITH ANIMALS

TABLE OF CONTENTS:

- 1.0 BACKGROUND AND PURPOSE
- 2.0 MANAGING GENERAL ANIMAL HEALTH
- 3.0 MANAGING BREEDING ANIMAL HEALTH
- 4.0 INFECTIOUS DISEASES ASSOCIATED WITH ANIMALS IN PUBLIC SETTINGS
- 5.0 MANAGING ANIMALS IN AN EDUCATIONAL SETTING
- 6.0 MANAGING HUMAN HEALTH IN SETTINGS WITH ANIMALS
- 7.0 FURTHER INFORMATION AND REFERENCES

1.0 PURPOSE AND BACKGROUND

The purpose of this chapter "Sanctioned Public Contact with Animals" is to 1) ensure animal welfare in public display settings and 2) prevent and mitigate the occurrence of zoonotic disease outbreaks in National Park units to safeguard the health of park visitors, staff, partners, concessionaires and the animals themselves. Park management can use the information in this memorandum in consultation with veterinarians, public health officials, state and local agriculture officials and/or other professionals to reduce the risk of disease transmission and promote animal welfare within the parks. For additional assistance in developing park-specific protocols, parks are encouraged to submit a Technical Assistance Request¹ to the One Health or NPS Office of Public Health programs.

There are over 150 units within the National Park Service currently using or displaying living animals in several capacities. The types of animals in use or on display are livestock, captive wildlife and other domestic species. Specific examples of living animal use and display include: components of living history, ecological management tools (e.g., goats for vegetation management), cultural significance, recreation, pack stock, education ambassadors and several more. These uses and displays permit the interaction of humans and animals, which can lead to the direct or indirect transmission of diseases between animals and people (zoonotic diseases). Stressed and sick animals are known to shed infectious pathogens at higher rates than healthy animals so animal health and well-being is also of utmost importance.

2.0 MANAGING GENERAL ANIMAL HEALTH

- 2.1 All captive animals within the park setting should be in good health while they are being used or displayed so as to promote animal welfare and prevent the transmission of infectious diseases. Parks that own animals should have a working relationship with a local veterinarian and be current on routine vaccinations as appropriate to the species. Animal caretakers within the park should be trained to recognize signs of illness or stress in their species.
- 2.2 All animals should be inspected by a veterinarian at minimum on an annual basis. This could include annual courtesy checks performed by the USDA. Work with your veterinarian to establish records for the health of the herd. Refer to policies in your state regarding vaccinations and preventative care.
- 2.3 All animals should have a certificate of veterinary inspection (CVI) updated on an annual basis, if crossing state lines. Concessionaires and contractors providing animals for use within NPS should also provide a CVI for all provided animals.
- 2.4 Animals should be housed in appropriate, clean, low-stress environments and should be permitted to enter off-display areas for rest periodically for livestock and at the animals'

¹ <https://irma.nps.gov/Star/> Accessed on 4/29/2019

discretion for wildlife species. Refer to the Animal Welfare Act² and the Care and Use of Agricultural Animals Guidelines³ for specific recommendations. Animals in outdoor exhibits should be provided access to shade and parks with working animals should have guidelines for work duties that protect against heat and cold stress. Refer to Fencing Guidelines⁴, including the use of wildlife friendly fencing whenever possible.

- 2.5 Animal caretakers and managers should monitor animals daily for signs of illness. When animals appear ill, they should be separated from group conspecifics (when applicable), removed from work or exhibition duties, and a veterinarian should be notified.
- 2.6 Only trained staff should assist in handling, moving, or restraining animals. Refer to Animal Handling Safety⁵.
- 2.7 Quarantine recommendations should be followed when introducing new animals to established herds for any reason or when animals appear ill. New or sick animals should be segregated from the existing herd for at least 21 days. Separate housing, feeding and birthing areas should be utilized for all new animals. Obtain veterinary records for new recruits. Monitor the new and sick animals frequently for signs of developing or changing illness. If detected, contact your veterinarian immediately. Refer to Animal Biosecurity^{6,7,8}.

3.0 MANAGING BREEDING ANIMAL HEALTH

- 3.1 Breeding animals require additional veterinary care and management during breeding and birthing seasons. Birthing products and birthing environments pose higher disease risks to staff or visitors that are immunocompromised, pregnant or suffering from heart or blood vessel diseases. Every effort should be taken to ensure people with these conditions understand the risks of attending or working in birthing environments and follow appropriate personal protection guidelines or are re-assigned to other duties in order to reduce risk.
- 3.2 Herd managers should have a working understanding of when animals breed, how to confirm pregnancy and how to appropriately prepare for the breeding season.
- 3.3 If outside animals are brought in for breeding purposes, these animals should be current on routine vaccinations and have a certificate of veterinary inspection or animal health certificate from a licensed veterinarian within the previous 30 days. Animals temporarily removed from NPS facilities for breeding purposes should not be returned to the herd until

² https://www.aphis.usda.gov/aphis/ourfocus/animalwelfare/SA_AWA Accessed on 4/29/2019

³ https://aaalac.org/about/Ag_Guide_3rd_ed.pdf Accessed on 4/29/2019

⁴ https://safeagrism.org/wp-content/uploads/Fencing_Guidelines_and_Recommendations.pdf Accessed on 4/29/2019

⁵ <https://ehs.weill.cornell.edu/forms-resources/we-offer-services/animal-handlers> Accessed on 4/29/2019

⁶ https://www.uvm.edu/~ascibios/?Page=Animal/Addition_of_New_Animals.html&SM=submenuanimal.html Accessed on 4/29/2019

⁷ https://www.uvm.edu/~ascibios/?Page=Animal/Isolation_and_Quarantine.html&SM=submenuanimal.html Accessed on 4/29/2019

⁸ <https://extension.psu.edu/biosecurity-a-practical-approach> Accessed on 4/29/2019

they have been housed separately and observed for potential signs of illness for a minimum of 21 days.

- 3.4 Animals that will not be used for breeding within a breeding herd should have some form of contraception (surgical alteration, boundary separation or medical intervention), be kept in a separate herd, or be sold.
- 3.5 Birthing areas should be protected from public entry with access limited to trained animal handlers and managers.
- 3.6 If abortions or still-births occur, the exhibit should be closed and a veterinarian should be contacted.
- 3.7 Volunteer programs that engage the public in handling herd animals should feature a “best practices” training before the public can handle, feed or directly interact with the animals. Refer to Farm Safety Handout⁹.

4.0 INFECTIOUS DISEASES ASSOCIATED WITH ANIMALS IN PUBLIC SETTINGS

- 4.1 Disease transmission can occur from either direct or indirect contact with animals. Direct physical contact includes touching, holding, kissing, being bitten and being scratched. Indirect contact includes contact with surfaces contaminated by animal saliva, blood, urine, nasal secretions, milk, feces or other bodily fluids. Animals that appear healthy are still capable of transmitting pathogens to people and causing human illness. Handwashing and good hand hygiene is the best method to prevent these diseases and therefore should be encouraged through the placement of signs and ready access to handwashing facilities when any physical contact with an animal occurs.
- 4.2 Enteric pathogens, or those found in the digestive tracts, pose the highest risk for human disease from animals in public settings. While rare, these pathogens are capable of causing significant human illness, particularly in at-risk groups or from certain types of animals. Good hand hygiene should be promoted at all times, but especially when the following are encountered:
 - 4.2.1 These pathogens are spread via the fecal-to-oral route and only a small number of pathogens are required to cause human illness. Young children (< 5 years of age) are considered to have the greatest risk for infection and so educational messages should highlight this unique risk and should also target caretakers and guardians of young children.
 - 4.2.2 Typical sources of infection include: cattle, goats, sheep, poultry, rodents, reptiles, amphibians and other animals. Young animals are more likely to shed enteric pathogens than older animals. Stressful events can increase the likelihood and rate of pathogen shedding. Consider enhancing handwashing

⁹ <https://farmsafety.mo.gov/wp-content/uploads/sites/8/2016/09/Livestock-Handling.pdf> Accessed on 4/29/2019

messaging during these periods of higher risk.

- 4.2.3 Some of these pathogens can survive in the environment for long periods. Ensure that staff are aware of these risks when working in environments where livestock have been housed and follow good hand hygiene when working in these environments.

4.3 Best practices for management of enteric pathogens:

- 4.3.1 Regular handwashing after animal contact should be encouraged (hand sanitizer can be used temporarily but is not a substitute for soap and water). Refer to handwashing procedures and post signs encouraging handwashing where possible public contact with animals may occur.
- 4.3.2 Animal enclosure surfaces should be cleaned regularly. Refer to Information on Disinfectants.
- 4.3.3 Animals should be under preventative veterinary care and husbandry practices that minimize animal stress. Animal handlers and staff are trained to recognize signs of stress or illness in the species of animal under care.
- 4.3.4 Animals should be assessed daily. Animals with diarrhea should be promptly removed from public contact.
- 4.3.5 Eating, drinking, and smoking should not be allowed in areas with animals.
- 4.3.6 Incidents of human illness should be reported to the NPS Office of Public Health.

- 4.4 Animal bites and scratches can lead to pathogen transmission via open wound contact with animal mucus membranes and general wound contamination. Bite and scratch pathogens include rabies virus and several types of bacteria. Bites and scratches should be reported to a park safety officer and the Office of Public Health if rabies virus is a concern.

- 4.5 Parks with owned animals or animals on display should be aware of the risks of rabies virus, routes of transmission, and proper steps to prevent rabies transmission to humans.

- 4.5.1 Human rabies exposure occurs when an open wound or mucous membrane becomes contaminated with infected saliva or nervous tissue.
- 4.5.2 Any mammal can become infected with rabies but the most commonly infected species include: bats, raccoons, skunks, foxes, cats, cows, horses, and dogs.
- 4.5.3 Human infection with rabies virus is almost always fatal once clinical signs

appear.

4.6 Best practices for management of potential rabies exposure:

- 4.6.1 All domestic animal species with potential public contact should have a current rabies vaccination and be under the care of a local veterinarian.
- 4.6.2 Bite or scratch wounds should be promptly cleaned and assessed to determine the appropriate treatment.
- 4.6.3 Animal bites or scratches should be reported to the NPS Office of Public Health and/or state public health authorities in order to evaluate the need for rabies post-exposure prophylaxis.

4.7 Skin infections can result from direct skin contact with animals. Potential cutaneous pathogens include: ringworm, parapox virus, monkeypox, mycobacterium spp and external parasites (mites, fleas and ticks). Animals diagnosed with any of these conditions should be removed from public contact until the condition is successfully treated. Ectoparasite control should be considered for animals in public settings to reduce the risk of human exposure to flea and tick-borne diseases.

4.8 Diseases transmitted through droplets or aerosols pose an important risk for disease transmission through indirect contact. The droplets can contain infectious pathogens from animals' respiratory tracts, reproductive fluids or other sources. Cleaning procedures can raise dust in animal areas and increase the amount of infectious aerosols in the immediate environment. Potential aerosolized pathogens include: influenza virus, Q fever (*Coxiella burnetii*), tuberculosis and *Chlamydophila psittaci*. Public display areas should be well-ventilated and animal areas should be closed to the public while dust-generating cleaning procedures are performed to minimize potential exposure.

5.0 MANAGING ANIMALS IN AN EDUCATIONAL SETTING

5.1 Venue operators and staff should be aware that certain populations are more likely than others to develop serious illness from diseases transmitted in animal contact settings. These groups include:

- Children under 5 years of age
- Adults over 65 years of age
- Pregnant women
- Immunocompromised individuals

5.2 Pathogen shedding can be enhanced by stress induced by transportation, confinement, physical crowding and increased handling; caretakers should be aware of this risk and take

steps to minimize each of these where possible. Animal handlers and managers should be aware of what signs of stress look like in species on exhibit and observe appropriate display and break period recommendations for those species. Additionally, housing multiple species within a single exhibit can also lead to increased disease transmission and is not recommended.

- 5.3 Whenever the public is permitted to directly contact exhibited animals, supervision by experienced animal caretakers should be enforced for human and animal safety.
- 5.4 Animals displaying signs of illness should be removed from the exhibition setting and a veterinarian should be notified. Refer to Animal Biosecurity¹⁰¹¹¹².
- 5.5 Direct contact with species that could serve as an unvaccinated reservoir for Rabies virus (bats, raccoons, skunks, foxes and coyotes) should not be permitted.
- 5.6 All domestic animal species with potential public contact should have a current rabies vaccination and be under the care of a local veterinarian.
- 5.7 Direct contact with species that can produce venom, feature excessive strength or are unpredictable in nature should not be permitted. Species of primary concern include: non-human primates, certain carnivores (lions, tigers, ocelots, wolves, wolf hybrids and bears) and venomous species.
- 5.8 If reptiles or amphibians are on display, the public should have no interaction with the tanks, water, filtration equipment or other tank contents.
 - 5.8.1 Reptiles smaller than 4 inches should not be touched or held by the public.
 - 5.8.2 Consider appropriate signage explaining the importance of handwashing after interacting with reptiles and amphibians.
- 5.9 For children under 5, no pre-weaned calves, reptiles, amphibians or live poultry (including chicks) should be used for direct contact.

6.0 MANAGING HUMAN HEALTH IN SETTINGS WITH ANIMALS

- 6.1 Visitors should receive educational messages before entering a live animal exhibit, including information that animals can cause injuries and spread germs that may result in serious illness in people, and that proper handwashing is the best way to prevent illness. This

¹⁰ https://www.uvm.edu/~ascibios/?Page=Animal/Addition_of_New_Animals.html&SM=submenuanimal.html
Accessed on 4/29/2019

¹¹ https://www.uvm.edu/~ascibios/?Page=Animal/Isolation_and_Quarantine.html&SM=submenuanimal.html
Accessed on 4/29/2019

¹² <https://extension.psu.edu/biosecurity-a-practical-approach> Accessed on 4/29/2019

messaging can be explained by park representatives or conveyed on readily visible, easily understood signs. Refer to Animals in Public Settings Guidelines¹³.

- 6.2 For any instance when there is direct contact between human and animals, handwashing stations and public education promoting handwashing behaviors should be provided. Refer to Handwashing Signs¹⁴¹⁵ and Handwashing Procedures¹⁶¹⁷.
- 6.3 Food and drink products should not be consumed in animal areas.
- 6.4 The flow of visitor traffic should be arranged in such a manner that visitors travel through transition areas in between animal areas and non-animal areas. Refer to Animal Exhibit Safety¹⁸.
- 6.5 Raw milk products should not be produced, distributed, sold or consumed on park lands, as these can carry bacteria that cause illness in humans.
- 6.6 Horned animals should not have direct contact with the public.
- 6.7 For any instance when an animal bites a human on NPS lands, park representatives should comply with local and state requirements for reporting animal bites and consider the possibility of rabies transmission.

7.0 FURTHER INFORMATION AND REFERENCES

- 7.1 Additional information or technical assistance: NPS One Health Program, Dr. Danielle Buttke, 970-267-2118; NPS Public Health Program, publichealthprogram@nps.gov, CAPT Sara Newman, 202-513-7225.

¹³ <http://nasphv.org/Documents/AnimalContactCompendium2017.pdf> Accessed on 4/29/2019

¹⁴ <https://www.uvm.edu/vtagritourism/?Page=farm-signage.html> Accessed on 4/29/2019

¹⁵ <https://safeagritourism.org/resources/> Accessed on 4/29/2019

¹⁶ <https://safeagritourism.org/wp-content/uploads/HandwashingPoster.pdf> Accessed on 4/29/2019

¹⁷ <https://safeagritourism.org/wp-content/uploads/HandwashingPolicy.pdf> Accessed on 4/29/2019

¹⁸ <https://safeagritourism.org/wp-content/uploads/AnimalExhibitsSafety.pdf> Accessed on 4/29/2019