



Patrick
Air Force Base

2018
Water Quality Report

2018 Annual Drinking Water Quality Report for Patrick Air Force Base (AFB) PWS ID #: 3054128

According to the Environmental Protection Agency (EPA), each water system is required to publish an annual Consumer Confidence Report (CCR). The CCR is intended to inform you about the quality of your drinking water. All drinking water sampling requirements, results and any contaminants exceeding regulatory limits defined by the EPA's Safe Drinking Water Act (SDWA) are published in this report.

This report is also available online at
<https://www.patrick.af.mil>

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SECTION 1: WATER SOURCES, SOURCE WATER PLAN, AND TREATMENT

We at Patrick AFB are pleased to present to you the 2018 Water Quality Report. This report is designed to inform you about the quality of water and services we deliver to you every day. Our constant goal is to provide you with a safe and dependable supply of drinking water. We want you to understand the efforts we make to continually improve the water treatment process and protect our water resources. We are committed to ensuring the quality of your water. Patrick AFB purchases drinking water from the neighboring City of Cocoa. Therefore we are classified as a "Consecutive Community Water System."

Where Does My Water Come From?

Cocoa has supplied central Brevard County with high quality drinking water since 1957. Cocoa's drinking water system processed approximately 7.38 billion gallons of water last year, with a peak flow of 24.76 million gallons per day (MGD) during the month of March. The Average daily flow was 20.23 MGD during 2018. Our water sources are ground water wells, Aquifer Storage and Recovery (ASR) wells, and surface water from the Taylor Creek Reservoir.

Groundwater

Cocoa's primary water source is groundwater pumped from the Intermediate and Floridan Aquifers. Groundwater treatment begins when raw water from wellfields is pumped to Cocoa's water treatment facility, the Claude H. Dyal Water Treatment Plant (WTP). In 2018, the Dyal WTP treated 6.49 billion gallons of groundwater.

Aquifer Storage and Recovery (ASR) Wells

Cocoa has 10 ASR wells at the Dyal Water Treatment Plant for the storage of finished, treated water. This is a system of wells that stores finished water safely underground for use during periods of high demand. In 2018, the Dyal WTP injected 0.32 billion gallons into the ASR wells and recovered 0.07 billion gallons of water.

Surface Water

Water from the Taylor Creek Reservoir is a supplemental source for Cocoa's water supply. Surface water requires a different type of treatment. After surface water enters the plant, ferric sulfate, hydrated lime, and a polymer are added. Ozone is injected into clarified water for disinfection, taste, and odor removal. After adding ozone, the water is treated with hydrated lime, carbon dioxide, chlorine and ammonia before passing through sand and anthracite coal filters. Turbidity is constantly measured at each filter. In 2018, the Dyal WTP treated 0.89 billion gallons of surface water.

Treatment at Patrick AFB

Once the water reaches Patrick AFB, the 45th Civil Engineer Squadron provides appropriate chlorine residual by using an automatic injection system. The water is then distributed throughout Patrick AFB through a system of pipes to assure a safe supply of water is available at sufficient pressure to serve the needs of base personnel, family housing residents, and the Child Development Center.

Source Water Assessment for the City of Cocoa

In 2018, the Florida Department of Environmental Protection (FDEP) performed a Source Water Assessment on the City of Cocoa's drinking water system. The assessment was conducted to provide information about any potential sources of contamination in the vicinity of surface water intakes. The surface water system is considered to be at high risk because of the many potential sources of contamination present in the assessment area. Of the 57 wells in operation, 27 have the potential to become contaminated from unique sources and are considered either a low or moderate level concern by FDEP. The assessment results are available on the FDEP Source Water Assessment and Protection Program website at <https://fldep.dep.state.fl.us/swapp/> or they can be obtained by contacting the Conservation/Public Relations Officer at (321) 433-8705.

The City of Cocoa's National Environmental Laboratory Accreditation Conference (NELAC) certified laboratory analyzes water quality throughout the treatment process and distribution system to ensure safe drinking water is delivered to our customers. The City of Cocoa remains vigilant in meeting the challenges of source water protection, water conservation and community education while continuing to serve the needs of all of our water users.

Patrick AFB utilizes two laboratories for water sampling analysis, TestAmerica Laboratory in Tampa, FL and the Kennedy Space Center Environmental Microbiology (KSC EM) Laboratory. The KSC EM Lab is used for monthly water sample analysis and TestAmerica Lab is used for non-routine samples.

Community Involvement is Encouraged

Interested customers are welcome to attend Cocoa's regularly scheduled Council Meetings held on the second and fourth Tuesday of every month. Please contact the City Clerk at (321) 433-8488 to confirm day, time, and location of the meeting.

SECTION 2: BASIC STATEMENT OF COMPLIANCE

We are pleased to report that our drinking water meets all federal and state requirements.

SECTION 3: CONTACT INFORMATION

For specific information about Patrick AFB's drinking water system, you can call the Bioenvironmental Engineering Flight at (321) 494-5435 or Civil Engineer Customer Service at (321) 494-7773/7883. Water quality questions, concerns, and comments can also be addressed at town meetings. For more information about the City of Cocoa water supply, you can call (321) 433-8705, or visit the City's Drinking Water website under Utilities at <http://www.cocoafl.org>.

SECTION 4: PERIOD COVERED BY REPORT

Cocoa's Claude H. Dyal Water Treatment Plant routinely monitors for contaminants in your drinking water according to federal and state laws, rules, and regulations. This report is based on the results of our monitoring for the period of January 1, 2018 through December 31, 2018. Any data that was obtained before January 1, 2018 and presented in this report are from the most recent testing performed in accordance with the laws, rules, and regulations.

SECTION 5: TERMS AND ABBREVIATIONS

Throughout this report you may find unfamiliar terms and abbreviations. To help you better understand these terms we have provided the following definitions:

Action Level (AL): The concentration of a contaminant which, if exceeded, triggers treatment or other requirements that a water system must follow.

Initial Distribution System Evaluation (IDSE): An important part of the Stage 2 Disinfection Byproducts Rule (DBPR). The IDSE is a one-time study conducted by water systems to identify distribution system locations with high concentrations of trihalomethanes (THMs) and haloacetic acids (HAAs). Water systems will use results from the IDSE, in conjunction with their Stage 1 DBPR compliance monitoring data, to select compliance monitoring locations for the Stage 2 DBPR.

Locational Running Annual Average (LRAA): The average of sample analytical results for samples taken at a particular monitoring location during the previous four calendar quarters.

Maximum Contaminant Level (MCL): The highest level of a contaminant that is allowed in drinking water. MCLs are set as close to the MCLGs as feasible using the best available treatment technology.

Maximum Contaminant Level Goal (MCLG): The level of a contaminant in drinking water below which there is no known or expected risk to health. MCLGs allow for a margin of safety.

Maximum residual disinfectant level (MRDL): The highest level of a disinfectant allowed in drinking water. There is convincing evidence that addition of a disinfectant is necessary for control of microbial contaminants.

Maximum residual disinfectant level goal (MRDLG): The level of a drinking water disinfectant below which there is no known or expected risk to health. MRDLGs do not reflect the benefits of the use of disinfectants to control microbial contaminants.

Million fibers per liter (MFL): Measure of the presence of asbestos fibers that are longer than 10 micrometers.

Millirem per year (mrem/yr): Measure of Radiation absorbed by the body.

N/A: Not Applicable

ND: Means "not detected" and indicates that the substance was not found by laboratory analysis.

Nephelometric Turbidity Unit (NTU): Measure of the clarity of water. Turbidity in excess of 5 NTU is just noticeable to the average person.

Parts per billion (ppb) or Micrograms per liter (µg/l): One part by weight of analyte to 1 billion parts by weight of the water sample.

Parts per million (ppm) or Milligrams per liter (mg/l): One part by weight of analyte to 1 million parts by weight of the water sample.

Parts per quadrillion (ppq) or Picograms per liter (picograms/l): One part by weight of analyte to 1 quadrillion parts by weight of the water sample.

Parts per trillion (ppt) or Nanograms per liter (nanograms/l): One part by weight of analyte to 1 trillion parts by weight of the water sample.

Picocurie per liter (pCi/L): Measure of the radioactivity in water.

Treatment Technique (TT): A required process intended to reduce the level of a contaminant in drinking water.

SECTION 6: WATER QUALITY TEST RESULTS

To ensure our drinking water is potable and all Safe Drinking Water Act (SDWA) regulatory limits are met, the Bioenvironmental Engineering Flight and the City of Cocoa conduct routine sampling, analysis, and monitoring of the drinking water. Each sample type requires a different sampling technique and frequency. Some are required several times throughout the year, while others are required annually or on three, four, or even nine-year intervals. This report shows our water quality results and what they mean. For your information, we have compiled the tables below to show what substances were detected in our drinking water during 2018. We feel it is important that you know exactly what was detected and how much of the substance was present in the water.

Microbiological Contaminants							
<i>Contaminant and Unit of Measurement</i>	<i>Dates of sampling (mo./yr.)</i>	<i>MCL Violation Y/N</i>	<i>The Highest Single Measurement</i>	<i>The Lowest Monthly Percentage of Samples Meeting Regulatory Limits</i>	<i>MCLG</i>	<i>MCL</i>	<i>Likely Source of Contamination</i>
City of Cocoa							
¹ Turbidity (NTU)	2018 (Daily)	No	0.64	100	N/A	TT (NTU)	Soil runoff

Radioactive Contaminants							
City of Cocoa							
<i>Contaminant and Unit of Measurement</i>	<i>Dates of sampling (mo./yr.)</i>	<i>MCL Violation Y/N</i>	<i>² Level Detected</i>	<i>Range of Results</i>	<i>MCLG</i>	<i>MCL</i>	<i>Likely Source of Contamination</i>
Alpha emitters (pCi/L)	2018 (Monthly)	No	4.4	ND - 4.4	0	15	Erosion of natural deposits
Radium 226 + 228 [Combined Radium] (pCi/L)	2018 (Monthly)	No	3.0	ND - 3.0	0	5	Erosion of natural deposits

Inorganic Contaminants							
City of Cocoa							
<i>Contaminant and Unit of Measurement</i>	<i>Dates of sampling (mo./yr.)</i>	<i>MCL Violation Y/N</i>	<i>² Level Detected</i>	<i>Range of Results</i>	<i>MCLG</i>	<i>MCL</i>	<i>Likely Source of Contamination</i>
Arsenic (ppb)	03/18	No	2.9	ND-2.9	0	10	Erosion of natural deposits; runoff from orchards; runoff from glass and electronics production wastes
Barium (ppm)	03/18	No	0.0065	N/A	2	2	Discharge of drilling wastes; discharge from metal refineries; erosion of natural deposits
Fluoride (ppm)	03/18	No	0.432	ND-0.432	4	4.0	Erosion of natural deposits; discharge from fertilizer and aluminum factories. Water additive which promotes strong teeth when at the optimum level of 0.7 ppm
Nitrate (as Nitrogen) (ppm)	03/18	No	0.281	N/A	10	10	Runoff from fertilizer use; leaching from septic tanks, sewage; erosion of natural deposits
Sodium (ppm)	03/18	No	85.6	N/A	N/A	160	Salt water intrusion, leaching from soil

³ Stage 1 Disinfectant/Disinfection By-Product							
Disinfectant or Contaminant and Unit of Measurement	Dates of sampling (mo./yr.)	MCL Violation Y/N	² Level Detected	Range of Results	MCLG	MCL	Likely Source of Contamination
<i>City of Cocoa</i>							
Bromate (ppm)	2018 (Quarterly)	No	0.417	ND-5	MCLG = 0	MCL = 10	By-product of drinking water disinfection
Chloramines (ppm)	2018 (Quarterly)	No	2.64	0.65-4.5	MRDLG = 4	MRDL = 4.0	Water additive used to control microbes
Contaminant and Unit of Measurement	Dates of sampling (mo./yr.)	TT Violation Y/N	⁴ Lowest Running Annual Average, Computed Quarterly, of Monthly Removal Ratio	Range of Monthly Removal Ratios	MCLG	MCL	Likely Source of Contamination
Total Organic Carbon	2018 (Monthly)	No	1.1	0.3-1.7	N/A	TT	Naturally present in the environment

⁵ Stage 2 Disinfectant and Disinfection By-Products							
Contaminant and Unit of Measurement	Dates of sampling (mo./yr.)	MCL Violation Y/N	² Level Detected	Range of Results	MCLG	MCL	Likely Source of Contamination
<i>Patrick AFB</i>							
Haloacetic Acids (HAA5) (ppb)	2018 (Quarterly)	No	24.85	15.5-29.5	N/A	60	By-product of drinking water disinfection
Total Trihalomethanes (TTHM) (ppb)	2018 (Quarterly)	No	46.01	30.6-60.6	N/A	80	By-product of drinking water disinfection

<i>Lead and Copper (Tap Water)</i>							
Contaminant and Unit of Measurement	Dates of sampling (mo./yr.)	AL Exceeded Y/N	90 th Percentile Result	No. of sample sites exceeding the AL	MCLG	AL (Action Level)	Likely Source of Contamination
<i>Patrick AFB</i>							
Copper (tap water) (ppm)	08/17	No	0.186	1	1.3	1.3	Corrosion of household plumbing systems; erosion of natural deposits; leaching from wood preservatives
Lead (tap water) (ppb)	08/17	No	2.4	0	0	15	Corrosion of household plumbing systems, erosion of natural deposits
<p>Lead and copper sampling is completed every three years at Patrick AFB to ensure the drinking water is not being contaminated by the degradation of aging pipes throughout the distribution system. Lead and copper were common materials used in the construction of water pipes prior to the early 1980's. The action levels (AL) for lead and copper are based on a percentage of the total samples collected. If 90% of the samples do not exceed the AL, the water system is in compliance with the Lead and Copper Rule. In 2017, 22 lead and 22 copper water samples were collected from specific locations throughout the base and housing areas. Patrick AFB had one site (Building 1368, ASTS) that exceeded the AL for copper. The Bldg. 1368, ASTS was given a fact sheet that addressed lead and copper in drinking water. For additional lead-specific information, please refer to Section 10, Lead Information.</p>							

Unregulated Contaminant Monitoring Requirements 4 (UCMR4)				
City of Cocoa				
Contaminant and Unit of Measurement	Dates of sampling (mo./yr.)	⁵Level Detected	Range of Results	Likely Source of Contamination
Bromide (Surface Water Raw) (ppb)	2/18 11/18	89.8	52.6-89.8	Unknown
Bromide (Ground Water Raw) (ppb)	2/18 11/18	394	236-394	Unknown
Haloacetic Acids (HAA5) (ppb)	2/18 3/18 6/18 8/18	38.2	17.7-38.2	By-product of drinking water disinfection
Haloacetic Acids (HAA6Br) (ppb)	2/18 3/18 6/18 8/18	17.7	7.2-17.7	By-product of drinking water disinfection
Haloacetic Acids (HAA9) (ppb)	2/18 3/18 6/18 8/18	51.0	25-51	By-product of drinking water disinfection
Total Organic Carbon (Surface Water Raw) (ppb)	2/18 11/18	19500	8750-19500	Naturally present in the environmental
Total Organic Carbon (Ground Water Raw) (ppb)	2/18 11/18	5560	5390-5560	Naturally present in the environmental
Footnotes				
<p>1. The result in the lowest monthly percentage column is the lowest monthly percentage of samples reported in the Monthly Operating Report meeting the required turbidity limits. Turbidity is a measure of the cloudiness of the water. We monitor it because it is a good indicator of the effectiveness of our filtration system. High turbidity can hinder the effectiveness of disinfectants.</p> <p>2. Results in the Level Detected column for radioactive, inorganic contaminants, and unregulated contaminants are the highest average at any of the sampling points or the highest detected level at any sampling point, depending on the sampling frequency.</p> <p>3. For Chlorine, the Level Detected is the highest running annual average (RAA), computed quarterly, of monthly averages of all samples collected. All of the 2018's TTHM and HAA5 samples were collected under "Stage 2 Disinfectants and Disinfection By-Products". Range of Results is the range of individual sample results (lowest to highest) for all monitoring locations.</p> <p>4. The monthly TOC removal ratio is the ratio between the actual TOC removal and the required TOC rule removal requirements.</p> <p>5. Stage 2 Disinfectants and Disinfection By-Products includes results from 2017 for LRAA calculation. Level Detected is the highest Location-al running annual average (LRAA) for any given sample location during 2018. Range of Results is the range of individual sample results (lowest to highest) for all monitoring locations for 2018.</p>				

SECTION 7: VIOLATIONS

Patrick AFB
Between 1 January and 31 December 2018, Patrick AFB had no drinking water violations.
City of Cocoa
<p>Monitoring and reporting (M/R) of compliance data violation</p> <p>Due to administrative oversight during a busy part of the year, our office failed to submit 1st, 2nd, and 4th quarter disinfection byproduct monitoring reports in a timely manner. Samples were collected on time, but the reports were submitted late. This violation has no impact on the quality of the water our customers received, and it posed no risk to public health. We have established a report tracking file to ensure that all reporting requirements are met in the future.</p> <p>We are required to collect dual samples for TTHMs and HAA5s at 12 locations in the distribution system. Samples must be collected on the same day. During the 1st quarter 2018, three locations were sampled for only TTHMs, which resulted in a missed monitoring violation. HAA5s make-up samples were collected a month later at the same locations. All results were below the Maximum Contaminant Level. We have taken measures to ensure this doesn't happen again in the future.</p> <p>Patrick AFB's samples during the same period were also all below the allowable levels for TTHM/HAA5s.</p>

SECTION 8: PROTECTING WATER QUALITY AND WATER

You can help protect our water quality. Quick things you can do!

Protecting drinking water sources usually requires the combined efforts of many partners such as public water systems, communities, resource managers, and the public.

- **Use and disposition of harmful materials properly.** Don't dump them on the ground! Hazardous waste that is dumped on or buried in the ground can contaminate the soil and can move down into the ground water or be carried into the nearby surface waters by runoff during rainstorms. You might be surprised to learn that a number of products you use at home contain hazardous and or toxic substances. Products like motor oil, pesticides, leftover paints or paint cans, mothballs, flea collars, weed killers, household cleaners, and even a number of medications contain materials that can be harmful to surface and ground water.
- **Don't overuse pesticides or fertilizers.** You might apply fertilizer to make your grass thick and green, your flowers colorful, and your vegetable crop abundant. You might also use pesticides to keep bugs from ruining what the fertilizers have helped to produce. What you might not know is that many of these fertilizers and pesticides contain hazardous chemicals that can travel through the soil and contaminate ground water. If you feel you must use chemicals, use them in moderation.
- **Don't flush your used/unwanted medications down toilets or sink drains.** For more information, please go to <http://www.dep.state.fl.us/waste/categories/medications/pages/disposal.htm>

Water Conservation:

Water Conservation measures are an important first step in protecting our water supply. Such measures help to preserve the supply of water and also save you money by reducing your water bill.

Know your days - Irrigate before 10:00 am and after 4:00pm

Daylight Savings Time (Spring & Summer) 2 days a week, if needed

- Odd numbered residential addresses - Wednesday & Saturday
- Even numbered residential addresses - Thursday & Sunday
- Non residential irrigation - Tuesday & Friday

Eastern Standard Time (Fall & Winter) 1 day a week, if needed

- Odd numbered residential addresses - Saturday
- Even numbered residential addresses - Sunday
- Non residential irrigation - Tuesday

Other ways that you can help conserve water can be found at <http://www.cocoafl.org/conservation> or <http://water.epa.gov/action/protect>

SECTION 9: CRYPTOSPORIDIUM IN DRINKING WATER

Cryptosporidium is a microbial parasite found in surface water throughout the United States. We detected Cryptosporidium in the untreated surface water. We detected this contaminant in two out of 25 samples tested in 2006 through 2008. Although filtration removes Cryptosporidium, the most commonly used filtration methods cannot guarantee 100% removal. Ozone is a powerful disinfectant that effectively destroys Cryptosporidium. The City of Cocoa ozonates all surface water before it is filtered to ensure the highest possible removal rate.

The City of Cocoa sampled Taylor Creek Reservoir for Cryptosporidium in accordance with Florida Department of Environmental Protection (FDEP)'s Long Term 2 (LT2) Enhanced Surface Water Treatment rule. This rule requires that the city sample for Cryptosporidium to provide a baseline for the amount of Cryptosporidium in Taylor Creek Reservoir. This baseline will be used by the EPA to increase treatment techniques or allow established techniques to continue to treat the surface water. Compliance sampling began in October 2006 and ended in October 2008. We began testing for LT2 compliance again in March, 2015 and completed sampling in March, 2017.

We believe it is important for you to know that Cryptosporidium may cause serious illness in immuno-compromised persons such as persons with cancer undergoing chemotherapy, persons who have undergone organ transplants, people with HIV/AIDS or other immune system disorders. These people should seek advice from their health care providers.

SECTION 10: LEAD AND OTHER CONTAMINANT INFORMATION

Lead and Drinking Water

If present, elevated levels of lead can cause serious health problems, especially for pregnant women and young children. Lead in drinking water is primarily from materials and components associated with service lines and home plumbing. The Cocoa Utilities Department is responsible for providing high quality drinking water, but cannot control the variety of materials used in plumbing components. When your water has been sitting for several hours, you can minimize the potential for lead exposure by flushing your tap for 30 seconds to 2 minutes before using water for drinking or cooking. If you are concerned about lead in your water, you may wish to have your water tested. Information on lead in drinking water, testing methods, and steps you can take to minimize exposure is available from the Safe Drinking Water Hotline (1-800-426-4791) or at <http://www.epa.gov/safewater/lead>.

Contaminants may be present in the source water

The sources of drinking water (both tap water and bottled water) include rivers, lakes, streams, ponds, reservoirs, springs, and wells. As water travels over the surface of the land or through the ground, it dissolves naturally occurring minerals and, in some cases, radioactive material, and can pick up substances resulting from the presence of animals or from human activity.

Contaminants that may be present in source water include:

- *Microbial contaminants:* such as viruses and bacteria, which may come from sewage treatment plants, septic systems, agricultural livestock operations, and wildlife.
- *Inorganic contaminants:* such as salts and metals, which can be naturally-occurring or result from urban stormwater runoff, industrial or domestic wastewater discharges, oil and gas production, mining, or farming.
- *Pesticides and herbicides:* which may come from a variety of sources such as agriculture, urban stormwater runoff, and residential uses.
- *Organic chemical contaminants:* including synthetic and volatile organic chemicals, which are by-products of industrial processes and petroleum production, and can, also, come from gas stations, urban stormwater runoff, and septic systems.
- *Radioactive contaminants:* which can be naturally occurring or be the result of oil and gas production and mining activities.

In order to ensure that tap water is safe to drink, the EPA prescribes regulations, which limit the amount of certain contaminants in water provided by public water systems. The Food and Drug Administration (FDA) regulations establish limits for contaminants in bottled water, which must provide the same protection for public health.

Drinking water, including bottled water, may reasonably be expected to contain at least small amounts of some contaminants. The presence of contaminants does not necessarily indicate that the water poses a health risk. More information about contaminants and potential health effects can be obtained by calling the Environmental Protection Agency's Safe Drinking Water Hotline at 1-800-426-4791.

SECTION 11: VULNERABLE POPULATION INFORMATION

Some people may be more vulnerable to contaminants in drinking water than the general population. Immunocompromised persons such as persons with cancer undergoing chemotherapy, persons who have undergone organ transplants, people with HIV/AIDS or other immune system disorders, some elderly, and infants can be particularly at risk from infections. These people should seek advice about drinking water from their health care providers. EPA/Center for Disease Control (CDC) guidelines on appropriate means to lessen the risk of infection by *Cryptosporidium* and other microbiological contaminants are available from the Safe Drinking Water Hotline (800-426-4791).

SECTION 12: CLOSING

We at Patrick AFB would like you to understand the efforts we make to continually improve the water treatment process and protect our water resources. We are committed to ensuring the quality of your water. If you have any questions or concerns about the information provided, please feel free to call any of the numbers listed in **Section 3** of this report.