**U.S. ENVIRONMENTAL PROTECTION AGENCY**

**NATIONAL STUDY OF NUTRIENT REMOVAL AND SECONDARY TECHNOLOGIES:**

**POTW SCREENER QUESTIONNAIRE**



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| --- |
| Form Approved  OMB Control No. 2040-0294  Approval Expires 07/31/2021  The public reporting and recordkeeping burden for this collection of information is estimated to average 3.3 hours per response. Burden means the total time, effort, or financial resources expended by persons to generate, maintain, retain, or disclose or provide information to or for a Federal agency. This estimate includes the time needed to review instructions, develop, acquire, install, and utilize technology and systems for the purposes of collecting, validating, and verifying information, processing and maintaining information, and disclosing and providing information; adjust the existing ways to comply with any previously applicable instructions and requirements; train personnel to be able to respond to a collection of information; search data sources; complete and review the collection of information; and transmit or otherwise disclose information. An agency may not conduct or sponsor, and a person is not required to respond to, a collection of information unless it displays a currently valid OMB control number. |

**Thank you for participating in the**

**National Study of Nutrient Removal and Secondary Technologies:**

**POTW Screener Questionnaire!**

**NOTE: *The survey is designed as an electronic questionnaire, therefore this paper copy does not accurately reflect formatting, spacing, and Section 508 coding. Text in boldfaced red is provided where the electronic questionnaire has a skip pattern.***

**INTRODUCTION**

EPA requests information for calendar year 2018. The questionnaire is voluntary and should be completed by personnel knowledgeable about the operation of the facility. Please read each question carefully and provide the appropriate response(s).

Key terms are defined throughout the questionnaire in footnotes. Key terms and acronyms are also defined in **GLOSSARY** and **ACRONYMS** on page iii.

You may provide any clarifying notes in the **FINAL COMMENTS** section at the end of the questionnaire. For example, you may indicate if information provided for the calendar year 2018 is not representative of normal operations.

EPA is not requesting you perform non-routine tests or measurements solely for the purpose of responding to this questionnaire. In the event exact data or information are not available, provide responses using your best professional judgement.

**QUESTIONNAIRE ASSISTANCE**

If you have any questions about completing this questionnaire, you can request assistance using the e-mail and telephone Helplines provided below.

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| --- |
| EPA POTW Screener Questionnaire Helplines  Eastern Research Group, Inc..……………. Local: 703-633-1696 or Toll-free: 1-877-353-7560  E-mail………………………….……………………………………… POTW\_Help@erg.com |

**WHEN TO RETURN THE QUESTIONNAIRE**

All facilities that request a paper copy of this questionnaire are requested to submit their response no later than***November 26, 2019***. EPA recommends making a copy of your completed questionnaire and keeping it for two years.

**WHERE TO RETURN THE QUESTIONNAIRE**

If you complete a hardcopy screener questionnaire, use the enclosed mailing label to mail the completed questionnaire to:

U.S. Environmental Protection Agency

POTW Screener Questionnaire

c/o Eastern Research Group, Inc.

14555 Avion Parkway, Suite 200

Chantilly, VA 20151-1102

**ACRONYMS**

BOD5 5-Day Biochemical Oxygen Demand

BNRBiological Nutrient Removal

COD Chemical Oxygen Demand

cBOD5 Carbonaceous Biochemical Oxygen Demand (5-day)

CWA Clean Water Act

EPA U.S. Environmental Protection Agency

MGD Million Gallons per Day

NPDES National Pollutant Discharge Elimination System

POTW Publicly Owned Treatment Works

TKN Total Kjeldahl Nitrogen

TOC Total Organic Carbon

TSS Total Suspended Solids

**GLOSSARY**

**5-Day Biochemical Oxygen Demand (BOD5):** A measure of the oxygen demand over five days to biologically degrade organic matter in wastewater.

**Biological Nutrient Removal (BNR):** A wastewater treatment system that is engineered to remove the nutrients nitrogen and phosphorus in amounts greater than the basic metabolic needs of the biological treatment system. BNR processes are often a variation of conventional activated sludge processes and incorporate additional biological processes into wastewater treatment systems to further reduce nutrients from the wastewater.

**Carbonaceous Biochemical Oxygen Demand (cBOD5):**  A measure of the oxygen demand to biologically degrade organic material in wastewater (carbonaceous demand), excluding biodegradation of forms of nitrogen (nitrogenous demand).

**Chemical Oxygen Demand (COD):** A measure of the oxygen demand to oxidize inorganic and organic matter in wastewater.

**Combined Sewer Collection System:** Wastewater systems that are designed to collect rainwater runoff, domestic sewage, and industrial wastewater in the same pipe. Most of the time, combined sewer systems transport all of their wastewater to a sewage treatment plant, where it is treated.

**Complex Treatment Pond System**: A multi-cell pond or lagoon system, with multiple cells aligned in series, designed to receive, hold, and treat wastewater.

**Continuous Discharge:** Discharge occurs throughout the year.

**Controlled or Intermittent Discharge:** Discharge only occurs at certain times or during certain times of the year.

**Daily Flow:** The average daily flow for any calendar month in the year.

**Design Capacity Flow**: A wastewater flow rate, typically expressed in volume (gallons) per day, that the treatment works was designed to process. Design capacity may be identified in the treatment works’ NPDES permit or in the treatment works’ design documentation***.***

**Headworks:** The point at which wastewater enters a wastewater treatment plant. The headworks may consist of bar screens, a comminutor, wet wells, or pumps.

**Maximum Capacity Flow or Peak Flow**: The treatment works’ designed maximum capacity, including capacity for diurnal variations, wet weather, safety factors, and/or other higher than average sustained flowrates that may occur during any given 24-hour period. These are fixed values based on facility design and do not vary based on facility operation.

**Municipality:** A city, town, borough, county, parish, district, association, or other public body created by or pursuant to State law and having jurisdiction over disposal of sewage, or an Indian tribe or an authorized Indian tribal organization, or a designated and approved management agency under section 208 of the CWA.

**National Pollutant Discharge Elimination System (NPDES)**: The national program for issuing, modifying, revoking and reissuing, terminating, monitoring and enforcing permits, and imposing and enforcing pretreatment requirements under the CWA. The NPDES permit number is assigned by the respective state or EPA Region and generally includes the state abbreviation in the number.

**Nutrient Recovery:** The practice of recovering nutrients, such as nitrogen and phosphorus, from wastewater streams that would otherwise be discharged to the environment and converting them into useful products.

**Package Plant:** A pre-manufactured treatment works used to treat wastewater in small communities or on individual properties.

**Publicly Owned Treatment Works (POTW):** A treatment works that is owned by a State, municipality, or tribal organization, including facilities owned by counties, sanitary sewer districts, or other approved management agencies. A POTW is usually designed to treat domestic sewage and not industrial wastewater.

**Recommended Standards for Wastewater Facilities**: A document of *Policies for the Design, Review, and Approval of Plans and Specifications for Wastewater Collection and Treatment Facilities,* written as a report of the Wastewater Committee of the Great Lakes – Upper Mississippi River Board of State and Provincial Public Health and Environmental Managers. Often referred to as “*The Ten State Standards*.”

**Separate Sewer Collection System:** wastewater systems that are designed to collect and convey sanitary wastewater (domestic sewage from homes as well as industrial and commercial wastewater), but not stormwater or runoff. In municipalities served by separate sanitary sewers, separate storm drains may convey stormwater and runoff. Separate sewer systems are distinguished from *combined sewers*, which combine sewage and stormwater in one pipe.

**Septage:** Also known as septic tank sludge, septage is the liquid or solid material removed from a septic tank cesspool, portable toilet, type III marine sanitation device, or a similar system. Septage may be transported to and discharged directly into an NPDES permitted POTW.

**Simple Pond**: A single-cell, earthen basin designed to receive, hold, and naturally treat wastewater.

**Total Nitrogen:** The sum of total Kjeldahl nitrogen and nitrate and nitrite.

**Total Kjeldahl Nitrogen (TKN):** The sum of ammonia and organic nitrogen.

**Total Suspended Solids (TSS):** Theportion of organic and inorganic solids retained on a filter.

**Treatment System:** The portion of the treatment works which is designed to provide physical, chemical, and/or biological treatment (including recycling and reclamation) of municipal sewage and industrial waste.

**Treatment Works:** Devices and systems used in the storage, treatment, recycling, and/or reclamation of municipal sewage. It also includes sewers, pipes, and other conveyances only if they convey wastewater to a treatment plant.

**Typical High Flow:** The average of the daily flow measurements taken during a one-month period of high flows, typically one month of significant rainfall, snowmelt, and/or significant volumes of inflow and infiltration. Flow averages should exclude days without flow readings.

**Wet Weather System:** The system through which flow is diverted past portions of the treatment works during wet weather events.

**POTW SCREENER QUESTIONNAIRE**

OMB Control No. 2040-0294

Approval Expires 07/31/2021

**Responses must be received no later than *November 26, 2019*.**

**EPA requests information for calendar year 2018.**

**Section A** **ELIGIBILITY CONFIRMATION**

1. Is this facility a treatment works[[1]](#footnote-2) used for the storage, treatment, recycling, and/or reclamation of municipal sewage? For purposes of this questionnaire, the term *treatment works* is used interchangeably with the terms publicly-owned treatment works (POTW), sewage treatment plant (STP), domestic wastewater treatment plant, wastewater treatment facility (WWTF), wastewater treatment plant (WWTP), and water resource recovery facility (WRRF).

Yes

****  No

**IF YOU ANSWERED “NO” TO QUESTION 1, DO NOT COMPLETE THE REMAINDER OF THIS QUESTIONNAIRE.**

1. Which of the following describes the ownership of your treatment works? Select all

that apply.

Publicly owned (owned by a State, municipality,[[2]](#footnote-3) or tribal organization, includes facilities owned by counties, sanitary sewer districts, or other approved management agencies)

Privately owned (owned by a private individual or private organization)

Federally owned (owned by the U.S. federal government)

****

**IF YOU DID NOT ANSWER “PUBLICLY OWNED” TO QUESTION 2,**

**DO NOT COMPLETE THE REMAINDER OF THIS QUESTIONNAIRE.**

1. Is your treatment works physically capable of directly discharging treatment system effluent to a surface water? This discharge may be continuous[[3]](#footnote-4) or intermittent (controlled).[[4]](#footnote-5)

Yes

No

** IF YOU ANSWERED “NO” TO QUESTION 3, DO NOT COMPLETE THE REMAINDER OF THIS QUESTIONNAIRE.**

**Section B POTW IDENTIFICATION**

1. Print your treatment works’ name:
2. Print your treatment works’ U.S. Postal Service (USPS) mailing address:

Street:

PO/Apt/Suite:

City:

State:

ZIP Code:

**5-1.** Print the physical location of your treatment works, if different from the mailing address:

Street:

Address Line 2

City:

State:

ZIP Code:

1. If we have any questions about your response, whom may we contact?

Name:

Business Phone: Extension

e-Mail: @  **.**

1. Print the National Pollutant Discharge Elimination System (NPDES)[[5]](#footnote-6) permit number associated with your treatment works. Also print the state-issued wastewater discharge permit number associated with this treatment works if it is known and applicable. If your treatment works does not have an NPDES or state-issued wastewater discharge permit, then please select ‘Do not have an NPDES permit nor state equivalent.’

Individual NPDES permit

NPDES Permit Number*:*

General NPDES permit

NPDES Permit Number*:*

State-issued wastewater discharge permit number

State Permit Number*:*

OR

Do not have an NPDES permit nor state equivalent

**Section C POTW OPERATIONS AND TREATMENT CHARACTERISTICS**

1. Which of the following best describes the maximum population served by your treatment works at any time in 2018? Select the most applicable.

< 750 individuals

750 – < 5,000 individuals

5,000 – < 10,000 individuals

10,000 – < 50,000 individuals

50,000 – < 100,000 individuals

100,000 – < 300,000 individuals

300,000 – < 1,000,000 individuals

> 1,000,000 individuals

1. Did the population served vary seasonally by more than 50 percent (e.g., college town, vacation resort, snowbird destination) in 2018?

Yes

No

Unknown

Decline to Respond

1. Is your POTW a package plant?[[6]](#footnote-7)

Yes

No

Unknown

Decline to Respond

1. Which of the following discharge or disposal methods does your treatment works use to manage treatment system effluent? Select all that apply.

Direct discharge to a surface water **🢂 Respond to Question 11-1 and 11-2**

Discharge to another POTW **🢂 Respond to Question 11-3**

Discharge to a non-publicly owned treatment works (e.g., privately or federally owned)

100% reuse

Evaporation

Other disposal method (e.g., underground injection, groundwater recharge, land application)

Describe ‘Other disposal method:’

Unknown

Decline to Respond

**11-1.** If you indicated that your treatment works directly discharges to a surface water in Question 11, did your treatment works operate continuous or intermittent (controlled) discharge in 2018?

Continuous Discharge

Controlled or Intermittent Discharge

Unknown

Decline to Respond

**11-2.** If you indicated that your treatment works directly discharges to a surface water in Question 11, provide the name of the receiving surface water(s) and provide the latitude and longitude of the outfall location(s) if known and readily available:

Unknown

Decline to Respond

|  |  |  |  |
| --- | --- | --- | --- |
| **Receiving Surface Water Name** | **Latitude** | **Longitude** | **Lat/Long Unknown** |
|  |  |  |  |
|  |  |  |  |
|  |  |  |  |

**11-3.** If you indicated that your treatment works discharges to another POTW in Question 11, enter the name of that facility and any other information you have available.

Unknown

Decline to Respond

Facility Name:

Street:

City:

State:

ZIP Code:

NPDES Permit Number:

1. Do you estimate your treatment works’ daily flow[[7]](#footnote-8) increased by 30 percent or more after a typical rainfall event in 2018?

Please note rigorous calculations are not required to answer this question; this question seeks to address whether typical rainfall events pose a significant source of flow to your treatment plant.

Yes

No

Unknown

Decline to Respond

1. What was your treatment works’ 2018 design capacity flow?[[8]](#footnote-9) Do not include additional flow capacity reserved for primary treatment units only.

Less than 1 MGD **🢂 Skip to Question 14**

Greater than or equal to 1 MGD **🢂 Continue to Question 13-1**

**13-1.** Enter the design capacity flow of your treatment works in 2018.

Design Capacity Flow: MGD

Unknown

Decline to Respond

**13-2.** This design capacity flow is also my NPDES permitted flow.

Yes

No

Unknown

Decline to Respond

**13-3.** The design flow of my treatment works is based on the *Recommended Standards for Wastewater Facilities*[[9]](#footnote-10) (i.e., the “*Ten State Standards*”)?

Yes

No

Unknown

Decline to Respond

**13-4.** Enter the Maximum Capacity Flow[[10]](#footnote-11) or Peak Capacity Flow11 (fixed values based on facility design) of your treatment works.

Maximum Capacity Flow or Peak Capacity Flow: MGD

Unknown

Decline to Respond

1. What were the actual operational flows to your treatment works in the calendar year 2018? Only use 2018 flow data for your averaging period.

Daily Flow (e.g.,average daily flow or total daily flow): MGD

Unknown

Decline to Respond

Typical High Flow:[[11]](#footnote-12) MGD

Unknown

Decline to Respond

**🢂 If your treatment works served < 750 individuals (Question 8) AND has a design capacity flow less than 1 MGD (Question 13): 🢂 Skip to Question 29**

**🢂 All others: 🢂 Continue to Question 15**

1. In 2018, which type(s) of collection system fed into your treatment works? Estimate contributions to your treatment works in either average daily flow or percent of sewered population using best professional judgement. Round to the nearest whole percentage/integer. Please enter zero (0) if no contribution was received from a particular source.

Unknown

Decline to Respond

|  |  |
| --- | --- |
| **Collection System** | **Units** |
| Separate Sewer Collection System[[12]](#footnote-13) | Percent of sewered population  Average Daily Flow (MGD) |
| Combined Sewer Collection System[[13]](#footnote-14) | Percent of sewered population  Average Daily Flow (MGD) |
| Hauled from off-site | Percent of sewered population  Average Daily Flow (MGD) |
| Other: | Percent of sewered population  Average Daily Flow (MGD) |

1. Indicate the average daily flow or percentage(s) of average daily flow by volume of the wastewater treated at your treatment works from each of the following sources in 2018. Estimate using best professional judgement. Round to the nearest whole percentage/integer. Please enter zero (0) if no contribution was received from a particular source.

Please note that the category of ‘septage’ is intended to cover septic tank sludge and is the liquid or solid material removed from a septic tank cesspool, portable toilet, type III marine sanitation device, or a similar system. Septage may be transported to and discharged directly into an NPDES permitted POTW. It should be accounted for separately from collected residential, commercial, and industrial wastewater. Boiler blowdown should be accounted for in the category of Commercial/Institutional. Examples of the category of ‘Other’ include onsite stormwater, onsite landfill leachate, and other POTW effluent.

Unknown

Decline to Respond

|  |  |
| --- | --- |
| **Wastewater Type** | **Units** |
| Residential | Percent of flow  MGD |
| Commercial/Institutional (e.g., schools, hotels,  restaurants) | Percent of flow  MGD |
| Septage | Percent of flow  MGD |
| Industrial | Percent of flow  MGD |
| Stormwater and other | Percent of flow  MGD |
| Describe other: |  |

**16-1.** If you indicated industrial contributions in Question 16, did flows from industrial contributions vary by more than 25 percent (excluding diurnal fluctuations) at any point in 2018?

Yes

No

Unknown

Decline to Respond

1. Did your treatment works receive process wastewater from one or more of the following industrial sources in 2018? Select all that apply.

No significant industrial sources

Unknown

Decline to Respond

Airport deicing

Dairy products (e.g. milk or cheese), animal processing (e.g., meat processing, poultry processing, aquaculture)

Breweries/microbreweries

Chemical, fertilizer, or phosphate manufacturing

Grain milling

Metals manufacturing and processing (e.g., electroplating, smelting, iron and steel)

Non-animal food processing

Petroleum refining

Pharmaceutical manufacturing

Pulp and paper manufacturing

Steam electric power

Oil and gas

Other significant industrial source of nutrients

Describe ‘Other significant industrial source of nutrients:’

1. Which of the following treatment technologies were included in your treatment works in 2018? Select all that apply.

Preliminary (e.g., grit removal, flow equalization, screening)

Primary treatment (e.g., primary clarification, chemically-enhanced primary

treatment [CEPT]) **🢂 Respond to Question 18-1**

Biological treatment **🢂 Respond to Questions 18-2 and 18-3**

Physical and/or chemical treatment **🢂 Respond to Question 18-4**

**18-1.** If you indicated primary treatment, is any chemical addition or chemical treatment in primary treatment specifically for the purposes of nutrient removal?

Yes

No

Unknown

Decline to Respond

In the following section, BNR stands for Biological Nutrient Removal. BNR means the wastewater treatment system is engineered to remove the nutrients nitrogen and phosphorus in amounts greater than the basic metabolic needs of the biological treatment system. BNR processes are often a variation of conventional activated sludge processes and incorporate additional biological processes into wastewater treatment systems to further reduce nutrients from the wastewater.

**18-2.** If you indicated biological treatment, indicate which types of biological treatment technologies were operated in 2018. Select all that apply.

Suspended growth: Natural wastewater treatment system (e.g., waste stabilization pond, wetland, facultative lagoon). **🢂 Respond to Questions 18-2.1 and 18-2.2**

Suspended growth: Tank/reactor system (e.g., sequencing batch reactor, conventional activated sludge, A2O, Modified Ludzack-Ettinger [MLE], Bardenpho, oxidation ditch) **🢂 Respond to Question 18-2.3**

Attached growth **🢂 Respond to Question 18-2.4**

Combined suspended/attached growth systems (e.g., integrated fixed film

activated sludge, moving-bed biofilm reactor)

Biological sidestream treatment (e.g., SHARON, ANAMMOX©, PhoStrip)

**18-2.1** If you indicated Suspended growth: Natural wastewater treatment system, indicate which types of natural wastewater treatment systems were operated in 2018. Select all that apply.

Simple (single cell) pond[[14]](#footnote-15)

Complex (multi-cell) treatment pond system[[15]](#footnote-16)

Wetland or vegetative pond (e.g., constructed wetland,

hyacinth pond, duckweed pond)

Terrestrial treatment (e.g., soil aquifer treatment/rapid infiltration,

overland flow system)

Unknown

Decline to Respond

**18-2.2.** If you indicated Suspended growth: Natural wastewater treatment system, was any portion of your natural wastewater treatment system mechanically aerated at any time in 2018?

Yes

No

Unknown

Decline to Respond

**18-2.3.** If you indicated Suspended growth: Tank/reactor system, which of the following describes your suspended growth biological treatment technology used in 2018. Select all that apply.

Oxidation or orbital ditch

Conventional activated sludge

Advanced activated sludge (e.g., Bardenpho, A2O, Modified Ludzack-Ettinger [MLE], Johannesburg)

Unknown

Decline to Respond

Other

Describe ‘Other Suspended growth: Tank/reactor system:’

**18-2.4.** If you indicated Attached growth, which of the following describes your attached growth biological treatment technology used in 2018. Select all that apply.

Trickling filter system (e.g., trickling filter with any media, activated biofilter)

Other than trickling filter system (e.g., rotating biological contactor, fixed-film reactor, denitrification filtration)

Unknown

Decline to Respond

**18-3.** If you indicated biological treatment,indicate the average seasonal wastewater temperatures (winter and summer) of the biological treatment system for your treatment works in 2018. Please note this question is not asking for the temperature at the outfall.

Unknown  Decline to Respond

|  |  |
| --- | --- |
| **Season** | **Temperature Units** |
| Coldest | ⁰C  ⁰F |
| Warmest | ⁰C  ⁰F |

**18-4.** If you indicated physical and/or chemical treatment, indicate which types of physical and/or chemical treatment technologies were present in your treatment works in 2018. Also indicate if any of these physical and/or chemical treatment technologies were specifically operated for nutrient removal and/or recovery in 2018. Select all that apply.

| **Treatment Technology** | **Present in Treatment Works** | **Operated for Nutrient Removal and/or Recovery** |
| --- | --- | --- |
| Ammonia oxidation with chlorine (e.g., breakpoint chlorination) |  |  |
| Chemically-assisted clarification for reasons other than nutrient removals (e.g., chemical oxidants, coagulants, flocculants, metals precipitants, proprietary additives) |  | Not Applicable |
| Chemical phosphorus precipitation |  |  |
| Disinfection |  |  |
| Gas stripping (e.g., ammonia stripping, air stripping) |  |  |
| Ion separation/exchange |  |  |
| Media/Granular filtration (e.g., sand, mixed media, granular activated carbon [GAC], fuzzy) |  |  |
| Membrane filtration (e.g., ultrafiltration, reverse osmosis, microfiltration) |  |  |
| Solids separation (e.g., clarification, sedimentation, settling, dissolved air flotation [DAF]) |  |  |
| Surface filtration (e.g., cloth, cartridge and bag filter) |  |  |
| Other physical and/or chemical technology |  |  |

Describe ‘Other physical and/or chemical technology:’

1. What type(s) of process control did your treatment works use in 2018? Select all that apply.

Manual (Operator Controlled)

Automatic (Computerized Control)

None **🢂 Skip to Question 20**

Unknown **🢂 Skip to Question 20**

Decline to Respond **🢂 Skip to Question 20**

**19-1.** Please indicate which parameters were used for process control and how each parameter was measured in 2018. Select all that apply.

|  |  |  |
| --- | --- | --- |
| **Parameter** | **Manual** | **Automatic** |
| Ammonia |  |  |
| Dissolved Oxygen (DO) |  |  |
| Influent Flow |  |  |
| Internal Recycle Flow |  |  |
| Mixed Liquor Suspended Solids (MLSS) |  |  |
| Nitrate and/or Nitrite |  |  |
| Organics (including BOD, COD, TOC) |  |  |
| Oxidation-Reduction Potential (ORP) |  |  |
| pH |  |  |
| Phosphate-orthophosphate |  |  |
| Solids Retention Time (SRT) |  |  |
| Sludge Blanket Depth |  |  |
| Temperature |  |  |
| Total Suspended Solids (TSS) |  |  |
| Other |  |  |

Describe ‘Other:’

1. Please indicate if your treatment works has implemented any capital upgrades or operational changes that resulted in nutrient removal or improved energy efficiency (e.g., energy audit, energy optimization) in the past 10 years. Select all that apply.

Unknown  Decline to Respond

|  |  |
| --- | --- |
| **Action** | **Objective** |
| Capital Upgrades  (e.g., baffles, added tank capacity, new treatment unit, pumps and piping for additional return and recycle lines) | Nutrient removal  Energy efficiency  Not applicable |
| Operational Changes  (e.g., adjusting residence time or mechanical aeration, additional monitoring probes in biological treatment, upgraded process control) | Nutrient removal  Energy efficiency  Not applicable |

**20-1.** Please indicate if your treatment works is planning to implement any capital upgrades or operational changes specifically for nutrient removal or to improve energy efficiency (e.g., energy audit, energy optimization) in the next 3 years. Select all that apply.

Unknown  Decline to Respond

|  |  |
| --- | --- |
| **Action** | **Objective** |
| Capital Upgrades  (e.g., baffles, added tank capacity, new treatment unit, pumps and piping for additional return and recycle lines) | Nutrient removal  Energy efficiency  Not applicable |
| Operational Changes  (e.g., adjusting residence time or mechanical aeration, additional monitoring probes in biological treatment, upgraded process control) | Nutrient removal  Energy efficiency  Not applicable |

1. Respond to the following three questions (Questions 21-1 through 21-3) to indicate if your treatment works may have been designed to achieve objectives for BNR or achieves these objectives for BNR through process optimization and/or other operational changes.

**21-1.** Which nutrients, if any, were removed by your treatment works in 2018? This does not include incidental nutrient removals due to the basic metabolic requirements of your biological treatment system. Select all that apply.

Ammonia

Nitrogen

Phosphorus

Unknown

**21-2.** Were the average annual treatment system effluent concentrations for your treatment works below the following values in 2018? Select all that apply.

Yes No Unknown

Total Nitrogen ≤ 8 mg N/L

Total Phosphorus ≤ 1 mg P/L

**21-3.** Did your treatment works utilize resource recovery practices in 2018? Select all that apply.

Nutrient recovery[[16]](#footnote-17) (e.g., struvite, nitrogen, phosphorus)

Beneficial use of biosolids (e.g., land application)

Energy recovery (e.g., digestion, biogas, primary effluent filtration [PEF] for carbon diversion)

Other resource recovery practice

No

**22.** Does your treatment works have more than one outfall?

Yes

No

Unknown

Decline to Respond

**23.** What were the average concentrations of BOD5, cBOD5, COD, and TSS at the headworks or system influent for your treatment works in 2018?

BOD5[[17]](#footnote-18) mg/L  Unknown  Decline to Respond

cBOD5[[18]](#footnote-19) mg/L  Unknown  Decline to Respond

COD[[19]](#footnote-20) mg/L  Unknown  Decline to Respond

TSS[[20]](#footnote-21) mg/L  Unknown  Decline to Respond

Thank you for completing the technical portions of this questionnaire.

The following section (questions 24 through 27) requests average annual concentrations of nutrient parameters through your treatment works.

EPA is not requesting you perform non-routine tests or measurements solely for the purpose of responding to this questionnaire.

For the purposes of this questionnaire, your treatment works’ nutrient monitoring data do not have to be collected using EPA approved methods.

In the event exact data or information are not available, you may provide responses using your best professional judgement. Like the technical portions of this questionnaire, responses to questions 24 through 27 are voluntary.

1. Indicate where your treatment works monitored for ammonia in 2018. Select all that apply. If your treatment works did not monitor for ammonia in any of the following locations in 2018, check the box under Did Not Monitor. Please note, if your treatment works has more than one outfall, use the primary outfall to answer this question.

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Nutrient monitored** | **Headworks or System Influent** | **Treatment System Effluent**[[21]](#footnote-22) | **Wet Weather System Effluent**[[22]](#footnote-23) | **Final Outfall(s)** | **Biosolids** | **Other locations within the treatment works** | **Did Not Monitor** |
| Ammonia |  |  |  |  |  |  |  |

1. For each monitoring location you indicated in Question 23, what were the average annual concentrations of ammonia in your treatment works in 2018? Circle the range that best approximates the concentration of ammonia and check the appropriate unit. Please note, if your treatment works has more than one outfall, use the primary outfall to answer this question.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Nutrient Parameter** | **Average Concentration (mg/L)** | | | | **Units**  Select the most applicable |
| **Headworks or System Influent (untreated)** | **Treatment System Effluent(treated)** | **Wet Weather System Effluent** | **Outfall** |
| Ammonia | < 10 mg/L  10 – < 25 mg/L  25 – < 50 mg/L  ≥ 50 mg/L | < 1 mg/L  1 – < 3 mg/L  3 – < 10 mg/L  ≥ 10 mg/L | < 5 mg/L  5 – < 15 mg/L  ≥ 15 mg/L | < 1 mg/L  1 – < 3 mg/L  3 – < 10 mg/L  ≥ 10 mg/L | NH3 as N  Other |

**24**. Indicate where your treatment works monitored for nutrients other than ammonia in 2018. Select all that apply. If your treatment works did not monitor for a nutrient parameter in any of the following locations in 2018, check the box under Did Not Monitor. Please note, if your treatment works has more than one outfall, use the primary outfall to answer this question.

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Nutrient monitored** | **Headworks or System Influent** | **Treatment System Effluent** | **Wet Weather System Effluent** | **Final Outfall(s)** | **Biosolids** | **Other locations within the treatment works** | **Did Not Monitor** |
| Total Nitrogen[[23]](#footnote-24) |  |  |  |  |  |  |  |
| Total Kjeldahl Nitrogen (TKN)[[24]](#footnote-25) |  |  |  |  |  |  |  |
| Nitrate or Nitrate-Nitrite (if measured together) |  |  |  |  |  |  |  |
| Organic Nitrogen[[25]](#footnote-26) |  |  |  |  |  |  |  |
| Total Phosphorus |  |  |  |  |  |  |  |
| Orthophosphate |  |  |  |  |  |  |  |

**25.** Of the nutrients that you monitor, what were the average annual concentrations in the treatment works measured at any of the following locations in 2018? Circle the range that best approximates the concentration of each of the following parameters and check the appropriate unit. Please note, if your treatment works has more than one outfall, use the primary outfall to answer this question.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Nutrient Parameter** | **Average Concentration (mg/L)** | | | | **Units**  Select the most applicable |
| **Headworks or System Influent (untreated)** | **Treatment System Effluent(treated)** | **Wet Weather System Effluent** | **Outfall** |
| Total Nitrogen | < 10 mg/L  10 – < 35 mg/L  35 – < 70 mg/L  ≥ 70 mg/L | < 5 mg/L  5 – < 10 mg/L  10 – < 25 mg/L  25 – < 35 mg/L  ≥ 35 mg/L | < 5 mg/L  5 – < 15 mg/L  15 – < 35 mg/L  ≥ 35 mg/L | < 5 mg/L  5 – < 10 mg/L  10 – < 25 mg/L  25 – < 35 mg/L  ≥ 35 mg/L | N  Other |
| Total Kjeldahl Nitrogen (TKN) | < 10 mg/L  10 – < 35 mg/L  35 – < 70 mg/L  ≥ 70 mg/L | < 5 mg/L  5 – < 10 mg/L  10 – < 25 mg/L  25 - < 35 mg/L  ≥ 35 mg/L | < 5 mg/L  5 – < 15 mg/L  15 – < 35 mg/L  ≥ 35 mg/L | < 5 mg/L  5 – < 10 mg/L  10 – < 25 mg/L  25 – < 35 mg/L  ≥ 35 mg/L | TKN as N  Other |
| Nitrate or  Nitrate-Nitrite  (if measured together) | Non-detect  > 0 mg/L | < 5 mg/L  5 – < 10 mg/L  10 – < 25 mg/L  25 – < 35 mg/L  ≥ 35 mg/L | < 5 mg/L  5 – < 15 mg/L  15 – < 35 mg/L  ≥ 35 mg/L | < 5 mg/L  5 – < 10 mg/L  10 – < 25 mg/L  25 – < 35 mg/L  ≥ 35 mg/L | NO3-/NO2- as N  Other |
| Organic Nitrogen | < 10 mg/L  10 – < 15 mg/L  15 – < 25 mg/L  ≥ 25 mg/L | < 5 mg/L  5 – < 10 mg/L  10 – < 20 mg/L  ≥ 20 mg/L | < 10 mg/L  10 – < 25 mg/L  ≥ 25 mg/L | < 5 mg/L  5 – < 10 mg/L  10 – < 20 mg/L  ≥ 20 mg/L | N  Other |
| Total Phosphorus | < 4 mg/L  4 – < 7 mg/L  7 – < 12 mg/L  ≥ 12 mg/L | < 0.3 mg/L  0.3 – < 1 mg/L  1 – < 4 mg/L  ≥ 4 mg/L | < 4 mg/L  4 – < 7 mg/L  ≥ 7 mg/L | < 0.3 mg/L  0.3 – < 1 mg/L  1 – < 4 mg/L  ≥ 4 mg/L | P  Other |
| Orthophosphate | < 3 mg/L  3 – < 6 mg/L  6 – < 10 mg/L  ≥ 10 mg/L | < 0.3 mg/L  0.3 – < 1 mg/L  1 – < 4 mg/L  ≥ 4 mg/L | < 3 mg/L  3 – < 6 mg/L  ≥ 6 mg/L | < 0.3 mg/L  0.3 – < 1 mg/L  1 – < 4 mg/L  ≥ 4 mg/L | PO4 as P  Other |

1. **FINAL COMMENTS: This concludes the questionnaire.** Provide any relevant notes or comments in this section. Operations are expected to fluctuate, but you may explain in this section if any information from calendar year 2018 is not representative of normal operations. If you need to provide additional comments, please record on separate pages and include your submission by mail.

**STOP HERE. DO NOT COMPLETE THE REMAINDER OF THIS QUESTIONNAIRE.**

**NOTE: *Complete Questions 28 through 31 only if, in 2018, your treatment works served less than 750 individuals (Question 8) AND had a design capacity flow less than 1 MGD (Question 13).***

**28.** Which of the following treatment technologies were included in the treatment works in 2018? Select all that apply.

Preliminary (e.g., grit removal, flow equalization, screening)

Primary treatment (e.g., primary clarification)

Biological treatment **🢂 Respond to Question 29-1**

**28-1.** If you indicated biological treatment, indicate which types of biological treatment technologies were operated in 2018. Select all that apply.

Suspended growth: Tank/reactor system (e.g., sequencing batch reactor, conventional activated sludge, oxidation ditch) **🢂 Respond to Question 29-2**

Attached growth (e.g., trickling filter, activated biofilter, rotating biological contactor, fixed-film reactor)

Suspended growth: Natural wastewater treatment system (e.g., waste stabilization pond, wetland, facultative lagoon) **🢂 Respond to Questions 29-3 and 29-4**

**28-2.** If you indicated Suspended growth: Tank/reactor system, which of the following describes your suspended growth biological treatment technology used in 2018. Select all that apply.

Oxidation or orbital ditch

Conventional activated sludge

Advanced activated sludge (e.g., Bardenpho, A2O, Modified Ludzack-Ettinger [MLE], Johannesburg)

Unknown

Decline to Respond

Other

Describe ‘Other Suspended growth: Tank/reactor system:’

**28-3.** If you indicated Suspended growth: Natural wastewater treatment system, please indicate which types of natural wastewater treatment systems were operated in 2018. Select all that apply.

Simple (single cell) pond[[26]](#footnote-27)

Complex (multi-cell) treatment pond system[[27]](#footnote-28)

Wetland or vegetative pond (e.g., constructed wetland,

hyacinth pond, duckweed pond)

Terrestrial treatment (e.g., soil aquifer treatment/rapid infiltration,

overland flow system)

Unknown

Decline to Respond

**28-4.** Was any portion of your Suspended growth: natural wastewater treatment system mechanically aerated at any time in 2018?

Yes

No

Unknown

Decline to Respond

**29.** Indicate where your treatment works monitored for ammonia in 2018. Select all that apply. If your treatment works did not monitor for ammonia in any of the following locations in 2018, check the box under Did Not Monitor. Please note, if you have more than one outfall, use your primary outfall to answer this question.

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Nutrient monitored** | **Headworks or System Influent** | **Treatment System Effluent**[[28]](#footnote-29) | **Wet Weather System Effluent**[[29]](#footnote-30) | **Final Outfall(s)** | **Biosolids** | **Other locations within the treatment works** | **Did Not Monitor** |
| Ammonia |  |  |  |  |  |  |  |

**30.** Indicate where your treatment works monitored for nutrients other than ammonia in 2018. Select all that apply. If your treatment works did not monitor for nitrogen species other than ammonia or phosphorus in any of the following locations in 2018, check the box under Did Not Monitor. Please note, if you have more than one outfall, use your primary outfall to answer this question.

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Nutrient monitored** | **Headworks or System Influent** | **Treatment System Effluent** | **Wet Weather System Effluent** | **Final Outfall(s)** | **Biosolids** | **Other locations within the treatment works** | **Did Not Monitor** |
| Nitrogen (other than Ammonia) |  |  |  |  |  |  |  |
| Phosphorus |  |  |  |  |  |  |  |

**31. FINAL COMMENTS: This concludes the questionnaire.** Provide any relevant notes or comments in this section. Operations are expected to fluctuate, but you may explain in this section if any information from calendar year 2018 is not representative of normal operations. If you need to provide additional comments, please record on separate pages and include your submission by mail.

1. Treatment works means devices and systems used in the storage, treatment, recycling, and/or reclamation of municipal sewage. It also includes sewers, pipes, and other conveyances only if they convey wastewater to a treatment plant. [↑](#footnote-ref-2)
2. Municipality means a city, town, borough, county, parish, district, association, or other public body created by or pursuant to State law and having jurisdiction over disposal of sewage, or an Indian tribe or an authorized Indian tribal organization, or a designated and approved management agency under section 1288 of the CWA. [↑](#footnote-ref-3)
3. Continuous discharge occurs throughout the year. [↑](#footnote-ref-4)
4. Controlled or intermittent discharge occurs only at certain times or during certain times of the year. [↑](#footnote-ref-5)
5. The NPDES program is the national program for issuing, modifying, revoking and reissuing, terminating, monitoring and enforcing permits, and imposing and enforcing pretreatment requirements under the CWA. The NPDES permit number is assigned by the respective state or EPA Region and generally includes the state abbreviation in the number. [↑](#footnote-ref-6)
6. A package plant is a pre-manufactured treatment works used to treat wastewater in small communities or on individual properties. [↑](#footnote-ref-7)
7. Daily Flow is the average daily flow for any calendar month in 2018. [↑](#footnote-ref-8)
8. Design Capacity Flow: A wastewater flow rate, typically expressed in volume (gallons) per day, that the treatment works was designed to process. Design capacity may be identified in the treatment works’ NPDES permit or in the treatment works’ design documentation***.*** [↑](#footnote-ref-9)
9. Recommended Standards for Wastewater Facilities is a document of *Policies for the Design, Review, and Approval of Plans and Specifications for Wastewater Collection and Treatment Facilities*, written as a report of the Wastewater Committee of the Great Lakes – Upper Mississippi River Board of State and Provincial Public Health and Environmental Managers. Often referred to as “*The Ten State Standards*.” [↑](#footnote-ref-10)
10. Maximum Capacity Flow or Peak Capacity Flow are the treatment works’ designed maximum capacity, including capacity for diurnal variations, wet weather, safety factors, and/or other higher than average sustained flowrates that may occur during any given 24-hour period. These are fixed values based on facility design and do not vary based on facility operation. [↑](#footnote-ref-11)
11. Typical High Flow is the average of the daily flow measurements taken during a one-month period of high flows, typically one of the months of significant rainfall, snowmelt, and/or significant volumes of inflow and infiltration. Flow averages should exclude days without flow readings. [↑](#footnote-ref-12)
12. Separate Sewer Collection Systems are wastewater systems that are designed to collect and convey sanitary wastewater (domestic sewage from homes as well as industrial and commercial wastewater), but not stormwater or runoff. In municipalities served by separate sanitary sewers, separate storm drains may convey stormwater and runoff. Separate sewer systems are distinguished from *combined sewers*, which combine sewage and stormwater in one pipe. [↑](#footnote-ref-13)
13. Combined sewer collection systems are wastewater systems that are designed to collect rainwater runoff, domestic sewage, and industrial wastewater in the same pipe. Most of the time, combined sewer systems transport all of their wastewater to a sewage treatment plant, where it is treated. [↑](#footnote-ref-14)
14. A simple pond is a single-cell, earthen basin designed to receive, hold, and naturally treat wastewater. [↑](#footnote-ref-15)
15. A complex treatment pond system is a multi-cell pond or lagoon system, with multiple cells aligned in series, designed to receive, hold, and treat wastewater. [↑](#footnote-ref-16)
16. Nutrient Recovery is the practice of recovering nutrients, such as nitrogen and phosphorus, from wastewater streams that would otherwise be discharged to the environment and converting them into useful products. [↑](#footnote-ref-17)
17. Biochemical Oxygen Demand (BOD5) is a measure of the oxygen demand to biologically degrade organic matter in wastewater. [↑](#footnote-ref-18)
18. Carbonaceous Biochemical Oxygen Demand (cBOD5) is a measure of the oxygen demand to biologically degrade organic material in wastewater (carbonaceous demand), excluding biodegradation of forms of nitrogen (nitrogenous demand). [↑](#footnote-ref-19)
19. Chemical Oxygen Demand (COD) is a measure of the oxygen demand to oxidize inorganic and organic matter in wastewater. [↑](#footnote-ref-20)
20. Total Suspended Solids (TSS) is the portion of organic and inorganic solids retained on a filter. [↑](#footnote-ref-21)
21. Treatment System is the portion of the treatment works which is designed to provide physical, chemical, and/or biological treatment (including recycling and reclamation) of municipal sewage and industrial waste. [↑](#footnote-ref-22)
22. Wet Weather System is the system through which flow is diverted past portions of the treatment works during wet weather events. [↑](#footnote-ref-23)
23. Total Nitrogen is the sum of total Kjeldahl nitrogen and nitrate-nitrite. [↑](#footnote-ref-24)
24. Total Kjeldahl Nitrogen (TKN) is the sum of ammonia and organic nitrogen. [↑](#footnote-ref-25)
25. Organic Nitrogen is typically a calculated, not measured, value. You do not need to calculate this value for purposes of this questionnaire. [↑](#footnote-ref-26)
26. A simple pond is a single-cell, earthen basin designed to receive, hold, and naturally treat wastewater. [↑](#footnote-ref-27)
27. A complex treatment pond system is a multi-cell pond or lagoon system, with multiple cells aligned in series, designed to receive, hold, and treat wastewater. [↑](#footnote-ref-28)
28. Treatment System is the portion of the treatment works which is designed to provide physical, chemical, and/or biological treatment (including recycling and reclamation) of municipal sewage and industrial waste. [↑](#footnote-ref-29)
29. Wet Weather System is the system through which flow is diverted past portions of the treatment works during wet weather events. [↑](#footnote-ref-30)