U.S. ENVIRONMENTAL PROTECTION AGENCY, REGION 8 NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM STATEMENT OF BASIS

PERMITTEE:	National Park Service
FACILITY NAME AND MAILING ADDRESS:	Yellowstone Center for Resources P.O. Box 168 Yellowstone National Park, WY 82190
PERMIT NUMBER:	WY0000005
RESPONSIBLE OFFICIAL/ FACILITY CONTACT:	Brian Ertel, Fisheries Biologist 307-344-2282 brian_ertel@nps.gov
PERMIT TYPE:	Minor, New Permit, Pesticides Application
FACILITY PEST MANAGEMENT AREA(S)/ LOCATION(S)- i.e., RECEIVING WATERS:	Buffalo Creek: Latitude: 45.028429, Longitude: -110.301223 to Latitude: 44.949731, Longitude: -110.307854 Tower Creek: Latitude: 44.790268, Longitude: -110.542800 to Latitude: 44.894832, Longitude: -110.383661 Carnelian Creek: Latitude: 44.801551, Longitude: -110.466256 to Latitude: 44.894832, Longitude: -110.383661

1 INTRODUCTION

This statement of basis (SoB) is for the issuance of a National Pollutant Discharge Elimination System (NPDES) permit, ID WY0000005, (Permit) to the National Park Service for the Yellowstone Center for Resources (Facility). The Permit establishes discharge limitations for any discharge of chemical pesticide pollutants (e.g., chemical pesticides which leave a residue) resulting from pesticide application to Buffalo Creek, Tower Creek, or Carnelian Creek. The SoB explains the nature of the discharges, EPA's decisions for limiting the pollutants, and the regulatory and technical basis for these decisions.

The Facility is located in the Yellowstone National Park, which is considered a Land of Exclusive Federal Jurisdiction (LEFJ). According to 16 U.S.C. Chapter 1, the National Park Service has identified several national parks that contain LEFJ, including Yellowstone National Park. LEFJs are lands in the U.S. where the Federal government retains exclusive jurisdiction in relevant respects. EPA Region 8 is the NPDES permitting authority for facilities located on LEFJ in Yellowstone National Park.

2 BACKGROUND INFORMATION

2.1 Pesticide Application Regulation

EPA regulates the sale, distribution and use of pesticides in the United States under the statutory framework of the Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA) to ensure that when used in conformance with FIFRA labeling directions, pesticides will not pose unreasonable risks to human health and the environment. All new pesticides, for which registration is required, must undergo a registration procedure under FIFRA during which EPA assesses a variety of potential human health and environmental effects associated with use of the product. Under FIFRA, EPA is required to consider the effects of pesticides on the environment by determining, among other things, whether a pesticide "will perform its intended function without unreasonable adverse effects on the environment," and whether "when used in accordance with widespread and commonly recognized practice [the pesticide] will not generally cause unreasonable adverse effects on the environment." 7 U.S.C. 136a(c)(5). In performing this analysis, EPA examines the ingredients of a pesticide, the intended type of application site and directions for use, and supporting scientific studies for human health and environmental effects and exposures. The applicant for registration of the pesticide must also provide specific data from tests done according to EPA guidelines.

When EPA approves a pesticide for a particular use, the Agency imposes restrictions through labeling requirements governing such use. The restrictions are intended to ensure that the pesticide serves an intended purpose and avoids unreasonable adverse effects. It is illegal under section 12(a)(2)(G) of FIFRA to use a registered pesticide in a manner inconsistent with its labeling. States have primary authority under FIFRA to enforce "use" violations, but both the states and EPA have ample authority to prosecute pesticide misuse when it occurs. 7 U.S.C. 136j(a)(2)(G).

The Sixth Circuit Court of Appeals found that if a chemical pesticide leaves any excess or residue after performing its intended purpose, such excess or residue would be considered a pollutant under the Clean Water Act (CWA). The Court also found that, unlike chemical pesticides, not only would the residue and excess quantities of a biological pesticide be considered a pollutant, but so too would the biological pesticide itself under the CWA.

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As defined in 40 CFR § 122.2, "*Pesticide residue* for the purpose of determining whether an NPDES permit is needed for discharges of pollutants to waters of the United States from pesticide application, means that portion of a pesticide application that is discharged from a point source to waters of the United States and no longer provides pesticidal benefits. It also includes any degradates of the pesticide."

2.2 Court Decisions Leading to the CWA Regulation Concerning Pesticide Applications

In the past, several courts have addressed the question of whether the CWA requires NPDES permits for pesticide applications. These cases resulted in some confusion among the regulated community and other affected citizens about the applicability of the CWA to pesticides applied to waters of the United States.

On November 27, 2006, EPA issued a final rule (hereinafter called the "2006 NPDES Pesticides Rule") clarifying two specific circumstances in which an NPDES permit was not required to apply pesticides to or around water. They were: 1) the application of pesticides directly to water to control pests; and 2) the application of pesticides to control pests that are present over, including near, water where a portion of the pesticides will unavoidably be deposited to the water to target the pests, provided that the application is consistent with relevant FIFRA requirements in both instances. The rule became effective on January 26, 2007.

On January 7, 2009, the Sixth Circuit vacated EPA's 2006 NPDES Pesticides Rule under a plain language reading of the CWA. National Cotton Council of America v. EPA, 553 F.3d 927 (6th Cir., 2009). The Court held that the CWA unambiguously includes "biological pesticides" and "chemical pesticides" with residuals within its definition of "pollutant." Specifically, an application of chemical pesticides that leaves no excess portion is not a discharge of a pollutant, and the applicator need not obtain an NPDES permit. However, chemical pesticide residuals are pollutants as applied if they are discharged from a point source for which NPDES permits are required. Biological pesticides, on the other hand, are always considered a pollutant under the CWA regardless of whether the application results in residuals or not and require an NPDES permit for all discharges of pollutants from a point source.

As a result of the Court's decision to vacate the 2006 NPDES Pesticides Rule, after October 31, 2011 NPDES permits are required for discharges to waters of the United States of biological pesticides, and of chemical pesticides that leave a residue. EPA and all NPDES-authorized states and territories have developed and are implementing NPDES permits for pollutant discharges resulting from pesticide applications. EPA Regional offices and state NPDES authorities may issue additional general permits or individual permits if appropriate.

The Permit has been written to align with requirements of EPA's 2021 Pesticide General Permit for Discharges from the Application of Pesticides (2021 PGP), which was written to conform to relevant court decisions. One of these cases held that because the terms of the Nutrient Management Plan (NMP) employed by concentrated animal feeding operations (CAFO) imposed restrictions on discharges of pollutants, those restrictions amounted to effluent limitations that needed to be made part of the permit and to be subject to public and permit writer review. *Waterkeeper Alliance, Inc. v. EPA*, 399 F.3d 486 (2nd Cir. 2005). In this respect, this Permit is different from the CAFO requirements.

In this Permit, EPA explicitly establishes effluent limitations in Section 6 that are independent of any documentation and recordkeeping requirements regarding implementation of the limitations.

All discharges of pollutants that would be authorized by this Permit involve either (1) applications made directly into or over waters of the United States to control pests in or over the water, or (2) applications to control pests near the water's edge such that pesticides will be unavoidably deposited into waters of the United States.

Exclusion of Spray Drift and Irrigation Return Flow

In the 2006 NPDES Pesticides Rule, EPA expressly noted that the rule did not cover either "spray drift" – the airborne movement of pesticide sprays away from the target application site into waters of the United States – or applications of pesticides to terrestrial agricultural crops where runoff from the crop, either as irrigation return flow or agricultural stormwater, discharges into waters of the United States.

Consistent with the 2006 NPDES Pesticides Rule and the 2021 PGP, the Permit does not cover spray drift resulting from pesticide applications. Instead, to address spray drift, EPA is actively engaged in several initiatives to help minimize pesticide drift problems such as: (1) evaluating potential for drift as a routine part of pesticides risk assessments; (2) in collaboration with experts, improving scientific models and methods for estimating drift and risks from drift; (3) strengthening labeling for new pesticides and when re-evaluating older pesticides; (improving the clarity and enforceability of product label directions and drift management restrictions; and (4) promoting applicator education and training programs. More information on EPA's work on reducing pesticide drift is available at https://www.epa.gov/reducing-pesticide-drift.

Additionally, as outlined in the 2021 PGP, irrigation return flow (such as runoff from a crop field due to irrigation of that field) and agricultural stormwater runoff do not require NPDES permits, as exempted from the definition of point source under section 502(14) of the CWA. Neither the 2006 NPDES Pesticides Rule, the Sixth Circuit Court vacatur of that rule, nor any version of the EPA's national Pesticide General Permit for Discharges from the Application of Pesticides (PGP) have changed in any way the determination of whether certain types of stormwater discharges are required to obtain permit coverage, or under which permit coverage is required. This is true whether the discharge of pollutants contains pesticides or pesticide residues resulting from the application of pesticides. In particular, non-agricultural stormwater that may contain pesticides would not be eligible for coverage under this Permit, and is not required to obtain NPDES permit coverage unless otherwise required under section 402(p) of the Clean Water Act. Existing stormwater permits for construction, industrial activity, and regulated municipal separate storm sewer systems (MS4s) already address pesticides in stormwater from those sources. Thus, stormwater is either: (a) already subject to NPDES permit requirements pursuant to section 402(p) of the CWA or (b) is a discharge for which NPDES permit coverage is not currently required under section 402(p). The regulations that specify what types of stormwater require NPDES permits can be found in 40 CFR §122.26 and 122.30-122.37.

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2.3 Clean Water Act

Section 301(a) of the Clean Water Act (CWA) provides that "the discharge of any pollutant by any person shall be unlawful" unless the discharge is in compliance with certain other sections of the Act. 33 U.S.C. 1311(a). The CWA defines "discharge of a pollutant" as "(A) any addition of any pollutant to navigable waters from any point source, (B) any addition of any pollutant to the waters of the contiguous zone or the ocean from any point source other than a vessel or other floating craft." 33 U.S.C. 1362(12). A "point source" is any "discernible, confined and discrete conveyance" but does not include "agricultural stormwater discharges and return flows from irrigated agriculture." 33 U.S.C. 1362(14). The term "pollutant" includes, among other things, "garbage… chemical wastes, biological materials …and industrial, municipal, and agricultural waste discharged into water." 33 U.S.C. 1362(6). One way a person may discharge a pollutant without violating the section 301 prohibition is by obtaining authorization to discharge (referred to herein as "coverage") under a section 402 NPDES permit (33 U.S.C. 1342). Under section 402(a)(1), EPA may "issue a permit for the discharge of any pollutant, or combination of pollutants, notwithstanding section 1311(a)" upon certain conditions required by the Act.

2.4 Facility Background

Prior to applying for individual permit coverage, the Facility had applied for coverage under the 2021 PGP. However, coverage is being issued under this individual permit as the 2021 PGP does not cover facilities on LEFJs. Nonetheless, the requirements of this individual permit are closely aligned with the 2021 PGP, which authorizes the point source discharges of chemical pesticides (e.g., that leave a residue) to waters of the United States (i.e., the receiving waters in Buffalo Creek, Tower Creek and/or Carnelian Creek, as identified in the Permit). For development of the 2021 PGP, EPA considered the information gathered during the implementation of the 2016 PGP and comments on the draft 2021 PGP in finalizing the 2021 PGP. Supporting information and materials for the 2021 PGP, including the response to comment document, are included in Docket ID No. EPA-HQ-OW-2020-0005 available at https://www.regulations.gov/.

In alignment with the 2021 PGP, EPA offers the following guidance with respect to the use patterns of chemical pesticides covered by this Permit.

1. If the application of a chemical pesticide is made over the receiving waters in Buffalo Creek, Tower Creek and/or Carnelian Creek to control pests over the water, any amount of the pesticide that falls into the receiving waters in Buffalo Creek, Tower Creek and/or Carnelian Creek is "excess" pesticide and would require coverage by an NPDES permit.

2. If the application of a chemical pesticide is made into the receiving waters in Buffalo Creek, Tower Creek and/or Carnelian Creek to control a pest in such waters, any amount of the pesticide that remains in those waters and no longer provides any pesticidal benefit is a "residual" and would require coverage by an NPDES permit. See 40 CFR § 122.2 for the definition of pesticide residue.

3. This Permit authorizes discharges of pollutants associated with animal pest control, as defined in Section 2 of the Permit. As noted above, only point source discharges of pollutants to the receiving waters in Buffalo Creek, Tower Creek and/or Carnelian Creek require an NPDES permit, and it is beyond the scope of this SoB to identify all specific activities that do

or do not require a permit. However, to the extent that activities that fall within the covered category (i.e., animal pest control) require an NPDES permit, they can be authorized by this Permit. For animal pest control, in alignment with the 2021 PGP, the Permit specifies that covered activities include applications to control pests "in water and at water's edge." EPA intends for the phrase "at water's edge" to allow coverage of activities targeting pests that are not necessarily "in" the water but are near the water such that control of the pests results in a point-source discharge of pollutants to the receiving waters in Buffalo Creek, Tower Creek and/or Carnelian Creek.

For purposes of this Permit and in alignment with the 2021 PGP, EPA is relying on existing regulatory definitions in 40 CFR §§ 174.3 and 158.2100(a) developed under FIFRA to define the term "biological pesticides." As such, EPA identifies biological pesticides (also called "biopesticides" under FIFRA regulations) to include microbial pesticides [40 CFR § 158.2100(b)], biochemical pesticides [40 CFR § 158.2000(a)(1)] and plant-incorporated protectants. [40 CFR § 174.3]

EPA recognizes that there are many site-specific situations which will determine whether a pesticide application operation needs permit coverage. EPA is not attempting to define all such situations in this SoB. Additionally, any pesticide application activities that do not fall within the use pattern (i.e., animal pest control) covered by this Permit will require coverage under some other NPDES permit if those activities result in point source discharges of pollutants to the receiving waters in Buffalo Creek, Tower Creek and/or Carnelian Creek. However, to the extent pesticide application operations need permit coverage, the 2021 PGP does offer coverage for four pesticide use categories and this Permit may be modified to align with requirements of those use categories, as applicable.

This Permit does not cover discharges of pollutants that, by law, are not required to obtain NPDES permit coverage. Of note, the CWA specifically excludes from the definition of point source, "agricultural stormwater discharges and return flow from irrigated agriculture." Nothing in this Permit changes the effect of those statutory exemptions.

In alignment with the 2021 PGP's requirements, the following are also included in this individual permit:

- The 2021 PGP defines "Operator" (i.e., the entity required to obtain NPDES permit coverage for discharges) to include any (a) Applicator who performs the application of pesticides or has day-to-day control of the application of pesticides that results in a discharge to the receiving waters in Buffalo Creek, Tower Creek and/or Carnelian Creek, or (b) Decision-maker who controls any decision to apply pesticides that results in a discharge to the receiving waters in Buffalo Creek, Tower Creek and/or Carnelian Creek. There may be instances when a single entity acts as both an Applicator and a Decision-maker. For the purposes of this Permit, the term Operator is considered interchangeable with "Responsible Official" and/or "Permittee", in instances when this individual(s) act in either the Applicator or Decision-maker roles.
    - All Applicators are required to minimize pesticide discharges by using only the amount of pesticide and frequency of pesticide application necessary to control the target pest, maintain pesticide application equipment in proper operating condition, control discharges as necessary to meet applicable water quality standards, and monitor for and report any adverse incidents.
    - All Decision-makers are required, to the extent not determined by the Applicator, to minimize pesticide discharges by using only the amount of pesticide and frequency of

pesticide application necessary to control the target pest. All Decision-makers are also required to control discharges as necessary to meet applicable water quality standards and monitor for and report any adverse incidents.

2.5 Facility Process Description

The following background information was obtained from the Facility's NPDES permit applications.

The National Park Service will be conducting several native fish restoration projects. One of the steps in this process is to remove any nonnative fish found within the proposed work area using the chemical rotenone (e.g., Prenfish, CFT Legumine, or similar). The chemical will be applied to the system as a liquid through metered drip stations and backpack sprayers, or as a solid in a powered rotenone/sand/gelatin matrix. Rotenone will be neutralized using potassium permanganate at the downstream end of the treatment area. All discharges from pesticide application will take place over a several week period. Stations will discharge for up to six hours daily as the treatment moves downstream. Discharge from the neutralization station will take place during this same period at the downstream end of the treatment area.

The following figures provide mapped areas within Yellowstone National Park for the Buffalo (Figure 1), Tower and Carnelian Creek (Figure 2) treatment areas/zones in which the pesticide application will occur, as well as where these areas/zones are located within Yellowstone National Park overall (Figures 3 and 4).

For animal pest control, the annual treatment area threshold for the 2021 PGP was set at 80 acres or 20 linear miles of pesticide application to canals and other waters of the United States. Invasive and nuisance aquatic animals are most commonly treated by public agencies such as departments of fish and game, or utilities such as water management districts. The high mobility and prolific breeding abilities that necessitate control of aquatic animals usually mean that pesticide applications most often occur in the entirety or large portions of the water bodies they inhabit. Only spot applications to eradicate small emergent populations of sessile animals or applications to very small water bodies were potentially excluded from the 2021 PGP notice of intent (NOI) application requirements. Therefore, it is appropriate for the pesticide application activities associated with the National Park Service native fish restoration projects (described above) to receive similar permit coverage requirements in alignment with the 2021 PGP for relatively small Decision-makers (as defined in Appendix A of the Permit) engaging in this use pattern.

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Figure 1. Buffalo Creek in Park Treatment Zone

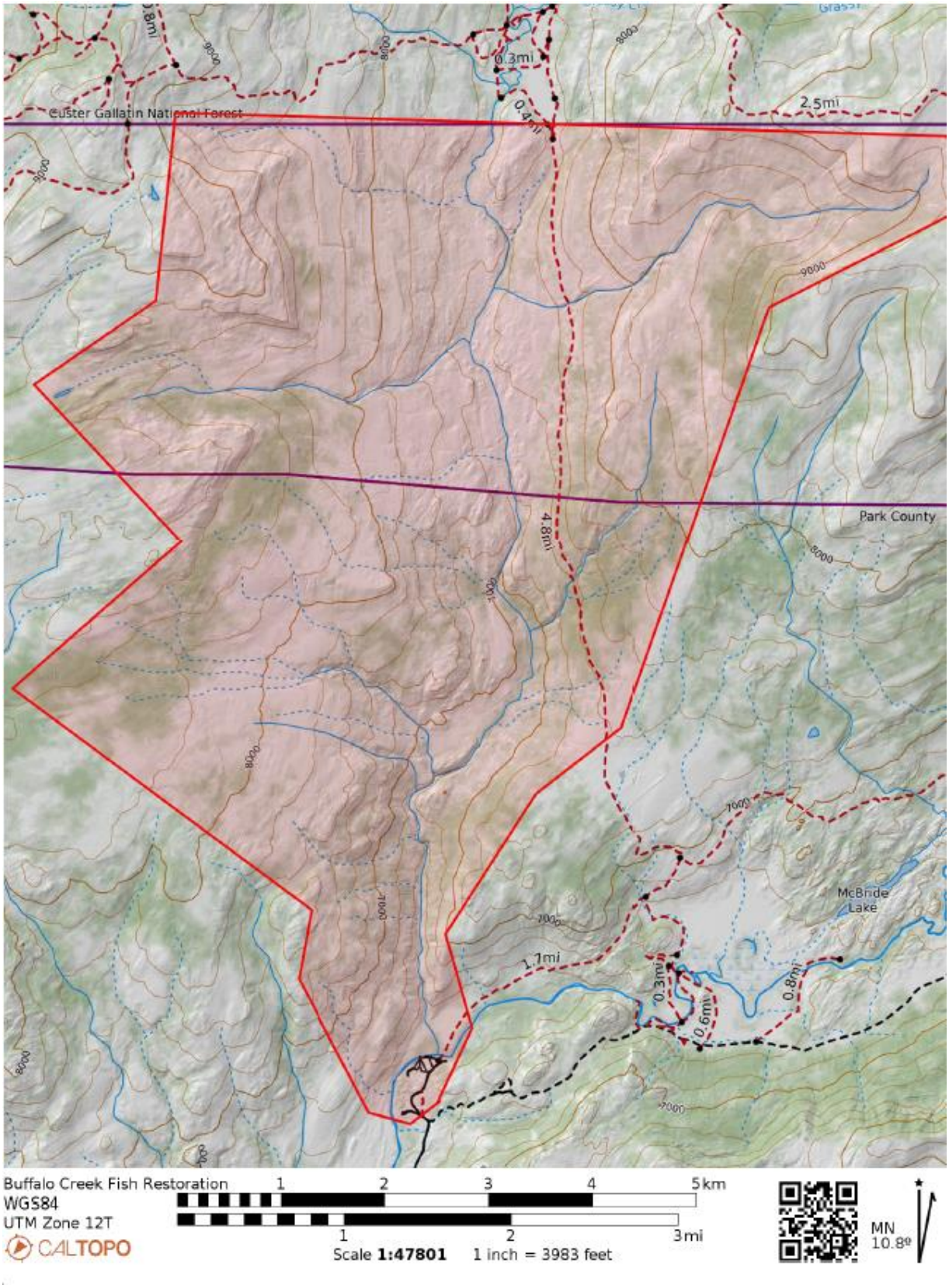


Figure 2. Tower Creek and Carnelian Creek Treatment Zone

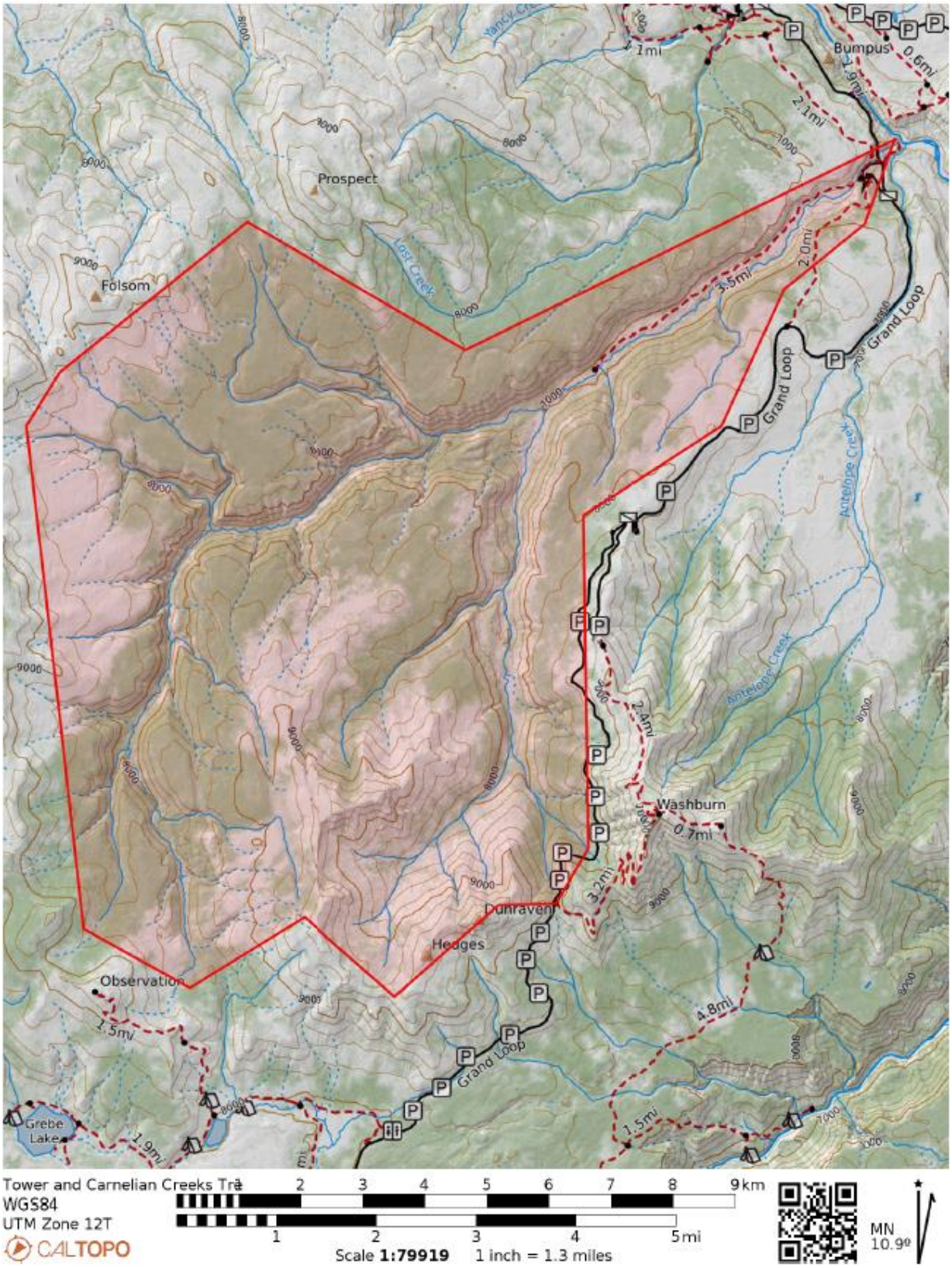


Figure 3: Overall Map of Yellowstone National Park

(*obtained 6/17/2025 from https://www.usgs.gov/media/images/yellowstone-national-park-map*)

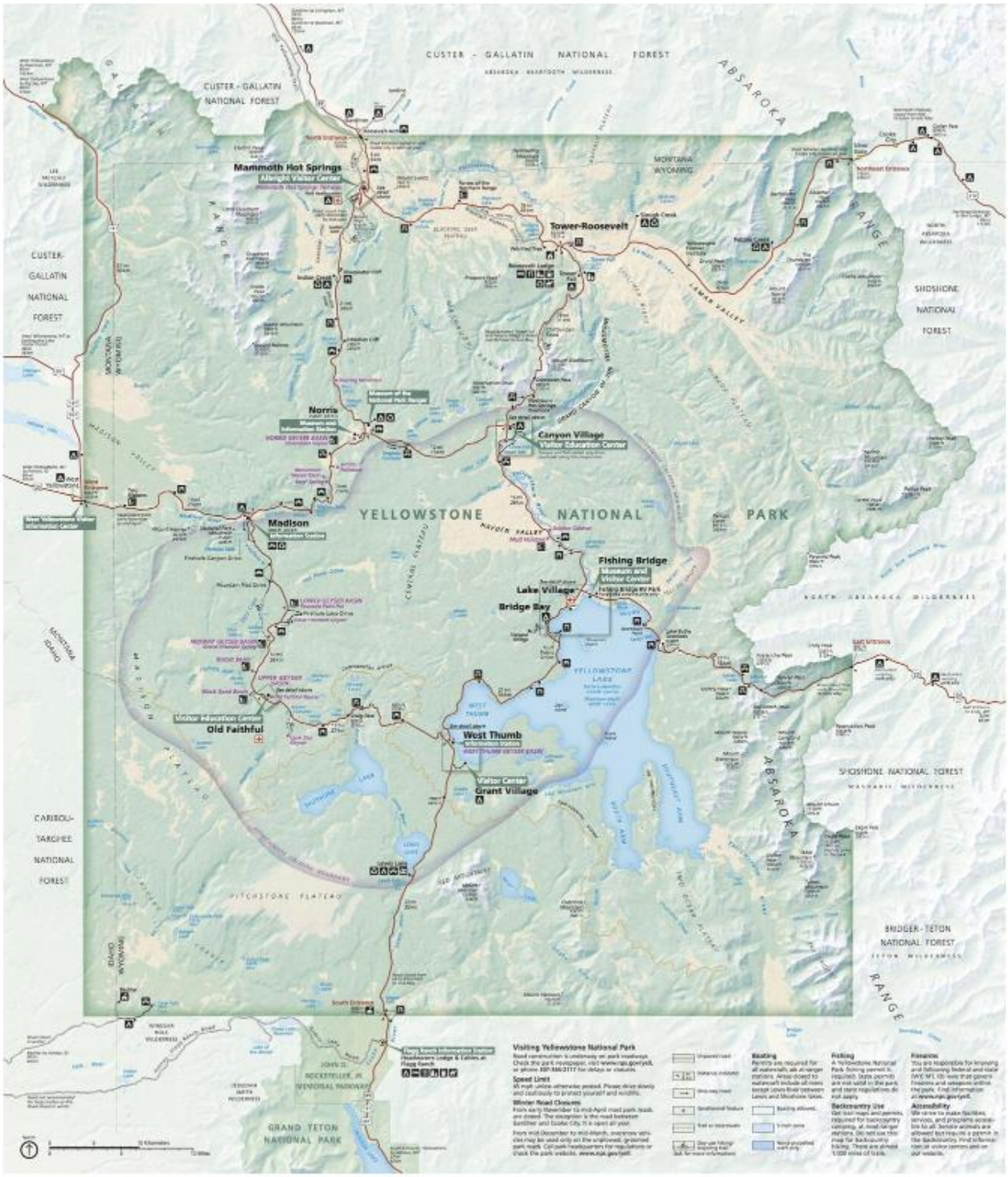
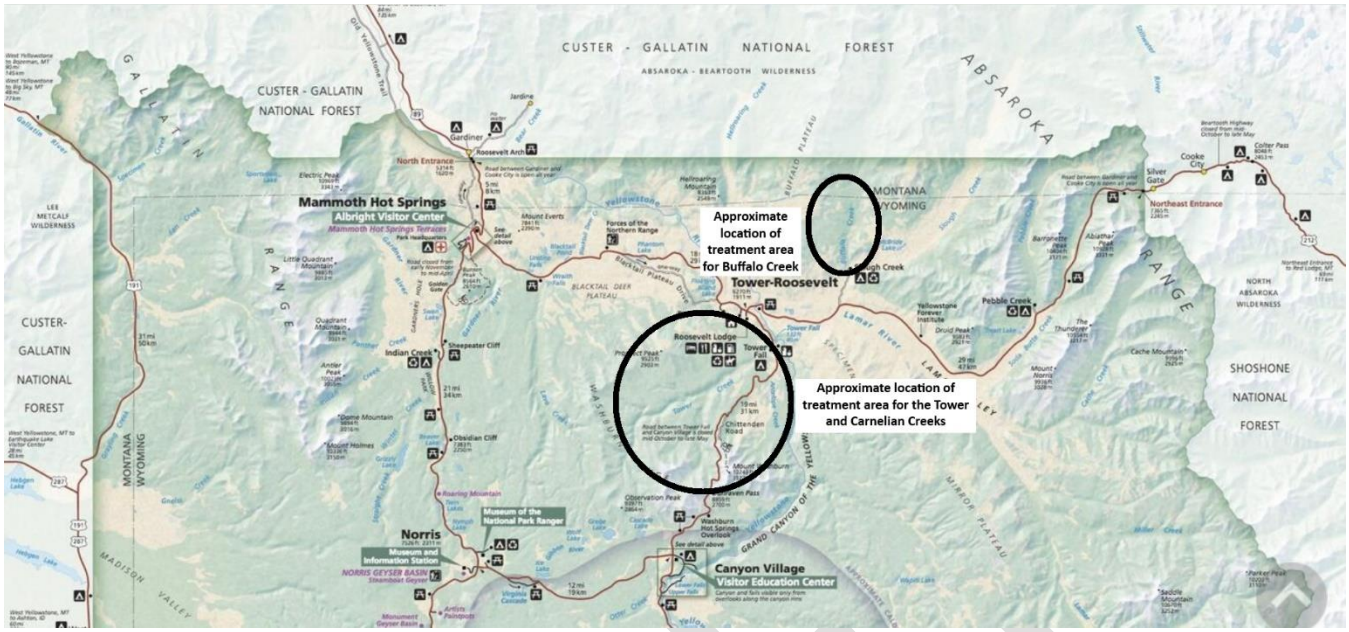


Figure 4: Approximate Locations of Treatment Areas within Yellowstone National Park



2.6 Pesticide Application/Chemicals Used

Based on the information provided in the permit application, all discharges from pesticide applications will take place over a several week period. Stations will discharge for up to six hours daily as the treatment moves downstream. Discharge from the neutralization station will take place during this same period at the downstream end of the treatment area.

Drip stations consist of a five-gallon water container, outfitted with a pipe stand and a control valve. Additionally, backpack sprayers may be used that are 3–4-gallon pressurized sprayers. The neutralization agent is dispensed as a powder through a dry auger outfitted with speed control to allow for the dispensing of potassium permanganate. This is measurable down to the 0.01 gram/minute.

Rotenone will be applied at the minimum label recommendation for removal of target species and confirmed by administrating a bioassay prior to the treatment of the system. Treatment effectiveness will be monitored throughout the process through the use of sentinel fish and by testing water for residual chemical. Rotenone will be neutralized using potassium permanganate at the downstream end of the treatment.

Based on the information given in the chemical labels provided with the permit application for FT Legumine Fish Toxicant (containing rotenone) and Rotenone Fish Toxicant Powder, the recommended active rotenone treatment concentrations for use are as follows:

Type of Use	Active Rotenone- Parts per Million (ppm)
Normal	0.025-0.05
Tolerant Species	0.05-0.15
Tolerant Species in Organic Ponds	0.10-0.20

Additionally, based on the general information given in these chemical labels, they are specially formulated products to be used in fisheries management for the eradication of fish from lakes, ponds, reservoirs, rivers and streams. The permit application also indicated that no listed resources of concern are located within the treatment area.

3 PERMIT HISTORY

This is the first EPA Region 8 NPDES permit issued to the Facility for pesticide application.

4 DESCRIPTION OF RECEIVING WATER

The GPS locations for the beginning and end of the project areas for pesticide application into receiving waters are as follows:

Buffalo Creek: Latitude: 45.028429, Longitude: -110.301223 to
Latitude: 44.949731, Longitude: -110.307854

Tower Creek: Latitude: 44.790268, Longitude: -110.542800 to
Latitude: 44.894832, Longitude: -110.383661

Carnelian Creek: Latitude: 44.801551, Longitude: -110.466256 to
Latitude: 44.894832, Longitude: -110.383661

Figures 1 and 2 in Section 2.5 of this SoB provide mapped images of the treatment zones for the Buffalo Creek, Tower Creek and Carnelian Creek treatment areas.

5 PERMIT LIMITATIONS

Background

The CWA requires that all point source discharges of pollutants from existing facilities, or in this case, pesticide applications, meet technology-based effluent limitations[1] (TBELs) representing the applicable levels of control (33 U.S.C. 1311(b)(1)(A)(BPT), (b)(2)(A)(BAT), (b)(2)(E)(BCT)). Additionally, water quality-based effluent limitations (WQBELs) are required where the technology-based effluent limitations are not sufficient to protect applicable water quality standards (33 U.S.C. 1311(b)(1)(C)). Water quality-based requirements will be discussed in greater depth in the "*Water Quality Based Effluent Limitations (WQBELs) Development"* part of this Section, and Section 5.2 of this SoB. In alignment with the TBELs contained in the 2021 PGP, this Permit will evaluate and incorporate applicable TBELs that are non-numeric and constitute the levels of control that reduce the area and

[1] *Natural Res. Def. Council, Inc. v. EPA, 673 F.2d 400, 403 (D.C. Cir. 1982)* (noting that "*section 502(11)* defines 'effluent limitation' as '*any* restriction' on the amounts of pollutants discharged, not just a numerical restriction"; holding that section of CWA authorizing courts of appeals to review promulgation of "any effluent limitation or other limitation" did not confine the court's review to the EPA's establishment of numerical limitations on pollutant discharges, but instead authorized review of other limitations under the definition) (emphasis added). In *Natural Res. Def. Council, Inc. v. Costle, 568 F.2d 1369 (D.C. Cir. 1977)*, the D.C. Circuit stressed that when numerical effluent limitations are infeasible, EPA may issue permits with conditions designed to reduce the level of effluent discharges of pollutants to acceptable levels.

duration of the discharge of pollutants to the receiving waters in Buffalo Creek, Tower Creek and/or Carnelian Creek.

<u>The Clean Water Act Requires EPA to Develop Effluent Limitations that Represent the Following:</u>

Best Practicable Control Technology Currently Available (BPT)

The CWA requires BPT effluent limitations for conventional, toxic, and non-conventional pollutants. Section 304(a)(4) designates the following as conventional pollutants: biochemical oxygen demand (BOD), total suspended solids, fecal coliform, pH, and any additional pollutants defined by the Administrator as conventional. The Administrator designated oil and grease as an additional conventional pollutant on July 30, 1979. 40 CFR § 401.16. EPA has identified 65 pollutants and classes of pollutants as toxic pollutants, of which 126 specific substances have been designated priority toxic pollutants. 40 CFR § 401.15 and 40 CFR Part 423 Appendix A. All other pollutants are considered to be non-conventional.

In specifying BPT, under CWA section 301(b)(1)(A); 304(b)(1)(B); 40 CFR § 125.3(d)(1), EPA evaluates a number of factors. EPA first considers the total cost of applying the control technology in relation to the effluent reduction benefits. The Agency also considers the age of the equipment and facilities, the processes employed, and any required process changes, engineering aspects of the control technologies, non-water quality environmental impacts (including energy requirements), and such other factors as the EPA Administrator deems appropriate. Traditionally, EPA establishes BPT effluent limitations based on the average of the best performance of facilities within the industry of various ages, sizes, processes, or other common characteristics. Where existing performance is uniformly inadequate, BPT may reflect higher levels of control than currently in place in an industrial category if the Agency determines that the technology can be practically applied.

Best Conventional Pollutant Control Technology (BCT)

The 1977 amendments to the CWA required EPA to identify effluent reduction levels for conventional pollutants associated with BCT for discharges from existing industrial point sources. CWA section 301(b)(2)(E); 304(b)(4)(B); 40 CFR § 125.3(d)(2). In addition to considering the other factors specified in section 304(b)(4)(B) to establish BCT limitations, EPA also considers a two part “cost-reasonableness'' test. EPA explained its methodology for the development of BCT limitations in 1986. 51 FR 24974 (July 9, 1986).

Best Available Technology Economically Achievable (BAT)

For toxic pollutants and non-conventional pollutants, EPA includes technology-based effluent limitations based on BAT in NPDES permits. CWA section 301(b)(2)(A); 304(b)(2)(B); 40 CFR § 125.3(d)(3). In establishing BAT, the technology must be technologically “available” and “economically achievable.” The factors considered in assessing BAT include the cost of achieving BAT effluent reductions, the age of equipment and facilities involved, the process employed, potential process changes, non-water quality environmental impacts, including energy requirements and other such factors as the EPA Administrator deems appropriate. The Agency retains considerable discretion in assigning the weight accorded to these factors. BAT limitations may be based on effluent reductions attainable through changes in an Operator’s processes and operations. Where existing performance is uniformly inadequate, BAT may reflect a higher level of performance than is currently being achieved within a particular subcategory based on technology transferred from a different

subcategory or category. BAT may be based upon process changes or internal controls, even when these technologies are not common industry practice.

In alignment with the 2021 PGP, the Permit contains effluent limitations that correspond to required levels of technology-based control (BPT, BCT, BAT) for discharges of pollutants under the CWA. Some effluent limitations have been established by examining other existing laws, requirements and practices. Because these are demonstrated practices, EPA has found that they are technologically available and economically practicable (BPT) or achievable (BAT).

Technology-Based Effluent Limitations (TBELs) Development

TBELs are in many cases established by EPA in regulations known as effluent limitations guidelines, or "ELGs." EPA establishes these regulations for specific industry categories or subcategories after conducting an in-depth analysis of that industry. The CWA sets forth different standards for the ELGs based upon the type of pollutant or the type of permittee involved. Where EPA has not issued effluent guidelines for an industry, EPA and State permitting authorities establish effluent limitations for NPDES permits on a case-by-case basis based on their best professional judgment. See 33 U.S.C. § 1342(a)(1); 40 CFR § 125.3(c)(2).

As stated above, the CWA establishes two levels of technology-based controls. The first level of control, "best practicable control technology currently available," or "BPT" applies to all pollutants. CWA section 304(b)(1)(B); 33 U.S.C. 1314(b)(1)(B). BPT represents the initial stage of pollutant discharge reduction, designed to bring all sources in an industrial category up to the level of the average of the best source in that category. See *EPA v. National Crushed Stone Association*, 449 U.S. 64, 75-76 (1980). In the second level of control, all point sources are required to meet effluent limitations based on "best conventional pollutant control technology," or "BCT" CWA section 304(b)(4)(B); 33 U.S.C. 1314(b)(4)(B) or "best available technology economically achievable," or "BAT" CWA section 301(b)(2)(A); 33 U.S.C. 1311(b)(2)(A), depending on the types of pollutants discharged. BCT applies to conventional pollutants, listed at 40 CFR § 401.16 (biological oxygen demand (BOD), pH, fecal coliform, TSS, and oil and grease). BAT applies to toxic and non-conventional pollutants. Technology-based limitations are to be applied throughout industry without regard to receiving water quality (*Appalachian Power Co. v. EPA*, 671 F.2d 801 (4th Cir. 1982)).

EPA's Authority to Include Non-Numeric TBELs in this Permit, in Alignment with the 2021 PGP

All NPDES permits are required to contain applicable TBELs (40 CFR §§ 122.44(a)(1) and 125.3; and CWA sections 301(b)(1)(A) for (BPT); 301(b)(2)(A) for (BAT); and 301(b)(2)(E) for (BCT)). TBELs in the 2021 PGP represent the BPT (for conventional, toxic, and non-conventional pollutants), BCT (for conventional pollutants), and BAT (for toxic pollutants and non-conventional) levels of control for the applicable pollutants. When EPA has not promulgated effluent limitation guidelines for an industry, or if an Operator is discharging a pollutant not considered in the development of the effluent guideline, permit limitations are based on the best professional judgment (BPJ, sometimes also referred to as "best engineering judgment") of the permit writer (33 U.S.C. § 1342(a)(1); 40 CFR § 125.3(c). See *Student Public Interest Group v. Fritzsche, Dodge & Olcott*, 759 F.2d 1131, 1134 (3rd Cir. 1985); *American Petroleum Inst. v. EPA*, 787 F.2d 965, 971 (5th Cir. 1986)). For this Permit, in alignment with the 2021 PGP, the technology-based effluent limitations are based on BPJ decision-making because no ELG applies.

Under EPA's regulations, non-numeric effluent limitations are authorized in lieu of numeric limitations, where "[n]umeric effluent limitations are infeasible." (40 CFR § 122.44(k)(3)). Through the Agency's NPDES permit regulations, EPA also interpreted the CWA to allow best management practices (BMPs) to take the place of numeric effluent limitations under certain circumstances. Federal regulations at 40 CFR §122.44(k), entitled "Establishing limitations, standards, and other permit conditions (applicable to state NPDES programs ...)," provides that permits may include BMPs to control or abate the discharge of pollutants when: (1) "[a]uthorized under section 402(p) of the CWA for the control of stormwater discharges"; or (2) "[n]umeric effluent limitations are infeasible." 40 CFR § 122.44(k).

Additionally, courts have held that the CWA does not require EPA to set numeric limitations where such limits are infeasible. *Citizens Coal Council v. EPA*, 447 F.3d 879, 895-96 (6th Cir. 2006). The Sixth Circuit cited *Waterkeeper Alliance, Inc. v. EPA,* 399 F.3d 486, 502 (2nd Cir. 2005), stating "site-specific BMPs are effluent limitations under the CWA." Additionally, the Sixth Circuit cited *Natural Res. Def. Council, Inc. v. EPA*, 673 F.2d 400, 403 (D.C.Cir.1982) noting that "section 502(11) [of the CWA] defines 'effluent limitation' as '*any* restriction' on the amounts of pollutants discharged, not just a numerical restriction."[2]

Therefore, this Permit (in alignment with the 2021 PGP) is using the term "Pest Management Measures," as defined in Appendix A of the Permit, to represent those practices used to meet the non-numeric effluent limitations.

EPA's Decision to Include Non-Numeric Technology-Based Effluent Limitations in the Permit, in Accordance with the 2021 PGP Rationale for Why the Limits Represent the Appropriate (BPT, BCT, or BAT) Level of Control.

As described above, numeric effluent limitations are not always feasible because the discharges of pollutants pose challenges not presented by other types of NPDES-regulated discharges of pollutants. The technology-based effluent limitations in this Permit are non-numeric based on the following:

- The point in time for which a numeric effluent limitation would apply is not easily determinable. For discharges of pollutants from the application of pesticides, the discharges of pollutants can be highly intermittent with those discharges of pollutants not practically separable from the pesticide application itself. For example, the discharge from the application of a chemical pesticide to waters of the United States is a discharge of pollutants when there is a residual remaining in the ambient water after the pesticide is no longer serving its intended purpose (*i.e.*, acting as a pesticide against targeted pests in the applied medium). This discharge of pollutants also will have combined with any other discharges of pollutants to that waterbody (be it from other point sources, non-point source runoff, air deposition, etc.). Given this situation, it is not clear what would be measured for a numeric limit or when.
- For discharges from the application of pesticides, there are often many short durations, highly variable, pollutant discharges to surface waters from many different locations for which it would be difficult to establish a numeric limitation at each location. This variability makes

[2] *See also*; *Northwest Envtl. Advocates v. City of Portland*, 56 F.3d 979, 988 (9th Cir. 1995) (finding that a narrative effluent limitation was an enforceable condition of an NPDES permit).

setting reasonable and fair numeric effluent limitations for pesticide applications extremely difficult. Even in a normal plant specific setting, EPA takes into account the variability of pollutant removal performance at a facility operated in compliance with applicable statutory and regulatory requirements to derive TBELs. In the WQBELs context, EPA takes into account ambient conditions of the waterbody which can require complex modelling and formulas to derive what discharge of pollutant level is necessary, without being overly stringent, to protect water quality. In the context of pesticide application, the numbers of variables that would affect such a calculation becomes unworkable. In this situation, requiring the use of standard control practices (*i.e.*, narrative non-numeric effluent limitations), provides a reasonable approach to control pesticide discharges of pollutants.

- The precise location for which a numeric effluent limitation would apply is not clear. Discharges from the application of pesticides are different from discharges of pollutants of process wastewater from a particular industrial or commercial facility where the effluent is more predictable and easily identified as an effluent from a conveyance (*e.g.*, pipe or ditch), can be precisely measured for compliance prior to discharge, and can be more effectively analyzed to develop numeric effluent limitations.
- EPA does not have sufficient information to develop numeric effluent limitations at this time. To develop numeric TBELs, EPA must evaluate factors outlined in 40 CFR § 125.3, such as the age of equipment and facilities involved, the process employed, the potential process changes, and non-water quality environmental impacts.

In the context of this Permit, in alignment with the 2021 PGP, EPA has determined these non-numeric effluent limits represent the best practicable technology (BPT) for all pollutants, the best conventional pollutant control technology for conventional pollutants (BCT) and the best available technology economically achievable (BAT) for toxic and non-conventional pollutants. EPA has determined that the combination of pollution reduction practices described below are the most environmentally sound way to control the point source discharges of biological pesticides, and chemical pesticides that leave a residue.

TBELs in this Permit are presented specific to the animal pest control use pattern, in alignment with the 2021 PGP, to reflect the procedures and expectations for the use and application of pesticides. These non-numeric effluent limitations are expected to reduce the point source discharges of pollutants to the receiving waters in Buffalo Creek, Tower Creek and/or Carnelian Creek, thereby protecting the receiving waters, including to the extent necessary to meet applicable water quality standards. In alignment with the 2021 PGP, the Permit will use the term “Pest Management Measures.” Use of the term Pest Management Measures is intended to better describe the range of pollutant reduction practices that may be employed when applying pesticides, whether they are structural, non-structural or procedural and includes BMPs as one of the components.

The BAT/BPT/BCT effluent limitations in this Permit are expressed as specific pollution prevention requirements for minimizing the pollutant levels in the discharge. In the context of this Permit and in alignment with the 2021 PGP, these requirements represent the best technologically available and economically practicable and achievable controls. EPA has determined that the combination of pollution prevention approaches and structural management practices required by these limits are the most environmentally sound way to control the discharge of pollutants to meet the effluent limitations.

Requirements are technologically available

EPA has found that the requirements of this Permit represent the appropriate level of control representing BPT, BCT, and BAT. In alignment with the 2021 PGP, this Permit requires certain Operators to implement Pest Management Measures to meet the TBELs that are based on Integrated Pest Management principles. See further discussion of pest management measures below. Unlike Permits, the technology available to Operators depends on the type of Operator (e.g. Applicator v. Decision-maker). For this reason, TBELs vary depending on Operator type. As an example of an effluent limit that meets BPT and BAT standards, applicators are required to maintain pesticide application equipment in proper operating condition, including requirement to calibrate, clean, and repair such equipment and prevent leaks, spills, or other unintended discharges. This effluent limitation is not appropriate for decision-makers that do not apply the pesticide themselves and as such, is not an effluent limitation for decision-makers. EPA determined that calibrating, cleaning, and repairing pesticide application equipment is technologically available and based on EPA's evaluation of this industry, is currently being implemented by many operators and is a practice that every operator should be doing when using pesticides, as a way to prevent leaks, spills, and other unintended discharges, such as over-applying pesticides as a result of poorly maintained equipment.

Requirements meet the BPT and BAT economic tests set forth in the CWA

There are different economic considerations under BPT, BCT, and BAT. This Permit aligns with the 2021 PGP, which contained limits that EPA determined to meet the BPT and BAT economic tests. Because the types of controls under consideration minimize toxic, nonconventional, and conventional pollutants, conventional pollutants are controlled by the same practices that control toxic and nonconventional pollutants. Hence, EPA evaluated effluent limits using a BPT and a BAT standard, but since conventional pollutants would also be adequately controlled by these same effluent limits for which EPA applied the BPT and BAT tests, EPA determined that it was not necessary to conduct BCT economic tests.

Under BPT, EPA has determined that the requirements of this Permit are economically practicable since they contain the same requirements as found in the 2021 PGP. To make the original BPT determination, EPA considered the reasonableness of the relationship between the costs of application of technology in relation to the effluent reduction benefit derived (CWA section 301(b)(1)(B); 40 CFR § 125.3(d)(1)). This analysis was documented in the fact sheet accompanying the 2011 PGP (available at https://downloads.regulations.gov/EPA-HQ-OW-2010-0257-1276/content.pdf). In light of the original BPT determination and the fact that the Permit does not alter per entity compliance costs, EPA finds that the BPT limits have a cost that is justified by the effluent reduction resulting from the BPT effluent limitations and that for BAT, the costs are economically achievable because they can reasonably be borne by the industry as a whole.

EPA continues to study the efficacy of various types of pollution prevention measures and BMPs; however, for this Permit numeric limitations are still not feasible.

Requirements have acceptable non-water quality environmental impacts.

EPA finds that the controls in the Permit have acceptable non-water quality environmental impacts. Because the Permit is in alignment with the 2021 PGP, there are no significant changes to the non-water quality environmental impacts. EPA also notes that the requirement to comply with the FIFRA label incorporates the consideration of the environmental impacts of the pesticide's use with the

benefits of the pesticide's use. When EPA determines that a pesticide product can be registered for use, the Agency has concluded that the use of the pesticide product will not cause unreasonable adverse effects to humans or the environment when applied according to the label directions and restrictions. "Unreasonable adverse effects" takes into account the economic, social, and environmental costs and benefits of the use of the pesticide. EPA finds that the pollutant discharges authorized by this Permit have recreational, environmental or other human benefits. This Permit also includes permit terms which provide reasonable protection to impacted receiving waters in Buffalo Creek, Tower Creek and/or Carnelian Creek without constraining the use of these pesticides which provide acceptable non-water quality environmental impacts.

Pest Management Measures Used to Meet the TBELs

Just as there is variability in the pesticide applications as described above, there is variability in the Pest Management Measures that can be used to meet the effluent limitations. Therefore, EPA is not mandating the specific Pest Management Measures that Operators must implement to meet the limitations. This is analogous to an industrial situation where discharges of pollutants to waters of the United States are via pipes and a numeric effluent limitation may be specified as a given quantity of pollutant that may be discharged, but EPA would not specify what technology should be employed to meet that limitation. A given Pest Management Measure may be acceptable and appropriate in some circumstances but not in others. In this respect, the non-numeric effluent limitations in the Permit are similar to performance-based numeric effluent limitations, which also do not require specific control technologies as long as the limitations are met.

Pest Management Measures can be actions (including processes, procedures, schedules of activities, prohibitions on practices, and other management practices), or structural or installed devices to prevent or reduce water pollution. The key is determining what measure is appropriate for the situation in order to meet the effluent limitation. In this Permit, Operators are required to implement site-specific Pest Management Measures to meet these effluent limitations. The Permit along with this SoB provide examples of Pest Management Measures, but Operators must tailor these to their situations as well as improve upon them as necessary to meet the effluent limitations.

The approach to Pest Management Measures in this Permit is consistent with the 2021 PGP and the CWA, as well as its implementing regulations at 40 CFR § 122.44(k)(4). Section 402(a)(2) of the CWA states: "The administrator shall prescribe conditions for such permits to assure compliance with the requirements in paragraph (1) . . . including conditions on data and information collection, reporting and such other requirements as he deems appropriate." (Section 402(a)(1) includes effluent limitation requirements.) This statutory provision is reflected in the CWA implementing regulations, which state that BMPs (in this case, specifically Pest Management Measures) can be included in permits when, "[t]he practices are reasonably necessary to achieve effluent limitations and standards or to carry out the purposes and intent of the CWA." (40 CFR § 122.44(k)(4))

Implementation of Pest Management Measures

Section 6.1 of the Permit requires Operators to implement Pest Management Measures to meet the TBELs listed in that Part. It also provides Operators with important considerations for the implementation of their specific Pest Management Measures. Some Decision-makers will have to document how such factors were taken into account in the implementation of their Pest Management Measures. EPA recognizes that not all of these considerations will be applicable to

every pest management area nor will they always affect the choice of Pest Management Measures. EPA expects that Operators have the experience and working knowledge to apply pesticides properly. In alignment with the 2021 PGP, the Permit requires the Operator to apply such expertise and working knowledge to use best professional judgment in meeting the Permit terms. If Operators find their Pest Management Measures are not minimizing discharges of pollutants adequately, the Pest Management Measures must be modified as expeditiously as practicable. See Section 8 of the Permit, Corrective Action.

EPA also recognizes that Operators need the flexibility to tailor Pest Management Measures to their situation as well as improve upon them as necessary to meet the TBELs. Decision-makers will tailor Pest Management Measures based on available information and the best professional judgment of qualified personnel. For example, while Section 6.1.2 of the Permit requires Decision-makers to evaluate other means than pesticide use, the Decision-makers ultimately decide what ultimate pest control method is employed. Thus, while mechanical pest removal or less toxic chemicals may be possible options, the Decision-maker is in the best position to know what method is most appropriate and effective against the target pest.

Pest Management Measures and Technology-Based Effluent Limitations – Definition of "Minimize"

EPA has found that the requirements of the 2021 PGP represent the appropriate BPT, BCT and BAT level of control. This Permit aligns with those requirements. The non-numeric effluent limitations require Operators to "minimize" discharges of pollutants. Consistent with the control level requirements of the CWA, the term "minimize" means to reduce and/or eliminate pollutants discharges to waters of the United States through the use of Pest Management Measures to the extent technologically available and economically achievable and practicable. For many pesticide applications, minimization of the discharge of pesticides to waters of the United States can be achieved without using highly engineered, complex pest control systems. The specific limits included in Section 6.1 of the Permit emphasize effective "low-tech" approaches, including using only the amount of pesticide product and frequency of pesticide application necessary to control the target pest, performing equipment maintenance and calibration, assessing weather conditions prior to pesticide application, accurately identifying the pest problem, efficiently and effectively managing the pest problem, and properly using pesticides.

Statutes, Regulations, and Other Requirements

In addition to the applicable Permit requirements, Operators must comply with all applicable statutes, regulations and other requirements including, but not limited to, requirements contained in the labeling of pesticide products approved under FIFRA ("FIFRA labeling"). See Section 4 of the Permit. See also Section 6.1 ("As stated in Section 4, this Permit requires all Operators to comply with all other applicable federal or state laws and regulations that pertain to application of pesticides by the Operator."). Although the FIFRA label and labeling requirements are not effluent limitations, it is illegal to use a registered pesticide inconsistent with its labeling. In fact, Operators discharging under this Permit must comply with FIFRA labeling requirements in order to be in compliance with the Permit TBELs. Per Sections 6.1.1 and 6.1.2 of the Permit, "To meet the effluent limitations of this Permit, all Applicators [or Decision-makers] must implement Section 6.1.1 [or Section 6.1.2] to minimize the discharge of pesticides to the receiving waters in Buffalo Creek, Tower Creek and/or Carnelian Creek from the application of pesticides, through the use of Pest Management Measures, as defined in Appendix A." Per Appendix A, Pest Management Measure means "any practice used to

meet the effluent limitations that comply with manufacturer specifications, industry standards and recommended industry practices related to the application of pesticides, relevant legal requirements and other provisions that a prudent Operator would implement to reduce and/or eliminate pesticide discharges to the receiving waters in Buffalo Creek, Tower Creek and/or Carnelian Creek." Pest Management Measures include FIFRA labeling requirements. Therefore, if Operators apply a pesticide in a manner inconsistent with any relevant water-quality related FIFRA labeling requirements such as those relating to application sites, rates, frequency, and methods, as well as provisions concerning proper storage and disposal of pesticide wastes and containers, the Operators would be in violation of the effluent limitation to minimize pesticides entering the receiving waters in Buffalo Creek, Tower Creek and/or Carnelian Creek. For example, an Operator, who is a pesticide Applicator, decides to use a mosquito adulticide pesticide product with a FIFRA label that contains the following language, "Apply this product at a rate not to exceed one pound per acre." The Applicator applies this product at higher than the allowable rate, which results in excess product being discharged into waters of the United States. EPA would find that this application was a misuse of the pesticide under the FIFRA label. Because of the misuse the Agency might also determine that the effluent limitation that requires the Operator to minimize discharges of pollutants to waters of the United States was violated, depending on the specific facts and circumstances. Therefore, pesticide use inconsistent with certain FIFRA labeling requirements could result in the Operator being held liable for a CWA violation as well as a FIFRA violation.

5.1 Technology-Based Effluent Limitations (TBELs)

As previously indicated, for the purposes of this Permit, the term Operator is considered interchangeable with “Responsible Official” and/or “Permittee”, in instances when this individual(s) act in either the Applicator or Decision-maker roles. An Applicator is an entity who performs the application of a pesticide or who has day-to-day control of the application (*i.e.*, they are authorized to direct workers to carry out those activities) that results in a discharge to the receiving waters in Buffalo Creek, Tower Creek and/or Carnelian Creek. A Decision-maker is an entity with control over the decision to perform pesticide applications, including the ability to modify those decisions that result in discharges of pollutants to the receiving waters in Buffalo Creek, Tower Creek and/or Carnelian Creek. As such, more than one Operator may be responsible for compliance with this Permit for any single discharge from the application of pesticides.

The TBELs of this Permit, in alignment with the 2021 PGP, require the Operator to minimize the discharge of pollutants to the receiving waters in Buffalo Creek, Tower Creek and/or Carnelian Creek from the application of pesticides. Consistent with the control level requirements of the CWA, the term “minimize” means to reduce and/or eliminate pollutant discharges to the receiving waters in Buffalo Creek, Tower Creek and/or Carnelian Creek through the use of Pest Management Measures to the extent technologically available and economically achievable and practicable for the category or class of point sources covered under the Permit, taking into account any unique factors relating to the Operators to be covered under the Permit.

EPA has delineated the non-numeric effluent limitations into tasks that EPA expects the Applicator to perform and tasks that EPA expects the Decision-maker to perform. In doing so, EPA has assigned the Applicator and the Decision-maker different responsibilities. The TBELs section is therefore divided into two parts:

- The first part applies to all Applicators and addresses the general requirement to minimize discharges from the application of pesticides. In this part, all Applicators must minimize discharges of pollutants by using only the amount of pesticide product per application and frequency of pesticide applications necessary to control the target pest, performing regular maintenance activities, calibrating and cleaning/repairing application equipment, and assessing weather conditions in the treatment area.

- The second part requires certain Decision-makers to implement pest management measures that involve the following: (1) identifying and assessing the pest problem; (2) assessing effective pest management; and (3) following specified procedures for pesticide application (see Section 6.1.2 of the Permit).

Applicators' Responsibilities

Section 6.1.1 of the Permit contains the general TBELs that *all* Applicators must perform, regardless of pesticide use pattern. These effluent limitations are generally preventative in nature and are designed to minimize pesticide discharges into the receiving waters in Buffalo Creek, Tower Creek and/or Carnelian Creek. All Applicators are required to minimize the discharge of pesticides to the receiving waters in Buffalo Creek, Tower Creek and/or Carnelian Creek by doing the following:

To meet the effluent limitations of this Permit, all Applicators must implement the following:

1. To the extent not determined by the Decision-maker, use only the amount of pesticide and frequency of pesticide application necessary to control the target pest, using equipment and application procedures appropriate for this task.

    - As noted earlier, it is illegal to use a pesticide in any way prohibited by the FIFRA labeling. Also, use of pesticides must be consistent with any other applicable state or federal laws. To minimize the total amount of pesticide discharged, Operators must use only the amount of pesticide and frequency of pesticide application necessary to control the target pest. Using only the amount of pesticide and frequency of pesticide application needed ensures maximum efficiency in pest control with the minimum quantity of pesticide. Using only the amount and frequency of applications necessary can result in cost and time savings to the user. To minimize discharges of pollutants, Operators should base the rate and frequency of application on what is known to be effective against the target pest.

2. Maintain pesticide application equipment in proper operating condition, including requirement to calibrate, clean, and repair such equipment and prevent leaks, spills, or other unintended discharges.

    - Common-sense and good housekeeping practices enable pesticide users to save time and money and reduce the potential for unintended discharge of pesticides to the receiving waters in Buffalo Creek, Tower Creek and/or Carnelian Creek. Regular maintenance activities should be practiced and improper pesticide mixing, and equipment loading should be avoided. When preparing the pesticides for application be certain that you are mixing them correctly and preparing only the amount of material that you need. Carefully choose the pesticide mixing and loading area and avoid places where a spill will

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discharge into the receiving waters in Buffalo Creek, Tower Creek and/or Carnelian Creek. Some basic practices Operators should consider are:

- Inspect pesticide containers at purchase to ensure proper containment;
- Maintain clean storage facilities for pesticides;
- Regularly monitor containers for leaks;
- Rotate pesticide supplies to prevent leaks that may result from long term storage; and
- Promptly deal with spills following manufacturer recommendations.

To minimize discharges of pollutants, Applicators must ensure that the rate of application is calibrated (*i.e.,* nozzle choice, droplet size, etc.) to deliver the appropriate quantity of pesticide needed to achieve greatest efficacy against the target pest. Improperly calibrated pesticide equipment may cause either too little or too much pesticide to be applied. This lack of precision can result in excess pesticide being available or result in ineffective pest control. When done properly, equipment calibration can assure uniform application to the desired target and result in higher efficiency in terms of pest control and cost. It is important for Applicators to know that pesticide application efficiency and precision can be adversely affected by a variety of mechanical problems that can be addressed through regular calibration. Sound maintenance practices to consider are:

- Choosing the right spray equipment for the application
- Ensuring proper regulation of pressure and choice of nozzle to ensure desired application rate
- Calibrating spray equipment prior to use to ensure the rate applied is that required for effective control of the target pest
- Cleaning all equipment after each use and/or prior to using another pesticide unless a tank mix is the desired objective and cross contamination is not an issue
- Checking all equipment regularly (*e.g*., sprayers, hoses, nozzles, etc.) for signs of uneven wear (*e.g.*, metal fatigue/shavings, cracked hoses, etc.) to prevent equipment failure that may result in inadvertent discharge into the environment
- Replacing all worn components of pesticide application equipment prior to application.

3. Assess weather conditions (e.g., temperature, precipitation, and wind speed) in the treatment area to ensure application is consistent with all applicable federal requirements.
   - Weather conditions may affect the results of pesticide application. Applicators must assess the treatment area to determine whether weather conditions support pest populations and are suitable for pesticide application.

<u>Decision-Maker's Responsibilities:</u>

To meet the effluent limitations of the Permit, all Decision-makers must minimize the discharge of pesticides to the receiving waters in Buffalo Creek, Tower Creek and/or Carnelian Creek from the application of pesticides, through the use of Pest Management Measures, defined as any practice used to meet the effluent limitations that comply with manufacturer specifications, industry standards and recommended industry practices related to the application of pesticides, relevant legal requirements, and other provisions that a prudent Operator would implement to reduce

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and/or eliminate pesticide discharges to the receiving waters in Buffalo Creek, Tower Creek and/or Carnelian Creek.

Section 6.1.2 of the Permit contains the effluent limitations that Decision-makers must perform. In alignment with the 2021 PGP, the Permit requires *all* Decision-makers, to the extent Decision-makers determine the amount of pesticide or frequency of pesticide application, to minimize the discharge of pesticides to the receiving waters in Buffalo Creek, Tower Creek and/or Carnelian Creek from the application of pesticides, through the use of Pest Management Measures, as defined in Appendix A of the Permit, by using only the amount of pesticide and frequency of pesticide application necessary to control the target pest. In addition, Section 6.1.2 of the Permit requires that the Decision-maker identify the pest problem, implement effective and efficient pest management options, and adhere to certain pesticide use provisions.

Decision-makers are required to perform each of these Permit conditions prior to the first pesticide application covered under this Permit that will result in a discharge to receiving waters, and at least once each calendar year thereafter. These additional TBELs are based on integrated pest management principles. EPA is requiring certain Decision-makers to also comply with a different technology-based effluent limitation than Applicators because the Agency has determined that they are the Best Available Technology Economically Achievable for these Operators. These requirements are aimed at reducing discharge of pesticides to the receiving waters in Buffalo Creek, Tower Creek and/or Carnelian Creek and lessening the adverse effects of pesticides that are applied. Each pesticide use pattern has specific limitations, and these requirements are divided into the follow three general sections (additional detailed information for these sections is outlined below):

(1) identify the problem,
(2) pest management options, and
(3) pesticide use.

For each pest management area, Decision-makers must identify the problem prior to pesticide application, consider using a combination of chemicals and non-chemical Pest Management Measures, and perform surveillance before pesticide application to reduce environmental impacts. In alignment with the 2021 PGP, the pest management area is defined as: The area of land, including any water, for which an Operator has responsibility and is authorized to conduct pest management activities as covered by this Permit (*e.g.*, for an Operator who is a mosquito control district, the pest management area is the total area of the district).

The Decision-maker must do the following for each pest management area:

1. Identify areas with pest problems and characterize the extent of the problems, including for example water use goals not attained (e.g., wildlife habitat, fisheries, vegetation, and recreation).

2. Identify target pest(s).

3. Identify possible factors causing or contributing to the problem (e.g., nutrients, invasive species).

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4. Establish any pest- and site-specific action threshold for implementing the Pest Management Options (in item 6 of this Section, below). Action threshold is defined as: the point at which pest populations or environmental conditions necessitate that pest control action be taken based on economic, human health, aesthetic, or other effects. An action threshold may be based on current and/or past environmental factors that are or have been demonstrated to be conducive to pest emergence and/or growth, as well as past and/or current pest presence. Action thresholds are those conditions that indicate both the need for control actions and the proper timing of such actions.

5. In the event there are no data for the pest management area in the past calendar year, use other available data as appropriate to meet the above Permit conditions.

6. Pest Management Options. Prior to the time of the first pesticide application covered under this Permit that will result in a discharge to the receiving waters in Buffalo Creek, Tower Creek and/or Carnelian Creek, and at least once each year thereafter prior to the first pesticide application during that calendar year, the Decision-maker must select and implement efficient and effective means of Pest Management Measures that minimize discharges resulting from the application of pesticides to control pests. In developing the Pest Management Measures for each pest management area, the Decision-maker must evaluate the following management options, including a combination of these management options, considering impact to water quality, impact to non-target organisms, feasibility, and cost effectiveness:
    a. No action;
    b. Prevention;
    c. Mechanical or physical methods;
    d. Cultural methods;
    e. Biological control agents;
    f. Pesticides.

7. Pesticide Use. If a pesticide is selected to manage pests and application of the pesticide will result in a discharge to the receiving waters in Buffalo Creek, Tower Creek and/or Carnelian Creek, the Decision-maker must:
    a. Conduct surveillance in an area that is representative of the pest problem prior to each application to assess the pest management area and to determine when the action threshold(s) is met; and
    b. Reduce the impact on the environment and non-target organisms by evaluating site restrictions, application timing, and application method in addition to applying the pesticide only when the action threshold(s) has been met.

In addition to the above requirements, EPA is requiring additional TBEL requirements from Decision-makers and not the Applicators because the measures necessary to meet these requirements are within the control of the Decision-makers, not the Applicators. These TBELs are based on integrated pest management principles. Integrated pest management, as defined in FIFRA, is a sustainable approach to managing pests by combining biological, cultural, physical, and chemical tools in a way that minimizes economic, health, and environmental risks. (FIFRA, 7 U.S.C. 136r-1) Integrated pest management is not a single pest control method but, rather, a series of pest management evaluations, decisions and controls. In evaluating available and relevant information, EPA found that

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some commercial (For-Hire Applicators) and non-commercial (*e.g.*, state governments, federal governments, local governments, utilities) entities are currently implementing integrated pest management or components of integrated pest management to minimize pesticide use. For example, federal agencies are required to implement integrated pest management under 7 USC 136r-1, "Federal agencies shall use Integrated Pest Management techniques in carrying out pest management through procurement and regulatory policies, and other activities." In addition, Executive Order 13514 (October 5, 2009) requires the head of each federal agency to implement integrated pest management and other appropriate landscape management practices as a means to promote pollution prevention and eliminate waste.

Below is a general discussion describing the limitations for all pesticide use patterns. Following the general discussion are more detailed descriptions of each specific requirement under this Permit's pesticide use pattern.

- Identify the Problem

  Decision-makers are required to identify the pest problem, identify the target pest, and establish an action threshold. Understanding the pest biology and ecology will provide insight into selecting the most effective and efficient Pest Management Measures (pesticidal or non-pesticidal methods), and in developing an action threshold. Action threshold is defined in the Permit as the point at which pest populations or environmental conditions cannot be tolerated, necessitating that pest control action be taken based on economic, human health, aesthetic, or other effects. Action thresholds, often expressed as number of pests per unit area, can vary by pest, by site, and by season. In a new pest management program, action thresholds may be difficult to establish and as a practical approach should first focus on major pests. As Operators gain insight and experience into specific pest management settings, the action levels can be revised up or down.

  To identify the problem at a treatment area, Decision-makers may use existing data (e.g., surveillance data from an adjacent district to identify pests in their pest management area) to meet the conditions of this Permit. Decision-makers may also use relevant historical site data.

- Pest Management Options

  Decision-makers are required to implement efficient and effective means of Pest Management Measures that most successfully minimize discharges of pollutants to the receiving waters in Buffalo Creek, Tower Creek and/or Carnelian Creek resulting from the application of pesticides. Decision-makers must evaluate both pesticide and non-pesticide methods. Decision-makers must consider and evaluate the following options: no action, prevention, mechanical/physical methods, cultural methods, biological control agents, and pesticides. In the evaluation of these options, Decision-makers must consider impacts to water quality, impacts to non-target organisms, feasibility, and cost effectiveness. Combinations of various management options are frequently the most effective Pest Management Measures over the long term. The goal should be to emphasize long-term control rather than a temporary fix.

- Pesticide Use

  Decision-makers are required to conduct pest surveillance in an area that is representative of the pest problem and reduce the impact on the environment. Pest surveillance is important to

properly time the need for pest control. To reduce the impact on the environment and non-target organisms, Operators are required to only apply pesticides when the action threshold has been met. As noted earlier, action thresholds help determine both the need for control actions and the proper timing of such actions.

To meet the effluent limitations of this Permit prior to pesticide application to minimize the discharge of pesticides to the receiving waters in Buffalo Creek, Tower Creek and/or Carnelian Creek from the application of pesticides, through the use of Pest Management Measures (as defined above), the Permittee must also implement the following as related to animal pest control. In alignment with the 2021 PGP, animal pest control use patterns include the application, by any means, of pesticides into the receiving waters in Buffalo Creek, Tower Creek and/or Carnelian Creek to control a range of animal pests for purposes such as fisheries management, invasive species eradication, or equipment operation and maintenance. Applications of this nature are often made over an entire or large portion of a waterbody as typically the target pests are mobile. Multiple pesticide applications to a waterbody for animal pest control are often made several years apart. These applications may be used to control animal pests in water and at water's edge. Animal pests in this use category include fish, lampreys, insects, mollusks, and pathogens.

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<u>Animal Pest Control Specific Permit Requirements:</u>

Identify the Problem- Prior to the first pesticide application covered under this permit that will result in a discharge to the receiving waters in Buffalo Creek, Tower Creek and/or Carnelian Creek*, and at least once each calendar year thereafter prior to the first pesticide application for that calendar year, the Decision-maker(s) must do the following for each pest management area:*

Decision-makers must identify the pest problem in their pest management area prior to the first application covered under this Permit. Knowledge of the pest problem is an important step to developing Pest Management Measures. Re-evaluation of the pest problem is also important to ensure Pest Management Measures are still applicable. Decision-makers must identify the pest problem at least once each calendar year prior to the first application for that calendar year.

Identify areas with pest problems and characterize the extent of the problems, including, for example, water use goals not attained (e.g., wildlife habitat, fisheries, vegetation, and recreation).

Decision-makers must be well-acquainted with the unique regional conditions of their sites and available Pest Management Measures for controlling the pest present. Intended use goals for the water bodies that are being impeded because of nuisance pest infestation must also be considered based on the control site.

The use of the best available mapping information to aid in identifying the problem areas is suggested. Mapping may include aerial photo assessments, topographic maps, and satellite imagery where available and/or practicable. Mapping can be essential to identify problem areas which can and cannot be controlled using non-pesticide preventative measures (*e.g.*, mechanical control). Mapping can also be used in plotting the regional distribution of desired aquatic species, as well as water use goals and complaints or reports of pests from the public.

Identify target pest(s).

Positive identification of the pest is required because many pests within the same genus may require different levels and types of Pest Management Measures. Animal identification is important when determining the best Pest Management Measures for each particular pest and for determining application areas. Decision-makers must develop Pest Management Measures based on identification of the targeted pest which occur in their area.

Identify possible factors causing or contributing to the problem (e.g., nutrients, invasive species).

While there may not be reasonable means to control and/or stop the introduction and occurrence of some pest infestations, the identification of possible sources (*e.g.*, outflows from other water systems/bodies) may help in minimizing the need for implementing Pest Management Measures. Potential factors which could lead to the establishment of animal populations such as accidental or intentional introduction of exotic species must be identified before Pest Management Measures are implemented.

Establish any pest- and site-specific action threshold, as defined in Appendix A, for implementing Section 6.1.2.1.b.

An action threshold should be established before implementing Pest Management Measures. Any data and/or information regarding pest can serve as an action threshold.

In the event there are no data for the pest management area in the past calendar year, use other available data as appropriate to meet the Permit conditions in Section 6.1.2.1.a.

Decision-makers may use historical data or neighboring district data to identify the pest and establish action thresholds.

Pest Management Options- Prior to the first pesticide application covered under this Permit that will result in a discharge to the receiving waters in Buffalo Creek, Tower Creek and/or Carnelian Creek*, and at least once each year thereafter prior to the first pesticide application during that calendar year, the Decision-maker(s) must select and implement efficient and effective means of Pest Management Measures that minimize discharges resulting from the application of pesticides to control pests. In developing the Pest Management Measures for each pest management area, the Decision-maker(s) must evaluate the following management options, including a combination of management options, considering impact to water quality, impact to non-target organisms, feasibility, and cost effectiveness: No action; Prevention; Mechanical/physical methods; Cultural Methods; Biological control agents; and Pesticides.*

Decision-makers are required to evaluate management options and implement Pest Management Measures to minimize pesticide discharges into the receiving waters in Buffalo Creek, Tower Creek and/or Carnelian Creek prior to the first pesticide application covered under this permit. As noted above, combinations of various management options are frequently the most effective Pest Management Measures over the long term. The goal should be to emphasize long-term control rather than a temporary fix. Decision-makers must reevaluate every year prior to the first pesticide application for that calendar year. All Pest Management Measures must be conducted in a manner that minimizes impacts to non-target species. The following describes the

management options that must be evaluated. Tactics of preventative, cultural, mechanical/physical, and biological Pest Management Measures may overlap for some aquatic systems or specific pest control situations.

- *No Action:* No action is to be taken, although an animal pest problem has been identified. This may be appropriate in cases where, for example, available control methods may cause secondary or non-target impacts that are not justified, or no available controls exist.

- *Prevention*: Preventing introductions of possible nuisance species is the most efficient way to reduce the threat of aquatic nuisance animals (ANS Task Force, 2009). Identifying primary pathways of introduction and actions to cut off those pathways is essential to prevention. Through a better understanding of the transportation and introduction of animals, private entities (e.g., aquaculturists) and the public have the necessary knowledge to assist in local animal control by reducing conditions that encourage the spread of animals in their immediate surroundings. For example, recreational water users provide a pathway of unintentional introductions. Increasing public awareness of pests, their impacts, and what individuals can do to prevent their introduction and spread is critical for prevention. Other examples of prevention include, better design of water holding sites, better management and maintenance of potential problem sites, and volunteer removal of pest species (*e.g.*, fishing). Monitoring and detection also play important roles in the prevention of the spread and introduction of pests.

- *Mechanical or Physical Methods:* Mechanical and biological controls will be the appropriate methods in some cases of pest control, or a part of a combination of methods. Mechanical control techniques will vary depending on the pest. Examples include fishing, dewatering, netting, electrofishing, pressure washing, use of electric fences, and abrasive scrubbing.

- *Cultural Methods:* Cultural control methods can include physical removal or make the habitat unsuitable for a pest. Cultural methods vary depending on the target pest and may involve tactics that overlap with preventative and mechanical methods. Some examples of cultural methods to manage aquatic animal pests include draining and rinsing boats prior to relocation, using underwater sounds that deter fish, drawdown of water, and managing vegetation.

- *Biological Control Agents:* Biological control of animals may be achieved through the introduction of diseases, predators, or parasites. While biological control generally has limited application for control of animals, Decision-makers may fully consider this option.

- *Pesticides:* Chemical and biological pesticides such as lampricides, molluscides, insecticides, and piscicides, are registered for use to control animal pests. These pesticides are specifically formulated for use in water where aquatic nuisance animals occur. In some cases, pesticide use may impact non-target species. As described below, once the determination is made to use pesticides, additional requirements must be met.

Pesticide Use- Conduct surveillance in an area that is representative of the pest problem prior to each application to assess the pest management area and to determine when the action threshold(s) is met.

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Often, each animal and pest management area warrant different Pest Management Measures, tailored to the regional conditions. Pest Management Measures should consist of combinations of mechanical, biological, and/or pesticidal control methods. All Pest Management Measures must be conducted in a manner that minimizes impacts to non-target species.

Operators must apply chemical pesticides only after considering the alternatives and determining those alternatives not to be appropriate Pest Management Measures. In some instances, the need for chemical pesticide use in and adjacent to the affected habitat can be reduced or virtually eliminated with proper execution of alternative strategies and best management practices. If pesticides are used, they must only be used as needed as determined by an action threshold, and Pest Management Measures must be implemented, including use of the minimum effective application rate. Also, the Decision-maker(s) must conduct surveillance (*e.g.*, pest counts or area survey) prior to application of pesticides to determine when the action threshold is met that necessitates the need for implementing Pest Management Measures.

Surveillance may include the relatively sophisticated transect method used in ecological studies to evaluate species distribution, or it may consist of simply conducting visual observations in the treated area to verify the eradication or reduction in populations of aquatic nuisance animals following pesticide application (Getsinger et al. 2005, pp 23-25).

Reduce the impact on the environment and non-target organisms by evaluating site restrictions, application timing, and application method in addition to applying the pesticide only when the action threshold(s) has been met.

The pest and site restrictions (water use, water movement, etc.) must be identified when choosing an appropriate pesticide. Environmental factors such as temperature as well as biological factors such as migration timing should be considered when deciding on application timing. Partial site pesticide applications over time may be considered to minimize risk to non-target organisms.

Pesticide application must be limited to the appropriate amount required to control the target pests. Methods used in applying pesticides must minimize the impact to non-target species. For piscicides, chemical deactivation is currently required for all lotic (flowing water) environments. Management agencies typically work downstream throughout the watershed in consecutive treatments as this will require the least amount of chemical deactivation. Most invertebrates repopulate treated areas through immigration (typically in the direction of flow); as such headwater streams/tributaries seem to be effective at accomplishing this. EPA also notes that not all piscicides are that harmful to invertebrate populations (*e.g.*, antimycin is more selective for scaled fish). It can be difficult to know the point at which headwater streams are "fishless"; however, most fishery management agencies do not treat streams unless they are considered a refuge for target species.

Recommended Animal Pest Control References

EPA recommends the following sources for additional information on Pest Management Measures for animal control:

- Aquatic Nuisance Species Taskforce. Online: http://www.anstaskforce.gov/.

- Getsinger, K., Moore, M. D., Layne, C. P., Petty, D. G., L, S., Sprecher, Dibble, E. D., Karcas, E., Maceina, M., Mudrak, V., Lembi, C., Madsen, J. D., Stewart, R. M., Anderson, L., Haller, W., Confrancesco, A., Newman, R., & Nibling, F. (2005). Aquatic Plant Management Best Management Practices in Support of Fish and Wildlife Habitat. Aquatic Ecosystem Restoration Foundation. Lansing, MI.
- Aquatic Nuisance Pest Task Force (ANP). (2011). Northern Snakehead. Fish and Wildlife Service. Retrieved May 18, 2021 from: https://www.fws.gov/anstaskforce/spoc/snakehead.php
- Gaikowski, M. (2018). Asian Carp Control. U.S. Department of the Interior. Retrieved May 18, 2021 from: https://www.doi.gov/ocl/asian-carp-control
- National Park Service (NPS). (2019). Asian Carp Overview. National Park Service. Retrieved May 18, 2021 from: https://www.nps.gov/miss/learn/nature/ascarpover.htm

Water Quality Based Effluent Limitations (WQBELs) Development

In addition to TBELs for all discharges of pollutants, the CWA requires additional effluent limitations that are as stringent as necessary to achieve applicable water quality standards. These are called water quality-based effluent limitations (WQBELs). Permit writers are to assess whether the TBELs are protective of applicable water quality standards, and if not, permit writers must also include WQBELs as necessary to ensure that the discharge of pollutants will not cause an excursion above any applicable state water quality standard, including state narrative criteria for water quality (see 40 CFR § 122.44(d)). In developing WQBELs, permit writers must consider the potential impact of every proposed surface water discharge of pollutants on the quality of the receiving water.

To date, as indicated in the 2021 PGP, after over eight years of implementation of the prior NPDES pesticide application permits, EPA does not have any evidence in the record that the existing and prior permits are causing water quality problems where the 2021 PGP has been applicable. However, if at any time the Operator or EPA determines that the discharge of pollutants causes or contributes to an excursion of applicable water quality standards, the Operator must take corrective actions as required in Section 8 of the Permit, and document and report the excursion(s) to EPA as required in Section 9 of the Permit. Furthermore, consistent with Sections 6.2 and 8.3 of the Permit, EPA may impose additional water quality-based limitations on a site-specific basis if information in required reports, or from other sources indicates that, after meeting the technology-based limitations in the Permit, the discharges of pollutants are not controlled as necessary to meet applicable water quality standards. EPA also notes that among the eligibility requirements for coverage under the Permit are requirements that the Permit does not cover discharges of any pesticide into a water impaired by a substance which either is an active ingredient in that pesticide or is a degradate of such an active ingredient, or into an Outstanding National Resource Water (40 C.F.R. 131.12), often referred to as a "Tier 3 water" (except for pesticide applications made to restore or maintain water quality or to protect public health or the environment that either do not degrade water quality or only degrade water quality on a short-term or temporary basis). These eligibility conditions further help EPA to issue the Permit while protecting water quality on a water-body-specific basis.

In alignment with the 2021 PGP, the Operator must control its discharge of pollutants as necessary to meet applicable water quality standards. Any discharge of pollutants that results in an excursion of any applicable numeric or narrative EPA-approved state, territory, tribal or EPA-promulgated water quality standard is prohibited. In general, based on past data (as stated previously) and the additional

requirements in the Permit, in addition to FIFRA's requirements and the data and information upon which FIFRA registrations are based, EPA expects that compliance with the TBELs and other terms and conditions in the Permit will meet applicable WQBELs and will result in discharges of pollutants that are controlled as necessary to meet applicable water quality standards based on the cumulative effect of the following factors, which are described below:

(1) Under FIFRA, EPA evaluates risk associated with pesticides and mitigates unreasonable ecological risk. Compliance with FIFRA is required.

(2) This Permit has been developed in alignment with the 2021 PGP. In developing the 2021 PGP, EPA evaluated national–scale ambient monitoring data, as well as the frequency of the identification of specific pesticides as the cause of water impairments, to assess whether pesticide residues are currently present in waters at levels that would exceed applicable water quality standards. The monitoring data, although limited in scope, show that, in most samples, most pesticides were below ambient water quality criteria or benchmarks developed by EPA's Office of Pesticide Programs (OPP). For the assessment of the USGS National Water-Quality Assessment Program's 1992-2001 data, ambient water quality criteria were available for 7 of the 83 analytes and one or more OPP benchmarks were available for 60 of the 83 analytes. For the small number of pesticides found in monitoring data to be present above such benchmarks, the evaluation, as summarized in Appendices B and C of the fact sheet for the 2011 PGP, also documents risk mitigation actions taken by EPA (such as cancellation of pesticide uses) that EPA expects have reduced the levels of those pesticides in water. EPA also assessed the study USGS National Water-Quality Assessment Program (NAWQA) released in 2014. A summary of the evaluation and risk mitigation actions taken by EPA is available in Appendices B and C of the SoB.

(3) TBELs in this Permit, which align with the 2021 PGP, provide further protections beyond compliance with existing FIFRA requirements.

(4) Biological pesticides discharged to waters, by regulatory definition, do not work through a toxic mode of action. For chemical pesticides, the discharges of pollutants covered under this Permit are the residues after the pesticide has performed its intended purpose. Thus, the residue will be no higher than, and in many instances, lower than, the concentration of the pesticide as applied.

(5) This Permit excludes pesticide applications that result in discharges of any pollutant to (1) waters impaired for an active ingredient of that pesticide or a degradate of such an active ingredient, or (2) any Tier 3 waters (*i.e.*, outstanding national resource waters), except for applications made to restore or maintain water quality or to protect public health or the environment that either do not degrade water quality or only degrade water quality on a short-term or temporary basis.

(6) EPA has no evidence in the record that implementation of the national PGPs has resulted in documented water quality problems.

This Permit requires Operators to control discharges of pollutants as necessary to meet applicable water quality standards. When the Operator or EPA determines a discharge of pollutants will cause or contribute to an excursion above any applicable water quality standard, including failure to protect and maintain existing designated uses of receiving waters, the Operator must take corrective action to ensure that the situation is eliminated and will not be repeated in the future. (See Section 8.0 of the Permit). If additional Pest Management Measures are required, the Operator is required to follow and document, as applicable, the process for Pest Management Measure selection, installation,

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implementation and maintenance, and cooperate to eliminate the identified problem within the timeframe stipulated in Section 8 of the Permit.

(1) Under FIFRA, EPA evaluates risks associated with pesticides and considers mitigation measures to address risks that exceed levels of concern.

Background

EPA regulates the use of pesticides under FIFRA. In general, FIFRA authorizes EPA to register each pesticide product intended for distribution or sale in the United States. To register a pesticide, the Agency must determine that its use in accordance with the label will not cause "unreasonable adverse effects on the environment." (see, *e.g.*, FIFRA sec. 3(c)(5)). FIFRA defines that term to mean, in part, "any unreasonable risk to man or the environment, taking into account the economic, social, and environmental costs and benefits of the use of any pesticide" (FIFRA sec. 2(bb)). The "unreasonable adverse effects" standard requires EPA, in effect, to balance the human health and ecological risks of using a pesticide against its economic, social, human health, and ecological benefits. Pesticides are registered for sale and distribution only if EPA determines that the benefits outweigh the risks. In making decisions on whether to register a pesticide, EPA considers the use directions on proposed product labeling and evaluates data on product chemistry, human health, ecological effects, and environmental fate to assess the potential risks associated with the use(s) proposed by the applicants for registration and expressed on the labeling. Among other things, the Agency evaluates the risks to human health and the environment (including water quality) posed by the use of the pesticide.

As stated above, EPA reviews and approves pesticide product labeling. EPA implements risk mitigation measures identified through the risk assessment process by placing use restrictions and warnings on labeling to ensure the use of the pesticide (under actual use circumstances and commonly accepted practice) will not cause any "unreasonable adverse effects on the environment." It is a violation under FIFRA sec. 12(a)(2)(G) (FIFRA's "misuse" provision) to use a registered pesticide inconsistent with its labeling.

After a pesticide has been registered, changes in science, public policy, and pesticide use practices will occur over time. FIFRA, as amended by the Food Quality Protection Act of 1996, mandates a registration review program, under which the Agency periodically reevaluates pesticides to ensure that as the ability to assess risk evolves and as policies and practices change, all registered pesticides continue to meet the statutory standard of no unreasonable adverse effects to human health or the environment. The Agency is implementing the registration review program pursuant to Section 3(g) of FIFRA and will review each registered pesticide every 15 years to determine whether it continues to meet the FIFRA standard for registration. Information on this program is provided at: http://www.epa.gov/pesticide-reevaluation.

Ecological Risk Assessment

The following is a discussion about the FIFRA risk assessment process with a focus on Ecological (specifically aquatic) Assessments. Entities seeking pesticide registrations bear the burden of demonstrating their products meet the statutory standard under FIFRA. As set forth in 40 CFR Part 158, applicants for pesticide registrations must provide EPA with a suite of product chemistry, residue chemistry, toxicity, environmental fate, and ecotoxicity studies, to support an application for

registration. To support outdoor uses, studies are required that provide information related to the environmental fate and transport of the chemical and that measure the acute and chronic toxicity to terrestrial and aquatic organisms. These studies, along with open literature that meet data quality guidelines, are the basis for the ecological risk assessments. The ecological risk assessment combines the results of an environmental exposure assessment and an ecological effect assessment for a pesticide active ingredients to produce a quantitative measure of potential risk.[3] A risk characterization is also presented to put the quantitative assessment of risk in the context of other lines of evidence, such as available monitoring data and incident reports, and to discuss uncertainties in the risk assessment. The quantitative and qualitative determination of potential ecological risk is independent of economic or other benefit considerations.

Aquatic Exposure Characterization

EPA estimates pesticide concentrations in aquatic environments to determine if exposure to a pesticide active ingredient is at a level that could cause unreasonable adverse effects to aquatic organisms. EPA estimates pesticide concentrations in water using peer-reviewed simulation modeling because there are not sufficient monitoring data to estimate exposure to aquatic organisms under all potential use conditions. When available, monitoring data are used to help characterize aquatic exposure.

EPA also estimates potential exposure from uses involving direct application to water. The model used for pesticides applied directly to water uses environmental fate data to simulate partitioning of the pesticide between the water column and bottom sediment in a standard rice paddy. This modeling is conservative because it does not simulate degradation of the applied pesticide, as would be necessary to estimate the amount of residue remaining after the pesticide product had performed its intended function. Depending on the rate of degradation, the initial concentration as estimated by the model could be much higher than the residual concentration remaining after pesticide application has been completed. Additionally, this modeling scenario is conservative because the resulting exposure estimate is the concentration in the paddy water itself, not taking into account dilution which would occur when paddy water is diluted by precipitation or when it is released into a receiving water body. See the U.S. EPA. 2004. Overview of the Ecological Risk Assessment Process in the Office of Pesticide Programs. Office of Prevention, Pesticides, and Toxic Substances. Office of Pesticide Programs. Washington, D.C. January 23, 2004. https://www.epa.gov/endangered-species/ecological-risk-assessment-process-under-endangered-species-act

As discussed above, when available, EPA uses ambient water monitoring data as a line of evidence to characterize aquatic exposure in ecological and human health risk assessments. The United States Geological Survey (USGS) maintains several sources of pesticide monitoring data. These sources include the National Water Quality Assessment program (NAWQA), the Toxic Substances Hydrology Program, and the National Stream Quality Accounting Network (NASQAN). EPA sources of water monitoring data include STORET, a storage and retrieval database of national water quality information, the Safe Drinking Water Information System (SDWIS), Office of Water compliance monitoring data, and the USGS/EPA Reservoir Monitoring Program. In addition to the federal data

[3] As part of the risk assessment, EPA also examines available information to determine the need to expand beyond the focus on the active ingredient to consider pesticide formulation, inert ingredients, or degradates.

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sources, monitoring data are sometimes available from States, pesticide registrants, and the open literature.

These monitoring data are evaluated on a case-by-case basis to help characterize the likelihood, extent, and nature of pesticide concentration in water under current use practices and actual field conditions. EPA considers the locations and frequency of sampling, the analytical methods, the detection limits, and the purpose of the monitoring studies from which the data are derived when determining how such data will be incorporated into the FIFRA risk assessment and the usefulness of the monitoring data for an aquatic exposure assessment. For example, a monitoring study targeted to measure concentrations of a pesticide in a watershed with high agricultural use of that pesticide will not provide much insight on the potential exposure from its use as a mosquito adulticide. Similarly, a general survey of ambient water quality might not necessarily target specific pesticide use areas or the time of year when pesticide concentrations may be at their peak, and for this reason may not provide a reliable estimate of acute exposure. However, if monitoring data from such a study shows higher confirmed detections than estimated by modeling, the higher monitoring values typically would be used in the risk assessment.

Aquatic Effects

To determine if a pesticide is sufficiently toxic at its estimated exposure concentrations to cause unreasonable adverse effects in the environment, EPA reviews available ecotoxicity data. These data may come from a number of sources, including direct guideline study submissions required in support of registration, and open literature data retrieved through ECOTOX[4]. The typical assessment endpoints for pesticide ecological risk assessments are reduced survival from direct acute exposures and survival, growth, and reproductive impairment from direct chronic exposures. As noted in the OPP Overview[5] document, which describes the process OPP uses to conduct ecological risk assessment under FIFRA, OPP evaluates other data on sublethal effects in addition to direct effects on survival, growth, and reproduction.

In general, the current FIFRA data regulations require studies that include but are not limited to a suite of aquatic toxicity studies for effects characterization. These test requirements are defined for each chemical class by use category (40 CFR Part 158 Subpart D; Wildlife and Aquatic Organism data requirements; http://edocket.access.gpo.gov/cfr_2007/julqtr/40cfr158.490.htm) and are performed on a limited number of laboratory test organisms in the following broad taxonomic groupings:

- Freshwater fish,
- Freshwater invertebrates,
- Estuarine/marine fish,
- Estuarine/marine invertebrates, and
- Algae and aquatic plants.

[4] U.S. EPA. 2007. Ecotoxicity Database (ECOTOX) Mid-Continent Ecology Division, National Health and Environmental Effects Research Laboratory. U.S. Environmental Protection Agency, Office of Research and Development. https://www.epa.gov/chemical-research/ecotoxicology-database.

[5] U.S. EPA. 2004. Overview of the Ecological Risk Assessment Process in the Office of Pesticide Programs. Office of Prevention, Pesticides, and Toxic Substances. Office of Pesticide Programs. Washington, D.C. January 23, 2004. Support Document 1: Study Classification used by EFED in Data Evaluation Records (DERs) https://www.epa.gov/sites/production/files/2014-11/documents/ecorisk-overview.pdf

Within each of these very broad taxonomic groups, the most sensitive acute and chronic toxicity value is selected from all available test data, including open literature and registrant submissions. If additional toxicity data for more species of organisms in a particular group are available, the most sensitive toxicity values from all sources for other species/studies that meet data quality standards are used in the risk assessment.[6] Aquatic toxicity data are required for each active ingredient, but aquatic toxicity data are also required on the typical end use product for any pesticide that will be introduced directly to aquatic environments (40 CFR Part 158.630).

Risk Characterization

Risk characterization is the integration of effects and exposure characterization to determine the ecological risk from the use of the pesticide and the likelihood of effects on non-target species based on the pesticide-use scenarios. In FIFRA screening-level assessments, OPP relies on the deterministic risk quotient (RQ) method to compare estimated exposure to toxicity endpoints. Estimated environmental concentrations (EECs) derived in the exposure characterization are divided by acute and chronic toxicity endpoints identified in the effects characterization. Risk quotients are then compared to the Agency's Levels of Concern (LOCs). These LOCs are the Agency's interpretative policy and are used to analyze the potential risk to non-target organisms and the need to consider regulatory action. These criteria are used to indicate when a pesticide use as directed on the label has the potential to cause adverse effects on non-target organisms. If a risk of concern is identified, risk mitigation measures are considered.

Risk Mitigation

EPA acknowledges that there are uncertainties in its pesticide risk assessments (see full discussion below), nonetheless the Agency reduces the risks of concern by imposing additional restrictions on the use of a pesticide to reduce pesticide concentrations in the aquatic environment. Mitigation measures may include limits on the amount and frequency that a pesticide may be applied, or the application methods may be restricted to limit off-site transport. Mitigation may also limit the geographical areas to which a pesticide can be applied or may include mandatory buffer distances from sensitive habitats. Mitigation measures are implemented through product labeling instructions, with which pesticide users are required to comply.

In some cases, EPA restricts the use of a pesticide so that levels of pesticide predicted by the model to reach water are below the relevant aquatic benchmarks (see Aquatic Benchmarks discussion below). In other cases, using the FIFRA risk-benefit balancing standard, EPA may permit the use of a pesticide even though the estimated water concentration might exceed a relevant benchmark. In such cases, the decision incorporates consideration of the benefits of the pesticide use and other lines of evidence, such as any available National Recommended Water Quality Criterion for ambient water quality, concerning the conservativeness of the modeling assessment and available monitoring data.

Uncertainties with Risk Assessment and Mitigation

For the majority of pesticides, the Agency relies on simulation modeling to predict potential aquatic exposure following pesticide applications. There are uncertainties embedded in the FIFRA exposure assessment, for example, the extent to which the simulated scenario represents actual use conditions

[6] *Ibid* U.S. EPA 2004

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in terms of hydrologic vulnerability and the amount and frequency with which pesticides are applied. In order to account for the inherent uncertainty, the Agency uses a combination of parameters and assumptions in the models that results in estimated potential exposure concentrations that are high-end and are not likely to underestimate actual aquatic exposure. This allows the Agency to identify pesticides that are not likely to pose a risk to aquatic life.

In the effects characterization under FIFRA, the lowest acute and chronic toxicity values from the most sensitive species tested in acceptable studies are used as the relevant endpoint for evaluating risk to various taxa. Implicit in the use of the lowest toxicity values for the most sensitive species is the presumption that these toxicity values afford protection not only for the individual surrogate species but for other untested taxa as well.

In the FIFRA risk characterization, data gaps are also considered as a source of uncertainty in the risk assessment conclusions, and each risk assessment discusses the potential for additional data to affect the risk assessment conclusions.

An additional source of uncertainty in assessing risk to aquatic life is the impacts of multiple stressors on aquatic organisms. A United States Geological Survey (USGS) 10-year study (*Gilliom et al., 2006*) shows that the most common form of pesticide exposure for aquatic organisms is simultaneous exposure to multiple pesticides. More than 50 percent of all stream samples contained five or more pesticides, although the majority of mixtures are comprised mainly of agricultural herbicides and degradates of these herbicides, or urban/residential use insecticides in urban streams. Pesticides that will be applied under the Permit may also co-occur with other manmade contaminants and/or other pesticides from other uses. For instance, the USGS has also performed monitoring studies which revealed the widespread presence of some pharmaceuticals and personal care products in drinking water. However, although pesticides may be detected with other chemicals or in discharges of pollutants covered by other NPDES permits, the majority of research and data on the effects of pesticides has focused on individual pesticides rather than on additive and synergistic toxic effects of exposure to multiple pesticides and/or non-pesticide toxicants.

Possible interactions among pesticides or between pesticides and other contaminants may occur including: independent, additive, antagonistic, or synergistic. The variety of chemical interactions presented in the available literature[7] suggests that the interaction can be a function of many factors including but not necessarily limited to: (1) the exposed species, (2) the co-contaminants in the mixture, (3) the ratio of concentrations in the mixture, (4) differences in the pattern and duration of exposure among contaminants, and (5) the differential effects of other physical/chemical characteristics of the receiving waters (*e.g.*, organic matter present in sediment and suspended water). Quantitatively predicting the combined effects of all these variables on mixture toxicity to any given taxon with confidence is beyond the capabilities of the available data. In order to assess the impacts of environmental mixtures on aquatic life, states have included ambient toxicity testing (also called Whole Effluent Toxicity or WET testing) in their monitoring programs. WET testing allows states to identify potential impacts to aquatic life and identify the toxicant(s) and through the toxicity reduction evaluation, reduce the source(s) of the toxicant(s). The level of toxic effect to the most sensitive tested species is therefore assumed to be protective of other species that may be present in

[7] National Research Council 2013. *Assessing Risks to Endangered and Threatened Species from Pesticides*. Washington, DC: The National Academies Press.

any given water body and is assumed to represent the most toxic component of a mixture. Note that a discussion of EPA's consideration of WET testing as a condition of the Permit is discussed in Section 6, Monitoring Requirements, of the SoB.

Aquatic Benchmarks

EPA's Office of Pesticide Programs (OPP) derives aquatic benchmarks by multiplying the most sensitive toxicity values (*i.e.*, the lowest acceptable toxicity value for the most sensitive species within a taxonomic group) by their respective (level of concern) LOC. These taxon-specific benchmarks, based on toxicity data used by OPP in assessments for FIFRA pesticide registration decision-making, are considered estimates of the concentrations below which pesticides are not expected to have the potential for adverse effects for the particular taxon for which those data serve as surrogates. It is reasonable to assume that above these levels, there may be potential for the pesticide to cause adverse effects to the given taxon.

EPA's Office of Water (OW) and OPP agreed that these values can be used by States and others to evaluate potential risks of pesticides in the aquatic environment, if a National Recommended Water Quality Criterion for ambient water quality is not available.[8] A number of states have used these benchmark values as indicators of whether pesticide residues detected in surface water warrant additional action such as refined monitoring efforts. While benchmarks can be useful as a screening tool, they do not provide the information necessary to link detected concentrations with their sources.

In response to recommendations and input from stakeholders, EPA developed a webpage of non-regulatory "OPP Aquatic Benchmarks."[9]

As described above, EPA's FIFRA risk assessment process includes a number of conservative assumptions that taken as a whole mitigate unreasonable ecological risk and protect water quality.

(2) Examination of national–scale ambient monitoring data to assess whether pesticide residues are currently present in waters at levels that would exceed applicable water quality standards.

Environmental Science and Technology: Pesticides in U.S. Streams and Rivers: Occurrence and Trends during 1992–2011

In addition to the protective nature of the pesticide risk assessment, EPA reviewed readily available surface-water monitoring data from the USGS National Water-Quality Assessment (NAWQA) Project. In 2006, the USGS NAWQA[10] released a 10-year (1992-2001) study of 51 major river basins and aquifer systems that account for more than 70 percent of total United States water use, and more than 50 percent of the United States drinking water supply. During the 2011 PGP development, EPA reviewed the data and found a total of 20 pesticides or degradates exceeded an EPA benchmark in one or more agricultural stream and/or urban stream (see the 2011 PGP, Appendix A of the fact sheet for a complete list of pesticides/degradates that had exceedances). Since 2001, EPA noted that

[8] Correspondence to SFIREG, November 3, 2006 from Office of Water director.

[9] OPP Aquatic Benchmark Table https://www.epa.gov/pesticide-science-and-assessing-pesticide-risks/aquatic-life-benchmarks-pesticide-registration

[10] Gilliom and others 2006. The Quality of Our Nation's Waters-Pesticides in the Nation's Streams and Ground Water, 1992-2001: U.S. Geological Survey Circular 1291, 172p.

regulatory actions taken under FIFRA with respect to all 20 pesticides found to be in excess of a benchmark, and many of their uses have been canceled (several detections were of pesticides no longer in use prior to the start of the study). See the 2011 PGP, Appendix C of the fact sheet for a summary of pesticide-specific exceedance data and risk mitigation actions.

In 2014, the USGS NAWQA[11] released a study of pesticide monitoring in streams and rivers across the U.S. for the decade of 2002–2011 that compares monitoring data to previously reported findings from the decade of 1992–2001. During the 2016 PGP development, EPA reviewed this USGS second decadal report and noted the findings in the accompanied fact sheet. As USGS has not released another similar report, for this PGP's fact sheet, EPA noted below the findings from the last review and updated EPA's regulatory actions under FIFRA. This report indicated that with regard to chronic aquatic life benchmarks, during 1992 – 2001, 16 pesticides exceeded a chronic aquatic life benchmark, while during 2002 – 2011, twenty-one pesticides exceeded a chronic aquatic life benchmark. See Appendix A of the SoB. Forty-seven pesticides were assessed in both decades. For 10 of these[12] with benchmark exceedances in both decades, exceedance frequencies were mostly lower during 2002 – 2011.[13] [14]This research found that that the proportion of assessed streams with one or more pesticides that exceeded a chronic aquatic life benchmark were very similar between the two decades for agricultural (69% for 1992 – 2001 compared to 61% for 2002 – 2011) and mixed use streams (45% compared to 46%). For urban streams the percentage increased from 53% during 1992 – 2001 to 90% during 2002 – 2011 predominantly due to the use of fipronil and dichlorvos in the latter decade (these two pesticides are among those not assessed for 1992 – 2001). Additional detail on the nature of EPA's regulatory actions under FIFRA appears in Appendices B and C of the SoB.

Water Quality Monitoring under CWA

EPA and states place waterbodies not meeting water quality standards on a list (303(d) list) which identifies the pollutant or pollutants causing or expected to cause the impairment. Based on a search of the EPA How's My Waterway (ATTAINS) website https://mywaterway.epa.gov/state/WY/water-quality-overview and https://mywaterway.epa.gov/state/MT/water-quality-overview (accessed June 2025), there were no listed 303(d) impairments or approved TMDLs for pesticides within or outside of the LEFJ downstream of the area of the proposed pesticide application treatment zones. The EPA has not listed any waterbodies in Yellowstone National Park as impaired on the 303(d).

Interpretation of Monitoring Data Relevant to Permit in Alignment with the 2021 PGP

When re-evaluating the registrations of existing pesticides, the Agency considers available surface-water monitoring data as a line of evidence regarding potential aquatic risk in addition to considering exposure estimates derived from simulation models. Such monitoring data can provide a measure of trends in aquatic exposure associated with mitigation measures imposed by the Agency. For instance,

[11] Stone and others 2014. An Overview Comparing Results From Two Decades of Monitoring for Pesticides in the Nation's Streams and Rivers, 1992-2001 and 2002-2011. U.S. Geological Survey Scientific Investigations Report 2014-5154, 23 p.
[12] Metolachlor, Atrazine, Diazinon, Malathion, Chlorpyrifos, Carbaryl, Azinphos methyl, cis-Permethrin, Disulfoton, Parathion.
[13] Stone and others 2014. Pesticides in U.S. Streams and Rivers: Occurrence and Trends during 1992-2011. Environmental Science and Technology, 2014, 48, 11025-11030.
[14] EPA notes that none of these 10 pesticides are among the top 10 solid or top 10 liquid or top 10 briquettes pesticide active ingredients applied under the 2016 PGP as reported in the 2018 annual report data. Seven of these top ten 10 pesticides are biological pesticides.

the USGS's 2009 report of *Trends of Pesticide Concentrations in Corn-belt Streams* states, "(t)he declines in pesticide concentrations closely followed declines in their annual applications, indicating that reducing pesticide use is an effective and reliable strategy for reducing pesticide contamination in streams." Similarly, a study entitled *Trends in pesticide concentrations and use for major rivers of the United States*[15] found that "pesticides strongly dominated by agricultural use (cyanazine, alachlor, atrazine and its degradate deethylatrazine, metolachlor, and carbofuran) has widespread agreement between concentration trends and use trends" and that "pesticides with substantial use in both agricultural and nonagricultural applications (simazine, chlorpyrifos, malathion, diazinon and carbaryl) had concentration trends that were mostly explained by a combination of agricultural use trends, regulatory changes, and urban use changes inferred from concentrations trends in urban streams."

Monitoring studies are valuable because they may specifically target areas in which pesticides considered in the study are likely to be used. This is an effective way of evaluating impact from mitigation measures, or the increase in use of other pesticides that might replace pesticides to which mitigation measures are applied.

The best way to interpret the likely causes of pesticide detections in surface water is to consider any detection in light of the design of the monitoring study itself. For instance, the USGS's study *The Quality of Our Nation's Water – Pesticides in the Nation's Streams and Ground Water, 1992-2001*, described above, used a targeted approach, focusing on areas of relatively homogenous land-use and environmental settings to relate pesticide occurrence to individual non-point sources. The sampling was also most intensive during periods of high pesticide use and runoff. Such a design can best capture transport of pesticide to surface water from runoff from treated agricultural fields (or treated buildings/lawns) in a watershed. But, the timing and location of sample collection may not be as effective in capturing residues of pesticides applied for purposes covered under the Permit. Concentrations detected could at times reflect such uses, but the design of the study was meant to capture more diffuse non-point transport of pesticides in watersheds, and not point source discharge.

Uncertainties with Monitoring Data

The Agency recognizes that monitoring of pesticide levels in water has limitations in its ability to identify whether use of specific pesticide may adversely affect water quality. The product monitoring data give only a "snapshot" of the concentration in a particular waterbody at a particular time. While the USGS (*Gilliom et al., 2006*) intensified the frequency of its monitoring during times of the year when most agricultural pesticide usage commonly occurred, their sampling did not necessarily account for timing of specific pesticide applications, frequency of applications, and meteorological events that can cause pesticides to reach surface water as covered by this Permit. Thus, monitoring may not collect a sample when pesticide concentrations are at peak levels or when present in the water. Moreover, if monitoring detects the presence of a pesticide, the data usually do not identify the source or if the pesticide residue is actually still a product serving its intended purpose. Ambient monitoring cannot determine whether the contamination was due to lawful use (and if so, which one) or unlawful pesticide use, an accidental spill or discharge of pollutants, or whether the residues detected were from runoff, or from aquatic uses such as those to be included in the Permit.

[15] Ryberg and Gilliom, Science of the Total Environment 538 (2015) 431-444, Elsevier B.V.

Monitoring data are often difficult to interpret because the ancillary data on pesticide usage in a basin, and factors that could make the location more or less vulnerable, are often not available.

(3) Technology-based effluent limitations in the Permit provide further protections beyond compliance with existing FIFRA requirements.

In alignment with the 2021 PGP, EPA has evaluated available information and expects that the TBELs in the Permit are as stringent as necessary to meet applicable water quality standards. These effluent limitations require Operators to minimize the discharge of pollutants through the use of the most efficient and effective means of Pest Management Measures, including pesticide and non-pesticide methods.

The TBELs require Applicators to minimize the discharge of pollutants by using only the amount of pesticide and frequency of pesticide application necessary to control the target pest, maintaining pesticide application equipment in proper operating condition, and ensuring weather conditions in the treatment area are appropriate for pesticide application.

The Applicator, to the extent not determined by the Decision-maker, must also use only the amount of pesticide and frequency of pesticide application necessary to control the target pest, using equipment and application procedures appropriate for the task.

Decision-makers are also required to more fully assess and implement procedures to minimize the discharge of pollutants. In this assessment, the Decision-makers must consider human health and ecological impacts, feasibility, and cost effectiveness and include prevention, mechanical/physical methods, cultural methods, biological control agents, and as a final resort, the application of pesticides. To ensure that pollutant discharges are minimized, the Decision-makers must identify target pest species and areas where those pests occur, identify the possible sources of the problem, and establish action thresholds or similar measures for implementing pest management strategies. The TBELs in Section 6.1.2 of the Permit also require Decision-makers, as appropriate, to analyze surveillance data prior to each pesticide application to determine when pest action thresholds are met.

The Permit also includes several other provisions that the Agency expects to provide further protections beyond compliance with FIFRA requirements. For instance, Section 7 of the Permit requires Operators to monitor pesticide applications activities to minimize discharges of pollutants and during any post-application monitoring to determine effectiveness of the pesticide application. In addition, Section 8 of the Permit contains requirements for all Operators to document and report adverse incidents involving non-target organisms or the environment, and to take corrective action if it is determined that revising Pest Management Measures can help to prevent future incidents. An adverse incident report calls attention to a situation in which water quality may be impacted by pesticide use and may indicate that corrective action is required to ensure that applicable water quality standards are further protected during future applications. The Permit also requires Operators to take corrective actions to eliminate other situations such as unauthorized releases (*i.e.*, spills or leaks) or the failure to meet applicable water quality standards. These requirements are discussed further in Section 7 of the SoB. EPA expects this approach will further reduce discharges of pollutants to the receiving waters in Buffalo Creek, Tower Creek and/or Carnelian Creek from the use pattern covered under this Permit.

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(4) For chemical pesticides, the discharges of pollutants covered under this Permit are the residues after the pesticide has performed its intended purpose.

Discharges of pollutants from the application of chemical pesticides are covered under the Permit, consistent with the Sixth Circuit Court's reading of the CWA term "pollutant" in *National Cotton Council v. EPA.*

For chemical or conventional pesticides applied directly to waters (*e.g.*, for aquatic weed control and aquatic nuisance pest control), it is the pesticide residue, including excess pesticide that is present outside of the treatment area or within the treatment area once the target pests have been controlled that is considered a pollutant under the Permit. For any pesticide applied over water (*e.g.*, mosquito control), any pesticide or pesticide residue that is incidentally deposited in the receiving waters in Buffalo Creek, Tower Creek and/or Carnelian Creek is considered a pollutant since the intended purpose of the application is to target pests above the water. Therefore, the concentrations of "pollutants" will be no higher, and in many instances significantly lower, than the product concentrations considered in EPA's assessment when the Agency registered the pesticide products for the relevant uses.

(5) The Permit excludes with certain exceptions pesticide applications that result in discharges of any pesticide to (1) waters impaired for an active ingredient in that pesticide or a degradate of such active ingredient or (2) any Tier 3 waters (i.e., Outstanding National Resource Waters) except for applications made to restore or maintain water quality or to protect public health or the environment that either do not degrade water quality or only degrade water quality on a short-term or temporary basis.

In alignment with the 2021 PGP, EPA identified two scenarios where it finds the Permit may not be adequately protective of applicable water quality standards and has excluded those discharges of pollutants from coverage under the permit. Namely, the Permit excludes from coverage: (1) any discharges from a pesticide application to waters of the United States if the water is identified as impaired by a substance which either is an active ingredient in that pesticide or is a degradate of such an active ingredient and (2) discharges of pollutants to Tier 3 Waters (*i.e.*, Outstanding National Resource Waters) except for pesticide applications made to restore or maintain water quality or to protect public health or the environment that either do not degrade water quality or only degrade water quality on a short-term or temporary basis.

With regards to the first exclusion, based on the application information and EPA's information regarding receiving water impairments (see the "Water Quality Monitoring under CWA" section of the SoB), EPA has determined that the treatment areas covered by this Permit do not include impaired waters.

With regards to the second exclusion, Waters of the United States in national parks have the potential to be considered Tier 3 or outstanding national resource waters pursuant to the EPA's regulations at 40 CFR § 131.12(a)(3). In this instance, EPA has determined that the pesticide application activities undertaken pursuant to this Permit are being performed to protect public health or the environment (e.g., removal of nonnative fish for native fish restoration) and do not degrade water quality or only degrade water quality on a short-term or temporary basis. EPA reached this conclusion because a) pesticide applications under this permit are limited to 6 hours daily over several weeks, and b) there are no expected significant adverse changes in water quality in these receiving waters from discharges that meet the permit conditions, as outlined in the "Water Quality

Based Effluent Limitations (WQBELs) Development" section of the SoB. As a result, if the Permittee fully complies with all permit conditions, pesticide applications that result in discharges are not excluded from coverage under this Permit.

(6) EPA has no evidence in the record that implementation of the 2011 PGP and 2016 PGP have resulted in documented water quality problems.

This Permit has been written in alignment with the 2021 PGP (which was developed consistent with previous PGPs). EPA has not received any adverse incident reports documenting water quality problems under the permit terms for previously implemented PGPs (e.g., 2011 PGP, 2016 PGP). EPA is also not aware of any negative public health or environmental impact resulting from discharges of pollutants authorized for use under previous PGPs.

(7) Water quality considerations for use of potassium permanganate as neutralizing agent for chemical pesticides used.

When potassium permanganate is mixed with water, it can disassociate into breakdown products such as potassium, permanganate, manganese dioxide and/or potassium manganate, depending on the chemistry of the water. Upon review of EPA's National Recommended Water Quality Criteria for both Aquatic Life and Human Health, there were no existing criteria specific to potassium permanganate or these potential breakdown products.

5.2 Water Quality Based Effluent Limitations (WQBELs)

In alignment with the 2021 PGP, this Permit includes a narrative statement that addresses WQBELs. In this Permit the WQBEL is as follows:

> *All Operators must control discharges as necessary to meet applicable numeric and narrative state, territory, or tribal water quality standards, for any discharges authorized under this Permit, with compliance required upon beginning such discharge.*
>
> *If at any time an Operator becomes aware (e.g., through self-monitoring or by notification from the state, tribe, or territory), or EPA determines, that a discharge causes or contributes to an excursion of any applicable water quality standards, the Operator must take corrective action as required in Section 8 up to and including the ceasing of the discharge, if necessary.*

The first sentence includes the general requirement to control discharges of pollutants as necessary to meet applicable water quality standards, while the second sentence implements this requirement in more specific terms by imposing on Operators a responsibility to take corrective action in response to an excursion of applicable water quality standards, whether discovered by EPA or by the Operator. Failure to take such corrective action is a violation of the Permit. Additionally, the Permit includes a provision, in Section 10.36.7, that specifies that EPA may reopen the Permit if it is determined that additional technology-based and/or water quality-based effluent limitations are necessary, based on new or revised information for the Facility.

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5.3 Pesticide Discharge Management Plan (PDMP)

Distinct from the technology-based or water quality-based effluent limitation provisions in the 2021 PGP, the 2021 PGP required some Decision-makers to prepare a PDMP to document the implementation of Pest Management Measures being used to comply with the effluent limitations.

The 2021 PGP required this of any Decision-makers who were required to submit an NOI and were large entities. Based on the permit application information submitted, this Facility is not considered a large entity as defined in Appendix A of the Permit. Therefore, in alignment with the requirements of the 2021 PGP, since this Facility is not considered a large entity, a PDMP is not required.

5.4 Sharing of Responsibilities

This Permit was developed in alignment with the 2021 PGP, with the understanding that there may be more than one responsible entity for a given discharge of pollutant. As structured, the Permit provides for sharing of responsibilities to meet the end goal of discharges of pollutants being in compliance with permit requirements. The NPDES regulations state that "Operators" are responsible for achieving permit compliance. Specifically, 40 CFR § 122.21(b) clarifies that when an activity is owned by one person, but it is operated by another person (*e.g.,* contractor), it is the Operator's duty to meet terms of the permit. EPA acknowledges, however, that in many instances the owner may still perform Operator duties; as such, they may still be required to obtain Permit coverage, even in situations in which, for example, the owner hires a contractor to apply the pesticides to control pests. The 2021 PGP includes a definition of "Operator" (also included in Appendix A of Permit) that is intended to clarify this point, focusing on the fact that Operator control exists both at the "Decision-maker" level about how to control pests, including financial considerations, as well as at the pesticide Applicator" level (such as calibration of pesticide application equipment). In these instances, both Operators, *i.e.*, the Decision-Maker and the Applicator, are required to obtain NPDES permit coverage; however, the Permit strives to minimize any potential duplication of effort by identifying which Operator is responsible for certain permit conditions. The Permit clarifies these responsibilities by identifying whether EPA expects these activities to be performed by all Operators, or just the Decision-maker or the Applicator.

Entities such as subcontractors that are hired by an owner or other entity but are under the supervision of such owner or entity generally are not Operators. Similarly, entities are likely not an Operator if, for example, they own the land, but the activities are being performed outside of their control (*e.g.*, a public entity is spraying for mosquitoes over private property, or a private party is spraying for weeds on public lands leased from the federal government).

EPA encourages Operators to use already prepared information and explore possible cost savings by sharing responsibilities for implementing aspects of this permit. For example, a mosquito control district may have developed something for their FIFRA program and they could assume the overall coordination of an integrated pest management program while a hired contractor may be responsible for minimizing the pollutant discharge and for site monitoring and maintaining and calibrating pesticide application equipment. In instances where multiple Operators are responsible for the discharge from larger pesticide application activities, some form of written explanation of the division of responsibilities should be documented. However, any and all Operators covered under the Permit

are still responsible for any violation that may occur, though EPA may consider this written division of responsibilities when determining the appropriate enforcement response to a violation.

5.5 Antidegradation

Under long-standing EPA policy, high quality waters such as those in national parks must be fully protected and only limited activities that may result in temporary and short-term changes in water quality are permitted. In broad terms, EPA's view of "temporary" is weeks and months, not years. The pesticide application activities undertaken pursuant to this permit are limited to 6 hours daily over several weeks. The management practices for these pesticide applications include the use of neutralizing agents applied at a rate to ensure that there is no residual toxicity to aquatic life. As a result, EPA has determined that pesticide applications that fully comply with all permit conditions do not degrade water quality or only degrade water quality on a short-term or temporary basis.

5.6 Anti-Backsliding

Federal regulations at 40 CFR § 122.44(l)(1) require that when a Permit is renewed or reissued, interim effluent limitations, standards or conditions must be at least as stringent as the final effluent limitations, standards, or conditions in the previous permit unless the circumstances on which the previous permit were based have materially and substantially changed since the time the Permit was issued and would constitute cause for permit modification or revocation and reissuance under 40 CFR § 122.62.

Since the issuance of this Permit is not a renewal permit for this Facility, anti-backsliding regulatory requirements do not apply.

6 MONITORING REQUIREMENTS

Site Monitoring

Monitoring is required in any NPDES permit to demonstrate compliance with the permit conditions. In alignment with the 2021 PGP, monitoring requirements apply from the time any authorized Operator begins discharging pollutants under the Permit. There are a variety of monitoring methods that a "traditional" NPDES permit may require, including end-of-pipe monitoring to show compliance with relevant water quality-based and technology-based effluent limitations prior to discharging pollutants to a receiving waterbody. Monitoring may also pertain to actions taken to ensure that recordkeeping or other permit control activities are being properly implemented. Water quality monitoring of receiving streams is not typically required in NPDES permits unless it is required to determine among other things, compliance with mixing zone dilution standards or some other special permit condition.

Pursuant to CWA sections 308 and 402(a)(2), 40 CFR § 122.43(a), and other applicable implementing regulations, the following requirements have been included in the Permit, as discussed below. The monitoring requirements of the Permit are narrative and demonstrate compliance with permit conditions by using currently established pesticide use routines for monitoring pest control. For instance, the Permit requires routine visual inspections (described below when considerations for safety and feasibility allow) to be conducted as part of the pest control activity and/or as part of post-

application pest surveillance, and calls for records of the pollutant discharge volume to be kept. The monitoring requirements of the Permit are reasonable measures of good pest management practice that the conscientious Operator should be currently employing to ensure environmental health and safety and optimal control of pest organisms.

Monitoring of pollutant discharges poses several challenges not generally encountered in "traditional" NPDES permitting situations. For example, there is no "wastewater discharge" per se from pesticide applications that is analogous to end-of-pipe discharges of pollutants. For example, a manufacturing plant would typically direct its wastewater through a treatment system to remove pollutants, and then would direct the effluent through a pipe into a receiving waterbody. However, for chemical pesticide applications, at the time of application the pesticide contains both the portion serving its intended purpose as well as the potential residual for which monitoring data would be appropriate. Thus, monitoring the "outfall" in this case would merely provide data on the amount of the product as applied (information already known through the FIFRA registration process) and would be inappropriate to compare with any type of technology based effluent limitation or water quality standard.

In alignment with the 2021 PGP, EPA considered requiring ambient water quality monitoring. However, EPA thinks that it was infeasible for the following reasons:

1) Uncertainty: Ambient water quality monitoring would generally not be able to distinguish whether the results were from the pesticide application for which monitoring is being performed, or some other upstream source.
2) Lack of applicable measurable standards: Federal pesticide-specific ambient water quality criteria do not exist at this time for the vast majority of constituents in the products authorized for use under the national PGPs.
3) Safety and Accessibility: Pesticides, particularly those used for mosquito control and forestry pest control, are often applied over waterbodies in remote areas, hazardous terrain, and swamps that are either inaccessible or pose safety risks for the collection of samples.
4) Difficulty of residue sampling for chemical pesticides: For chemical pesticides, the "pollutant" regulated by the Permit is the residue that remains after the pesticide has completed its activity, and it is this residue that would be the subject of any water quality monitoring requirement. However, the point at which only "residue" remains is not practically discernable at this time for all pesticides.
5) Usefulness of data: Some states have questioned the value of ambient water quality monitoring data obtained from state permitting programs. The data generally showed that water quality impacts were not occurring, and one state even discontinued the requirement in revisions of its state permit.

Given the infeasibility of requiring ambient water quality data to demonstrate permit compliance, EPA thinks that there are suitable alternative monitoring activities to determine permit compliance, other than ambient water quality monitoring, for the Permit.

Additionally, in assessing the appropriateness of requiring ambient water quality monitoring, EPA also considered Whole Effluent Toxicity (WET) testing as a possible option for assessing Operator compliance with permit conditions; however, WET testing in an NPDES permit program is best used to monitor whether an Operator's discharge of pollutants is toxic and not whether a receiving stream (*i.e.*, the ambient environment), that may be influenced by a number of different discharges of

pollutants from different Operators and different sources, is toxic. In addition, WET testing would not indicate the actual source of the toxicity. If a waterbody is found to be toxic or to contain pollutants above applicable water quality standards, it can be quite complex to identify the source of the toxicity, which may or may not actually be the NPDES permittee performing the monitoring.

Thus, the monitoring program that EPA has developed for the Permit has been tailored to accommodate the unique situations related to pesticide applications. Routine visual monitoring is required in the Permit and can be used to determine if any pesticide use practices may need to be revised to ensure that avoidable adverse impacts to the environment do not occur. The monitoring requirements in the Permit are in alignment with the 2021 PGP (which remained unchanged from EPA's 2016 PGP).

6.1 Visual Monitoring Requirements for Pesticide Applicators

Visual monitoring assessments are required as a means of identifying, for example, instances of detrimental impact to non-target organisms, disruption or degradation of wildlife habitat, or the prevention of designated recreational or municipal uses of a waterbody that may possibly be related to the Operator's use of pesticides in a given area. This requirement consists of visually monitoring the area to and around where pesticides are applied for possible and observable adverse incidents, such as unanticipated death or distress of non-target organisms and disruption of wildlife habitat, recreational or municipal water use.

Visual monitoring assessments are required during the pesticide application when feasibility and safety allow. Visual monitoring is not required during the course of pesticide application when that application is performed in darkness as it would be infeasible for the inspector to note adverse effects under these circumstances. Additionally, the following scenarios often preclude visual monitoring during pesticide application:

1. Applications made from an aircraft
2. Applications made from a moving road vehicle when the Applicator is the driver
3. Applications made from moving watercraft when the Applicator is the driver
4. Applications made from a moving off-road wheeled or tracked vehicle when the Applicator is the driver.

6.2 Visual Monitoring Requirements for all Operators

Visual monitoring must also be conducted during any post-application surveillance, such as to determine the efficacy of the pesticide application. Visual monitoring of this type is required of all Operators but only if the Operator, be it the Applicator or the Decision-maker or both, performs post application surveillance in the course of business. EPA expects that post-application visual assessments are reasonably conducted on foot or from a stationary vehicle, although they might also be conducted from a moving vehicle, including a boat or plane, in certain circumstances.

7 CORRECTIVE ACTION

The purpose of including corrective action requirements in the PGP is to assist this universe of NPDES permittees with effectively meeting technology-based and water-quality-based effluent limitations and implementing Pest Management Measures in the Permit. Corrective action requirements apply

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from the time any authorized Operator begins discharging pollutants under the Permit. Corrective actions in this Permit are follow-up actions an Operator must take to assess and correct problems. They require review and revision of Pest Management Measures and pesticide application activities, as necessary, to ensure that these problems are eliminated and will not be repeated in the future. The Permit makes clear that the Operator is expected to assess why a specific problem has occurred and document what steps were taken to eliminate the problem. This approach will help Operators in complying with the requirements of the Permit on a consistent basis. Compliance issues with some of the permit's requirements -- for instance, those related to reporting and recordkeeping and some of those related to operation and maintenance -- may be able to be corrected immediately simply by following already established procedures, and therefore, are not considered problems that trigger the corrective action provisions of the Permit.

It should be noted that a situation triggering corrective action is not necessarily a permit violation and, as such, may not necessarily trigger a modification of Pest Management Measures to meet effluent limitations. However, failure to conduct (and document) corrective action reviews in such cases does constitute a permit violation.

7.1 Situations Requiring Revision of Pest Management Measures

Operators are required to review and, as necessary, revise the selection and implementation of their Pest Management Measures to eliminate any of the following situations:

- An unauthorized release or discharge of pollutants associated with the application of pesticides (*e.g.*, spill, leak, or discharge not authorized by this or another NPDES permit) occurs;
- Operators become aware, or EPA concludes, that Pest Management Measures are not adequate/sufficient for the discharge of pollutants to meet applicable water quality standards;
- Any monitoring activities indicate failure to meet applicable technology-based effluent limitations in Section 6.1 of the Permit;
- An inspection or evaluation by an EPA official, or local, state, or Tribal entity, determines that modifications are necessary to meet the non-numeric effluent limitations detailed in Section 6.1 of the Permit; or
- An Operator observes or is otherwise made aware (*e.g.*, a third-party notification) of an adverse incident.

EPA considers the above situations to be of significant concern. Thus, EPA is requiring Operators to assess the cause of these situations, which may be affiliated with the Operator's discharge from the application of pesticides and to take any necessary steps to eliminate the situation and ensure that the situation will not be repeated in the future.

The purpose of Section 8.1 of the Permit is to ensure compliance with corrective action requirements through increased accountability and oversight. EPA views ongoing assessment of the effectiveness of Pest Management Measures and corrective actions as integral to an effective pesticide management program. Written records associated with corrective action assessments must be kept with the other recordkeeping documentation required by this permit.

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7.2 Corrective Action Deadlines

The Permit requires that corrective action be completed "before or, if not practicable, as soon as possible after the next pesticide application that results in a discharge." EPA emphasizes that this timeframe is not a grace period within which an Operator is relieved of any liability for a permit violation. EPA is adopting this flexible deadline to account for the variation in types of responses (*e.g.*, evaluate situation and select, design, install, and implement new or modified Pest Management Measures) that may be necessary to address any identified situations of concern. EPA recognizes that in rare cases a corrective action review may identify the need for substantial improvements to the Operator's Pest Management Measures and does not want to limit the selection and implementation of such controls with an inflexible deadline. Another possibility is that EPA or the Operator may determine that further monitoring is needed under Section 8.3 of the Permit to pinpoint the source of the problem, and this monitoring may need to be conducted during future pesticide application activities. In the vast majority of cases, however, corrective action reviews will identify responses that can be taken quickly, either before the next pesticide application that results in a discharge or shortly thereafter.

7.3 Effect of Corrective Action

The occurrence of a situation described in Section 8.1 of the Permit may, but does not necessarily, constitute a violation of the Permit. The occurrence of a situation identified in Section 8.1 does require the Operator to immediately review and as necessary, revise the selection and implementation of their Pest Management Measures to eliminate the situation. Section 8.3 of the Permit explains that taking corrective action does not absolve the Operator of any liability for a permit violation requiring that action, however, failure to take required corrective action will constitute an original or an additional permit violation. EPA will consider the appropriateness and promptness of corrective action in determining enforcement responses to permit violations. EPA may impose additional requirements and schedules of compliance, including requirements to submit additional information concerning the condition(s) triggering corrective action, additional site-specific water-quality based limitations, additional monitoring requirements, or other schedules and requirements more stringent than specified in this Permit. Those requirements and schedules will supersede those of Sections 8.1 and 8.2 of the Permit if such requirements conflict.

7.4 Adverse Incident Documentation and Reporting

Section 8.4 of the Permit requires Operators to take specific actions in response to identified adverse incidents which may have resulted from a discharge from the Operator's pesticide application. Namely, Operators are required to provide oral notice to EPA within 24 hours and then follow-up with a written report within 30 days of becoming aware of the adverse incident. EPA defines an "adverse incident" in Appendix A of the Permit, but generally it is defined as any effect of a pesticide's use that is unexpected or unintended, in which there is evidence that a person or non-target organism has likely been exposed to a pesticide residue and suffered a toxic or adverse effect.

Section 8.4.1 of the Permit requires Operators to call the appropriate EPA Incident Reporting Contact within 24 hours of any identified adverse incident and provide basic information about it. The purpose of this requirement is twofold: (1) to provide an opportunity for the Agency to respond to these incidents as soon as reasonably can be expected, and (2) to provide a basis for potential

corrective actions. EPA does not expect this initial notification to be detailed but merely a reporting of the date of the finding, a general discussion of the incident and a review of the necessity to conduct corrective action. The Permit requires Operators to document the information identified in Section 8.4.1, including the date and time that EPA was notified and a description of any deviations from Section 8.4.1 notification requirements based on nuances of the adverse incident. For example, an Operator may decide to notify multiple EPA contacts because of the severity of the adverse incident. This type of information should be included in the written documentation of the 24-hour notification as described below.

Section 8.4.2 of the Permit requires Operators to provide a written report of the adverse incident to the EPA Region 8 office and to the State Lead Agency for pesticide regulation within 30 days of discovering the adverse incident. The adverse incident report must include the following information:

- Information required to be provided in Section 8.4.1.1 of the Permit;
- Date and time you contacted EPA notifying the Agency of the adverse incident;
- Location of incident, including the names of any waters affected and appearance of those waters (sheen, color, clarity, etc.);
- A description of the circumstances of the incident including species affected, number of individuals and approximate size of dead or distressed organisms;
- Magnitude of the effect (*e.g.*, aquatic square area or total stream distance affected);
- Quantity of pesticide applied and EPA registration number of pesticide product, intended use site (*e.g.*, banks, above, or direct to water), and method of application;
- Description of the habitat and the circumstances under which the incident occurred (including any available ambient water data for pesticides applied);
- Information on any laboratory tests performed and test results; and
- Actions to be taken to prevent recurrence of the incident.

Adverse incident information associated with discharges from the application of pesticides is useful to the Agency because the information:

- Provides the Agency with an indication of the effectiveness of the permit in controlling discharges of pollutants to protect water quality, including data upon which the Agency may base future permit decisions (*e.g.*, modifications to or reissuance of this Permit).
- May be considered when reviewing applications for registration of new pesticides that are chemically similar to existing pesticides, as well as re-evaluations of existing pesticides;
- May be considered in ecological risk assessment and during deliberations on risk management decisions;
- May be reviewed to determine trends that may indicate potential ecological impacts with an existing pesticide and/or to track improvements when mitigation measures are applied;
- Provides information on the nature, extent, and severity of incidents to decision-makers, stakeholders, and the public; and
- Provides the Agency with information on which to assess compliance with regulatory requirements, including documentation and reporting.

Currently, there is no database that includes adverse reporting from anyone other than the registrant under 6(a)(2) of FIFRA. EPA does not consider inclusion of adverse incident reporting in the NPDES permit to be a duplicative requirement to the FIFRA section 6(a)(2) requirements for registrant reporting of adverse incidents. This is because pesticide registrants are not likely to be directly covered under the Permit. Although some pesticide product labels may require that adverse incidents

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be reported, requiring the reporting of all adverse incidents and follow-up corrective actions may address the lack of a universal, mandatory legal duty for pesticide users to report adverse incidents, at least for the pesticide use patterns covered by the Permit.

EPA acknowledges that assessing and correcting adverse incidents may be complicated in certain instances. For example, symptoms associated with adverse incidents are often vague or mimic other causes which may lead to incorrect diagnoses. Thus, it may be difficult to identify and track chronic effects resulting from pollutant discharges. It may also be difficult to observe adverse effects because of limited visibility or access such as dead fish poisoned in a wetland under dense vegetation or in sparsely populated areas or because scavengers scatter or devour carcasses before discovery. It is important, however, to identify to the extent feasible situations where adverse effects occur where discharges from the application of pesticides also occur.

Immediately observable signs of distress or damage to non-target plants, animals and other macro-organisms within the treatment area may warrant concern for a possible adverse incident related to a discharge of pesticides during application. EPA acknowledges that some degree of detrimental impact to non-target species may occur and may be acceptable during the course of normal pesticide application. EPA expects Operators to use their best professional judgment in determining the extent to which non-target effects appear to be abnormal or indicative of an unforeseen problem associated with an application of pesticides.

During a visual inspection, Operators should watch for distressed or dead juvenile and small fish, washed up or floating fish, fish swimming abnormally or erratically, fish lying lethargically at the water surface or in shallow water, fish that are listless or nonresponsive to disturbance, the stunting, wilting, or desiccation of non-target submerged or emergent aquatic plants, and other dead or visibly distressed non-target organisms including amphibians, turtles, and macro-invertebrates. These observations must be noted unless they are deemed not to be aberrant (for example, distressed non-target fish are to be expected when conducting pest control with rotenone and non-target vegetation will be stressed near the target of contact herbicides). It should be noted that observation of these impacts does not necessarily imply that a pesticide has been misused or that there has been a permit violation or an instance of noncompliance, but may provide cause for further investigation of local water quality or reconsideration of Pest Management Measures.

Complete information concerning adverse impacts will aid EPA in any review of current or future pesticide use, adherence to Pest Management Measures, or effectiveness of these measures. Reporting of adverse incidents is not required under this Permit in the following situations: (1) you are aware of facts that indicate that the adverse incident was not related to toxic effects or exposure from the pesticide application; (2) you have been notified in writing by EPA that the reporting requirement has been waived for this incident or category of incidents; (3) you receive information notifying you of an adverse incident but that information is clearly erroneous; (4) an adverse incident occurs to pests that are similar in kind to pests identified as potential targets on the FIFRA label. However, even for these situations, certain records must be kept on site by the Decision-makers, pursuant to Section 9.3 of the Permit.

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7.5 Reportable Spills and Leaks

Section 8.5.1 of the Permit requires Operators to call the appropriate EPA Incident Reporting Contact to report any spill or leak of a hazardous substance or oil into waters of the United States with 24 hours of becoming aware of the spill or leak.[16] Section 8.5.2 of the Permit requires Operators to document this notification within 30 days of becoming aware of such spill or leak. If the spill or leak triggers the notification in Section 8.5.1 and results in an adverse incident, then Operators must report the incident per the guidelines in Sections 8.4.1 and 8.4.2 of the Permit. If the spill or leak triggers the notification in Section 8.5.1, but does not result in an adverse incident, then Operators must document and retain information outlined in Section 8.5.2 within 30 days of becoming aware of the situation. This documentation provides a written record of what you reported to EPA orally. It should also include a description of the reporting system that will be used to alert responsible managers and legal authorities in the event of a future spill or leak and a description of preventive measures to prevent, contain, or treat spills and leaks of these materials. Section 8.4.3 of the Permit requires Operators to notify either the National Marine Fisheries Service or the United States Fish and Wildlife Service if the Operator becomes aware of an incident that may have resulted from a discharge from the pesticide application that adversely affects a federally-listed threatened or endangered species or its federally-designated critical habitat. This information will be used by EPA to ascertain compliance with Permit conditions.

7.6 Documentation for Other Corrective Action

For any event described in Section 8.1 of the Permit, other than for adverse incidents or reportable spills or leaks, immediate reporting to EPA is not required, but Operators must document basic information describing the event and the Operators' response to that event within 30 days. For triggering events in Section 8.1, where the Operator determines that revision to Pest Management Measures is not necessary, the Operator must still document the review and the basis for this determination. EPA is not requiring Operators to submit this documentation to the Agency. Rather, EPA expects Operators to retain this information on-site and upon request, to make any such records available to EPA or any other Federal, state, or local regulatory agency governing pesticide applications.

8 SPECIAL CONDITIONS

N/A

9 RECORDKEEPING AND ANNUAL REPORTING

In alignment with the 2021 PGP, this Permit requires all Decision-makers and Applicators to maintain certain records to help them assess performance of Pest Management Measures and to document compliance with permit conditions. Recordkeeping and reporting requirements apply from the time any authorized Operator begins discharging pollutants under the Permit. These requirements are consistent with Federal regulations at 40 CFR § 122.41(j), but have been tailored to more closely reflect the requirements in the Permit. The Permit requires a basic set of records to be maintained by all

[16] Reportable Spills and Leaks are defined as those that trigger the requirement to notify the National Response Center (40 CFR Parts 110, 117, 302) based on the type of pollutant and quantity released.

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Decision-makers and Applicators, as well as separate requirements depending on the type of Operator (*i.e.*, Applicator, For-Hire Applicators, and Decision-maker who is a small entity). Section 9 of the Permit sets forth the recordkeeping requirements for each of these types of Operators. Operators can rely on records and documents developed for other programs, such as requirements under FIFRA, provided all requirements of the Permit are satisfied.

EPA has found that it is appropriate and reasonable to require different records for different types of Operators, reasoning that the recordkeeping responsibilities assigned in the permit reflect the nature of involvement in pesticide application activities for the Operators described. The following sections describe the sets of records that the Permit requires different types of Operators keep and enumerates the specific information items to be recorded.

9.1 Records to be Kept by all Operators (all Decision-makers and all Applicators)

These records must be kept by *all* Operators. Although this section is a universal requirement, these particular records are necessary only in the event of an adverse incident, the case that corrective action was required, or in the event of a discharge resulting from a spill or leak.

a. A copy of any Adverse Incident Reports (See Section 8.4.2);
b. Rationale for any determination that reporting of an identified adverse incident is not required, consistent with allowances identified in Section 8.4.1.2;
c. A copy of any corrective action documentation (See Section 8.6); and,
d. A copy of any spill and leak or other unpermitted discharge of pollutants documentation (See Section 8.5.2)

9.2 Records to be Kept by all For-Hire Applicators

All Operators who are For-Hire Applicators, as defined in Appendix A of the Permit, must keep the records listed above, as well as records that specifically document pesticide application equipment maintenance and details of the pesticide application event. Since Decision-makers who are not themselves performing pesticide applications are generally not able to record such information, EPA requires different recordkeeping requirements depending on the type of Operator.

a. Documentation of equipment calibration; and
b. Information on each treatment area to which pesticides are discharged, including:
    1. Description of each treatment area, including location and size (acres or linear feet) of treatment area and identification of any waters, either by name or by location, to which pesticide(s) are discharged;
    2. Pesticide use pattern(s) (*i.e.*, mosquito and other flying insects, weed and algae, animal pest, or forest canopy);
    3. Target pest(s);
    4. Documentation of any assessment of weather conditions in the treatment area prior to and during application to ensure application is consistent with all applicable federal requirements;
    5. Name of each pesticide product used including the EPA registration number;
    6. Quantity of each pesticide product applied to each treatment area;
    7. Pesticide application date(s); and

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8. Whether or not visual monitoring was conducted during pesticide application and/or post-application and if not, why not and whether any unusual or unexpected effects identified to non-target organisms.

9.3 Records to be Kept by Small Entities

Any Decision-maker that is below the SBA thresholds for small businesses or is a public entity serving a population of fewer than 10,000, is defined as a *small entity* in the Permit. In alignment with the 2021 PGP, decision-makers who are defined as small entities are required to keep the following records (a template worksheet for documenting this information on each treatment area is provided in Appendix B of the Permit, Pesticide Discharge Evaluation Worksheet):

a. Copy of the permit applications submitted to EPA, any correspondence exchanged between the Decision-maker and EPA specific to coverage under this Permit, and a copy of the EPA Permit and associated SoB with the assigned NPDES ID number;
b. Documentation of equipment calibration (only if Decision-maker is also the Applicator);
c. Information on each treatment area to which pesticides are discharged, including:
    1. Description of treatment area, including location and size (acres or linear feet) of treatment area and identification of any waters of the United States, either by name or by location, to which pesticide(s) are discharged;
    2. Pesticide use pattern(s) (*i.e.*, animal pest);
    3. Target pest(s) and explanation of need for pest control;
    4. Description of pest management measure(s) implemented prior to the first pesticide application;
    5. Company name and contact information for pesticide applicator;
    6. Name of each pesticide product used including the EPA registration number;
    7. Quantity of each pesticide product applied to each treatment area;
    8. Pesticide Application Start Date;
    9. Pesticide Application End Date; and
    10. Whether or not visual monitoring was conducted during pesticide application and/or post-application and if not, why not and whether any unusual or unexpected effects identified to non-target organisms.

9.4 Retention of Records

All required records must be prepared as soon as possible but no later than 14 days following completion of the associated activity. Operators must retain copies of these documents for a period of at least 3 years from the date their coverage under this Permit expires or is terminated.

EPA recommends that all Decision-makers keep records of acres or linear miles treated each calendar year for all applicable use patterns covered under this Permit. This record will help Decision-makers estimate when they will exceed the annual treatment area threshold, or to complete an annual report if required.

9.5 Annual Reports

In addition to recordkeeping, the 2021 PGP required any Decision-makers who:

1) were required to submit an NOI and were large entities, or

2) were required to submit an NOI for discharges of pollutants to waters of the United States containing NMFS Listed Resources of Concern, and were a small entity,

to submit annual reporting that contained basic information on their pollutant discharges to waters of the United States. Based on the permit application information submitted, this Facility is not considered a large entity as defined in Appendix A of the Permit. Additionally, the permit application indicated that pesticide application activities will not result in a point source discharge to one or more waters of the United States containing NMFS Listed Resources of Concern. Based on a review of information for NMFS at https://www.epa.gov/npdes/nmfs-listed-resources-concern-materials (site accessed June 2025), the permitted area for this Facility does not have any NMFS Listed Resources of Concern. Therefore, in alignment with the requirements of the 2021 PGP, since this Facility is not considered a large entity or is anticipated to discharge pollutants to waters of the United States containing NMFS Listed Resources of Concern, an annual report is not required.

10 EPA CONTACT AND MAILING ADDRESS

This Permit requires the Permittee to send written correspondence concerning discharges covered under this Permit to the addresses listed in Section 10.6 of the Permit. Generally, information is to be shared with the NPDES permitting authority, EPA Region 8.

11 PERMIT APPENDICES

A. Definitions and Acronyms

Appendix A of the Permit provides permit-specific definitions of statutory, regulatory, and other terms important for understanding its requirements. Any terms that are not listed in this definitions part have the meaning given to the terms by 40 CFR § Part 122.2 (the definitions section of the NPDES regulations). To develop these definitions, EPA has, where possible, relied on existing definitions in other laws and regulations applicable to this universe of permittees in order to provide consistency with those laws and provide permittees with a familiar framework.

B. Pesticide Discharge Evaluation Worksheet

In alignment with the 2021 PGP, Section 9.3 of the Permit requires Decision-makers who are small entities, as defined in Appendix A of the Permit, to complete and retain a worksheet for at least 3 years from when an Operator's coverage under the Permit expires or is terminated. Appendix B of the Permit contains a copy of a worksheet template with the information required to be retained by Decision-makers. This worksheet was originally included for reporting requirements in the 2021 PGP however, it is also considered appropriate to use for reporting under this Permit since the permit reporting requirements are aligned with the 2021 PGP (including use of this worksheet). The worksheet instructions (also included in Appendix B) have been updated so they are more specific to this Permit.

Decision-makers are required to make this worksheet information available to EPA, including an authorized representative of EPA, upon request.

C. Adverse Incident Report Template

In alignment with the 2021 PGP, Section 8.4 of the Permit requires Operators to: (1) provide oral notice to EPA within 24 hours, and (2) submit a written report within 30 days of becoming

aware of an adverse incident which may have resulted from a discharge from the Operator's pesticide application. Adverse Incident, as defined in the Permit Appendix A, is an unusual or unexpected incident that an Operator has observed upon inspection or of which the Operator otherwise become aware, in which: (1) There is evidence that a person or non-target organism has likely been exposed to a pesticide residue, and (2) The person or non-target organism suffered a toxic or adverse effect. Appendix C of the Permit contains a copy of a worksheet template with the information required to be submitted to EPA Region 8 and to the State Lead Agency within 30 days of discovering the adverse incident. This worksheet was originally included for reporting requirements in the 2021 PGP however, it is also considered appropriate to use for reporting under this Permit since the permit reporting requirements are aligned with the 2021 PGP (including use of this worksheet). The worksheet instructions (also included in Appendix C) have been updated so they are more specific to this Permit.

12 ENDANGERED SPECIES CONSIDERATIONS

The Endangered Species Act of 1973 requires all Federal Agencies to ensure, in consultation with the U.S. Fish and Wildlife Service (FWS), that any Federal action carried out by the Agency is not likely to jeopardize the continued existence of any endangered species or threatened species (together, "listed" species), or result in the adverse modification or destruction of habitat of such species that is designated by the FWS as critical ("critical habitat"). See 16 U.S.C. § 1536(a)(2), 50 CFR Part 402. When a Federal agency's action "may affect" a protected species, that agency is required to consult with the FWS (formal or informal) (50 CFR § 402.14(a)).

Specific to the area of this Permit coverage, the U.S. Fish and Wildlife Information for Planning and Conservation (IPaC) website (https://ecos.fws.gov/ipac/) was accessed on 6/24/2025 to determine federally-listed Endangered, Threatened, Proposed and Candidate Species for the area near the Facility's pesticide application area. The IPaC Trust Resource Report findings are provided below. The designated area utilized was identified in the IPaC search and covers the mapped areas shown below (Figures 5) for the Buffalo Creek, Tower Creek and Carnelian Creeks (approximately 103.96 square miles combined) pesticide application treatment areas:

Figure 5: IPaC Mapped Area for the Buffalo Creek, Tower Creek and Carnelian Creek Pesticide Application Treatment Area:

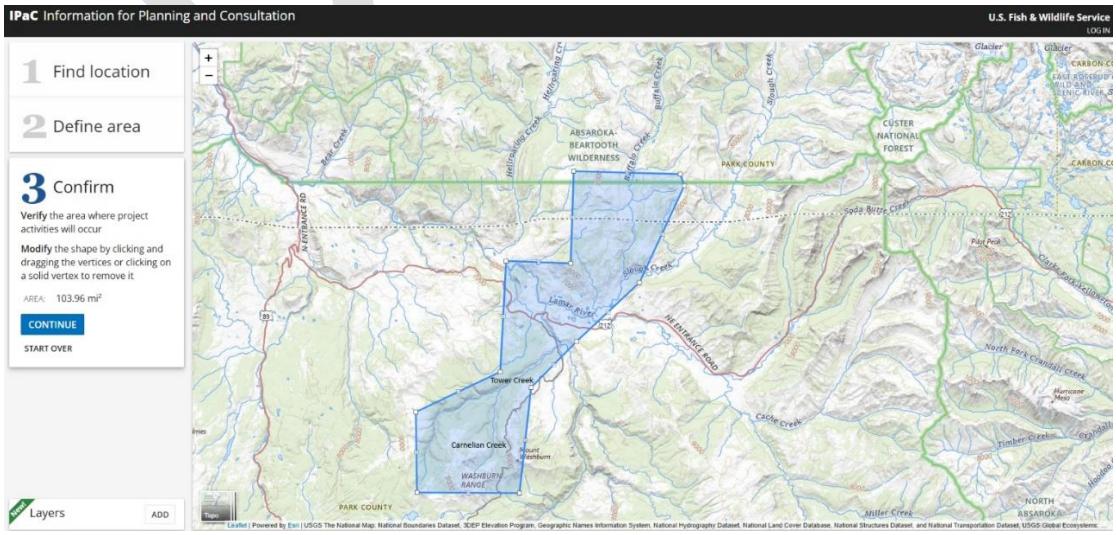

Table 1. IPaC Federally listed Threatened and Endangered Species

Species	Scientific Name	Species Status	Designated Critical Habitat
Canada Lynx	*Lynx canadensis*	Threatened	"There is final critical habitat for this species. Your location **overlaps** the critical habitat."
Grizzly Bear	*Ursus arctos horribilis*	Threatened	"There is proposed critical habitat for this species." It was not clear from the IPAC report if the mapped locations overlapped with the proposed critical habitat.
North American Wolverine	*Gulo gulo luscus*	Threatened	No critical habitat has been designated for this species.
Monarch Butterfly	*Danaus plexippus*	Proposed Threatened	"There is proposed critical habitat for this species. Your location does not overlap the critical habitat."
Suckley's Cuckoo Bumble Bee	*Bombus suckleyi*	Proposed Endangered	No critical habitat has been designated for this species.
Ute Ladies'-tresses	*Spiranthes diluvialis*	Threatened	No critical habitat has been designated for this species.
Whitebark Pine	*Pinus albicaulis*	Threatened	No critical habitat has been designated for this species.

12.1 Biological Evaluation

In alignment with the 2021 PGP, the permit application information submitted was evaluated and indicates that pesticide application activities will not result in a point source discharge to one or more waters of the United States containing National Marine Fisheries Service (NMFS) Listed Resources of Concern, as defined in Appendix A, for this Permit. However, EPA conducted the following additional evaluation to support the determination for identified species.

Based on the IPaC information generated, the Facility location is outside of the critical habitat for the Monarch Butterfly. There is no critical habitat listed for the North American Wolverine, Suckley's Cuckoo Bumble Bee, Ute Ladies'-tresses, or Whitebark Pine. Additionally, this Permit does not directly permit habitat disturbing activities and no changes in physical habitat/habitat modifications from permitted pesticide application activities will occur. Wolverines are opportunistic feeders, consuming a variety of foods depending on availability. They primarily scavenge carrion (e.g., carcasses), but also prey on small animals and birds, and eat fruits, berries, and insects. The Suckley's Cuckoo Bumble Bee, Ute Ladies'-tresses, and Whitebark Pine do not feed on aquatic organisms. Therefore, these are all terrestrial species that do not eat aquatic animals, and are therefore not aquatic dependent species, and may have limited contact with anticipated pesticide treatment areas along Buffalo Creek, Tower Creek and Carnelian Creek. If these species are present,

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they may use receiving waters for a short period of time during the year but, there are no expected significant adverse changes in water quality in these receiving waters, as outlined in the "Water Quality Based Effluent Limitations (WQBELs) Development" section of the SoB, from discharges that meet permitted limitations. Therefore, EPA's determination for these species is "No Effect" based on the Designated Critical Habitat information in Table 1 and the consideration that these are all primarily terrestrial species.

The IPaC results did indicate that there was overlap in critical habitat with the permitted area for the Canada Lynx. Additionally, it was not clear from the IPaC results if the permitted area overlapped with proposed critical habitat for the Grizzly Bear. As noted above, this discharge permitting activity does not directly permit habitat disturbing activities and no changes in physical habitat/habitat modifications from permitted pesticide application activities will occur.

- For the Canada Lynx: Based on the IPaC information, snowshoe hares are the primary prey of lynx, comprising the bulk of the lynx diet throughout its range. Without high densities of snowshoe hares, lynx are unable to sustain populations despite utilizing a multitude of other prey when snowshoe hare numbers are low. Other prey species include red squirrel, grouse, flying squirrel, ground squirrel, porcupine, beaver, mice, voles, shrews, and fish. Ungulate carrion (e.g., hoofed mammal carcasses) may also be consumed. Based on this information, this species is a primarily terrestrial species that does not solely eat aquatic animals and is therefore not a primarily aquatic dependent species.

  For the Grizzly Bear: Based on the IPaC information, Grizzly bear diets are highly variable among individuals, seasons, and years, and between ecosystems. They opportunistically seek and consume whatever plant and animal foods are available to them. Grizzly bears will consume almost any food available including living or dead mammals or fish, insects, worms, plants, human-related foods, and garbage. This species is therefore a primarily terrestrial species that does not solely eat aquatic animals and is not a primarily aquatic dependent species.

- For both the Canada Lynx and Grizzly Bear: As primarily terrestrial species, both may have limited contact with anticipated pesticide treatment areas along Buffalo Creek, Tower Creek and Carnelian Creek. If these species are present, they may use receiving waters for a short period of time during the year; however, there are no expected significant adverse changes in water quality in these receiving waters, as outlined in the "Water Quality Based Effluent Limitations (WQBELs) Development" section of the SoB, from discharges that meet permitted limitations. For the permitted pesticide application, the Facility will use chemical pesticides with the primary piscicide: rotenone. The two chemical pesticide product labels provided in the permit application (containing rotenone) were for CFT Legumine Fish Toxicant and Rotenone Fish Toxicant Powder. The Permit requires that discharges be in alignment with chemical labeling. Based on the label directions for use for these chemicals, it was indicated that "It is a violation of Federal Law to use this product in a manner inconsistent with its labeling, including both the container label and the Rotenone Standard Operation Procedures Manual (SOP) available from the registrant or the American Fisheries Society at http://rotenone.fisheries.org". Based on the "Toxicity to Fish and Wildlife" evaluation in the referenced SOP (i.e., the U.S. Fish and Wildlife Service Division of Fish and Wildlife Management and Habitat Restoration and American Fisheries Society's "Planning

and Standard Operating Procedures for the Use of Rotenone in Fish Management — Rotenone SOP Manual, Revised 2nd Edition (2023 Online Version)"), rotenone degrades at least moderately rapidly in aquatic environments, thus is unlikely that residues will accumulate and persist for long periods in water or sediment. The evaluation goes on to indicate, "There is likely little chance for chronic exposure given rotenone's instability in the environment." Additionally, it states, "Since rotenone is applied directly to water, EPA considers the risk of terrestrial animal acute mortality to be low since there are not likely to be rotenone residues on terrestrial animal forage items. There are insufficient quantities of rotenone to represent a risk of acute effects in terrestrial animals that have consumed fish killed by rotenone or rotenone treated water." It also states that "Since fish rapidly decompose and sink to the bottom of treated water, the likelihood of chronic exposure through the diet of terrestrial animals is also considered to be low." Under these conditions, labeled requirements for use, and considering the proposed and designated critical habitat areas for these species, the EPA has determined the impact for this species is "No Effect" for the permitted pesticide treatment areas.

Overall, based on the IPaC information and considerations listed above, EPA has determined the permitting action will have "No Effect" on the species listed as threatened or endangered in the action area by the FWS under the Endangered Species Act nor their critical habitat. Since a "No Effect" determination was made, no formal consultation with FWS is required.

13 NATIONAL HISTORIC PRESERVATION ACT REQUIREMENTS

Section 106 of the National Historic Preservation Act of 1966 (NHPA), 16 U.S.C. § 470(f) requires that federal agencies consider the effects of federal undertakings on historic properties. The implementing regulations of the NHPA can be found at 36 CFR Part 800. An "undertaking," as defined at 36 CFR § 800.16(y), includes projects requiring a federal permit. Therefore, the issuance of this permit constitutes an undertaking. The first step in this analysis is to consider whether the undertaking is a type of activity that has the potential to cause effects on historic properties. See 36 CFR § 800.3(a). With this Permit issuance, there is no new construction and would generally not be the type of action with the potential to cause effects on historic properties.

The EPA has additionally evaluated its planned issuance of the Permit for the Facility to assess this action's potential effects on any listed or eligible historic properties or cultural resources. The National Park Service (NPS) National Register of Historic Places website (https://www.nps.gov/subjects/nationalregister/database-research.htm) and NPGallery (https://npgallery.nps.gov/nrhp) was accessed June 2025, and a search was performed using the National Register of Historic Places GIS mapping site (https://www.nps.gov/maps/full.html?mapId=7ad17cc9-b808-4ff8-a2f9-a99909164466) to search for places in the vicinity of the anticipated discharges. Additional information was obtained based on the mapped locations, using a search for States (WY, MT), Counties (MT: Park County, WY: Park County), and NPS Park Name (i.e., Yellowstone National Park), to gather additional information on the asset(s) identified with the mapping software.

Figure 6: Mapped Area for the Buffalo Creek, Tower Creek and Carnelian Creek Pesticide Application Treatment Area:

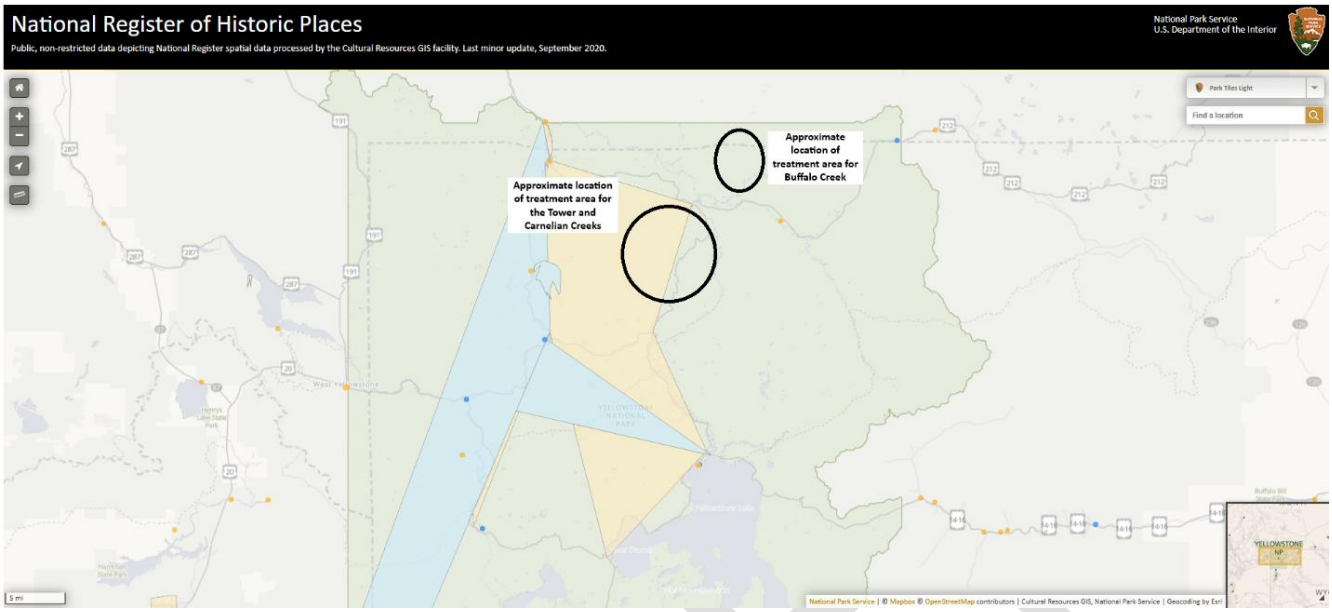
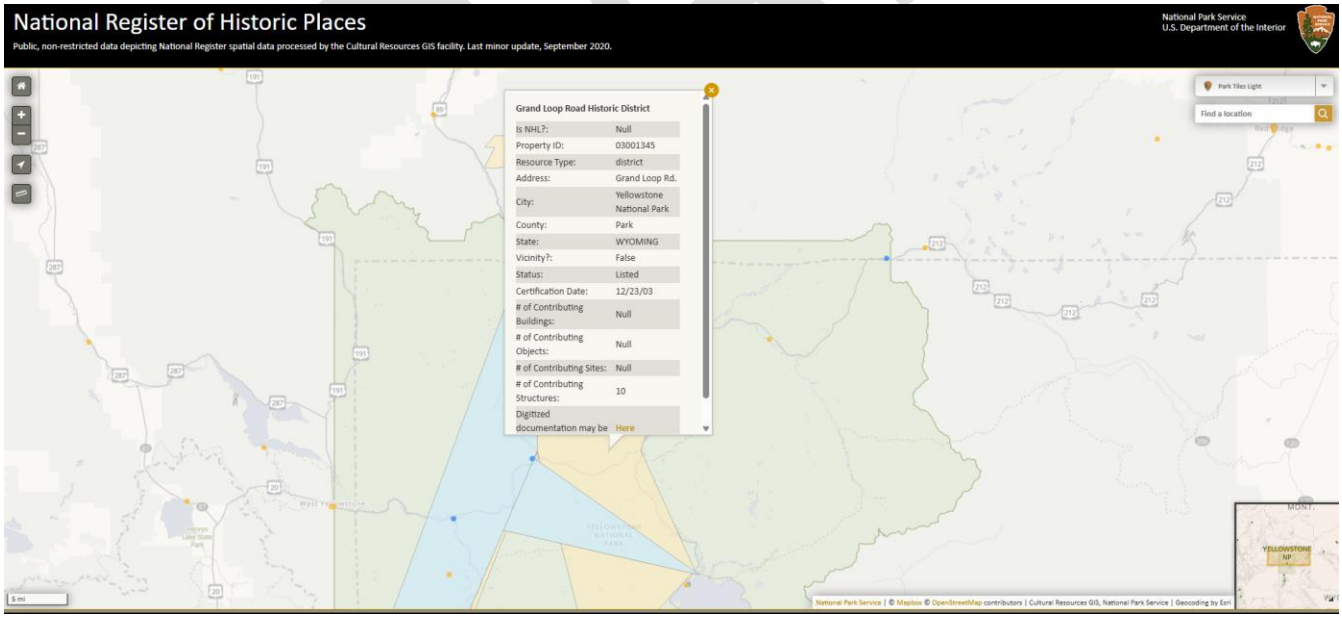


Figure 7: Historic Preservation Information (i.e., Grand Loop Road Historic District) for Overlapping Mapped Area for the Tower Creek and Carnelian Creek Pesticide Application Treatment Area:



The National Historic Places Register Reference Number :	Title:	Areas of Significance/ Resource Type	State/ County/ City (or national park)	NAID/Site Number
03001345	Grand Loop Road Historic District	Road System: The Grand Loop Road Historic District is a 140.14 mile road system (consisting of roads and bridges) which provides the primary visitor access to the major points of interest and visitor facilities in Yellowstone National Park.	Wyoming/ Park/ Yellowstone National Park	NAID: 73730609 Site Number: 48YE520

Based upon the information provided by the NPS National Register of Historic Places and NPGallery databases, the EPA does not anticipate any impacts to the listed/eligible historic properties or cultural resources provided above due the Permit issuance or permitted pesticide application activities in the area. This determination was made because the road system of the Grand Loop Road Historic District is primarily made up of roadways and bridges and the permitted pesticide application activities will only occur in waterbodies (with no anticipated impact to roadway infrastructure).

During the public comment period, the State Historic Preservation Office (SHPO) of the state of Wyoming will be notified as an interested party to ensure they are aware of the anticipated Permit issuance and so they can provide any additional information they may have to ensure that historic properties are not negatively affected by the conditions of the Permit.

14 401 CERTIFICATION CONDITIONS

At the time of the Permit reissuance, EPA was the CWA Section 401 certifying authority for the Permit, because this Permit is being issued in a LEFJ. The EPA will seek public comments on the Section 401 certification prior to issuing the certification and finalizing the Permit.

15 MISCELLANEOUS

The effective date of the Permit and the Permit expiration date will be determined upon issuance of the Permit. The intention is to issue the Permit for a period not to exceed 5 years.

Permit drafted by Alysia Tien, U.S. EPA, 303-312-7021, June 2025

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ADDENDUM

AGENCY CONSULTATIONS

On [Month Day, Year], the State Historic Preservation Office was notified, during the public notice period, about the draft Permit and SoB containing EPA's preliminary determination that the Permit issuance will not impact any historic properties.

PUBLIC NOTICE AND RESPONSE TO COMMENTS

The Permit and statement of basis, including the CWA Section 401 certification, were public noticed on EPA's website on [Month Day, Year]. The comment(s) received and the response(s) are provided below/No comments were received.

Comment:

The commenter noted that …

Response:

The following language was added to the final Permit./No changes were made to the final Permit:

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APPENDIX A. List of Pesticides and Degradates Which Exceeded Aquatic-life Benchmarks in the USGS 2014 Study and the CA Central Valley Regional 303(d) Impairment List of Pesticides.

Table A1. Sites that exceed one or more aquatic-life benchmarks in the last decade (2002-2011) USGS 2014 study

Pesticide/Degradate	Sites that exceed one or more aquatic-life benchmarks			
	Agricultural sites	Urban Sites	Mixed sites	Total exceedances
Acetochlor	2			2
Alfa-endosulfan			1	1
Atrazine	1			1
AZM	5	1	2	8
Carbofuran	2		1	3
Carbaryl	1	5		6
Chlorpyrifos	4			4
Cis-permethrin	2	2	5	9
Diazinon	1	4	2	7
Disulfoton	2	1	1	4
Disulfoton-sulfone		1		1
Dichlorvos	1	19	3	23
Dicrotophos	1			1
Ethoprophos	1			1
Fipronil	10	52	23	85
Fipronil sulfone		2		2
Lambda-cyhalothrin	1		1	2
Linuron		3		3
Malathion	7	12	8	27
Metolachlor	32	1	34	67
Parathion-methyl	1			1

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Table A1a. Percentage of sites that exceed one or more aquatic-life benchmarks in the last decade (2002-2011) in the USGS 2014 study

Pesticide/Degradate	Percentage of sites that exceed one or more aquatic-life benchmarks		
	Agricultural sites	Urban Sites	Mixed sites
Acetochlor	9.1	0.0	0.0
Alfa-endosulfan	0.0	0.0	3.7
Atrazine	4.5	0.0	0.0
AZM	13.6	3.7	7.4
Carbofuran	4.5	0.0	3.7
Carbaryl	4.5	7.4	0.0
Chlorpyrifos	9.1	0.0	0.0
Cis-permethrin	4.5	7.4	18.5
Diazinon	4.5	11.1	7.4
Disulfoton	9.1	3.7	3.7
Disulfoton-sulfone	0.0	3.7	0.0
Dichlorvos	4.5	51.9	11.1
Dicrotophos	4.5	0.0	0.0
Ethoprophos	4.5	0.0	0.0
Fipronil	36.4	77.8	48.1
Fipronil sulfone	0.0	7.4	0.0
Lambda-cyhalothrin	4.5	0.0	3.7
Linuron	0.0	11.1	0.0
Malathion	27.3	33.3	18.5
Metolachlor	63.6	3.7	29.6
Parathion-methyl	4.5	0.0	0.0

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Table A2. Pesticides/Degradates that are listed as 303(d) impairments from the CA Central Valley (USEPA Approved 2008-2010 list)

Note: This table includes pesticides that have been cancelled.

Pesticide/Degradate	# of impairments	WQS being exceeded
Aldicarb	1	Narrative toxicity and pesticide objectives – one-tenth the 48-hr LC50 Chironomus tentans.
Azinphos-methyl	3	Narrative toxicity and pesticide objectives – USEPA ambient water quality criteria (USEPA, 1976).
Bifenthrin	1	Narrative toxicity and pesticide objectives - one tenth the 96-hour LC50 for Haylella azteca.
Carbofuran	1	Narrative toxicity and pesticide objectives – USEPA recommended water quality criterion for the protection of freshwater aquatic life.
Chlordane	2	Fish tissue samples exceed narrative toxicity objective. Composites exceeded the 5.6 ug/kg OEHHA screening value for total chlordane in fish tissue.
Chlorpyrifos	72	Numeric site-specific water quality objective for chlorpyrifos or narrative toxicity and pesticides objective – exceedance of 1-hour and/or 4-day average maximum concentration criterion above the allowable frequency.
DDD	1	Samples exceeded the California Toxic Rule/USEPA (CTR/USEPA) criteria limit of 0.00083 µg/L for DDD based on a human health carcinogenic risk level of 10-6 for consumption of water and aquatic organisms.
DDE	9	Samples exceed the 0.00059 µg/L California Toxic Rule/USEPA (CTR/USEPA) criteria limit based on a human health 10-6 carcinogenic risk level for consumption of water and aquatic organisms for DDE.
DDT	23	Placeholder to support decision made prior to 2006.
Diazinon	63	Numeric site-specific water quality objective for diazinon or narrative toxicity and pesticides objectives – exceedances of 1-hour and/or 4-day average maximum concentration criterion above the allowable frequency.
Dichlorvos	2	Narrative toxicity and pesticides objectives – one-tenth the 96-hour LC50 for Daphnia magna.
Dieldrin	10	Samples exceed the California Toxic Rule/USEPA (CTR/USEPA) criteria for Dieldrin of 0.00014 µg/L based on a human health 10-6 carcinogenic risk level for water and fish consumption.

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Pesticide/Degradate	**# of impairments**	**WQS being exceeded**
Dimethoate	8	Narrative toxicity and pesticides objectives – one-tenth LC50 for the most sensitive species in freshwater (Cyclops strenuus, a copepod crustacean).
Disulfoton	1	Narrative toxicity and pesticides objectives – USEPA National Ambient Water Quality Disulfoton Criterion for freshwater aquatic life protection, maximum concentration of 0.05 ug/L.
Diuron	8	Narrative toxicity and pesticides objectives – the 96-hour EC50 for Chlorella pyrenoidosa (1.3 ug/L).
Group A Pesticides	19	Placeholder to support decision made prior to 2006.
Hexachlorobenzene/ HCB	1	Samples exceed USEPA IRIS Reference Dose (RfD) for maximum Hexachlorobenzene content in surface water with a limit of < 0.00075 ug/L.
Lindane/ gamma Hexachlorohexane (gamma HCL)	1	Samples exceeded the CTR criteria of 0.019 mg/g for human consumption of water and organisms.
Malathion	4	Narrative toxicity and pesticides objectives – The USEPA recommended 4-day average criterion continuous concentration (CCC) (0.1 ug/L) (USEPA, 1976). The California Department of Fish and Game Hazard Assessment Criterion 1-hr average concentration (CMC) (0.43 ug/L) (CDFG, 1998)..
Organophosphorus Pesticides	1	Narrative toxicity and pesticides objectives – Toxicity and chemistry results indicating organophosphorus pesticide toxicity..
Oxyfluorfen	2	Narrative toxicity and pesticides objectives – the 96-hour EC50 for Selenastrum capricornutum, a green algae.
cis-Permethrin	1	Narrative toxicity and pesticides objectives – one-tenth the LC50 value for the most sensitive freshwater species, Tanytarsus sp.
Prometryn	1	Narrative toxicity objective; 96-hour EC50 value for Navicula pelliculosa, a freshwater diatom.
Pyrethroids	14	Narrative toxicity objective; sediment-bound toxicity; chemical analysis; and TIE manipulations indicate pyrethroid pesticides are the likely cause.
Simazine	3	Drinking water primary Maximum Contaminant Limit (MCL) (4 µg/L).
Toxaphene	2	Samples exceeded the OEHHA Screening Value (30 ng/g).
Trifluralin	1	Narrative toxicity and pesticides objectives; interpreted using LOEC for Pimephales promelas of 0.7 ug/L.

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APPENDIX B. Chemicals and Exceedances in USGS 2014 Study and Subsequent Mitigation Measures that Reduce Pesticides Residues in Waters.

Chemical	Recent Actions
Acetochlor	Acetochlor is currently undergoing Registration Review[17].
Atrazine	Intensive monitoring program (2003 IRED). Atrazine is currently undergoing Registration Review.
Azinphos-methyl	In 2006, EPA issued its final decision on Azinphos-methyl that phased out the remaining uses by September 30, 2012.
Carbaryl	Lawn broadcast uses of liquid formulations cancelled; certain other uses and application methods cancelled; reduced application rates for some uses; prohibit most aerial applications (2003 IRED). Carbaryl is currently undergoing Registration Review.
Carbofuran	Domestic sales phased out in 2013 (2006 IRED). Technical registrations remain for export of the active ingredient.
Chlorpyrifos	Residential uses cancelled (except for roach baits in child-resistant packaging and ant mound treatments); agricultural use restrictions including reduced application rates and fewer applications per season, increase in retreatment intervals and addition of buffer zones around water bodies; some aerial application uses cancelled (2001 IRED). Chlorpyrifos is currently undergoing Registration Review.
Cis-permethrin	Standard pyrethroid specific spray drift language, including a 25 foot aquatic buffer zone for ground applications, 100-foot for aerial application, and 450 foot for ULV applications; amended agricultural labels to include new use pattern (rate reductions, seasonal maximum reductions, and minimum retreatment interval) identified for the selected crop uses (2006 RED). Cis-permethrin is currently undergoing Registration Review.
Diazinon	Residential uses and granular uses cancelled; aerial application cancelled; seed treatment uses cancelled (2002 IRED). Diazinon is currently undergoing Registration Review.
Dichlorvos (DDVP)	Dichlorvos is currently undergoing Registration Review.
Dicrotophos	Dicrotophos is currently undergoing Registration Review.

[17] For a current Registration Review schedule, please go to: https://www.epa.gov/pesticide-reevaluation/registration-review-schedules

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Chemical	**Recent Actions**
Disulfoton	Cancellations for EPA Reg. Nos. 264-723, 264-734, 5481-8989, and 432-1286 were effective December 31, 2009. Cancellations EPA Reg. Nos. 264-725 and 72155-49 were effective December 31, 2010. All disulfoton registrations are now cancelled (2002 IRED).
Endosulfan	In July 2010, EPA signed a Memorandum of Agreement with the registrants of endosulfan that resulted in voluntary cancellation and phase-out of all existing endosulfan uses in the U.S. the last endosulfan uses ended on July 31, 2016, and there are currently no existing registrations.
Ethoprophos	Ethoprophos is currently undergoing Registration Review.
Fipronil	Fipronil is currently undergoing Registration Review.
Lambda-Cyhalothrin	Lambda-Cyhalothrin is currently undergoing Registration Review.
Linuron	Linuron is currently undergoing Registration Review.
Malathion	Some uses cancelled; reduced application rates and frequency of application for many crops; 25 and 50 foot buffer zones for non-ULV and ULV aerial applications near water bodies; droplet size, wind speed, and application altitude specifications for mosquito adulticide use; spray drift minimization label statements for agricultural and public health products; environmental hazard precautionary label statements required for agricultural, public health, and residential products (2006 RED; 2009 RED Revision). Malathion is currently undergoing Registration Review.
Methyl-parathion	On July 16, 2010 the cancellation order to voluntarily cancel all product registrations containing methyl parathion was published. This cancellation order terminated the last methyl parathion products registered for use in the U.S., effective December 31, 2012. End-use products could not be sold after August 31, 2013, and end-use products cannot legally be used after December 31, 2013. There are currently no existing end-use registrations.
S-metolachlor	S-metolachlor is currently undergoing Registration Review.

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APPENDIX C. Summary of Pesticide-Specific Exceedance Data and Risk Mitigation Actions.

- Of the 75 pesticides and 8 degradates analyzed, 19 pesticides in use at the time of the USGS 2014 study were measured at concentrations that exceeded EPA benchmarks: 4 herbicides (acetochlor, atrazine, linuron, and metalochlor SS) and 15 insecticides (azinphos-methyl, carbaryl, carbofuran, cis-permethrin, chlorpyrifos, diazinon, dichlorvos, dichlorovos, disulfoton, endosulfan, ethoprophos, fipronil, lambda-cyhalothrin malathion, and methyl parathion).
- Six pesticides accounted for the majority of the exceedances: fipronil, S-metolachlor, malathion, dichlorvos, cis-permethrin, and azinphos-methyl. These pesticides are discussed in more detail below:

Fipronil
Fipronil entered Registration Review in June of 2011. The preliminary risk assessments for fipronil are expected to be completed in 2020. Any potential mitigation would be included in a proposed registration review decision.

S-metolachlor
Metolachlor and S-metolachlor entered Registration Review in December of 2014. The preliminary risk assessments for metolachlor and S-metolachlor are were publish in 2019. Any potential mitigation would be included in a proposed registration review decision.

Malathion
The revision of the malathion RED was completed in 2009. Mitigation required by the RED reduced maximum application rates and the number of applications allowed annually.
Malathion entered Registration Review in June of 2011. The preliminary human health risk assessment for malathion published in August of 2016. The draft biological evaluation, with coordination from both The National Marine Fisheries Service and US Fish and Wildlife Service, including an endangered species and environmental fate and effects risk assessment published in April 2016. The draft biological evaluation identified potential risks to listed birds, mammals, amphibians, reptiles, terrestrial invertebrates, fish, aquatic invertebrates, and plants. EPA also made "likely to adversely affect" determinations for 97% of all listed species assessed and "likely to adversely affect determinations" for 99% of all critical habitats as a result of current labeled malathion usage. Any potential mitigation would be included in a proposed registration review decision.

Dichlorvos (DDVP)
Dichlorvos entered Registration Review in June of 2009. The preliminary risk assessments for dichlorvos are expected to be published in 2020. Any potential mitigation would be included in a proposed registration review decision.

Cis-permethrin
The permethrin RED was completed in 2006. Mitigation included standard pyrethroid specific spray drift language, including a 25-foot aquatic buffer one for ground applications, 100-foot for aerial application, and 450 foot for ULV applications. Agricultural labels were amended to include new use pattern (rate reductions, seasonal maximum reductions, and minimum retreatment interval)

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identified for the selected crop uses. Include stewardship language in the directions for use section of all products registered for outdoor use in residential areas.
Cis-permethrin entered Registration Review in June of 2011. The preliminary risk assessments for cis-permethrin were published in 2016. Any potential mitigation would be included in a proposed registration review decision.

Azinphos-methyl
As part of EPA's 2006 final decision on azinphos-methyl all remaining uses were phased out by September 30, 2012.

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