ALASKA POLLUTANT DISCHARGE ELIMINATION SYSTEM

PERMIT FACT SHEET – DRAFT

Permit Number: AKG870000

PESTICIDE GENERAL PERMIT (PGP) FOR DISCHARGES FROM THE APPLICATION OF PESTICIDES

ALASKA DEPARTMENT OF ENVIRONMENTAL CONSERVATION
Wastewater Discharge Authorization Program
555 Cordova Street
Anchorage, AK 99501

Public Comment Period Start Date: August 2, 2016
Public Comment Period Expiration Date: September 2, 2016
Alaska Online Public Notice System

Technical Contact: Jim Rypkema
Alaska Department of Environmental Conservation
Division of Water
Wastewater Discharge Authorization Program
555 Cordova Street
Anchorage, AK 99501
(907) 301-1836
Fax: (907) 269-3487
Jim.Rypkema@alaska.gov

Proposed reissuance of the Alaska Pollutant Discharge Elimination System (APDES) Pesticide General Permit for Discharges from the Application of Pesticides within the State of Alaska.

The Alaska Department of Environmental Conservation (Department or DEC) proposes to reissue an APDES general permit AKG870000 – Pesticide General Permit (PGP) for discharges from the application of pesticides. The permit authorizes and sets conditions on the discharge of pollutants from pesticide applications to waters of the United States. In order to ensure protection of water quality and human health, the permit describes control measures that must be used to control the types and amounts of pollutants that can be discharged from pesticide applications.

This fact sheet explains the nature of potential discharges from insert name of facility or category of discharges and the development of the permit including:

- information on public comment, public hearing, and appeal procedures
- a listing of proposed effluent limitations and other conditions
- technical material supporting the conditions in the permit
- proposed monitoring requirements in the permit

Public Comment

Persons wishing to comment on, or request a public hearing for the draft permit for this facility, may do so in writing by the expiration date of the public comment period.

Commenters are requested to submit a concise statement on the permit condition(s) and the relevant facts upon which the comments are based. Commenters are encouraged to cite specific permit requirements or conditions in their submittals.

A request for a public hearing must state the nature of the issues to be raised, as well as the requester's name, address, and telephone number. The Department will hold a public hearing whenever the Department finds, on the basis of requests, a significant degree of public interest in a draft permit. The Department may also hold a public hearing if a hearing might clarify one or more issues involved in a permit decision or for other good reason, in the Department's discretion. A public hearing will be held at the closest practicable location to the site of the operation. If the Department holds a public hearing, the Director will appoint a designee to preside at the hearing. The public may also submit written testimony in lieu of or in addition to providing oral testimony at the hearing. A hearing will be tape recorded. If there is sufficient public interest in a hearing, the comment period will be extended to allow time to public notice the hearing. Details about the time and location of the hearing will be provided in a separate notice.

All comments and requests for public hearings must be in writing and should be submitted to the Department at the technical contact address, fax, or email identified above (see also the public comments section of the attached public notice). Mailed comments and requests must be postmarked on or before the expiration date of the public comment period.

After the close of the public comment period and after a public hearing, if applicable, the Department will review the comments received on the draft permit. The Department will respond to the comments received in a Response to Comments document that will be made available to the public. If no substantive comments are received, the tentative conditions in the draft permit will become the proposed final permit.

The proposed final permit will be made publicly available for a five-day applicant review. The applicant may waive this review period. After the close of the proposed final permit review period, the Department will make a final decision regarding permit issuance. A final permit will become effective 30 days after the Department's decision, in accordance with the state's appeals process at 18 AAC 15.185.

The Department will transmit the final permit, fact sheet (amended as appropriate), and the Response to Comments to anyone who provided comments during the public comment period or who requested to be notified of the Department's final decision.

The Department has both an informal review process and a formal administrative appeal process for final APDES permit decisions. An informal review request must be delivered within 15 days after receiving the Department's decision to the Director of the Division of Water at the following address:

Director, Division of Water
Alaska Department of Environmental Conservation
410 Willoughby Street, Suite 303
Juneau AK, 99811-1800

Interested persons can review 18 AAC 15.185 for the procedures and substantive requirements regarding a request for an informal Department review.

See http://dec.alaska.gov/commish/InformalReviews.htm for information regarding informal reviews of Department decisions.

An adjudicatory hearing request must be delivered to the Commissioner of the Department within 30 days of the permit decision or a decision issued under the informal review process. An adjudicatory hearing will be conducted by an administrative law judge in the Office of Administrative Hearings within the Department of Administration. A written request for an adjudicatory hearing shall be delivered to the Commissioner at the following address:

Commissioner
Alaska Department of Environmental Conservation
410 Willoughby Street, Suite 303
Juneau AK, 99811-1800

Interested persons can review 18 AAC 15.200 for the procedures and substantive requirements regarding a request for an adjudicatory hearing. See http://dec.alaska.gov/commish/ReviewGuidance.htm for information regarding appeals of Department decisions.

Documents are Available

The permit, fact sheet, and related documents can be obtained by visiting or contacting DEC between 8:00 a.m. and 4:30 p.m. Monday through Friday at the addresses below. The permit, fact sheet, and other information are located on the Department's Wastewater Discharge Authorization Program website: http://dec.alaska.gov/water/wwdp/index.htm.

Alaska Department of Environmental Conservation
Division of Water
Wastewater Discharge Authorization Program
555 Cordova Street
Anchorage, AK 99501
(907) 269-6285

Alaska Department of Environmental Conservation
Division of Water
Wastewater Discharge Authorization Program
410 Willoughby Avenue, Suite 310
Juneau, AK 99801
(907) 465-5180

Alaska Department of Environmental Conservation
Division of Water
Wastewater Discharge Authorization Program
610 University Avenue
Fairbanks, AK 99709
(907) 451-2100

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1.0 Background

The Alaska Department of Environmental Conservation (DEC or Department) is proposing to reissue the Alaska Pollutant Discharge Elimination System (APDES) Pesticide General Permit (PGP) which authorizes the point source discharges of biological pesticides and chemical pesticides that leave a residue to waters of the United States. Once finalized, the latest version of the PGP will replace the 2011 PGP, which expires on October 31, 2016. This fact sheet describes the draft "2016 PGP" which is being proposed. The PGP will be available state-wide where DEC is the APDES permitting authority.

Conditions and requirements in the 2016 PGP remain largely unchanged from the 2011 PGP. Implementation of the 2011 PGP has been successful during its first four years. The regulated community has raised very few implementation issues, which have been successfully resolved. Operators have generally submitted the required Notice of Intent (NOIs) and Annual Reports to the Department on time and in accordance with the PGP requirements.

The 2016 PGP includes some changes from the 2011 PGP resulting in restructuring the 2016 PGP to reflect DEC as the permitting authority, and are listed below:

- NOI requirements and date authorization to begin, and
- Permit specific requirements in regards to National Marine Fisheries Service (NMFS) Listed Resources of Concern.

1.1 Basis for Permit

Section 301(a) of the Clean Water Act (CWA) and Alaska Administrative Code (AAC) 18 AAC 83.015 provide that the discharge of pollutants to waters of the United States is unlawful except in accordance with an APDES permit. Although such permits are usually issued to individual discharges, DEC regulation also authorize the issuance of general permits (18 AAC 83.205) to categories of discharges when a number of point sources are:

- Located within the same geographic area and warrant similar pollution control measures;
- Involve the same or substantially similar types of operations;
- Discharge the same types of wastes;
- Require the same effluent limits or operating conditions;
- Require the same or similar monitoring requirements; and
- In the opinion of the DEC, are more appropriately controlled under a general permit than under individual permits.

The permit provides coverage for any Operator of a point source discharge of pollutants (i.e., discharge) of waters of the United States resulting from the application of pesticides and eligible for permit coverage under Part 1.1 of the permit and located within the State of Alaska (except lands within the Metlakatla Indian Reservation and the Denali National Park Preserve).

DEC also notes that the issuance of the permit, including the requirements to submit information in the NOI, is also based on DEC's authority under section 308(a) of the CWA. In 2012, Environmental Protection Agency (EPA) transferred authority to administer the pesticide general permit to the state. EPA has no authority to issue a permit to a facility where jurisdiction over that facility or activity has transferred to the State. EPA retains authority, pursuant to the CWA for 1) projects located within Denali National Park and the Metlakatla Indian Reservation and 2) to review all DEC-drafted permits and to conduct inspections and pursue an enforcement action on any discharges in Alaska.

1.2 History of 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 provide specific data from tests done according to EPA guidelines.

When EPA approves a pesticide for a particular use, EPA 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 FIFRA section 12(a)(2)(G) 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.

1.3 Court Decisions leading to the CWA regulation concerning Pesticide Applications

In the past, several courts have addressed the question of whether the CWA requires National Pollutant Discharge Elimination System (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 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.

1.4 Permit Issuance History

On October 31, 2008, EPA formally approved Alaska's application for primacy of the NPDES Program. The approved state program is called the Alaska Pollutant Discharge Elimination System (APDES) Program. The transfer of program responsibilities took place over a period of four years from program approval. Authority for the Pesticide General Permit (PGP) transferred to DEC on October 31, 2012 as part of the APDES Program. The 2011 PGP was issued by EPA and became effective on October 31, 2011 and expires on October 31, 2016.

1.5 Water Quality Standards

The protection of surface water occurs primarily through the development, adoption, and implementation of water quality standards and the use of the water quality standards in APDES permits. The water quality standards designate specific uses for which water quality must be protected. Alaska water quality standards designate seven uses for fresh waters (drinking water; agriculture; aquaculture; industrial; contact recreation; non-contact recreation; and growth and propagation of fish, shellfish, other aquatic life, and wildlife) and seven uses for marine waters (aquaculture; seafood processing; industrial; contact recreation; non-contact recreation; growth and propagation of fish, shellfish, other aquatic life, and wildlife; and harvesting raw mollusks or other raw aquatic life for human consumption).

To prevent unnecessary lowering of water quality, 40 CFR § 131.12 requires Alaska to develop and adopt an antidegradation policy, which the Department has done in 18 AAC 70.015. The general purpose of the antidegradation policy is to protect the quality of the state's waters. The Department conducts an antidegradation analysis to determine the permitted activities' potential effect on water quality and whether the permitted activities meet the antidegradation policy and Alaska's water quality standards. The basic purpose of the antidegradation policy is to maintain and protect existing water quality. Many waterbodies have natural water quality that is better than the criteria established by the water quality standards at 18 AAC 70. In such cases, a wastewater discharge could meet water quality standards but still cause some degradation of the waterbody. See Section 5.0 for the Antidegradation Analysis conducted as part of this permit issuance.

2.0 Structure of the 2016 PGP

2.1 General

Throughout the fact sheet (and permit), DEC uses consistent terms when referring to what activity or discharge will be eligible for coverage and who will be responsible to comply with the terms of the permit. Specifically, the permit holder is referred to as the "Operator." This term has a similar meaning to the term "permittee", which is also used in the fact sheet; generally, the term permittee is specific to the period of time that an Operator or contractor is actually covered under the permit. More details on how an Operator may obtain permit coverage and the applicable permit requirements are provided in Section 3.0 of the fact sheet.

The permit is divided into seven parts: (1) coverage under the permit, (2) technology-based effluent limitations, (3) water quality-based effluent limitations, (4) monitoring, (5) pesticide discharge management plan, (6) corrective action, and (7) recordkeeping and annual reporting. Additionally, the

permit includes four appendices with additional conditions and guidance for permittees: (A) standard permit conditions, (B) abbreviations and acronyms, (C) definitions, (D) Forms: Notice of Intent Form, Notice of Termination Form, Pesticide Discharge Evaluation Worksheet, Annual Report Template, and Adverse Incident Template.

Operators should carefully read each part of the permit to assess what portion of the requirements in each part may apply to their activities. As will be discussed in more detail in Section 3.0 of the fact sheet, the permit establishes different requirements for different types of pesticide use patterns, different types of Operators, and different sizes of areas treated and managed for the control of pests. The organization of the permit is intended to clarify the applicable requirements for Operators to the greatest extent possible.

2.2 Effluent Limitations in the 2016 PGP

Part 2 of the permit contains the technology-based effluent limitations. Part 3 of the permit contains the water quality-based effluent limitations. These Parts of the permit contain effluent limitations, defined in the CWA as restrictions on quantities, rates, and concentrations of constituents that are discharged. CWA section 502(11). Violation of any of these effluent limitations constitutes a violation of the permit. As is described in more detail in Section 3.2 (Effluent Limitations) of the fact sheet, under the CWA these effluent limitations can be narrative rather than numeric.

The technology-based effluent limitations set forth in Part 2 of the permit require the Operator to minimize the discharge of pesticides to waters of the United States from the application of pesticides. Consistent with the control level requirements of the CWA, the term “minimize” means to reduce and/or eliminate pesticide 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 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. The technology-based effluent limitations section is divided into two parts. The first part applies to all Applicators and addresses the general requirement to minimize discharges from application of pesticides. In this part, all Applicators must minimize discharges of pesticides 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 Part 2.2 of the PGP).

In addition to the technology-based effluent limitations, Part 3 of the PGP contains the water-quality-based effluent limitations. The Operator must control its discharge as necessary to meet applicable water quality standards. Any discharge that results in an excursion of any applicable numeric or narrative state water quality standard is prohibited. In general, based on the data included in the record and the additional requirements in the permit, in addition to FIFRA’s requirements and the data and information upon which FIFRA registrations are based, DEC expects that compliance with the technology-based effluent limitations and other terms and conditions in the permit will meet applicable water quality-based effluent limitations. To date, after over four years of implementation of the prior permit, DEC does not have any evidence in the record that activities authorized by the existing permit have caused water quality problems. However, if at any time the Operator or DEC determines that the discharge causes or contributes to an excursion of applicable water quality standards, the Operator must take

corrective actions as required in Part 6 of the permit, and document and report the excursion(s) to DEC as required in Part 7. Furthermore, consistent with Parts 3.0 and 6.3 of the permit, DEC may impose additional water quality-based limitations on a site-specific basis, or require the Operator to obtain coverage under an individual permit, if information in an NOI, required reports, or from other sources indicates that, after meeting the technology-based limitations in the permit, the discharges are not controlled as necessary to meet applicable water quality standards. DEC 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 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). While not specifically framed as effluent limitations, these eligibility conditions further help to protect water quality on a water-body-specific basis.

2.3 Pesticide Discharge Management Plan (PDMP)

Distinct from the technology-based or water quality-based effluent limitation provisions in the permit, Part 5.0 of the permit requires Decision-makers that must submit an NOI and that are large entities to prepare a PDMP to document the implementation of Pest Management Measures being used to comply with the effluent limitations set forth in Parts 2.0 and 3.0. A large entity, as defined in Appendix C of the permit, is (1) a public entity that serves a population greater than 10,000 people or (2) a private enterprise that exceeds the Small Business Administration "size standards" as provided in 13 CFR 121.201.

In general, Part 5.0 of the permit requires that the following be documented in the PDMP: (1) pesticide discharge management team information; (2) problem identification; (3) pest management options evaluation; (4) response procedures pertaining to spills and adverse incidents; (5) documentation to support eligibility considerations under other federal laws, and (6) signature requirements. The PDMP must be kept up-to-date and modified whenever necessary to document any corrective actions as necessary to meet the effluent limitations in the permit.

The requirement to prepare a PDMP is not an effluent limitation because it does not restrict quantities, rates, and concentrations of constituents that are discharged. CWA section 502(11). Instead, the requirement to develop a PDMP is a permit "term or condition" authorized under sections 402(a)(2) and 308 of the Act. Section 402(a)(2) states, "[t]he Administrator shall prescribe conditions for [APDES] permits to assure compliance with the requirements of paragraph (1) of this subsection, including conditions on data and information collection, reporting, and such other requirements as he deems appropriate." The PDMP requirements set forth in the permit are terms or conditions under the CWA because the Operator is documenting information on how it is complying with the effluent limitations (and inspection and evaluation requirements) contained elsewhere in the permit. Thus, the requirement to develop a PDMP and keep it updated is no different than other information collection conditions, as authorized by section 402(a)(2), in other permits. Failure to have a PDMP, where required, is a violation of the permit.

While Part 2 of the permit requires the Operator to select Pest Management Measures to meet the effluent limitations in the permit, the Pest Management Measures themselves described in the PDMP are not effluent limitations because the permit does not impose on the Operator the obligation to comply with the PDMP; rather, the permit imposes on the Operator the obligation to meet the effluent limitations prescribed in Parts 2.0 and 3.0. Therefore, the Operator is free to change as appropriate the

Pest Management Measures used to meet the effluent limitations contained in the permit. This flexibility helps ensure that the Operator is able to adjust its practices as necessary to ensure continued compliance with the permit's effluent limitations. However, the permit also contains a recordkeeping condition that requires that the PDMP be updated with any such changes in the Operator's practices. See Part 5.2 of the permit. Thus, if an Operator's on-the-ground practices differ from what is in the PDMP, this would constitute a violation of the permit's recordkeeping requirement to keep the PDMP up-to-date, and not per se a violation of the permit's effluent limitations, which are distinct from the PDMP. DEC recognizes, however, that because the PDMP documents how the Operator is meeting the effluent limitations contained in the permit, not following through with actions identified by the Operator in the PDMP as the method of complying with the effluent limitations in the permit is relevant to evaluating whether the Operator is complying with the permit's effluent limitations.

2.4 Public Availability of Documents

Part 5.3 of the permit requires that the Operator retain a copy of the current PDMP at the address listed on the NOI and it must be immediately available, at the time of an onsite inspection or upon request to DEC, EPA, or local agencies governing wastewater discharges and/or pesticide applications, and representatives of the United States Fish and Wildlife Service (FWS) or the National Marine Fisheries Service (NMFS). While not required to be submitted to DEC, interested persons can request a copy of the PDMP through DEC, at which point DEC will likely request the Operator to provide a copy of the PDMP. By requiring members of the public to request a copy of the PDMP through DEC, the Department is able to provide the Operators with assurance that any Confidential Business Information that may be contained within its PDMP is not released to the public.

2.5 Sharing of Responsibilities

The general permit was developed with the understanding that there may be more than one responsible entity for a given discharge. As structured, the permit provides for sharing of responsibilities to meet the end goal of discharges being in compliance with permit requirements. The APDES regulations state that "Operators" are responsible for achieving permit compliance. Specifically, 18 AAC 83.105(c) 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. DEC 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 PGP includes a definition of "Operator" in Appendix C of the 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 APDES 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 DEC 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).

DEC encourages Operators to use already prepared information and explore possible cost savings by sharing responsibilities for implementing aspects of the permit. For example, a pest control district or Agency 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 pesticide 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, jointly and severally, for any violation that may occur, though DEC may consider this written division of responsibilities when determining the appropriate enforcement response to a violation.

3.0 Summary of Permit Conditions

3.1 Coverage under the 2016 PGP

3.1.1 Eligibility (Part 1.1)

3.1.1.1 Activities Covered (Part 1.1.1)

The activities covered under the 2016 PGP remain unchanged from the 2011 PGP. Only Operators meeting the eligibility requirements outlined in the PGP may be covered under the permit. If an Operator does not meet the eligibility provisions described in Part 1.1 of the PGP, the Operator's point source discharges to waters of the United States from the application of pesticides will be in violation of the CWA, unless the Operator has obtained coverage under another permit or the CWA exempts these discharges from APDES permit requirements. The activities covered by the permit generally include the use patterns and types of pest control activities described in the vacated 2006 NPDES Pesticides Rule. Under CWA section 502(14), agricultural storm water and irrigation return flow are exempt from APDES permits. Also, applications that do not reach waters of the United States do not need permit coverage. Thus, the PGP covers the discharge of pesticides (biological pesticides and chemical pesticides which leave a residue) to waters of the United States resulting from the following use patterns: (1) Mosquito and Other Flying Insect Pest Control; (2) Weed and Algae Control; (3) Animal Pest Control; and (4) Forest Canopy Pest Control, as summarized below:

Mosquito and Other Flying Insect Pest Control

This use pattern includes the application, by any means, of chemical and biological insecticides and larvicides into or over water to control insects that breed or live in, over, or near waters of the United States. Applications of this nature usually involve the use of ultra-low volume sprays or granular larvicides discharged over large swaths of mosquito breeding habitat and often are performed several times per year.

Weed and Algae Pest Control

This use pattern includes the application, by any means, of contact or systemic herbicides to control vegetation and algae (and plant pathogens such as fungi) in waters of the United States and at water's edge, including ditches and/or canals. Applications of this nature typically are single spot pesticide applications to control infestations or staged large scale pesticide applications intended to control pests in several acres of waterway. Pesticide applications in a treatment area may be performed one or more times per year to control the pest problem.

Animal Pest Control

This use pattern includes the application, by any means, of pesticides into waters of the United States 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.

Forest Canopy Pest Control

This use pattern includes pest control projects in, over, or to forest canopies (aerially or from the ground) to control pests in the forest canopy where waters of the United States exist below the canopy. Applications of this nature usually occur over large tracts of land, and are typically made in response to specific pest outbreaks. DEC understands that for this use pattern pesticides will be unavoidably discharged into waters of the United States in the course of controlling pests over a forest canopy as a result of pesticide application. These pests are not necessarily aquatic (*e.g.*, airborne non-aquatic insects) but are detrimental to industry, the environment, and public health. Note: DEC recognizes that mosquito adulticides are applied to forest canopies, and this application is covered under the "Mosquito and Other Flying Insect Pest Control" use pattern.

In promulgating 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 from storm water, discharges into waters of the United States.

Consistent with the 2006 NPDES Pesticides Rule and the 2011 PGP, the 2016 PGP does not cover spray drift resulting from pesticide applications. Instead, to address spray drift, DEC is aware that EPA is actively engaged in several initiatives to help minimize pesticide drift problems such as: (1) establishing a new voluntary Pesticide Drift Reduction Technology (DRT) program; (2) evaluating potential for drift as a routine part of pesticides risk assessments; (3) in collaboration with experts, improving scientific models and methods for estimating drift and risks from drift; (4) 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 (5) promoting applicator education and training programs. More information on EPA's work on reducing pesticide drift is available at http://www2.epa.gov/reducing-pesticide-drift.

Irrigation return flow (such as runoff from a crop field due to irrigation of that field) and agricultural storm water runoff do not require APDES permits, as exempted from the definition of point source under section 502(14) of the CWA. However, discharges from the application of pesticides, which includes applications of herbicides, into irrigation ditches and canals that are themselves waters of the United States, are not exempt as irrigation return flows or agricultural storm water, and do require APDES permit coverage. This is because such pesticide discharges are not only point sources, but also that these pesticides are defined as "pollutants" under the CWA under the Sixth Circuit Court's decision interpreting that definition in the CWA. The permit does not address what are waters of the United States but contains the conditions to authorize the controlled discharge to jurisdictional waters.

Neither the 2006 NPDES Pesticides Rule, the Sixth Circuit Court vacatur of that rule, nor any version of the PGP have changed in any way the determination of whether certain types of storm water discharges

are required to obtain permit coverage, or under which permit coverage is required. This is true whether the discharge contains pesticides or pesticide residues resulting from the application of pesticides. In particular, non-agricultural storm water that may contain pesticides would not be eligible for coverage under the permit, and is not required to obtain APDES permit coverage unless otherwise required under section 402(p) of the CWA. Existing storm water permits for construction, industrial activity, and regulated municipal separate storm sewer systems (MS4s) already address pesticides in storm water from those sources. Thus, storm water is either: (a) already subject to APDES permit requirements pursuant to section 402(p) of the CWA or (b) is a discharge for which APDES permit coverage is not currently required under section 402(p). The regulations that specify what types of storm water require APDES permits can be found in 40 CFR §122.26 and 122.30-122.37 (adopted by reference in 18 AAC 83.010(b)(3) and (5)).

In the 2016 PGP, DEC continues the four use patterns included in the 2011 PGP that EPA had determined encompasses the majority of pesticide applications that would result in point source discharges to waters of the United States and generally represent the use patterns intended to be addressed by the 2006 rule that is now vacated. The permit does not cover, nor is permit coverage required, for pesticides applications that do not result in a point source discharge to waters of the United States, such as for the purpose of controlling pests on agricultural crops, forest floors, or range lands. However, the application of herbicides in waters of the United States and the control of pests on plants grown in waters of the United States, such as perennial obligate hydrophytes, is within the scope of coverage of the permit. This fact sheet does not identify every activity which may involve a point source discharge of pesticides to waters of the United States that would require a permit; rather, the fact sheet focuses on the activities for which coverage under the PGP is available. The existence of the general permit does not alter the requirement that discharges of pesticides to waters of the United States that are not covered by the permit be covered by an individual permit or another general permit.

Scope of Permit

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 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.

Although the court did not define what a residual is, for purposes of the permit, DEC assumes that most if not all chemical pesticides will leave a residual once the product has performed its intended purpose, unless the Operator can show otherwise.

DEC offers the following guidance with respect to the use patterns of chemical pesticides covered by this general permit.

1. If the application of a chemical pesticide is made <u>over</u> waters of the United States to control pests <u>over</u> the water, any amount of the pesticide that falls into waters of the United States is “excess” pesticide and would require coverage by an APDES permit. DEC expects that some portion of every application of a pesticide made over waters of the United States will fall directly into such waters and thus assumes that applications will trigger the requirement for an APDES permit. A permit is unnecessary if no portion of a chemical pesticide applied over waters of the United States will fall into those waters.

2. If the application of a chemical pesticide is made into waters of the United States to control a pest in such waters, once the pesticide no longer provides any pesticidal benefit, any amount of the pesticide that remains in those waters is a "residual" and would require coverage by an APDES permit. Additionally, as the Sixth Circuit reasoned, the residual is discharged at the time of a pesticides initial application. DEC expects that some portion of every application of a pesticide made into waters of the United States will leave a residual in those waters and thus assumes every application will trigger the requirement for an APDES permit. DEC expects that an entity applying pesticides with a discharge to waters of the United States who wishes to dispute this assumption would be expected to provide scientific data supporting such a determination. Such data should show what level of the pesticide can be detected in water, and at what level in water the pesticide provides a pesticidal benefit. Such data should address the properties of the chemical pesticide under different water conditions (*e.g.*, different pH, organic content, temperature, depth, etc.) that might affect the pesticide's properties. A permit would not be necessary if it is determined that a residual did not enter waters of the United States.
3. The permit authorizes discharges associated with four categories of pesticide application activities: mosquito and other flying insect pest control, weed and algae pest control, animal pest control, forest canopy pest control. As noted above, only point source discharges of pollutants to waters of the United States require a permit, and it is beyond the scope of this fact sheet to identify all specific activities that do or do not require a permit. However, to the extent that activities that fall within the four covered categories require a permit, they can be authorized by the general permit if all eligibility requirements are met. For example, discharges to control pests in or near areas that are waters of the United States, even when these areas are dry for much of the year, may be covered by the permit, if one is required. This would include discharges on forest or range lands that include dry washes and ephemeral streams that are waters of the United States, to control pests that may be found in these occasionally wet areas. For two of the categories, weed and algae pest control and animal pest control, the permit specifies that covered activities include applications to control pests "in water and at water's edge." DEC 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 may unavoidably involve a point-source discharge of pesticides to waters of the United States. The category forest canopy pest control is for applications to a forest canopy. DEC intends that this can include both mature and immature forest canopies, including canopies that may not be continuously connected, where control of pests associated with the canopy (*i.e.*, branches and leaves of the trees) may unavoidably involve point source discharges of pesticides to waters of the United States.

For purposes of the permit, DEC is relying on existing regulatory definitions in 40 CFR 174.3 and 158.2100(a) developed under FIFRA to define the term "biological pesticides." For purposes of the permit, DEC 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]

DEC recognizes that there are many site-specific situations which will determine whether a pesticide application operation needs permit coverage. DEC is not attempting to define all such situations in this fact sheet. Additionally, any pesticide application activities that do not fall within the four use patterns covered by the permit will require coverage under some other APDES permit if those activities result in

point source discharges to waters of the United States. However, the Department does want to make it clear that to the extent pesticide application operations need permit coverage, the permit is available for the four pesticide use categories. Thus, to the extent that a permit is needed for discharges from pesticide applications to rangelands, forestry, park lands, rights-of-way, and other areas, and the activity falls within one of the four use categories, coverage can be granted under the general permit.

3.1.1.2 Limitations on Coverage (Part 1.1.2)

3.1.1.2.1 Discharges to Water Quality Impaired Waters (Part 1.1.2.1)

The permit specifies eligibility requirements for coverage under the general permit for discharge to impaired waters. The requirements remain unchanged from the 2011 PGP. Coverage under the permit is only available for certain discharges to impaired waters. Discharges to waters which are impaired for a substance which is not an active ingredient in that pesticide or a degradate of such an active ingredient are eligible for coverage. Discharges to waters impaired for temperature or some other indicator parameter, or for physical impairments such as "habitat alteration" are also eligible for PGP coverage, unless otherwise notified by DEC. Conversely, the permit is not available for the discharge of any pesticide to water that is impaired for a substance that is an active ingredient in that pesticide or a degradate of such an active ingredient. For example, application of the pesticide copper sulfate to a waterbody impaired for either copper or sulfates would not be eligible for coverage under the permit, because copper sulfate can degrade into these two substances. In this instance, the Operator would have to choose between obtaining coverage under an individual permit for such a discharge or selecting some other means of pest management (*e.g.*, using mechanical means or a different pesticide active ingredient).

For the permit, DEC determined that it does not have information warranting a limitation for all impaired waters regardless of the impairment. In fact, the application of a pesticide to water in some instances actually improves the quality of the water, such as when used to control algae growth that can deplete oxygen levels in water. It is important to note that the permit allows DEC, based on additional information, to opt not to approve coverage under the PGP, or at a later date to require an Operator covered under the PGP to apply for coverage under an individual permit.

For purposes of the permit, impaired waters are those that have been identified by DEC or EPA pursuant to Section 303(d) of the CWA as not meeting applicable water quality standards. Impaired waters for purposes of the 2016 PGP include both waters with EPA-approved and EPA-established Total Maximum Daily Loads (TMDLs), and those for which EPA has not yet approved or established a TMDL. (A list of impaired waters, along with the pollutants or pollution identified as the cause of the impairment is available at http://dec.alaska.gov/water/tmdl/tmdl_index.htm.) Since the 303(d) list provides the most readily-available evidence of impairment, Operators should use the list when deciding whether their discharge(s) meet the eligibility requirements regarding waterbodies impaired for specific pesticides. Thus, these requirements will further ensure protection of water quality.

3.1.1.2.2 Discharges to Waters Designated as Tier 3 for Antidegradation Purposes (Part 1.1.2.2)

The permit specifies requirements for coverage under the general permit for discharge to Tier 3 waters. The requirements remain unchanged from the 2011 PGP. The permit provides coverage for discharges 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. This is consistent with EPA's longstanding view that "[s]tates may allow some limited activities which result in

temporary and short-term changes in water quality. Such activities are considered to be consistent with the intent and purpose of [a Tier 3 water]." 48 FR 51400, 51403 (1983).

Tier 3 protection provides the most stringent level of antidegradation protection, *i.e.*, to outstanding national resource waters. These waters are often regarded as the highest quality waters of the United States, but the Tier 3 designation also provides special protection for waters of exceptional ecological significance, *i.e.*, those which are important, unique, or sensitive ecologically. Except for certain temporary changes, Tier 3 protection means that water quality cannot be lowered in such waters. In broad terms, DEC's view of "temporary" is weeks and months, not years. At this time, no Tier 3 waters have been designated in Alaska.

EPA received many comments on the draft 2011 PGP indicating that time sensitive pesticide applications to Tier 3 waters in other states are routinely performed and quick response is needed to preserve the outstanding quality of these Tier 3 waters and/or to protect public health near these waters. Several commenters stated that having to go through the more timely individual permit process would complicate the ability to control pests in a timely manner as is needed to minimize the environmental effects and costs of these pest problems. Several commenters noted that pesticides have been discharged to these waters for many years without negatively impacting those waters (Comments received are available in the docket for the draft 2011 PGP at EPA-HQ-OW-2010-0257 available at www.regulations.gov). Thus, in light of these comments, and in recognition of the fundamental purpose of water quality standards ("to protect the public health or welfare, enhance the quality of water and serve the purposes of this chapter," as stated in Section 303(c)(2) of the CWA), the 2016 PGP continues the 2011 PGP provision of providing permit coverage for discharges 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.

DEC is continuing the requirement for additional documentation and reporting for discharges to Tier 3 waters. See Part 5.1.2 of the 2016 PGP. Any Decision-maker proposing to discharge to a Tier 3 water must submit an NOI consistent with Part 1.2.2 of the PGP. NOIs for such discharges are required to identify the Tier 3 water by name, and provide a discussion of the environmental problem and demonstration that the pesticide discharge is necessary to protect water quality, the environment, and/or public health. This NOI requirement includes the requirement for any Decision-maker already covered under the PGP who wants to discharge to a Tier 3 water at a later date, to submit an updated NOI containing the information identified above for discharges to Tier 3 waters.

3.1.1.2.3 Discharges Currently or Previously Covered by another Permit (Part 1.1.2.3)

Part 1.1.2.3 of the permit describes situations where an Operator is ineligible for coverage under the permit because of coverage under another permit. The permit provisions would remain unchanged from the 2011 PGP. These include discharges currently covered under an APDES permit and discharges from activities where the associated APDES permit has been or is in the process of being denied, terminated, or revoked by DEC (although this last provision does not apply to the routine reissuance of permits every five years).

3.1.2 Authorization to Discharge under the permit (Part 1.2)

3.1.2.1 How to Obtain Authorization (Part 1.2.1)

The APDES general permit regulations, at 18 AAC 83.210(b), require that Operators submit an NOI to obtain coverage under an existing general permit for which that discharge is eligible. However, those

regulations, at 18 AAC 83.210(g), provide that at the discretion of the Department certain discharges can be authorized under a general permit without submitting an NOI where DEC finds that an NOI would be inappropriate for such discharges. In making such a finding, DEC must consider the following criteria: the type of discharge; the expected nature of the discharge; the potential for toxic and conventional pollutants in the discharges; the expected volume of the discharges; other means of identifying discharges covered by the permit; and the estimated number of discharges to be covered by the permit. The 2016 PGP is requiring submission of an NOI for certain discharges and is providing automatic coverage for certain other discharges. These requirements remain unchanged from the 2011 PGP.

DEC is requiring submission of an NOI for certain discharges and is providing automatic coverage for certain other discharges for which DEC determined it would be inappropriate to require an NOI. DEC is exempting Operators of pesticide research and development activities from the need to submit an NOI because these activities are typically smaller and in many instances, are already covered under FIFRA's section 5 (experimental use permits). Similarly, the 2016 PGP exempts these activities from many requirements of the permit where such activities are inconsistent with the research plan.

As identified in Section 3.1.1.1 of the fact sheet, DEC expects a number of discharges from the application of pesticides to span a range of Operators and activities that will require APDES permit coverage. DEC's consideration of the regulatory criteria in 18 AAC 83.210(g) is as follows:

Type and expected nature of discharge

All discharges that would be authorized by the 2016 PGP involve either (1) applications made directly to or over waters of the United States to control pests in or over the water, or (2) applications to control pests near water such that pesticides will be unavoidably deposited into waters of the United States. The 2016 PGP is structured by pesticide use patterns as was depicted in the 2011 PGP. These use patterns were developed to include discharges that are similar in type and nature, and therefore represent the type of discharges and expected nature of the discharges covered under the permit. The 2016 PGP covers the four use patterns described in Section 3.1.1. DEC considered each use pattern independently with the goal of identifying the significant activities resulting in discharges that should be covered under this PGP.

Potential for toxic and conventional pollutants in the discharge

DEC does not expect the potential for toxic and conventional pollutants in the discharges from pesticides to vary among use patterns. DEC would expect, however, that the potential for impacts from high concentrations of toxic or conventional pollutants in the discharge would be smaller when fewer acres or linear feet are treated.

Expected volume of discharge

DEC also considered the expected volume of discharges from each use pattern. It is difficult to estimate the expected volume of discharges for each use pattern because Pest Management Measures used by Operators to meet the permit's technology based effluent limitations may vary based on site-specific conditions. For example, the volume of the discharge may vary depending on the specific pesticide being used, the intensity of the pest pressure based on the specific pest problem, and the pest management strategy deemed to be most effective for the pest problem. Moreover, minimizing the discharge of pesticide product necessary to manage pests successfully will vary among Operators depending on which Pest Management Measures the Operator uses. Nonetheless, DEC expects that, in general, the volume of the discharge will vary proportionally

with the number of acres and linear miles treated. Therefore, for all use patterns, DEC expects that the volume of the discharge for a given pesticide application will be lower when fewer acres or linear feet are treated over a calendar year. Moreover, while there may be more Operators applying pesticides to small treatments areas when compared to Operators applying to large treatment areas, the volume of discharges from Operators applying to small treatment areas is believed to be substantially less on a per applicator basis and cumulatively less than the volume of discharges from applications made by Operators applying to large treatment areas.

Other means to identify discharges

DEC also considered other means of identifying types of discharges covered by the permit. DEC may be able to identify pesticide discharges from Operator-submitted data, ambient water sampling data, and other information submitted by pesticide dischargers pursuant to federal or state law. However, DEC recognizes that the availability and quality of these data may be limited and highly variable across the scope of activities and areas covered under the 2016 PGP.

Number of discharges

While the exact number of entities and thus the number of discharges which may be covered by the permit is unknown, during the draft 2011 PGP EPA estimated that the PGP covers more than 35,000 dischargers per year in the states for which EPA was the permitting authority, of which 385 dischargers were estimated for Alaska. Of this total, a large majority represent dischargers performing small pesticide applications that EPA considered to have very low potential for impact (such as herbicide applications to short sections of ditches or canal banks). Thus, requiring an NOI from all dischargers would be a large burden of little value for permitting authorities and permittees alike. Also, EPA had received many comments on the draft 2011 PGP that indicated For-Hire Applicators applying to many small areas throughout different pest management areas, and requiring an NOI from them for certain activities would be duplicative of Decision-maker requirements. This would likely confuse For-Hire Applicators who are generally very small businesses, and would not provide meaningful information on identification of pest management areas.

In analyzing these regulatory criteria, the EPA gave particular weight to the expected volume of the discharges and the estimated number of discharges to be covered by the 2011 PGP. After considering the universe of entities to be covered under the permit, EPA found a logical break between entities applying pesticides to larger areas versus smaller areas, and a difference between the types of entities generally responsible for performing such pest control activities. As a result, NOI requirements are based on the size of areas treated and the entity making the decision to perform pesticide applications.

3.1.2.2 Decision-makers Required to Submit an NOI (Part 1.2.2)

To obtain authorization under the 2016 PGP, once final, Operators must meet the Part 1.1 eligibility requirements, and only if required by Part 1.2.2, also submit a complete and accurate NOI no later than the appropriate deadline described in Part 1.2.3.

Table 1-1 in Part 1.2.2 of the 2016 PGP identifies which Decision-makers are or will be required to submit an NOI. Based on the analysis outlined in Section 3.1.2.1 above, DEC has determined that it is inappropriate to require For-Hire Applicators, who are not Decision-makers as defined in Appendix C of the permit, to submit NOIs. DEC has further determined that Decision-makers who apply pesticides to

relatively small areas should not be required to submit NOIs. Therefore, DEC is exercising its discretion and not requiring these Operators to submit NOIs (except for certain Operators that the Department finds have a significant role in pest control for public health and environmental protection and should be expected to provide the Department notice of such activities). Nonetheless, DEC emphasizes that even if an NOI is not required, Operators are covered automatically and are still subject to all applicable requirements. DEC is requiring NOIs from the following types of Decision-makers:

- Decision-makers exceeding an annual treatment area threshold;
- Other Decision-makers specifically in the business of pest control; and
- Decision-makers discharging to Tier 3 waters;

A more detailed discussion of DEC's rationale for requiring NOIs for these categories of Decision-makers follows.

NOIs for Decision-Makers Exceeding an Annual Treatment Area Threshold

DEC has continued the 2011 PGP annual treatment area thresholds for each use pattern that will only require large Operators applying pesticides to large areas to submit an NOI. In developing the 2011 PGP, to determine the appropriate annual treatment area thresholds that would trigger the NOI requirement, EPA's Office of Water, Office of Chemical Safety and Pollution Prevention (formerly the Office of Pesticides, Pollution, and Toxic Substances) and the ten EPA Regional Offices engaged in discussions with USDA, states as co-regulators, and representatives from industry including pesticide registrants, applicators, and land managers. EPA also solicited and received some comments on the draft 2011 PGP on appropriate threshold values to use for NOI submission. Based on these discussions, the comments received, and EPA's best professional judgment, EPA developed annual treatment area thresholds that established NOI requirements for applications to larger areas, which are believed to have the greatest potential for impact to waters of the United States. In the 2011 PGP, EPA recognized there are many unknowns concerning the size, organization, and activities of the permitted universe. Considerable variation in the availability of data and in the consistency of requirements across regions and states resulted in EPA relying heavily on its best professional judgment in setting the NOI annual treatment area thresholds for each of the use patterns. If a Decision-maker, otherwise not required to submit an NOI, anticipates it will exceed an applicable annual treatment area threshold during any time in a given calendar year of the permit cycle, the Decision-maker must then submit an NOI consistent with the due dates described in Part 1.2.3.

When calculating the size of the treatment area for comparing to an annual treatment area threshold, DEC uses the term "at water's edge adjacent to waters of the United States" to identify those areas where pesticides are applied to control pests that are present near water where a portion of the pesticides will unavoidably be deposited to the water to target the pests. DEC's use of the word "adjacent" in identifying these areas is merely used to identify areas near waters of the United States and is not intended to mean "adjacent" as defined in regulation for use when defining the term "waters of the United States."

To avoid duplication of submission, DEC is requiring that the Decision-maker responsible for such applications be the Operator required to submit the NOI. So, where a Decision-maker hires an Applicator to perform the pest control activities, the NOI is to be submitted by the Decision-maker.

DEC's rationale for the annual treatment area threshold and Decision-makers required to submit NOIs for each use pattern is as follows:

Mosquito Control and Other Flying Insect Pest Control

For Mosquitoes and Other Flying Insect Pests, DEC has continued the 2011 PGP annual treatment area threshold set at 6,400 acres. DEC understands that a pest control district may manage areas significantly larger than this threshold and may reasonably expect to exceed it during any given year.

Furthermore, the effective control of other aquatic breeding, flying insects, such as the blackfly, necessitates applications that approach or exceed this threshold. Therefore, the threshold appropriately captures most Decision-makers engaging in this use pattern. DEC also finds that even those pest control districts that treat areas below the threshold should be required to submit NOIs, as these entities were created specifically for the control of pests and should provide notice to the Department of their activities. As such, the permit requires all mosquito control districts or similar pest control districts, as well as any other Decision-makers treating over the annual treatment area threshold, to submit an NOI. The Department has determined this appropriately captures those two classes of entities that either (1) are established with a specific purpose of pest control or that (2) treat large enough areas to warrant notice to the Department.

Weed and Algae Control

For Weeds and Algae, DEC has continued the 2011 PGP annual treatment area threshold set at 80 acres or 20 linear miles of pesticide application to waters of the United States. This threshold has been set to capture Decision-makers treating relatively large portions of surface waters and watersheds, such as water management districts, wildlife and game departments, and some homeowner and lake associations. After reviewing the operations of major irrigation and flood control systems as part of the initial 2011 PGP development, EPA expected that generally, relatively large entities or organizations with comparable resources are the types of entities that manage 20 or more miles of engineered irrigation systems, and that this is a reasonable limit to trigger the NOI requirement. The same rationale is applied to managers of ditch and canal banks. Therefore, the threshold appropriately captures the relatively large applications but excludes a significant number of small applications. Similar to mosquito control, weed control districts, or similar pest control districts created specifically for the control of pests that treat areas below the threshold, should be required to submit NOIs. As such, the 2016 PGP continues the requirement to require all weed control districts or similar pest control districts as well as any other Decision-makers treating over the annual treatment area threshold to submit an NOI. The Department has determined that this appropriately captures those two classes of entities that either (1) are established with a specific purpose of pest control or that (2) treat large enough areas to warrant notice to the Department.

Animal Pest Control

For Animal Pest Control, DEC has continued the 2011 PGP annual treatment area threshold. Invasive and nuisance aquatic animals are most commonly treated by public agencies such as the Departments of Fish and Game, or Natural Resources, or utilities such as water management districts that manage areas of surface water in excess of 80 acres or 20 linear miles. 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. For example, fishery management applications using rotenone often occur in the entire lake, and thus any similar application to a lake of more than 80 acres in area will trigger

the annual treatment area threshold. DEC expects that for this reason, only spot applications to eradicate small emergent populations of sessile animals or applications to very small water bodies might be excluded from an NOI requirement. Therefore, the threshold appropriately captures the relatively large Decision-makers engaging in this use pattern.

Forest Canopy Pest Control

For Forest Canopy Pest Control, DEC has continued the 2011 PGP annual treatment area threshold. Forest canopy pest suppression programs are designed to blanket large tracts of terrain, throughout which Operators may not be able to see waters of the United States beneath the canopy. DEC has set the annual treatment area threshold at 6,400 acres for this use pattern with the understanding that this will exclude only the smallest applications from the NOI requirement. These smaller applications generally occur on private lands. Therefore, the threshold appropriately captures most Decision-makers engaging in this use pattern, particularly public agencies managing large tracts of land.

NOIs for Certain Entities Regardless of the Annual Treatment Area Threshold

In addition to NOIs from Decision-makers treating the largest areas, DEC is also requiring NOIs from certain other types of entities with land resource stewardship responsibilities that involve the routine control of pests. For these entities, the 2016 PGP requires NOIs regardless of the size of the area treated. In general, DEC expects that in many instances these entities will exceed one or more of the annual treatment area thresholds. Nonetheless, the Department finds that regardless of the size of the treatment area, any entity for which pest management for land resource stewardship is an integral part of the organization's operations should also be required to submit NOIs. Such entities may include federal government agencies such as the U.S. Forest Service (U.S. Department of Agriculture) and the Bureau of Land Management (Department of the Interior), state government agencies such as natural resources departments, or pest control districts. DEC's rationale for imposing the NOI requirement is premised on these entities (public, quasi-public, and private) having as an integral responsibility controlling pests. The specific entities required to submit NOIs regardless of whether an annual treatment area threshold is exceeded are as follows:

Any Agency for which pest management for land resource stewardship is an integral part of the organization's operations

Any entity that has pest control as an integral part of the organization's operations or responsibilities is required to submit an NOI. Information in the record indicates that many pest control activities performed by these entities will meet or exceed the threshold requirement to submit an NOI. Even when these activities do not exceed the thresholds, however, they are subject to the NOI requirement if the pesticide application is an integral part of their operations and responsibilities. DEC also recognizes, however, that some of these agencies may perform ad-hoc pest control on a small-scale that is not an integral part of the organization's operations but rather incidental, for example, to its occupancy of a building. As an example, the U.S. Social Security Administration may maintain a building or group of buildings where weeds have overtaken a parking lot that is adjacent to a lake, and the local office decides to control those weeds with an herbicide. That weed control activity would not be considered an integral part of the Social Security Administration operations but rather the weed control would be incidental to operation of the facility. By contrast, state agencies such as a department of natural resources and federal agencies such as the U.S. Forest Service, would have pest control as an integral part of

their organization's operations and as such would be required to submit an NOI. To be clear, in all instances described above, discharges would require permit coverage; however, the requirement to submit an NOI applies only to those pest control activities that are integral to an organization's operations and responsibilities.

Mosquito control districts (or similar pest control districts, such as vector control districts)

–Special districts established for the purpose of mosquito control. Generally, these districts treat large areas that would exceed DEC's annual treatment area thresholds; however DEC is requiring any such district, regardless of the area treated, to submit an NOI.

Irrigation control districts (or other similar public or private entities supplying irrigation waters)

–Special districts established for the purpose of maintaining irrigation canals and ditches. Generally, these districts treat large areas that exceed DEC's annual treatment area thresholds; however DEC is requiring any such district, regardless of the area treated, to submit an NOI.

Weed control districts (or other similar special purpose districts created with a responsibility of pest control)

–Specific districts established for the responsibility to control pests. The Department has determined that these types of entities, who perform pest management and control, as the primary function of their organization, should provide notice to the Department of such activities regardless of the size of the area treated.

NOIs for Discharges to Tier 3 Waters

Any Decision-maker requesting to discharge to Tier 3 waters may seek coverage under the PGP provided that the discharge is short-term or temporarily lowers water quality due to pesticide applications that are necessary to protect the water quality, environment, or public health. Any Decision-maker wanting coverage under the PGP for such a discharge will be required to identify the Tier 3 water by name with authorization to discharge to Tier 3 waters limited to only such named waters. Note, at the time of the permit issuance, no Tier 3 waters have been designated in Alaska.

Contents of the NOI

Pursuant to 18 AAC 83.210(c), the contents of any NOI must be specified in the general permit and require the submission of information necessary for adequate program implementation, including at a minimum:

- the legal name and address of the Owner or Operator,
- the facility name and address,
- type of facility or discharges,
- the receiving stream(s), and
- signed in accordance with Appendix A, part 1.12.

The specific requirements of the 2016 PGP NOI are identified in the NOI form provided in Appendix D of the 2016 PGP but include those elements identified in the regulations described above with three additional data elements that are important to fully characterize the activities for which permit coverage is being provided, namely identification of:

- pesticide use activities that trigger the PGP requirements to develop a pesticide discharge management plan and submit an annual report;
- impaired water(s) and/or Tier 3 water(s) for which permit coverage is being requested for discharges to these waters and demonstration of eligibility for such discharges; and

Also, the 2016 PGP requires Decision-makers to submit changes to previous NOI forms where, for example, coverage for an additional discharge not included in the original NOI is being requested. DEC expects these NOI change requests to be submitted primarily in two instances:

(1) Coverage for a new or expanded pest management area or a new pesticide use pattern is being requested, or

(2) Discharge to a not-previously identified Tier 3 water is identified for permit coverage.

In cases where this information was previously provided to the extent feasible and consistent with the implementation of selected pest management practices, a revised NOI is not required as long as the discharge continues to be consistent with the information provided in the original NOI submission. In these four instances, Decision-makers are required to submit revised NOIs that reflect changes in the areas and types of activities for which coverage is being requested.

3.1.2.3 Notice of Intent (NOI) Submission (Part 1.2.3)

DEC requires any new Operator to submit an NOI identified in Table 1-1 of the Permit to submit an NOI at least 30 days prior to the discharge to DEC. DEC may accept an NOI submitted in less than 30 days from the planned activity on a case-by-case basis including pesticide applications that are necessary due to a declared pest emergency situation. The NOI can be submitted electronically (if available) or via hard copy to DEC. Payment of a general permit authorization fee (in accordance with 18 AAC 72.956) may also be required before the NOI is considered complete.

3.1.2.4 Permitted Ongoing Projects (Part 1.2.4)

DEC's 2011 PGP is scheduled to expire at midnight on October 31, 2016. In the event that DEC may not finalize a new permit and become effective on or before October 31, 2016, the 2011 PGP will be administratively continued and remain in force and effect as per Part 1.2.4 of the 2011 PGP. Dischargers who obtained coverage under the 2011 PGP and continue to discharge after the expiration date of the 2011 PGP will receive uninterrupted permit coverage. Once the 2016 PGP is issued and in-effect, Decision-makers who are required to submit NOIs, as detailed in Part 1.2.2 of the 2016 PGP, are authorized consistent with the timeframes and provisions detailed in Part 1.2.4 of the 2016 PGP. Decision-makers who are required to submit an NOI must begin complying with Part 2.2 requirements as of the effective date of the final 2016 PGP.

3.1.2.5 Continuation of the permit (Part 1.2.5)

The 2016 PGP specifies procedures for continued coverage under a general permit if the permit expires prior to a replacement permit being issued. The procedures remain unchanged from the 2011 PGP. In short, the expired permit would remain in full force and effect in accordance with 18 AAC 83.155(c). Any permittee granted coverage prior to the permit's expiration date will automatically remain covered by the continued permit until the earliest of:

- Authorization under a new version of the PGP following timely and accurate submittal of a complete NOI (if required);
- The processing of a Notice of Termination (NOT) consistent with Part 1.2.6.1;

- The issuance of an individual permit;
- A formal permit decision by DEC not to reissue the general permit, at which time DEC will identify a reasonable time period for covered dischargers to seek coverage under an alternative general permit or an individual permit. Coverage under the permit will cease when coverage under another permit is granted/authorized; or
- DEC has informed the permittee that the permittee's discharges are no longer covered under the permit.

If DEC fails to issue a final general permit prior to the expiration of a previous general permit, the permit will be administratively continued in accordance with 18 AAC 83.155(c) and will remain in force and effect for discharges that were covered prior to expiration.

Per 18 AAC 83.155(c) the conditions of an expired permit continue in force until the effective date of a new permit if (1) the permittee has submitted a timely application for a new permit under 18 AAC 83.110, and the department determines the application is complete under 18 AAC 83.110(d); and (2) the department, because of time, resource, or other constraints, but through no fault of the permittee, does not issue a new permit with an effective date on or before the expiration date of the previous permit. For an APDES general permit, an application is not required but a NOI must be submitted as set out in 18 AAC 83.210(b). A complete and timely NOI in compliance with the requirements of the general permit fulfills a discharger's duty to apply for a permit. If a permittee fails to submit a timely NOI (if required) for coverage under the reissued or replacement permit, the permittee's coverage will expire on midnight on the date that the NOI is due.

However, should the permit expire prior to a replacement permit being issued, the existing permit will only cover those permittees authorized to discharge under the administratively extended general permit. DEC does not have the authority to provide coverage to new permittees after the expiration date of the permit.

3.1.2.6 Terminating Coverage (Part 1.2.6)

The 2016 PGP specifies procedures for terminating coverage under the general permit. The procedures remain unchanged from the EPA's 2011 PGP.

3.1.2.6.1 Submitting a Notice of Termination (Part 1.2.6.1)

To terminate coverage under the permit, any Decision-maker who submitted a NOI to obtain permit coverage is required to submit a NOT in accordance with information identified in Appendix D of the 2016 PGP. The Decision-maker's authorization to discharge under the permit terminates at midnight of the day that a complete NOT is signed. Dischargers automatically covered (as identified in Part 1.2.3) are automatically terminated upon permanent cessation of discharge consistent with any of the criteria identified in Part 1.2.6.2.

DEC requires Decision-makers who file a NOT to notify DEC that its obligation to manage pesticide discharges is no longer necessary for one of the DEC-approved reasons (as described in Part 1.2.6.2). If DEC determines that the Decision-maker has not satisfied one of the conditions in Part 1.2.6.2 for being able to submit a NOT (*e.g.*, the Decision-maker continues to have a discharge) then the notice is not valid and the Decision-maker must continue to comply with the conditions of the 2016 PGP. Likewise, if DEC determines that the NOT is incomplete, the Decision-maker may be found to be in violation of reporting requirements under Section 308 of the CWA.

3.1.2.6.2 When to Submit a Notice of Termination (Part 1.2.6.2)

Once all point source discharges associated with pesticide application have ceased, the Decision-maker must submit a NOT, as described in Part 1.2.6.1 of the 2016 PGP, within 30 days after one or more of the following conditions have been met: (1) a new Decision-maker has taken over responsibility for the pest control activities; (2) all discharges have ceased from the application of pesticides for which permit coverage was obtained and discharges are not expected during the remainder of the permit term for any of the use patterns as identified in Part 1.1.1, or (3) coverage under an individual permit or alternative general permit has been obtained for all discharges required to be covered by an NPDES permit, unless coverage was obtained consistent with Part 1.3, in which case, coverage under the permit will terminate automatically.

In the 2016 PGP, DEC is requiring a NOT from Operators who on their own switch to a different permit to provide the DEC with clear notice that the Operator's discharge is not covered under two APDES permits. Operators who terminate coverage based on a DEC request consistent with Part 1.3 of the 2016 PGP are not required to submit a NOT.

3.1.2.6.3 Termination for Operators not Required to Submit an NOI (Part 1.2.6.3)

Operators covered under the 2016 PGP who are not required to submit an NOI are terminated from permit coverage when there is no longer a discharge from the application of pesticides or the discharges are covered under an APDES individual permit or alternative APDES general permit. Operators not required to submit an NOI are also not required to submit an NOT.

3.1.3 Alternative Permits (Part 1.3)

The 2016 PGP specifies requirements and procedures for coverage under an alternative permit. The requirements and procedures remain unchanged from the EPA's 2011 PGP.

3.1.3.1 Requirements for Coverage under an Alternative Permit (Part 1.3.1)

DEC may require an individual permit (in accordance with 18 AAC 83.210 and 18 AAC 83.215 or coverage under an alternative APDES general permit instead of the PGP (when finalized). The regulations also provide that any interested party may petition DEC to take such an action. The issuance of the individual permit or alternative APDES general permit is in accordance with 18 AAC 83 and provides for public comment and appeal of any final permit decision. The circumstances in which such an action would be taken are set forth at 18 AAC 83.125.

3.1.3.2 Operator Requesting Coverage under an Alternative Permit (Part 1.3.2)

After being covered by the 2016 PGP, the Operator may request to be excluded from such coverage by applying for an individual permit or alternative APDES general permit. In this case, the Operator must submit an individual permit application in accordance with 18 AAC 83.215(b) along with a statement of reasons supporting the request, to DEC at the Permitting Program address listed in Appendix A, Part 1.1.1 of the PGP. The request may be granted by issuance of an individual permit or authorization of coverage under an alternative general permit if the reasons are adequate to support the request. Under this scenario, if an individual permit is issued, or authorization to discharge under an alternative general permit is granted, coverage under the permit is automatically terminated under 18 AAC 83.215(c) on the effective date of the individual permit or the date of authorization of coverage under the alternative general permit.

Part 1.3.2 of the 2016 PGP reminds Operators of their ability to apply for coverage under an individual permit in lieu of coverage under this general permit and describes the steps to take to be excluded from the permit after being authorized under the permit. Cases where an individual APDES permit may be required are described fully in 18 AAC 83.215(a). The following are the pertinent situations for the permit where an individual permit may be necessary:

- A Water Quality Management plan containing requirements applicable to such point sources is approved;
- Circumstances have changed since the time of the request to be covered so that the discharger is no longer appropriately controlled under the general permit, or either a temporary or permanent reduction or elimination of the authorized discharge is necessary; or
- The discharge(s) is a significant contributor of pollutants. In making this determination, DEC may consider the following factors:
    - The location of the discharge with respect to waters of the United States;
    - The size of the discharge;
    - The quantity and nature of the pollutants discharged to waters of the United States; and
    - Other relevant factors.

DEC may require an Operator to apply for an individual permit only if DEC notifies the Operator in writing that a permit application is required. This notice must include a brief statement of the reasons for this decision, an application form, a statement setting a time for the Operator to file the application, and a statement that on the effective date of the individual APDES permit the general permit as it applies to the individual Operator shall automatically terminate. DEC may grant additional time upon request of the applicant.

When an individual APDES permit is issued to an Operator otherwise subject to a general APDES permit, the applicability of the general permit to the individual APDES Operator is automatically terminated on the effective date of the individual permit.

Note that an individual permit is required for discharges from the application of pesticides to waters where such waters are impaired by a substance which either is an active ingredient in that pesticide or is a degradate of such an active ingredient, and for certain applications of pesticides to Tier 3 waters where such applications are not made to restore or maintain water quality or to protect public health or the environment in such a way that they either do not degrade water quality or only degrade water quality on a short-term or temporary basis. In these cases, authorization under this general permit would not have been available in the first place.

3.1.4 Severability (Part 1.4)

Invalidation of a portion of the permit does not necessarily render the whole permit invalid. DEC's intent is that the permit remains in effect to the extent possible; in the event any part of the permit is invalidated, DEC will advise the regulated community as to the effect of such invalidation.

3.1.5 Other Federal and State Laws (Part 1.5)

Part 1.5 of the 2016 PGP includes the following language: "Operators must comply with all other applicable federal and state laws and regulations that pertain to the application of pesticides. For example, the permit does not negate the requirements under the FIFRA and its implementing regulations to use registered pesticides consistent with the product's labeling. In fact, applications in violation of certain FIFRA requirements could also be a violation of the permit and therefore a violation of the CWA

(*e.g.*, exceeding label application rates). Additionally, other laws and regulations might apply to certain activities that are also covered under the permit (*e.g.*, United States Coast Guard regulations)."

This part of the 2016 PGP fact sheet is intended to clarify that Operators are still required to comply with other applicable laws, and that merely complying with the conditions of the permit may not meet all regulations applicable to the types of activities covered under the permit. In fact, compliance with permit terms, in some instances, establishes an expectation that Operators will comply with other laws to demonstrate compliance with the permit. For example, the 2016 PGP requires Operators to use "Pest Management Measures" to "minimize" discharges. As these terms are defined in Appendix C of the 2016 PGP, Operators must use practices that comply with, among other things, "relevant legal requirements" to reduce and/or eliminate pesticide discharges to waters of the United States.

3.1.6 Federally Listed Endangered and Threatened Species and Designated Critical Habitat (Part 1.6)

A new Decision-maker who is required to submit an NOI per Part 1.2.2 or a Decision-maker that proposes to modify their NOI, that includes endangered and threatened species or critical habitat shall notify the Service (NMFS or FWS) 60 days prior to initial discharge. The Decision-maker shall also provide a copy of the notification to DEC Permitting Program to the address specified in Appendix A, Part 1.1.1, and provide any water quality based recommendations from the Service to DEC when submitting their NOI per Part 1.2.3. Listings of endangered and threatened species and federally-listed critical habitat in Alaska and interactive maps is available at:

- National Oceanic and Atmospheric Administration (NOAA) Fisheries – Alaska Regional Office: https://alaskafisheries.noaa.gov/pr/esa-consultations,
    - Interactive map: http://alaskafisheries.noaa.gov/mapping/esa and
- U.S. Fish and Wildlife Service (FWS) http://ecos.fws.gov/ecp,
    - Interactive map: https://ecos.fws.gov/ipac

3.2 Technology-Based Effluent Limitations (Part 2.0)

Background

The CWA requires that all point source discharges from existing facilities, or in this case, pesticide applications, meet technology-based effluent limitations representing the applicable levels of necessary control. Additionally, water quality-based effluent limitations are required by CWA section 301(b)(1)(C) as necessary where the technology-based effluent limitations are not sufficient to protect applicable water quality standards. Water quality-based requirements will be discussed in greater depth in Section 3.3 of the fact sheet. The technology-based effluent limitations contained in the 2016 PGP are non-numeric and constitute the levels of control that reduce the area and duration of impacts caused by the discharge of pesticides to waters of the United States. In addition, these effluent limitations provide for protection of water quality standards, including protection of beneficial uses of the receiving waters following completion of pest management activities.

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 EPA as conventional. EPA designated oil and grease as an additional conventional pollutant on July 30, 1979.

40 CFR 401.16. (Adopted by reference 18 AAC 83.010(g)(1)). 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 (Adopted by reference 18 AAC 83.010(g)(1) and 18 AAC 83.010(g)(3). 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) (Adopted by reference 18 AAC 83.010(c)((1)), EPA looks at a number of factors. EPA first considers the total cost of applying the control technology in relation to the effluent reduction benefits. EPA 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 EPA 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) (Adopted by reference 18 AAC 83.010(c)((1)). 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, DEC includes technology-based effluent limitations based on BAT in APDES permits. CWA section 301(b)(2)(A); 304(b)(2)(B); 40 CFR 125.3(d)(3) (Adopted by reference 18 AAC 83.010(c)((1)). 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 2016 PGP continues the previous effluent limitations of the 2011 PGP, which contains effluent limitations that correspond to required levels of technology-based control (BPT, BCT, BAT) for discharges under the CWA. Some effluent limitations have been established by examining other existing laws, requirements and practices. Because these are demonstrated practices, DEC has found that they are technologically available and economically practicable (BPT) or achievable (BAT).

Technology-Based Effluent Limitations

Technology-based effluent limitations 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 C.F.R. § 125.3(c)(2) (Adopted by reference 18 AAC 83.(c)(1)).

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. 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.

DEC's Authority to Include Non-Numeric Technology-Based Limitations in the permit

Technology-based effluent limitations in the 2016 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 may be based on the best professional judgment (BPJ) of the permit writer. For the 2016 PGP, the technology-based effluent limitations are based on BPJ decision-making because no ELG applies.

Under DEC's regulations, non-numeric effluent limitations are authorized in lieu of numeric limitations, where "[n]umeric effluent limitations are infeasible." 18 AAC 83.475. For the 2016 PGP, DEC is using the term "Pest Management Measures," as defined in Appendix C of the 2016 PGP, to represent those practices used to meet the non-numeric effluent limitations.

DEC's Decision to Include Non-Numeric Technology-Based Effluent Limitations in the 2016 PGP and 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 pose challenges not presented by other types of APDES-regulated discharges. The technology-based effluent limitations remain unchanged from the 2011 PGP. The technology-based effluent limitations in the permit are non-numeric based on the following facts:

- The point in time for which a numeric effluent limitation would apply is not easily determinable. For discharges from the application of pesticides, the discharges can be highly intermittent with those discharges 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 also will have combined with any other discharges 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 duration, highly variable, pesticide 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 setting reasonable and fair numeric effluent limitations for pesticide applications extremely difficult. Even in a normal plant specific setting, DEC takes into account the ambient conditions of the waterbody which can require complex modelling and formulas to derive what discharge 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 pesticides discharges.
- 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 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.
- DEC does not have sufficient information to develop numeric effluent limitations at this time. To develop numeric technology-based effluent limitations, DEC 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 addition, it is estimated that more than 400 pesticide active ingredients contained in over 3,500 pesticide products may be covered under the permit.

In the context of the general permit, DEC 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. DEC 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.

Technology-based effluent limitations in the permit are presented specific to each pesticide use pattern to reflect the variations in procedures and expectations for the use and application of pesticides. These non-numeric effluent limitations are expected to minimize environmental impacts by reducing the point source discharges of pesticides to waters of the United States, thereby protecting the receiving waters, including to the extent necessary to meet applicable water quality standards. DEC notes that the 2016 PGP uses 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 the permit are expressed as specific pollution prevention requirements for minimizing the pollutant levels in the discharge. In the context of the general permit, these requirements represent the best technologically available and economically practicable and achievable controls. DEC 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 pesticide pollutants to meet the effluent limitations. Pollution prevention continues to be the cornerstone of the APDES program.

Requirements are Technologically Available

DEC has found that the requirements of the permit represent the appropriate level of control representing BPT, BCT, and BAT. The 2016 PGP requires certain Operators to implement pest management measures to meet the technology-based effluent limitations that are based on Integrated Pest Management principles. See further discussion of pest management measures below. Unlike other general permits, the technology available to Operators depends on the type of Operator (*e.g.* Applicator v. Decision-maker). For this reason, technology-based effluent limitations 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. DEC determined that calibrating, cleaning, and repairing pesticide application equipment is technologically available and based on DEC'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. DEC finds that the limits in the 2016 PGP meet the BPT and BAT economic tests, and remain unchanged from the 2011 PGP. 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, DEC is evaluating effluent limits using a BPT and a BAT standard, but since conventional pollutants will also be adequately controlled by these same effluent limits for which DEC applied the BPT and BAT tests, DEC has determined that it is not necessary to conduct BCT economic tests.

Under BPT, DEC has determined that the requirements of the permit are economically practicable. To make this determination, DEC has 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) (Adopted by reference 18 AAC 83.010(c)(1)). In the 2011 PGP, EPA estimated the total universe that would be affected by the permit included approximately 35,000 entities. Because the 2016 PGP contains the same requirements as the 2011 PGP there are no significant changes to analyze in the cost analysis and DEC interprets the cost impact analysis to indicate that the BAT limits are still economically achievable.

Requirements have acceptable non-water quality environmental impacts.

DEC finds that the controls in the proposed permit have acceptable non-water quality environmental impacts. Because the 2016 PGP contains the same requirements as the 2011 PGP there are no significant changes to the non-water quality environmental impacts. DEC 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, EPA 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. DEC finds that the pesticide discharges authorized by the permit have recreational, environmental or other human benefits. For example, permittees will discharge pesticides to control for mosquitos and other flying insects in order to prevent the spread of infectious diseases, such as malaria, vesicular stomatitis, and West Nile Virus. Control of weed, algae, and plant pathogens promotes healthy aquatic communities and recreational and other benefits for the human population. Permittees will also discharge pesticides to control invasive and nuisance aquatic animals, such as fish, lampreys, and mollusks, which negatively affect aquatic biodiversity, human health, and economic stability. Pesticide discharges will also control pests that threaten the health of the forest canopy, such as the gypsy moth. The permit includes permit terms which provide reasonable protection to impacted waters of the United States without constraining the use of these pesticides which provide acceptable non-water quality environmental impacts.

Pest Management Measures Used to Meet the Technology-Based Effluent Limitations

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, DEC is not mandating the specific Pest Management Measures Operators must implement to meet the limitations. This is analogous to an industrial situation where discharges 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 DEC would not specify what technology should be employed to meet that limitation. For pesticides, namely mosquitocides, for example, Part 2.2.1.b of the PGP requires mosquito control Decision-makers to consider mechanical/physical methods of control to eliminate or reduce mosquito habitat. How this is achieved will vary by Operator: For some, this may be achieved through elimination of development habitat (*e.g.* filling low areas, dredging, etc.) while for others these measures will not be feasible. Thus, 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 2016 PGP 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 the permit, Operators are required to implement site-specific Pest Management Measures to meet these effluent limitations. The permit along with this fact sheet 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 the permit is consistent with the CWA as well as its implementing regulations at 18 AAC 83.475(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." 18 AAC 83.475(4).

Implementation of Pest Management Measures

Part 2.0 of the 2016 PGP requires Operators to implement Pest Management Measures to meet the technology-based effluent limitations 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 (See Part 5 of the 2016 PGP). DEC 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. DEC expects Operators to have the experience and working knowledge to apply pesticides properly. The PGP 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 pesticide adequately, the Pest Management Measures must be modified as expeditiously as practicable. See Part 6 of the 2016 PGP, Corrective Action.

DEC appreciates that Operators need the flexibility to tailor Pest Management Measures to their situation as well as improve upon them as necessary to meet the technology-based effluent limitations. Decision-makers will tailor Pest Management Measures based on available information and the best professional judgment of qualified personnel. For example, while Part 2.2 of the 2016 PGP 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"

DEC has found that the requirements of the 2016 PGP represent the appropriate BPT, BCT and BAT level of control. The non-numeric effluent limitations require Operators to "minimize" discharges of pesticide. Consistent with the control level requirements of the CWA, the term "minimize" means to reduce and/or eliminate pesticide 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 Part 2.0 of the 2016 PGP 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

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"). Although the FIFRA label and labeling requirements are not effluent limitations, it is illegal to use a registered pesticide inconsistent with its labeling. If Operators are found to have applied a pesticide in a manner inconsistent with any relevant water-quality related FIFRA labeling requirements, DEC will presume that the effluent limitation to minimize pesticides entering the waters of the United States has been violated under the APDES permit. DEC considers many provisions of

FIFRA labeling -- 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 -- to be requirements that affect water quality. 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. DEC would find that this application was a misuse of the pesticide under the FIFRA label. Because of the misuse the DEC might also determine that the effluent limitation that requires the Operator to minimize discharges of pesticide products 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.

Technology-Based Effluent Limitations in the PGP (Part 2.0)

In the 2016 PGP, all Operators are classified as either “Applicators” or “Decision-makers” or both. 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 waters of the United States. 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 to waters of the United States. As such, more than one Operator may be responsible for compliance with the permit for any single discharge from the application of pesticides. DEC has delineated the non-numeric effluent limitations into tasks that DEC expects the Applicator to perform and tasks that DEC expects the Decision-maker to perform. In doing so, DEC has assigned the Applicator and the Decision-maker different responsibilities.

3.2.1 Applicators’ Responsibilities (Part 2.1)

Part 2.1 of the 2016 PGP contains the general technology-based effluent limitations 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 waters of the United States. All Applicators are required to minimize the discharge of pesticides to waters of the United States by doing the following:

3.2.1.1 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 pesticide, Operators should base the rate and frequency of application on what is known to be effective against the target pest.

3.2.1.2 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 waters of the United States. 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 discharge into waters of the United States. 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 pesticides, 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.

3.2.1.3 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.

3.2.2 Decision-makers' Responsibilities (Part 2.2)

As noted above, APDES permits must contain technology-based effluent limitations. Part 2.2 of the permit contains the effluent limitations that Decision-makers must perform. The PGP 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 waters of the United States from the application of pesticides, through the use of Pest Management Measures, as defined in Appendix C of the permit, by using only the amount of pesticide and frequency of pesticide application necessary to control the target pest.

In addition, Part 2.2 of the permit requires that any Decision-maker who is required to submit a NOI to identify the pest problem, implement effective and efficient pest management options, and adhere to certain pesticide use provisions. (For purposes of the discussion below on Part 2.2 of the permit, the term Decision-maker means any Decision-maker who is or will be required to submit an NOI.)

Decision-makers are required to perform each of these permit conditions prior to the first pesticide application covered under the permit and at least once each calendar year thereafter. These additional technology-based effluent limitations are based on integrated pest management principles. DEC is requiring certain Decision-makers to also comply with a different technology-based effluent limitation than Applicators because it has been found that they are the Best Available Technology Economically Achievable for these Operators. These requirements are aimed at reducing discharge of pesticides to waters of the United States and lessening the adverse effects of pesticides that are applied. Each pesticide use pattern has specific limitations, and these requirements are divided into three different sections: (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.

DEC is requiring these additional technology-based effluent limitation 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.

As stated above, these technology-based effluent limitations 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 the 2011 PGP EPA found that mosquito control operations are performed by local government entities and that they are generally performing integrated pest management.

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 each pesticide use pattern.

Any Decision-maker who is or will be required to submit an NOI must do the following regardless of the 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 Appendix C of 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. An action threshold helps determine both the need for control actions and the proper timing of such actions. It is a predetermined pest level that is deemed to be unacceptable. In some situations, the action threshold for a pest may be zero (*i.e.*, no presence of the pest is tolerated). This is especially true when the pest is capable of transmitting a human pathogen and/or is an invasive species. In areas where aquatic weeds are problematic, it may be preferable to use an aquatic herbicide as a preventive measure rather than after weeds become established. In some situations, even a slight amount of pest damage may be unacceptable for ecological or aesthetic reasons. Sometimes pre-emergent pesticide application is needed, as a preventive measure to keep aquatic weeds at bay. 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 to meet the conditions of the permit. For example, a mosquito district may use surveillance data from an adjacent district to identify pests in their pest management area. 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 to waters of the United States 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. For additional information, see discussion under each pesticide use pattern.

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.

There are additional requirements designed for each pesticide use pattern in Sections 2.2.1 through 2.2.4 of the permit. For additional information and other limits on pesticide use, see specific discussion under each pesticide use pattern.

3.2.2.1 Mosquito and Other Flying Insect Pests Control (Part 2.2.1)

i. Mosquitoes

Background

There are over 3,000 different species of mosquitoes throughout the world, with approximately 176 species present in the United States[1]. The total budgets for mosquito control in the United States exceed $200,000,000 annually (AMCA 2009). Mosquitoes can be a source of annoyance (*e.g.*, work and leisure activities), a limiting factor in economic development (*e.g.*, residential development and property value), a causal factor in decreased agricultural productivity (*e.g.*, animal weight loss/death and decreased milk production) from irritation and blood loss, and a source of disease transmission (*e.g.*, malaria, encephalitis, yellow fever, dengue, and West Nile Virus). Most of these diseases have been prominent as endemic or epidemic diseases in the United States in the past, although today only the insect-borne (arboviral) encephalitides and West Nile virus fever occur annually and dengue occurs periodically in this country. Thus, control of mosquitoes is an important public health issue. Numerous strategies are used to reduce the impact of mosquitoes but a comprehensive approach using a variety of complementary control methods is usually necessary for any mosquito control program.

Of major concern is the transmission of microorganisms that cause diseases such as western equine encephalitis and St. Louis encephalitis. Both of these diseases can cause serious, sometimes fatal neurological ailments in people. (Western equine encephalitis virus also causes disease in horses.) Western equine encephalitis infections tend to be more serious in infants while St. Louis encephalitis can be a problem for older people. These viruses normally infect birds or small mammals. During such infections, the level of the virus may increase in these infected animals, facilitating transmission to humans by mosquitoes. The West Nile virus, which can also cause encephalitis, was found in the northeastern United States for the first time in 1999, and is a good example of this mode of transmission. Symptoms of human illness can range from mild flu-like symptoms to severe encephalitis, meningitis, or acute flaccid paralysis.

Other pathogens transmitted by mosquitoes include a protozoan parasite which causes malaria, and *Dirofilaria immitis*, a parasitic roundworm and the causative agent of dog heartworm. Disease carrying mosquito species are found throughout the United States, especially in urban areas and coastal or inland areas where flooding of low lands frequently occurs. Even when no infectious diseases are transmitted by mosquitoes, they can be a health problem to people and livestock. Mosquito bites can result in secondary infections, allergic reactions, pain, irritation, redness, and itching.

ii. Black Flies

Background

Black flies, commonly referred to as buffalo gnats, are the smallest of the blood feeding dipterans. Worldwide, blackflies are responsible for transmitting ochocerciasis (river blindness) to millions of

[1] http://www.mosquito.org/mosquito-info

people in tropical areas. Black flies can also vector bovine onchocerciasis, mansonellosis, and leucoytozoonosis, in wild and domestic animals. While generally only considered nuisance pests in the United States, epidemiological research has demonstrated that black flies are competent vectors of vesicular stomatitis and suggest that these pests may be responsible for periodic outbreaks of this disease in livestock, wildlife, and humans, in the western United States. However, flies may also become so abundant as to be drawn into the air passages of livestock, occasionally resulting in death. Black fly feeding activity may also result in allergic reaction in both animals and man as a result of histaminic substances in black fly saliva.

There are approximately 1,800 species of black flies throughout the world with approximately 254 species in North America alone. Black flies can be 1) a source of annoyance to people, animals, and wildlife, 2) a limiting factor in economic development (*e.g.*, residential development and property value), and 3) a causal factor in decreased agricultural productivity (*e.g.*, animal weight loss/death and milk production). Black fly control in the United States provides economic, health, and quality of life benefits. In contrast to the integrated approach used for mosquito control, due to its unique biology, black fly control in the United States is primarily through the use of larvicides.

3.2.2.1.1 Identify the Problem (Part 2.2.1.1)

- *Prior to the first pesticide application covered under the permit that will result in a discharge to waters of the United States, and at least once each calendar year thereafter prior to the first pesticide application for that calendar year, any Decision-maker who is or will be required to submit an NOI must do the following for each pest management area, as defined in Appendix C.*

Decision-makers must identify the pest problem in their pest management areas prior to the first application covered under the 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.

- *Establish densities for larval and adult mosquito or flying insect pest populations or identify environmental condition(s), either current or based on historical data, to serve as action threshold(s) for implementing Pest Management Measures.*

Decision-makers must develop action thresholds for larval and adult mosquitoes prior to the first pesticide application covered under the permit. The action thresholds must be re-evaluated at least once each calendar year. As noted in the general discussion above, an action threshold is a point at which pest populations or environmental conditions indicate that pest control action must be taken. Action thresholds help determine both the need for control actions and the proper timing of such actions. For example, an action threshold could be the number and distribution of service requests received from the public. It is a predetermined pest level (or other indicator) that is deemed to be unacceptable. For example, in Maryland, “A collection of more than 10 anthropophagous (human biting) female mosquitoes per night of trap operation is considered to be the level which causes discomfort and/or complaints from the majority of people. The light trap action threshold for ground spraying of adult mosquitoes is 10-20 per trap-night. The action threshold to suppress pest populations of adult mosquitoes by aerial spraying (application of insecticide by an aircraft) is a light trap collection of 100 female mosquitoes. The action threshold for landing rate counts to justify ground spraying for the control of adult mosquitoes is 3 mosquitoes in 2 minutes. The action threshold for aerial spraying is 12

mosquitoes per minute."[2] For larvae control, action thresholds are determined by standard mosquito dipping techniques. For example, in Canyon County Mosquito Abatement District, Idaho[3], they established larvae density action levels for Culex species (primary disease vectors) as Low: 1-5 larvae per dip; Medium: 6-10 larvae per dip; High: > than 10 larvae per dip. The larvae density action threshold can be used to determine how much larval control products are to be used or even if any action is to be taken. In some situations, the action threshold for a pest may be zero (*i.e.*, no presence of the pest is tolerated). This is especially true when the pest is capable of transmitting a human pathogen (*e.g.*, mosquitoes and the West Nile virus).

- *Identify the target pest(s) to develop Pest Management Measures based on developmental and behavioral considerations for each pest.*

Knowledge of the developmental biology of mosquitoes is essential to developing Pest Management Measures for mosquito control. The mosquito undergoes complete metamorphosis and has four distinct stages in its life cycle: egg, larva, pupa, and adult. Depending on the species, eggs are deposited either in permanent water habitats or in temporary/floodwater habitats. Egg deposition in permanent water habitats occurs as individual eggs or as multiple egg rafts deposited directly to the water surface in natural or artificial water-holding containers found in the domestic environment or in naturally occurring pools. Egg rafts may contain 100-200 eggs. A batch laid of single eggs may range from 60-100 eggs. Egg deposition in temporary/floodwater habitats occurs as individual eggs on moist soil (*e.g.*, roadside ditches, depressions, farmland irrigation ditches, etc.) or in other objects (*e.g.*, flower pots, cans, tires, tree holes, etc.) in which periodic flooding will occur. Eggs deposited in permanent habitats will hatch in a few days whereas eggs deposited in temporary/floodwater habitats are resistant to desiccation in the absence of flooding and can withstand drying for extended periods of time (weeks to months) before hatching.

Following egg hatching, typically 2-3 days after laying, mosquitoes go through four larval developmental stages (instars) commonly known as wrigglers. Larval development may be completed in a week or less under ideal conditions but may also take longer depending on the species, geography, and environmental conditions (*e.g.*, crowding, food availability, and water temperature). The first three larval instars continually feed on detritus, algae, bacteria, and fungi. However, some mosquito species are predacious with larva feeding on other mosquitoes and/or small aquatic invertebrates. Late in the fourth larval instar the larvae ceases to feed in preparation for pupation. The pupal stage, commonly referred to as a tumbler, is a non-feeding developmental stage in which the adult form is developed. Following a few hours to several days, dependent upon species and water temperature, the adult emerges from the pupae.

The adult mosquito is the pestiferous stage. Adults emerge from the water surface and after a short period of rest seek out a food source. Both males and females feed on nectar of flowers and other sugar sources as a source of energy. Only female mosquitoes seek out a blood meal as a source of protein and lipids for egg development. However, females of some species are autogenous (*i.e.*, able to use energy reserves carried over from the immature stage to develop the first egg batch). In addition, most mosquitoes have preferred hosts which may include warm and cold blooded animals and birds. Human blood meals are seldom first or second choices with livestock, smaller mammals and/or birds generally preferred. Host seeking and blood feeding activities by mosquitoes are initiated by a complex variety of

[2] http://mda.maryland.gov/plants-pests/Pages/mosquito_control_program_description.aspx
[3] http://www.canyoncountymosquito.com/CCMADMosquitoPesticideUsePlan.pdf

host and environmental cues (*e.g.*, carbon dioxide, temperature, moisture, smell, color, movement and host preference). Adult feeding activity is generally either crepuscular (early morning, dusk and into the evening) or diurnal (daytime, particularly in relation to cloudy days and shaded areas). Although highly variable by species and environmental conditions, a complete development cycle can occur every one to three weeks. An understanding of the developmental biology of species in a given area provides the basis for developing Pest Management Measures aimed at reducing pesticide discharges into waters of the United States.

Prior to the first pesticide application covered under the permit, Operators must ensure proper identification of mosquito to better understand the biology of the target pest and develop Pest Management Measures. Due to the great variability in developmental habitats and adult feeding behaviors as discussed previously, proper identification is imperative in designing an effective and efficient Pest Management Measures. Identification of the target pest will aid in development of Pest Management Measures aimed at both the immature and adult developmental stages. Identification of the target pest for a specific area allows 1) identification of potential breeding sites, 2) evaluation of alternative Pest Management Measures aimed at controlling the immature stages (habitat modification, source reduction, larvicides, biological larvicides, and oils), and 3) assessment of potential for disease transmission.

For black flies, the life cycle includes four stages: egg, larva, pupa, and adult. All are aquatic except the adults, which leave the water to search for food and mates. Black fly immatures have three general life history strategies. One group of species produces one generation per year (univoltine) that matures in late winter or early spring. A second group is also univoltine, but these species develop during late spring or summer. The third and final group of species produces two or more generations per year (bivoltine or multivoltine) that typically develop from early summer through fall.

Adult females deposit from 150 to 500 eggs in flowing water. Flowing water habitats capable of black fly production range from a 4-inch trickle to large rivers. Egg-laying occurs near dusk for many species. The eggs are dropped singly from the air or deposited in masses on trailing vegetation, rocks, debris and other substrates. Eggs hatch in two days to eight months, depending on black fly species and water temperature. Incubation time in some species is delayed by a prolonged diapause, or resting period. Eggs of many species can successfully withstand temperature extremes and fluctuating water levels associated with seasonal flood and drought conditions, .Many species overwinter in the egg stage, but a few black flies spend the winter months as larvae and pupae, or rarely, as adults.

Larvae anchor themselves to clean vegetation, rocks, or debris by spinning a small silken pad with their mouthparts and inserting a row of hooks at the end of their enlarged abdomen into the silk pad. This technique allows the larvae to secure themselves in areas of very fast water velocity and orient their body with the abdomen pointed upstream, and head positioned downstream to feed. Larvae can easily relocate to other areas by drifting downstream on a silken thread, spinning a new silk pad, and reattaching themselves in areas with more acceptable substrates or food supplies. Feeding is accomplished by expanding a pair of fan-like structures on their hardened head capsule to efficiently filter microscopic food particles from the water column. The larvae filter or scrape very fine organic matter, filamentous algae, bacteria and tiny aquatic animals from the current or substrates. Larvae are often infected with various parasites and pathogens, including nematode worms, bacteria, fungi, protozoa and viruses.

Larval instars vary from four to nine, depending on species, with many species passing through an average of seven instars. Larval development time varies from one week to six months depending on

species, water temperature, stream turbidity and food availability. Larval growth is very temperature dependent, with relatively slow growth during the cold winter months and very rapid growth during warm summer water temperatures. Some summer-developing, multivoltine species are capable of completing their entire life cycle in just a few weeks. Mature larvae, with fully developed respiratory filaments visible as a dark area on each side of the thorax, stop feeding, and construct a silken pupal cocoon where metamorphosis takes place.

Pupae secure themselves inside their cocoons with rows of spine-like hooks on their abdomen. The tightly woven or loose cocoons, characteristically shaped for each species, are attached to substrates with the closed end facing upstream to protect pupae from current and sediments. Some species have a lateral aperture, or window, on each side of the cocoon to increase water circulation around the pupa. The branched respiratory organs that project from the pupal thorax are designed to function in or out of water. This adaptation allows pupae to obtain oxygen at all times, and survive normal fluctuations in water levels. The pupal stage may last from two days to several weeks depending on the species and water temperature.

Adults emerge from the pupal skin through an elongate slit at the top of the thorax and ride a bubble of air that propels them to the water surface. Freshly emerged adults fly to streamside vegetation where their wings and bodies quickly dry and harden. Mature adults immediately seek food sources and mates. Both sexes feed on nectar, sap, or honeydew to obtain the sugar used for flight and energy. Only females feed on blood. In most species, mating takes place in flight, with females flying into male swarms that form over landmarks such as waterfalls, vegetation or host species. Males utilize their large eyes to detect and seize females entering the swarm. Male and female pairs exit the swarm, and mating takes place in flight in just a few seconds. Females then seek a host to obtain the blood meal required to nourish their eggs. Adults are strong fliers, capable of dispersing many miles from their larval habitats.

Black fly females are attracted to their specific hosts by size, shape, color, carbon dioxide, body odor, body movement, skin texture, temperature and humidity. Females use their mouthparts to cut, or lacerate the host skin, and then drink from the resulting pool of blood. Anticoagulants in the saliva are injected into the bite to facilitate bleeding. Many domestic and wild animals have been killed by outbreaks of adult black flies. Deaths have been attributed to acute toxemia from large numbers of bites, anaphylactic shock, and weakness due to blood loss. In humans, lesions can develop at the bite, accompanied by reddening, itching, and swelling. In severe cases, allergic reactions may occur, resulting in nausea, dizziness, and fever.

Host specificity in black flies varies from highly specific species that will feed on blood from only one host, to much more generalized species that will draw blood from a number of different hosts. Although host preferences for many North American black flies are poorly understood, it is estimated that 67% feed on mammals and 33% feed on birds. Approximately 10% of North American species will feed on the blood of humans.

Prior to first pesticide application covered under the permit, Operators must ensure proper identification of the pest to develop Pest Management Measures. Due to preferred hosts and developmental habitats, proper identification of the pest is instrumental in determining the biology (univoltine or multivoltine), and developmental habitat preference (*e.g.*, flow rate, stream size, stream substrate composition), and flight range of the target pest. By knowing these factors, a control program can 1) determine if the black fly species warrants control activities (*i.e.* host preference and historical problems), 2) identify habitats and delineate the potential area for ongoing monitoring and control activities, 3) determine frequency of site monitoring, 4) estimate timing for pesticide application (*i.e.* historical seasonal occurrence, age

distribution of susceptible immature population, environmental conditions suitable for control activity, etc.), 5) reduce discharge of pesticides into waters of the United States.

- *Identify known breeding sites for source reduction, larval control program, and habitat management.*

Once pests have been identified, mapping is a valuable tool in assessing mosquito habitats and designing control programs for a specific area to minimize pesticide discharges into waters of the United States. Maps may simply be township/city/county maps but may also include aerial photo assessments, topographic maps, and satellite imagery where available and/practicable. Mapping is essential to identify pest producing areas which can and cannot be controlled using non-chemical preventative measures (*e.g.*, source reduction). Maps should include all potential sites for mosquito development including agricultural areas in the specific area (*e.g.*, hay, pasture, circle irrigation, orchards, rill irrigated field crops, and flood irrigated pastures and farmland). Mapping should also be a priority in a surveillance program utilizing mosquito traps, biting counts, complaints, and reports from the public. Planning in coordination with mapping ensures the best Pest Management Measures (whether source reduction, biological, or chemical) for each particular pest is chosen. Operators must identify known breeding sites prior to the first pesticide application covered under the permit.

In conjunction with identifying the target pest, mapping should be considered part of control programs aimed at black fly management. As black flies are strong fliers and will travel great distance to obtain a blood meal, mapping should be for an extended area from the site to be protected by control activities. Pest identification and mapping should also be a priority in a surveillance program (both current and historical) to determine the need for initiating control activity. Identification and mapping are both essential to planning a control program which reduces pesticide discharges into waters of the United States.

- *Analyze existing surveillance data to identify new or unidentified sources of mosquito or flying insect pest problems as well as sites that have recurring pest problems.*

As discussed above, mapping is a valuable tool in assessing mosquito habitats and designing control programs. Decision-makers must analyze existing surveillance data to identity any new source of pest problems.

- *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 Part 2.2.1.1.*

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

3.2.2.1.2 Pest Management Options (Part 2.2.1.2)

- *Prior to the first pesticide application covered under the permit that will result in a discharge to waters of the United States, and at least once each calendar year thereafter prior to the first pesticide application for that calendar year, any Decision-maker who is or will be required to submit NOIs must select and implement efficient and effective means of Pest Management Measures that minimize discharges resulting from the application of pesticides to control mosquitoes or other flying insect 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: 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 waters of the United States prior to the first pesticide application covered under the permit. For black flies, Pest Management Measures will vary by locality (*i.e.* stream size, stream substrate, and stream vegetation), black fly species (5 multi/univoltine development and host specificity), and financial concerns (*i.e.* accessibility to streams and size/rate of flow for the streams). 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.

Based on problem identification, two preventive measures other than pesticides should be evaluated for blackflies. The first is reducing the number of black fly breeding areas. This may include removal (physical and/or chemical) of vegetation and other objects in streams to reduce number of larval habitats. The second is temporary damming of flowing stream larval development sites to create pool habitats. As larvae require flowing water for development, pooling can kill developing black fly larvae. However, the impact of these habitat management options must be considered in relation to other environmental impacts on other aquatic species. Furthermore, due to the wide variability in stream size/flow rate and the accessibility of streams for habitat modification, these options are seldom acceptable control solutions for most black fly developmental habitats.

The following describes the management options that must be evaluated.

No Action. No action is to be taken, although a mosquito 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 control methods exist.

Prevention. Prevention strategies are program activities which eliminate developing mosquito populations through environmental modification and/or habitat management. For mosquito control, these activities are physical methods such as habitat modification, cultural methods that reduce sources of mosquitoes, and biological control.

Mechanical/Physical Methods. Habitat modification, also known as physical or permanent control, is in many cases the most effective mosquito control technique available and is accomplished by eliminating mosquito breeding sites. Habitat modification activities have the potential to be both effective and economical in some areas and can virtually eliminate the need for pesticide use in and adjacent to the affected habitat. However, the ability to use prevention strategies is dependent upon local authority and restrictions.

Cultural Methods. Cultural methods can reduce sources of mosquitoes and can be as simple as properly discarding old containers that hold water capable of producing *Aedes aegypti*, *Ae. albopictus* or *Culex spp*. or as complex as implementing Rotational Impoundment Management (RIM) or Open Marsh Water Management (OMWM) techniques. RIM is a source reduction strategy that controls salt marsh mosquitoes (*e.g.*, *Ae. taeniorhynchus* and *Ae. sollicitans*) at the same time as significant habitat restoration is occurring. Source reduction may include; water management, vegetation management, biological control, and pesticide use in non-waters of the United States.

Containers provide excellent habitats for development of numerous mosquito species. These may include but are not limited to flowerpots, cans, and tires. Container-inhabiting mosquitoes of particular concern include, *Ae. aeypti*, *Ae. albopictus*, *Cx. p. pipiens*, and *Cx. salinarious*. A container-breeding mosquito problem can be solved by properly disposing of such materials, covering them, tipping them over to ensure that they do not collect water, and/or periodic draining. Urban container-breeding mosquito control is best implemented through education and surveillance programs.

Source reduction in freshwater lakes, ponds, and retention areas is more applicable to artificially created areas than natural areas. Artificial ponds can be eliminated as a breeding site simply by filling in the areas, (*i.e.* habitat modification). However, large permanent water bodies and areas for storm water or wastewater retention require other methods. Options for these areas include minimizing and/or eliminating emergent and standing vegetation, maintenance of steep banks, and inclusion of deep water areas as sanctuary for larvivorous fish.

Mosquito production from storm water/wastewater habitats can result in considerable mosquito problems as a result of engineering, poor construction or improper maintenance. However, mosquito populations can typically be managed by keeping such areas free of weeds through an aquatic plant management program and maintaining water quality that can support larvivorous fish. *Culex*, *Coquillettidia*, *Mansonia*, and *Anopheles* mosquitoes are often produced in these habitats.

Pastures and agricultural lands are enormous mosquito producers, frequently generating huge broods of *Aedes*, *Psorophora*, and *Culex* mosquitoes. Improved drainage is one effective tool for source reduction in such habitats. The second is the use of efficient, precision irrigation practices that will result in less standing water for those agricultural areas that require artificial watering.

In coastal areas with extensive coastal salt marshes, there can be tremendous production of *Aedes* mosquitoes, making coastal human habitation virtually impossible. Several source reduction efforts can greatly reduce salt-marsh mosquito production through high-to mid-intensity management that relies upon artificial manipulation of the frequency and duration of inundation.

Biological Control Agents. The use of biological organisms or their byproducts to combat pest insects, such as mosquitoes, is termed biological control, or biocontrol. Biocontrol is utilization of parasites, predators, and pathogens to regulate pest populations. Generally, this definition includes natural and genetically modified organisms and means that the agent must be alive and able to attack the mosquito. The overall premise is simple: Biocontrol agents that attack mosquitoes naturally are grown in the lab and then released into the environment, usually in far greater numbers than they normally occur, and often in habitats that previously were devoid of them, so as to control targeted mosquito species.

One advantage of biocontrol agents is host-specificity which affords minimal disturbance to non-target species and to the environment. However, it is this specificity and the cost of commercializing biocontrol agents that deter development of biocontrol agents. In addition, utilization of biocontrol requires increased capital outlay and start-up costs as well as increased training requirements for personnel.

Biocontrol should be considered a set of tools that a mosquito control program can use when it is economically feasible. When combined with conventional chemicals and physical control procedures, biocontrol agents can provide short and, occasionally, long-term control. Biocontrol,

as a conventional control method, should aim at the weakest link of the life cycle of the mosquito. In most cases, this is the larval life stage.

Mosquitofish (*Gambusia affinis*) are currently the most extensively used biocontrol agent. These fish, which feed on mosquito larvae, can be placed in a variety of permanent and semi-permanent water habitats. Differences of opinion exist on the utility and actual control benefits derived from *Gambusia* implementation in an integrated pest management program with results reported from excellent control to no control at all. Concerns over placing *Gambusia* in habitats where other fish species assemblages are threatened have been ongoing. Care must be taken in placement of this cosmopolitan species in areas where endemic fish species are sensitive to further environmental perturbation. Additionally, use of endemic fish species in these areas of concern deserves greater attention.

In some aquatic habitats, fish function as an excellent mosquito biocontrol mechanism. These typically are permanent habitats where *Culex* and *Anopheles* are the primary mosquito residents and where the mosquito densities are not excessive. However, in habitats such as salt marshes fish are unable to control the sudden explosion of larvae produced by rainfall or rising tides. Here, the mosquito population numerically exceeds what the fish can consume during the brief immature mosquito developmental period. In salt marshes, fish must rely on things other than mosquito larvae for their nutritional needs most of the time, simply because there may be long delays between hatches of larvae. Mosquito larvae present an abundant food source, but only for a few days during their rapid development.

Species of predacious mosquitoes in the genus *Toxorhynchites* have been studied in a variety of urban areas for control of container-inhabiting mosquitoes, such as the Asian tiger mosquito (*Ae. albopictus*). *Toxorhynchites* mosquitoes also affect mosquito populations that develop in the treehole environment; however, their introduction into urban container habitats has proven unsuccessful.

In specific containers, *Toxorhynchites* may consume a large number of prey mosquito larvae, such as *Aedes aegypti* and *Ae. albopictus*. However, this predator does not disperse well enough to impact the vast number of natural and artificial containers used by these mosquitoes. Additionally their life-cycle is two to three times that of their prey making it impossible for them to keep up with the other more rapidly developing mosquitoes.

Another group of biocontrol agents with promise for mosquito control is the predacious copepods (very small crustaceans). Copepods can be readily mass reared, are easily to delivered to the target sites, and perform well when used with insecticides.

Birds and bats are often promoted as potential biocontrol agents of adult mosquitoes. However, while both predators eat adult mosquitoes, they do not do so in sufficient amounts to impact the mosquito populations. Mosquitoes provide such a small amount of nutrition that birds or bats expel more energy pursuing and eating mosquitoes than they derive from them. They are not a primary food source for these predators. Additionally, with mosquito flight behavior being crepuscular they are not active during the feeding periods of most birds. While bats are active during the correct time period, they simply cannot impact the massive numbers of adult mosquitoes available.

Bio-rational products exploit insecticidal toxins found in certain naturally occurring bacteria. These bacteria are cultured in mass and packaged in various formulations. The bacteria must be

ingested by mosquito larvae so the toxin is released. Therefore bio-rational products are only effective against larvae since pupae do not feed. The bacteria used to control mosquito larvae have no significant effects on non-target organisms. The possibility of creating a new invasive species by the introduction of biocontrols should be considered, evaluated, and avoided.

Pesticides. There are chemical and biological pesticide products registered for use against mosquitoes. Two biological pesticide products that are used against mosquito larvae singly or in combination are *Bacillus thuringiensis israelensis* (Bti) and *Bacillus sphaericus* (Bs). Manufactured Bti contains dead bacteria and remains effective in the water for 24 to 48 hours; some slow release formulations provide longer control. In contrast, Bs products contain live bacteria that in favorable conditions remain effective for more than 30 days. Both products are safe enough to be used in water that is consumed by humans. In addition to the biological pesticides, there are chemical pesticides for use against mosquitoes. As described below, once the determination is made to use pesticides to control mosquitoes, additional requirements under the 2016 PGP must be met.

3.2.2.1.3 Pesticide Use (Part 2.2.1.3)

- *Conduct larval and/or adult surveillance in an area that is representative of the pest problem or evaluate existing larval surveillance data, environmental conditions, or data from adjacent area prior to each pesticide application to assess the pest management area and to determine when action threshold(s) is met.*

Pest surveillance is important for timing pest control properly and to evaluate the potential need for pesticide use for mosquito control. Understanding surveillance data may enable mosquito control Operators to more effectively target their control efforts. Decision-makers are required to conduct a surveillance program to minimize discharges from control activities. Surveillance is necessary not only to establish pests' presence and abundance but also as an evaluation tool of the effectiveness of source reduction and chemical control activities. Furthermore, surveillance should be used as an indicator of the need for additional chemical control activities based on pre-established criteria related to population densities in local areas.

Larval surveillance involves routine sampling of aquatic habitats for developing mosquitoes. The primary tools used to determine larval densities and species composition are a calibrated dip cup and/or a bulb syringe for inaccessible areas such as treeholes. The counts may be expressed as the number of immature (larvae and pupae) mosquitoes per dip, per unit volume, or per unit surface area of the site. However, due to natural mortality from environmental factors, disease and predators, larval dip counts do not provide an accurate indication of the potential adult population. Nevertheless, larval counts do indicate when chemical larval control measures are warranted.

Adult surveillance is a key component of Pest Management Measures. Adult surveillance can be conducted using a variety of methods including but not limited to CDC traps, New Jersey light traps, resting site traps, egg oviposition traps, vehicle traps, and landing count rates. Mosquito control Operators should use a variety of the available traps as adults are attracted to different traps depending on their species, sex, and physiological condition. Trapped adults provide information about local species composition, distribution, and density. In addition, the need for adulticide application may also be established through the number and distribution of service requests received from the public. Collection data also provide feedback to the mapping and planning component of the integrated pest

management program as well as to its effectiveness and also serve to identify new sources of mosquitoes or identify recurring problem sites.

Disease surveillance, where practical, is also a key component of Pest Management Measures. Detecting antibodies in "sentinel" chicken flocks, equine cases, and testing dead birds and adult mosquitoes for infections are all used to determine whether disease is being transmitted in an area. Mosquito and vector control agencies also may test mosquitoes for viruses in their laboratories. Although generally less sensitive than sentinel chickens, mosquito infections may be detected earlier in the season than chicken seroconversions and therefore provide an early warning of virus activity. However, disease surveillance is not applicable to all mosquito control programs. In the absence of a dedicated disease surveillance program, mosquito control Operators should stay informed of arboviral occurrence or potential for occurrence in their control areas as determined by local, state, and/or national public health agencies.

Larval surveillance involves routine sampling of aquatic habitats for developing black flies. Larval surveillance is primarily accomplished by collecting stream substrates (rocks, vegetation, etc.) and examining for larval and pupal occurrence. Due to the varied developmental sites for black larvae and their ability to move in streams relative to changes in flow patterns, quantitative sampling will vary from site to site and in many instances, particularly with continuously changing water levels, is not practical. Qualitative sampling is often used in lieu of quantitative sampling, as an indicator of egg hatch and to indicate the age distribution of developing larvae. Qualitative sampling alone when used in conjunction with historical occurrence data can provide a reliable indicator of the need to initiate control activities.

Adult surveillance for black flies may include sweep sampling, vacuum aspiration of adults, and the use of silhouette traps. Traps may be simple visual attractants or may be baited with artificial attractants (*e.g.*, ocentol and CO_2). However, as different black fly species will respond differently in relation to different attractants, based on host preference, care must be used in selecting attractants that will provide a representative sample of the complete black fly spectrum present in any given location. Choice of adult sampling will in many cases be dictated by historical occurrence of black flies in a given area. Regardless, surveillance data is a useful tool in providing feedback to the mapping and planning component of any Pest Management Measure.

Aside from surveillance data, Decision-makers may also evaluate environmental conditions to assess the pest management area. For example, if the pest management area is known for pest development after flooding then Pest Management Measures may be needed after a rain storm.

- *Reduce the impact on the environment and on non-target organisms by applying the pesticide only when the action threshold(s) has been met.*

Operators must apply pesticide only as indicated by action thresholds for the pest management area. As noted above, action thresholds, established by the Decision-maker, help determine both the need for control actions and the proper timing of such actions. Timing pesticide application can reduce the impact on the environment and on non-target organisms.

- *In situations or locations where practicable and feasible for efficacious control, use larvicides as a preferred pesticide for mosquito or flying insect pest control when the larval action threshold(s) has been met.*

Operators may use larvicides, adulticides or a combination of both. However, when practicable and feasible, larviciding should be the primary method for mosquito control. Larviciding is a general term for the process of killing mosquitoes by applying natural agents or manmade pesticide products designed

to control larvae and pupae (collectively called larvicides) to aquatic habitats. Larviciding uses a variety of equipment, including aerial, from boats, and on the ground, as necessitated by the wide range of breeding habitats, target species, and budgetary constraints. Applications can be made using high pressure sprayers, ultra-low volume (ULV) sprayers, handheld sprayers, and back sprayers. However, larviciding is only effective when a high percentage of the mosquito production sites are regularly treated, which may be difficult and expensive.

There are advantages and disadvantages to aerial and ground larvicide applications. Ground larviciding allows application to the actual treatment area and consequently to only those micro-habitats where larvae are present. Therefore, ground larviciding reduces unnecessary pesticide load on the environment. However, ground applications often rely on in-the-field human estimates of the size of treatment areas and equipment output with a greater chance of overdosing or under-dosing. Ground larviciding is also impractical for large or densely wooded areas and exposes Applicators to greater risk of insecticide exposure.

Aerial larviciding application methods are generally used for controlling mosquito larvae present in large areas and areas that are inaccessible for ground application. However, failure to treat an entire area with good larvicide coverage can result in the emergence of large adult populations. In order to prevent poor site coverage, a global positioning system (GPS), where economically feasible, or site flagging are necessary to increase accuracy of the pesticide application coverage while minimizing the amount of larvicides being applied. Aerial application does provide easier calibration of equipment due to the fact that the target area is generally mapped and the material is weighed or measured when loading. However, cost of aerial application is higher than ground application (*i.e.* additional personnel for flagging or expensive electronic guidance systems) and also requires special FAA licenses, training of staff, and additional liability insurance. In addition, aerial larviciding has greater potential for non-target impacts.

Bacillus thuringiensis var israelensis (Bti) is the primary larvicide used for black fly control in the United States. Bti is a gram positive, aerobic, spore-forming bacterium that produces protoxins in the form of parasporal protein crystals. In the alkaline digestive tract of black flies and mosquitoes, the protoxins become activated into highly toxic delta-endotoxins. The endotoxins cause a rapid breakdown in the lining of the mid-gut and necrosis of skeletal muscles, resulting in paralysis and mortality of target insect pests. Bti is nontoxic to most non-target organisms due to their acidic digestive systems and lack of suitable tissue receptor sites.

To minimize pesticide discharges into waters of the United States, Operators must apply larvicides as needed for source reduction as indicated by the action threshold in situations or locations where it is practicable and feasible to do so. The action threshold may be based on occurrence of adults (current or historical) and/or larval sampling of stream substrates for immature black flies. Surveillance is also a valuable tool for assessing the effectiveness of larval control activities.

Larvicides may be applied to streams using either ground or aerial equipment. Choice of equipment is largely dictated by stream size and accessibility. Application equipment may include backpack sprayers, boats equipped with sprayers or metered release systems, helicopters or fixed wing aircraft. The amount of insecticide required to treat a stream should be based on the desired dosage and the stream discharge. Stream discharge is calculated by determining the average width and depth of the stream and the stream velocity (discharge = width (m) x depth (m) x velocity (m/s)). Proper calibration of insecticide delivery based on discharge is necessary to ensure complete coverage throughout the water column in order to expose all larval habitats to an effective insecticide dose.

A larvicide is applied across the stream width for the time specified by the application rate. The point of application should be far enough upstream from the larval habitat to ensure proper insecticide dispersal in the water passing over the treatment area. Operators should determine the effective downstream carry (maximum distance at which at least 80% larval control is achieved) of the insecticide suspension. By determining downstream carry, black fly control Operators can limit the number of applications necessary to treat any given stream and thereby reduce pesticide discharges into waters of the United States.

In situations or locations where larvicide use is not practicable or feasible for efficacious control, use adulticides for mosquito or flying insect pest control when the adult action threshold(s) has been met. Chemical pesticide applications for adult mosquitoes, adulticiding, is the most visible and commonly used form of mosquito control. Adulticide applications may be used for nuisance or disease vectoring mosquitoes. Adulticiding consists of dispersing an insecticide as a space spray into the air column, using ground or aerial equipment, which then remains suspended in the air column through the habitat where adult mosquitoes are flying. Any mosquito adulticiding activity that does not follow reasonable guidelines, including timing of applications, avoidance of sensitive areas, and strict adherence to the pesticide label, risks affecting non-target insect species.

Operators must ensure that the adulticide applications are made only when necessary by determining a need in accordance with specific criteria that demonstrate a potential for a mosquito-borne disease outbreak, or numbers of disease vector mosquitoes sufficient for disease transmission, or a quantifiable increase in numbers of pestiferous mosquitoes. To determine the need for adulticide application, at least one of the following criteria should be met and documented by records: 1) when a large population of adult mosquitoes is demonstrated by either a quantifiable increase in, or a sustained elevated mosquito population level as detected by standard surveillance methods, 2) where adult mosquito populations build to levels exceeding community standards (*e.g.*, 25 mosquitoes per trap night or 5 mosquitoes per trap hour during crepuscular periods), and/or 3) when service requests for arthropod control from the public have been confirmed by one or more recognized surveillance methods.

The most common forms of adulticiding are ultra-low volume spray (ULV) and thermal fogging. Ground adulticiding is almost exclusively conducted with ULV equipment and is the most common method used to control mosquitoes. Ground adulticiding can be a very effective technique for controlling most mosquito species in residential areas with negligible non-target effects.

Aerial adulticiding is a very effective means of controlling adult mosquitoes, particularly in inaccessible areas, and may be the only means of covering a very large area quickly in case of severe mosquito outbreaks or vector borne disease epidemics. Aerial adulticide applications are made using either fixed wing aircraft or rotor craft. Application is generally as ULV spray but some thermal fogging still occurs.

Adulticide application has its own set of conditions that determine success or failure. The application must be at a dosage rate that is lethal to the target insect and applied with the correct droplet size. Whether the pesticide application is ground or aerially applied, it must distribute sufficient insecticide to cover the prescribed area with an effective dose. Typically with ground applications, vegetated habitats may require up to three times the dosage rates that open areas require. This is purely a function of wind movement and its ability to sufficiently carry droplets to penetrate foliage. In addition, aerial application is dependent upon favorable weather conditions.

Environmental conditions may also affect the results of adulticide application. Wind determines how the ULV droplets will be moved from the output into the treatment area. Conditions of no wind will result in

the material not moving from the application point. High wind, a condition that inhibits mosquito activity, will quickly disperse the insecticide over too wide an area but at a diluted rate too low to effectively control pests. Light wind conditions (< 10 mph) are the most desirable because they move the material through the treatment area and are less inhibiting to mosquito activity. Thermal fogs perform best under very light wind conditions.

ULV application should be avoided during hot daylight hours. Thermal conditions, particularly temperature inversion, will cause the small droplets to quickly rise, moving them away from mosquito habitats. Generally, applications are made after sunset and before sunrise, depending upon mosquito species activity. Some mosquitoes (*Culex* and *Anopheles*) are most active several hours after sunset, while others (*Ae. aegypti* and *Ae. albopictus*) are more active during the daytime, and if these species are the targets, application should be made during the period of highest activity for the target species, provided that meteorological conditions are suitable for application (seldom during daylight hours).

One notable exception to applications made when mosquitoes are up and flying is a residual barrier treatment application. Barrier applications are based on the natural history and behavioral characteristics of the mosquito species causing the problem. Barrier applications use a residual material and are generally applied with a powered backpack sprayer to preferred resting areas and migratory stops in order to intercept adult mosquitoes hunting for blood meals. Barrier applications are often applied during daylight hours as a large-droplet liquid application and are designed to prevent a rapid re-infestation of specific areas, such as recreational areas, parks, special-event areas, and private residences. Barrier applications can help provide control of nuisance mosquitoes for up to one week or longer.

Pesticide control of black flies in the United States historically relied upon both larvicides and adulticides. However, adulticide use against black fly populations is no longer a common practice. As adult black flies are seeking blood meals during the daytime, adulticide application coincides with human activity, so daytime application is no longer a standard control procedure. One reason for this change is due to environmental factors associated with daytime adulticide application, particularly thermal inversions, which cause adulticide application for black fly control to be ineffective. Furthermore, as only adults directly contacted by the adulticide application are killed, with no residual activity against other adults immigrating to the treatment area, adulticide applications are both ineffective and expensive. For these reasons, larvicides which target the immature stages before development of the pestiferous adult are now the primary means of black fly control in the United States.

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DEC recommends the following sources for additional information on Pest Management Measures for mosquito control.

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3.2.2.2 Weed and Algae Pest Control (Part 2.2.2)

Background

Weeds and algae that negatively affect aquatic biodiversity, human health, and economic stability are considered to be pests. Weeds and algae can decrease populations of native aquatic species including threatened and endangered species. Weeds and algae can reduce aquatic biodiversity by preventing desirable species growth and unbalancing desirable aquatic species populations and development. Social, economic, and human health are all affected by a lower aesthetic appeal of water bodies, an increased cost of agricultural irrigation water, and an increase in the risk of human diseases, by providing ideal vector breeding grounds. In addition, the reduction in the utility of water can have social and economic impacts due to reduced hydroelectric operations, impeded opportunity for recreational activities (*e.g.*, fishing, boating, and swimming), and disruption of water transport (*e.g.*, agricultural irrigation), to name a few. As a result, if weeds and algae become established and impede the environmental stability and use goals for a body of water, control measures will be necessary. Pest control may be necessary before the pests become established.

The requirements in Part 2.2.2 apply to pesticide discharges associated with management of weeds, algae, and plant pathogens in water and water's edge (including near the water), including ditches and/or canals. Most aquatic plants and algae are largely beneficial to water quality, especially when present in

the appropriate densities. However, overabundant native algae and aquatic vegetation, as well as introduced, exotic species, can decrease water quality and utility. Dense plant or algae growth can interfere with recreational activities (*e.g.*, fishing, boating, and swimming), disrupt water transport, reduce aquatic biodiversity by preventing desirable plant growth and unbalancing fish populations, lower the aesthetic appeal of a water body, and increase the risk of human diseases by providing ideal vector breeding grounds.

Algae

Algae are non-vascular plants that do not have true roots, stems, leaves, or vascular tissue, and have simple reproductive systems. Some macroscopic algae may resemble a plant in appearance. Algae may occur in the sea or freshwater. Algae are an important aquatic food source for many animals. However, excess algae growth such as algae blooms, frequently caused by unbalanced or elevated nutrients, can be damaging to aquatic ecosystems. Control options include mechanical, biological, and chemical methods.

Weeds

Weeds, include floating, emergent, or submerged plants negatively impact the quality and utility of waters of the United States. Weeds also include unwanted vegetation, including invasive species, at water's edge, including near the water and vegetation in or near waters of the United States that are not always "wet" (*e.g.*, ephemeral streams, seasonal waters). Aquatic systems need plant materials as an important part of the systems ecology; however, when vegetation becomes established to the point of impeding the use goals for a body of water, control measures become necessary. As a part of such aquatic weed control programs Pest Management Measures should consider mechanical, biological, and/or chemical controls. Details for developing an aquatic weed pest management measures can be found in the document *Aquatic Plant Management, Best Management Practices in Support of Fish and Wildlife Habitat* (Getsinger et al. 2005).

The appropriate type of control for weeds and algae is dictated by the biology of the target species and by environmental conditions and concerns for a specific area. Numerous Pest Management Measures are used to reduce the impact of weeds and algae, but an integrated pest management plan should be the basis for any pest control program. This is a comprehensive approach for managing pest populations using a variety of control methods.

Plant Pathogens

Plant pathogens are microorganisms that cause plant disease. Plant pathogens can be fungi, bacteria, viruses, mycoplasmas, or nematodes. Each has a different life cycle which includes an infectious stage. Most pathogens are host-specific to a particular plant species, genus, or family. Some diseases, such as the powdery mildews, produce similar symptoms on different plants. However, the fungi involved are usually host-specific. (Ohio State University Extension)

Fungi is one group of plant pathogens. They cause plant diseases such as rusts, smuts, and mildews. Fungal spores may be actively or passively released for dispersal by several effective methods (air dispersal, rain splash, flowing water dispersal, and forcible release). The function of some spores is not primarily for dispersal, but to allow the organisms to survive as resistant cells during periods when the conditions of the environment are not conducive to growth. Most phyla are terrestrial in origin, although all major groups have invaded marine and freshwater habitats. Wherever adequate moisture, temperature, and organic substrates are available, fungi are present. Although we normally think of fungi as growing in warm, moist forests, many species occur in habitats that are cold, periodically arid,

or otherwise seemingly inhospitable. It is important to recognize that optimum conditions for growth and reproduction vary widely with fungal species. Fungi can be controlled using chemical, biological, and cultural practices.

Bacteria are single celled organisms that can cause many plant diseases (such as fire-blight, canker, and leaf spots). The infected plant can suffer significant yield losses or die prematurely. Bacterial diseases can be managed by chemical, biological, or cultural practices.

Nematodes are simple, multi-cellular organisms that look like worms. They are soft-bodied (no skeleton) non-segmented round worms. Most nematode species that attack plants are microscopic. Plant parasitic nematodes may attack the roots, stem, foliage, and flowers of plants. Nematodes can be controlled by chemical, physical, or biological methods.

3.2.2.2.1 Identify the Problem (Part 2.2.2.1)

- *Prior to the first pesticide application covered under the permit that will result in a discharge to waters of the United States, and at least once each calendar year thereafter prior to the first pesticide application for that calendar year, any Decision-maker who is or will be required to submit NOI must do the following for each pest management area, as defined in Appendix C.*

Decision-makers must identify the pest problem in their pest management area prior to the first application covered under the 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 target pest, as well as water use goals and complaints or reports of weeds and algae from the public.

- *Identify target pest(s).*

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

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

While there may not be reasonable means to control and/or stop the introduction and occurrence of some nuisance pest infestations, the identification of possible sources (*e.g.*, outflows from other water systems/bodies) may help in reducing the need for pesticide. Potential weed and algae causes such as changes in nutrient levels or accidental or intentional introduction of exotic species must be identified.

- *Establish any pest- and site-specific action threshold, as defined in Appendix A, for implementing Part 2.2.2.2.*

Any data and/or information regarding pest can be used to establish an action threshold. An action threshold must be established.

- *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 Part 2.2.2.1.*

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

3.2.2.2.2 Pest Management Options (Part 2.2.2.2)

- *Prior to the first pesticide application covered under the permit that will result in a discharge to waters of the United States, and at least once each calendar year thereafter prior to the first pesticide application for that calendar year, any Decision-maker who is or will be required to submit an NOI 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-makers 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: No action; Prevention; Mechanical/physical methods; Cultural methods; Biological control agents; and Pesticides.*

Decision-makers must evaluate management options and implement Pest Management Measures to minimize pesticide discharges into waters of the United States prior to the first pesticide application covered under the 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 implemented in a manner that reduces impacts to non-target species. The following describes the management options that must be evaluated:

No Action. No action is to be taken, although pest problem has been identified. This may be appropriate in cases where, for example, available pest management options may cause secondary or non-target impacts that are not justified, no available controls exist, or the pest population is stable at a level that does not impair water body uses.

Prevention. Preventing introductions of possible pest is the most efficient way to reduce the threat of nuisance species (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 pest, private entities (aquaculture) and the public have the necessary knowledge to assist in local pest control by reducing conditions that encourage the spread of pests in their immediate surroundings. For example, recreational water users provide a pathway of unintentional introductions. Increasing public awareness of weeds and algae, 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 (*e.g.*, hand weeding). Monitoring and detection also play important roles in the prevention of the spread and introduction of weeds and algae.

Mechanical or Physical Methods. Mechanical control techniques will vary depending on the pest. Examples include dewatering, pressure washing, abrasive scrubbing, and weed removal by hand or machine. Mechanical and biological controls will be the appropriate method in some cases, or a part of a combination of methods. 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 Pest Management Measures.

Cultural Methods. Cultural techniques include the use of pond dyes and water-level drawdown. The use of certain pond dyes may help manage filamentous algae and submersed (underwater) vegetation. Several pond colorants and one or two dyes are EPA-registered for weed control. Pond dyes and colorants can be effective if there is little water outflow from the pond. Dyes and colorants intercept sunlight needed by algae and other underwater plants for photosynthesis. Therefore, they are generally ineffective on floating plants like duckweed and water lilies and emergent (growing above the surface) plants like cattails and bulrushes. Dyes and colorants are nontoxic and do not kill the plants, and they are safe for use in ponds for irrigation, fishing, and livestock. However, they are not intended for use in large lakes with a lot of water flow or lakes used for public water supplies.[4]

Biological Control Agents. Biological control of weeds and algae may be achieved through the introduction of diseases, predators, or parasites. While biological controls generally have limited application for control of weeds and algae, the Operator should fully consider this option in evaluating pest management options.

Pesticides. Aquatic herbicides are chemicals specifically formulated for use in water to kill or control aquatic plants. Aquatic herbicides are sprayed directly onto floating or emergent aquatic plants as well as plants at or near the water's edge or are applied to the water in either a liquid or pellet form. Systemic herbicides are capable of killing the entire plant. Contact herbicides cause the parts of the plant in contact with the herbicide to die back, leaving the roots alive and able to regrow. Non-selective, broad spectrum herbicides will generally affect all plants that they come in contact with. Selective herbicides will affect only some plants.[5]

3.2.2.2.3 Pesticide Use (Part 2.2.2.3)

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

Often, each weed and algae and pest management area warrants different Pest Management Measures tailored to regional conditions. The 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.

[4] http://www.grounds-mag.com/mag/grounds_maintenance_weeds_overboard
[5] http://www.ecy.wa.gov/programs/wq/plants/management/aqua028.html

Decision-makers should apply chemical pesticides only after considering the alternatives and determining those alternatives not to be appropriate Pest Management Measures. Also, Decision-makers should conduct surveillance (*e.g.*, pest counts or area survey) prior to application of pesticides to determine when the action threshold is met thus necessitating 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 weeds and algae following pesticide application (Getsinger et al. 2005, pp 23-25).

- *Reduce the impact on the environment and non-target organisms by applying the pesticide only when the action threshold has been met.*

Operators must apply pesticide only as indicated by action thresholds for the pest management area. As noted above, action thresholds help determine both the need to implement Pest Management Measures and the proper timing of such actions. Timing pesticide application can reduce the impact on the environment and on non-target organisms.

Environmental factors such as temperature and dissolved oxygen content, as well as biological factors such as stage of growth, should be considered when deciding on application timing. Partial site pesticide applications over time may be considered to reduce risk. Pesticide application must be limited to the appropriate amount required to control the target pests. Methods used in applying pesticides must reduce the impact to non-target species.

Recommended Weed and Algae Control References

DEC recommends the following sources for additional information on Pest Management Measures for weed and algae control:

Aquatic Nuisance Species Taskforce. Available at http://www.anstaskforce.gov/default.php.

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.

Gettys, L. A., Haller, W. T., & Bellaud, M. (2009). Biology and control of aquatic plants. Marietta GA: Aquatic Ecosystem Restoration Foundation. Available at http://www.fs.usda.gov/Internet/FSE_DOCUMENTS/stelprdb5373509.pdf

3.2.2.3 Animal Pest Control (Part 2.2.3)

Background

Animal Pests, such as fish, lampreys, and mollusks, negatively affect aquatic biodiversity, human health, and economic stability. Aquatic nuisance animals decrease populations of native aquatic species including threatened and endangered species. Aquatic nuisance animals can reduce aquatic biodiversity by preventing desirable species growth and unbalancing desirable aquatic species populations and development. Social, economic, and human health are all affected by a lower aesthetic appeal of water bodies, an increased cost of agricultural irrigation water, and an increase in the risk of human diseases by providing ideal vector breeding grounds. In addition, the reduction in the utility of water can have

social and economic impacts due to reduced hydroelectric operations, impeded opportunity for recreational activities (*e.g.*, fishing, boating, and swimming), and disruption of water transport (*e.g.*, agricultural irrigation), to name a few. As a result, if or when animal pests become established and impede the environmental stability and use goals for a body of water, implementation of Pest Management Measures will become necessary. Animal aquatic pests also include insects, amphibians, and other animals that spend part or all of their life cycle at water's edge, including near the water, as well as in or near waters of the US that are not always "wet" (*e.g.*, ephemeral streams, seasonal waters).

The requirements in this Part apply to pesticide discharges associated with the management of animal pests including fish, lampreys, insects, mollusks, and microorganisms. Animal pest control includes management of nuisance species in waters of the United States, including lakes, ponds, rivers, estuaries, and streams. Pest Management Measures for animal pest control should consider mechanical, biological, and chemical controls. Details for identifying animal pests and developing Pest Management Measures can be found online through the Aquatic Nuisance Species Taskforce (http://www.anstaskforce.gov).

Fish

Reasons for applications of piscicides in waters of the United States for controlling nuisance species of fish may include, but are not limited to, restoration of threatened and endangered species; fish population management; restoration of native species; control of invasive species; and aquaculture. Pest Management Measures for fish should consider mechanical, biological, and chemical controls.

Lampreys

There are approximately 40 species of lamprey, which are aquatic vertebrates. The sea lamprey is an example of a problematic non-native parasitic species that feeds on native fish species in United States waters. Lampreys may be managed using lampricides that are applied directly to the waters of the United States. Several effective management techniques such as mechanical and biological methods are available for lamprey control in addition to lampricides and should be considered when developing Pest Management Measures.

Mollusks

Nuisance mollusks including, but not limited to, zebra and quagga mussels, may cause damage to freshwater ecosystems, degrade drinking water, clog water-intake/discharge pipes for utilities and industries, and negatively impact commercial and recreational activities. Use of molluscicides is one of several methods of control for these aquatic nuisance animals; however, it is important to consider the impacts of mechanical, biological, and/or chemical pesticide use for control of mussels and other aquatic nuisance mollusk species.

Other Animals

There may be animals of concern in addition to fish, lampreys, and mollusks. Control of other animals including, but not limited to, crustaceans, amphibians, or insects found to be a nuisance and requiring management with mechanical, biological, and/or chemical pesticides are included in the requirements in Part 2.2.3.

The appropriate type of Pest Management Measures for animal pests is dictated by the biology of the target pest and by environmental conditions and concerns for a specific area. Numerous Pest Management Measures are used to reduce the impact of animal pests, but integrated pest management should be the basis for any pest control program. This is a comprehensive approach for managing pest populations using a variety of Pest Management Measures.

3.2.2.3.1 Identify the Problem (Part 2.2.3.1)

- *Prior to the first pesticide application covered under the permit that will result in a discharge to waters of the United States, and at least once each calendar year thereafter prior to the first pesticide application for that calendar year, any Decision-maker who is or will be required to submit an NOI must do the following for each pest management area, as defined in Appendix C.*

Decision-makers must identify the pest problem in their pest management area prior to the first application covered under the 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 pest 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 Part 2.2.3.2.*

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 Part 2.2.3.1.*

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

3.2.2.3.2 Pest Management Options (Part 2.2.3.2)

- *Prior to the first pesticide application covered under the permit that will result in a discharge to waters of the United States, and at least once each year thereafter prior to the first pesticide application during that calendar year, any Decision-maker who is or will be required to submit an NOI 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 management options, considering impact to water quality, impact to non-target organisms, feasibility, and cost effectiveness: No action; Prevention; Mechanical/physical methods; Biological control agents; and Pesticides.*

Decision-makers are required to evaluate management options and implement Pest Management Measures to minimize pesticide discharges into waters of the United States prior to the first pesticide application covered under the 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:

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 (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.

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 should 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.

3.2.2.3.3 Pesticide Use (Part 2.2.3.3)

- *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.*

Often, each animal and pest management area warrants 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 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

DEC 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.

3.2.2.4 Forest Canopy Pest Control (Part 2.2.4)

Background

The forest canopy is the uppermost level of the forest. It is composed of treetops, or the crowns of the trees. It provides habitat for animals and plants, some of whom live their entire lives in the canopy. Pests that threaten the health of the forest canopy must be controlled to maintain forest health. Forest canopy pest control programs are designed to integrate environment-friendly Pest Management Measures (*e.g.*, sterile insect release, pheromone trapping, mating disruption, etc.) to reduce losses and pesticide use. But pesticide applications may aerially blanket large tracts of terrain to control an entire population of pests within a delimited geographic area. Forest canopies may also include the tops or crowns of immature trees, where pesticide application is necessary to control pests that live in or threaten these areas.

Forest canopy pest control programs included in the 2016 PGP are treetop pesticide applications that may inadvertently expose waters of the United States to direct, but limited, pesticide application. Forest canopy pest control can be directed at a variety of pests, but primarily insects. Forest canopy pest control programs are utilized to prevent habitat elimination/modification, economic losses (*e.g.*, habitat aesthetics, tree losses), quarantine pest outbreaks, and eradicate or prevent the spread of introduced invasive species. Therefore, forest canopy pest management programs provide environmental, economic, and quality of life benefits in the United States.

The type of forest canopy pest control is dictated by the biology of the target pest and by environmental conditions and concerns for a specific area. Forest canopy pest control programs are primarily conducted at the state and federal level but may also be conducted at the local/community level.

3.2.2.4.1 Identify the Problem (Part 2.2.4.1)

- *Prior to the first pesticide application covered under the permit that will result in a discharge to waters of the United States, and at least once each calendar year thereafter prior to the first pesticide application in that calendar year, any Decision-maker who is or will be required to submit an NOI must do the following for each pest management area, as defined in Appendix C.*

In order to reduce pesticide discharges into waters of the United States associated with forest canopy pest control, it is important for Decision-makers to ensure proper problem identification. Problem

identification is determined through pest identification, delineation of the extent and range of the pest problem, determination of the potential for pest problem expansion, and assessing the economic impact of not implementing Pest Management Measures.

- *Establish any pest- and site-specific action threshold, as defined in Appendix A, for implementing Part 2.2.4.2.*

Decision-makers must develop action thresholds for the target pests prior to the first pesticide application as covered under the 2016 PGP. The action thresholds must be re-evaluated at least once each calendar year. As noted in the general discussion above, an action threshold is a point at which pest populations or environmental conditions indicate that Pest Management Measures must be taken. Action thresholds help determine both the need for implementing Pest Management Measures and the proper timing of such actions. It is a predetermined pest level that is deemed to be unacceptable.

- *Identify target pest(s) to develop Pest Management Measures based on developmental and behavioral considerations for each pest.*

Pest identification is a key activity for implementation of a forest canopy pest control system. Pest identification should only be conducted by personnel with adequate training and experience with the pests. While numerous similar pests (insects and/or pathogens) may be present in any given location, only a few of the representative pest may constitute a threat which requires control activities. Through proper pest identification informed control decisions can be made based on the development biology of the pest (susceptible development stage), pest mobility (potential rate of spread), timing of selected Pest Management Measures, applicable control techniques, and most effective chemical pesticides for the target pests (insecticide class, resistance, etc.). Failure to identify pests can lead to unwarranted control activities and/or the need for chemical application with potential for discharges into waters of the United States. Control for each specific pest is also predicated on the status of the pest as native recurring, quarantine restricted, or designated as an invasive species.

- *Identify current distribution of the target pest and assess potential distribution in the absence of Pest Management Measures.*

Control activities are warranted only after exact pest identification and delineation of the extent of the pest infestation. As forest canopy pest control can involve treating large expanses of forests, mapping is also an important component in identification of the problem. The distribution of the pest, usually insects, within the area of infestation can impact the selection of Pest Management Measures. In addition, mapping of the pest infestation will allow evaluation of the actual/potential spread of the infestation (*e.g.*, pest biology, pest mobility, and host availability) and also serve as a tool to evaluate the effectiveness of the Pest Management Measures. Mapping can also provide essential information for assessment of economic damages that can result from the current and potential pest infestation and failure to control the pest. Management decisions can thereby be based on cost/benefit evaluations based on the current and potential distribution of any pest.

The third component of problem identification is to determine the potential economic impact of not controlling the pest. By establishing economic thresholds, it is possible to determine pest action thresholds which warrant control activities. However, control decisions must take into account not only the projected economic impact of the current pest infestation but also the potential of the pest infestation to spread. Therefore, control decisions based on economic impact must in turn rely on proper pest identification, pest biology, and current and potential pest distribution.

- *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 Part 2.2.4.1.*

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

3.2.2.4.2 Pest Management Options (Part 2.2.4.2)

- *Prior to the first pesticide application covered under the permit that will result in a discharge to waters of the United States, and at least once each calendar year thereafter prior to the first pesticide application for that calendar year, any Decision-maker who is or will be required to submit an NOI 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 management area, the Decision-maker 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.*

Pest control activities in forest canopy management programs may be warranted following problem identification and based solely on pest occurrence (*e.g.*, quarantine pest, invasive species). However, in many instances control activities may only be necessary based on pest population distribution and/or pest densities. To minimize the need for pest control while also producing the best control results, Pest Management Measures appropriate for the specific problem site(s) must be developed. A site-specific management plan will consider biotic (*e.g.*, plant and animal species community structure) and abiotic (*e.g.*, environmental) factors. Combinations of various management options are frequently the most effective Pest Management Measures over the long term. The goal of Pest Management Measures in forest canopy pest control should be to emphasize long-term control rather than a temporary fix.

All Pest Management Measures must be conducted in a manner that minimizes impacts to non-target species. The following is a discussion of the relevant management options as they might be implemented for forest canopy pest control:

No Action. No action is to be taken, although a pest problem has been identified. This may be appropriate in cases where available control methods may cause secondary or non-target impacts or where aesthetic/economic losses are not anticipated.

Mechanical/Physical Methods. Mechanical and biological controls will be the appropriate method in some cases, or a part of a combination of methods. 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 measures and best management practices. Mechanical control techniques will vary depending on the pest. An example of mechanical control in a forest canopy would be egg mass removal (*e.g.*, gypsy moth).

Cultural Methods. Cultural control methods are Pest Management Measures that make the habitat unsuitable for a pest. An example of a cultural method to manage pests of the forest canopy would be to select a different species of tree to plant, or to plant resistant varieties of trees. Maintaining the trees in good health to discourage pests is another method of cultural control.

Biological Control Agents. Biological control of forest canopy pests may be achieved through the introduction/enhancement of diseases, predators, or parasites. In addition, forest canopy pest control programs aimed specifically at insects may also utilize sterile insect release, mating disruption, and biological pesticides. While biological controls generally have limited applications for forest canopy pest control programs, they should be fully considered as an option in the development of Pest Management Measures. The latter two control approaches are often utilized when controlling for gypsy moth.

Pesticides. Several chemical and biological pesticides are available that may be used to reduce defoliation of the trees. These pesticides are typically used when pest populations are high and the action threshold has been reached. They are aerially applied. As described below, once the determination is made to use pesticides, additional requirements must be met.

3.2.2.4.3 Pesticide Use (Part 2.2.4.3)

- *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 pest action threshold is met.*

Decision-makers must apply pesticides only as needed as determined by pre-established criteria and pest action thresholds. Decision-makers must establish a pest action threshold that warrants pesticide application based on problem identification and pest surveillance. In order to establish pest densities and determine when pest action thresholds have been met, forest canopy pest control programs must include pest surveillance activities as an integral component of Pest Management Measures. Pest surveillance is necessary to detect the presence (or confirm the absence) and magnitude of pest populations in a given location and precisely pinpoint zones of infestation. Surveillance activities will vary according to the pest (insect, weed, or pathogen) but in general should include observations of pest numbers, developmental stage of the current infestation, and biotic factors which would enhance development/expansion of pest populations (*e.g.*, weather, crowding, predators, pathogens, etc.).

Pest surveillance will vary according to pest type and species. For insect pests, surveillance activities may include, but not be limited to, pheromone traps, sticky traps, light traps, defoliation monitoring. In some cases, traps used in surveillance activities have been developed to the extent that they alone provide adequate control of the targeted pest, thus eliminating the need for pesticides completely. Conversely, in the instance of quarantine pests or invasive species, pest identification alone may suffice to fulfill surveillance requirements and indicate need for control measures. Regardless, surveillance should take into account local environmental conditions and projected environmental conditions, which would support development and/or spread of the pest population and which would limit the choice or effectiveness of control activities.

It is also important to continue surveillance following control activities to assess the efficacy of Pest Management Measures and to monitor for new pests. Surveillance can determine if the current techniques are effective and whether additional Pest Management Measures are required, particularly pesticide application. Based on follow-up surveillance activity, Decision-makers can make informed decisions which serve to increase the effectiveness of their control programs and minimize the potential for pesticide discharges to waters of the United States. Surveillance is necessary not only to establish the pest presence and its abundance but also as an evaluation tool of the effectiveness of chemical control activities. Furthermore, surveillance should be used as an indicator of the need for additional chemical control activities based on pre-established criteria related to population densities in local areas.

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

Forest canopy pest and site restrictions (water use, water movement, etc.) must be identified when choosing an appropriate pesticide. For instance, with gypsy moth control, a biological insecticide, Bacillus thuringiensis kurstaki, is usually selected. However, if endangered or threatened butterfly or moth species are in the area, a viral insecticide that specifically targets gypsy moth larvae should be considered. 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 should weigh the potential impact to non-target species.

- *Evaluate using pesticides against the most susceptible developmental stage.*

For forest canopy pests, pesticides should be selected that target the most susceptible life stage. Gypsy moth caterpillars are susceptible to control by chemical pesticides, or by ingestion of nucleopolyhedrosis virus occlusion bodies.

Recommended Forest Canopy Pest Control Reference

DEC recommends the following sources for additional information on Pest Management Measures for forest canopy pest control:

Emily Grafton and Ralph Webb. Homeowner's guide to gypsy moth management. West Virginia University Extension Service. http://www.nj.gov/agriculture/divisions/pi/pdf/GMguide.pdf

USDA. 2009. Gypsy Moth Program Manual. http://www.aphis.usda.gov/import_export/plants/manuals/domestic/downloads/gypsy_moth.pdf

USDA. 2015. Asian Gypsy Moth Factsheet. https://www.aphis.usda.gov/publications/plant_health/content/printable_version/fs_phasiangm.pdf

Reardon, Podgwaite, and Zerillo. GYPCHEK- Environmentally Safe Viral Insecticide for Gypsy Moth. FHTET-2012-01. U.S. Department of Agriculture, Forest Service. http://www.fs.fed.us/foresthealth/technology/pdfs/Gypchek_FHTET-2012-01.pdf

Kucera, Daniel and P. Orr. Spruce Budworm in the Eastern United States. U.S. Department of Agriculture, Forest Service. Forest Insect and Disease Leaflet 160. Retrieved 3/12/09 at http://www.na.fs.fed.us/spfo/pubs/fidls/sbw/budworm.htm

Michael, Jerry. 2004. Best Management Practices for Silvicultural Chemicals and the Science behind Them. Water, Air, and Pollution: Focus. 4(1), 95-117.

3.3 Water Quality-Based Effluent Limitations (Part 3.0)

In addition to technology-based effluent limitations for all discharges, the CWA requires additional effluent limitations that are as stringent as necessary to achieve water quality standards. These are called water quality-based effluent limitations (WQBELs). Permit writers are to assess whether the technology-based effluent limitations are protective of water quality standards, and if not, permit writers must also include WQBELs as necessary to ensure that the discharge will not cause an excursion above any 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 on the quality of the receiving water. Unlike individual permits that include requirements tailored to site-specific considerations, general permits, while tailored to specific industrial processes or types of discharges (*e.g.*, from the application of pesticides), often do not contain site-specific WQBELs. Instead, in general, DEC includes a narrative statement that addresses WQBELs. In the permit, the WQBEL is as follows:

> *All Operators must control discharges as necessary to meet applicable numeric and narrative state water quality standards, for any discharges authorized under the permit, with compliance required upon beginning such discharge.*
>
> *If at any time an Operator becomes aware (e.g., through self-monitoring or DEC 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 Part 6.0 and Appendix A, Part 1.4, up to and including the ceasing of the discharge, if necessary.*

The first sentence includes the general requirement to control discharges as necessary to meet 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 DEC or by the Operator. Failure to take such corrective action is a violation of the permit. Additionally, the permit includes a provision, in Part 1.2.3 of the permit, that specifies that DEC may determine that additional technology-based and/or water quality-based effluent limitations are necessary, or may deny coverage under the permit and require submission of an application for an individual APDES permit, as detailed in Part 1.3.

Each Operator is required to control its discharge as necessary to meet applicable water quality standards. In general, DEC expects that compliance with the other conditions in the permit (*e.g.*, the technology-based limitations, corrective actions, etc.) will result in discharges 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. (See Section 3.1.5 of this fact sheet.)

(2) In developing the 2011 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 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)..

(3) Technology-based effluent limitations in the 2016 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 covered under the 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) The PGP excludes pesticide applications that result in discharges of any pesticide 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 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.

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

This 2016 PGP requires Operators to control discharges as necessary to meet applicable water quality standards. When the Operator or DEC determines a discharge will cause or contribute to an excursion above any water quality standards, 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 Part 6.0). If additional Pest Management Measures are required, DEC expects the Operator to vigilantly and in good-faith follow and document, as applicable, the process for Pest Management Measure selection, installation, implementation and maintenance, and cooperate to eliminate the identified problem within the timeframe stipulated in Part 6.0 of the 2016 PGP.

(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 the Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA). In general, FIFRA authorizes EPA to register each pesticide product intended for distribution or sale in the United States. To register a pesticide, EPA 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, EPA 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 EPA 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. EPA 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.11[6] 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.

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

[6] 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.

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 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.

In sum, EPA's screening level exposure estimates from simulation models are conservative, consistent with their intended use as a screen to identify pesticide use scenarios that do not pose a risk of concern, both because of the selected inputs used to generate them and the values from the model outputs that are selected for the FIFRA risk assessment. When ambient aquatic monitoring data are available for a given pesticide, monitored concentrations are usually lower than modeled concentrations and in many cases substantially lower. The next section describes the second portion of the risk assessment: effects.

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[7]. 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[8] 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:

[7] 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. http://cfpub.epa.gov/ecotox.

[8] 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) http://www.epa.gov/oppfead1/endanger/consultation/ecorisk-overview.pdf

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

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[9]. 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 EPA's Levels of Concern (LOCs). These LOCs are EPA'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 EPA 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.

[9] Ibid U.S. EPA 2004

Uncertainties with Risk Assessment and Mitigation

For the majority of pesticides, EPA 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 in terms of hydrologic vulnerability and the amount and frequency with which pesticides are applied. In order to account for the inherent uncertainty EPA 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 EPA 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 PGP 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 covered by other APDES 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 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 any given water body and is assumed to represent the most toxic component of a mixture.

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.[10] 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."[11]

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 water quality standards.

United States Geological Survey: The Quality of Our Nation's Waters – Pesticides in the Nation's Streams and Ground Water, 1992-2001.

In addition to the protective nature of the pesticide risk assessment, EPA reviewed readily available surface-water monitoring data. In 2006, the USGS National Water-Quality Assessment Program (NAWQA)[12] 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. Most NAWQA samples were analyzed for 75 pesticides and eight degradation products, including 20 of the 25 most commonly used herbicides and 16 of the 25 most commonly used insecticides. Water samples were collected at 186 stream sites for analysis of pesticides and degradates dissolved in water. The samples were collected from streams throughout the year, including high-flow and low-flow conditions. Sampling was most intensive during the time of highest pesticide use and runoff – generally weekly or twice monthly for a 4- to 9-month period. As a general matter, the USGS uses sampling and analytic methods that provide highly reliable data. The NAWQA

[10] Correspondence to SFIREG, November 3, 2006 from Office of Water director.
16 OPP Aquatic Benchmark Table http://www2.epa.gov/pesticide-science-and-assessing-
[11] OPP Aquatic Benchmark Table http://www2.epa.gov/pesticide-science-and-assessing-pesticide-risks/aquatic-life-benchmarks-pesticide-registration
[12] 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.

database stands out among available data sources in terms of the number of pesticides and sites examined, as well as the overall number of samples collected and analyzed.

Overall results. Overall, the 10-year assessment indicates that for the pesticides sampled, surface and ground water are generally not being adversely affected by pesticide applications for irrigation, drinking water, and home/recreational uses. The USGS analytical methods are very sensitive and are designed to detect and measure minute amounts – in some cases parts per trillion – that are often 10 to 100 times lower than benchmarks or water quality criteria for most pesticides. There were detections of pesticides in these samples, but the concentrations detected were generally low (parts per billion and parts per trillion). The NAWQA data generally reflect pesticides that were used in watersheds from which water samples were taken. There were also some detections of legacy pesticides that were no longer registered at the time of sampling.

For environmental effects, the USGS compared the concentrations found in the NAWQA sampling with two general types of aquatic life benchmarks (1) ambient water quality criteria (AWQC) for the pesticide and (2) benchmarks derived from the lowest acute and chronic ecological effects endpoint for the pesticide (OPP benchmarks). Acute AWQC and all acute OPP benchmarks were compared with each measured concentration for the most complete year of data for each NAWQA stream. Chronic AWQC were compared with 4-day moving average concentrations, chronic OPP benchmarks for invertebrates were compared to 21-day moving average concentrations, and chronic fish OPP benchmarks were compared to 60-day moving average concentrations. AWQC were available for 7 of the 83 pesticides and degradates analyzed by NAWQA. One or more OPP benchmarks were available for 60 of the 83 NAWQA analytes, including 5 of the 7 that had AWQC. A total of 62 of the pesticide compounds analyzed in water by NAWQA had one or more aquatic-life benchmarks.

A total of 20 pesticides or degradates exceeded an EPA benchmark in one or more agricultural stream and/or urban stream (see Appendix A of fact sheet for a complete list of pesticides/degradates that had exceedances). In agricultural streams, most concentrations greater than a benchmark involved chlorpyrifos, azinphos-methyl, atrazine, p,p’-DDE or alachlor. In urban streams most concentrations greater than a benchmark involved diazinon, chlorpyrifos, or malathion. It should be noted that pesticide concentrations in agricultural streams most often originate from terrestrial agricultural activities and the NAWQA 10-year study acknowledges that its assessment of pesticides focuses primarily on non-point sources. Runoff from terrestrial agricultural activities is exempted under the CWA from NPDES permit requirements and is not covered under the permit.

Since 2001, the last year of sampling covered by the NAWQA report, EPA has taken regulatory action 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). For atrazine, the registrant has been required to undertake an aggressive and innovative ecological monitoring program to protect vulnerable watersheds in areas of atrazine use, and to develop mitigation measures for watersheds that might have atrazine detections above levels of concern. Residential uses of the two pesticides most commonly detected above a benchmark (diazinon and chlorpyrifos) have been canceled.

State Water Quality Monitoring under CWA

Every two years states must identify, based on ambient sampling, waterbodies that are not attaining water quality standards (narrative and numeric) under CWA Section 303(d). States must 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. In developing the 2011 PGP, EPA received ambient monitoring data for pesticides present in waters that are attributable to a variety of types of pesticide use patterns from states and other stakeholders. This data is included in the administrative record for the 2011 permit (see docket number EPA-HQ-OW-2010-0257) and in general, do not show the presence of pesticides in concentrations above levels of concern (*i.e.*, recommended ambient water quality criteria – available at http://epa.gov/waterscience/criteria/wqctable or FIFRA OPP benchmark levels – available at http://www.epa.gov/oppefed1/ecorisk_ders/aquatic_life_benchmark.htm). In review of the 2010 Integrated Report, DEC currently has not listed any waterbody as impaired for pesticides.

Technology-based effluent limitations in the 2016 PGP provide further protections beyond compliance with existing FIFRA requirements.

DEC has evaluated available information and expects that the technology-based effluent limitations are as stringent as necessary to meet applicable water quality standards. These effluent limitations require Operators to minimize the discharge of pesticides through the use of the most efficient and effective means of Pest Management Measures, including pesticide and non-pesticide methods.

The technology-based effluent limitations require Applicators to minimize the discharge of pesticides 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.

Certain Decision-makers are also required to more fully assess and implement procedures to minimize the discharge of pesticides. In this assessment, these 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 pesticide discharges are minimized, these 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 technology-based effluent limitations in Part 2.2 of the permit also require certain Decision-makers, as appropriate, to analyze surveillance data prior to each pesticide application to determine when pest action thresholds are met.

The general permit includes several other provisions that DEC expects to provide further protections beyond compliance with FIFRA requirements. For instance, Part 4.0 of the 2016 PGP requires Operators to monitor pesticide applications activities to minimize discharges and during any post-application monitoring to determine effectiveness of the pesticide application. In addition, Part 6.0 of the 2016 PGP 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 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 Part 6 of this fact sheet. DEC expects this approach will

further reduce discharges of pesticides to waters of the United States from the use patterns covered under the permit.

Biological pesticides either do not work through a toxic mode of action, or when they do, are toxic only to a very narrow range of target pest organisms. For chemical pesticides, the discharges covered under the permit are the residues after the pesticide has performed its intended purpose.

The permit provides coverage for point source discharges from certain applications of pesticides, as identified in Part 1.1.1. Discharges from the application of both chemical and biological 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 2016 PGP. For any pesticide applied over water (*e.g.*, mosquito control), any pesticide or pesticide residue that is incidentally deposited in waters of the United States 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 EPA registered the pesticide products for the relevant uses.

Discharges of biological pesticides require permit coverage regardless of whether or not a residue exists. Biological pesticides or biopesticides are certain types of pesticides derived from such natural materials as animals, plants, bacteria, and certain minerals. Two classes of biopesticides are relevant to the permit, microbial pesticides and biochemical pesticides. Microbial pesticides consist of a microorganism (*e.g.*, a bacterium, fungus, virus, or protozoan) as the active ingredient. The most widely used microbial pesticides are subspecies and strains of *Bacillus thuringiensis*, or Bt which operate by a toxic mode of action yet they are toxic only to a very narrow range of target pest organisms (mosquito larvae). Biochemical pesticides, as defined in 40 CFR 158.2000(a), are naturally occurring substances that control pests by non-toxic mechanisms. Biochemical pesticides include substances, such as insect sex pheromones that interfere with mating, as well as naturally-occurring repellants and attractants.

Biopesticides are usually inherently less toxic than conventional pesticides and generally only affect the target pests and closely related organisms. Often, they are effective in very small quantities and decompose quickly thereby resulting in lower exposures and largely avoiding the pollution problems caused by chemical pesticides. When used as a component of Integrated Pest Management programs, biopesticides can greatly decrease the use of chemical pesticides; however, use of biopesticides effectively requires users to have a very good understanding of pest management. Since biochemical pesticides, by regulatory definition, do not work through a toxic mode of action they may be less likely to result in an excursion of a water quality standard.

The 2016 PGP excludes 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.

DEC identified two scenarios where it finds the PGP may not be adequately protective of water quality standards and has excluded those discharges from coverage under the 2016 PGP. Namely, the 2016 PGP

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 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. Any Operator desiring to discharge in either of these two scenarios is required to submit an application for an APDES individual permit. Links to lists of impaired waters is available at http://dec.alaska.gov/water/tmdl/tmdl_index.htm. As previously mentioned, no Tier 3 waters have been identified in Alaska at the time.

DEC has no evidence in the record that implementation of the 2011 PGP has resulted in documented water quality problems.

DEC has not received any adverse incident reports documenting water quality problems under the 2011 PGP to date. DEC is also not aware of any negative public health or environmental impact resulting from discharges authorized for use under the 2016 PGP.

3.4 Monitoring (Part 4.0)

In accordance with AS 46.03.110(d), the Department may specify in a permit the terms and conditions under which waste material may be disposed. The monitoring requirements from the 2011 PGP are carried forward to the 2016 PGP. Monitoring requirements apply from the time any authorized Operator begins discharging under the 2016 PGP. These requirements are not tied to submission of an NOI. There are a variety of monitoring methods that a "traditional" APDES permit may require, including end-of-pipe monitoring to show compliance with relevant water quality-based and technology-based effluent limitations prior to discharging to a receiving waterbody. Monitoring may also pertain to actions taken to ensure that record keeping or other permit control activities are being properly implemented. Water quality monitoring of receiving streams is not typically required in APDES permits unless it is required to determine among other things, compliance with mixing zone dilution standards or some other special permit condition.

The monitoring requirements of the 2016 PGP are narrative and demonstrate compliance with permit conditions by using currently established pesticide use routines for monitoring pest control. For instance, the 2016 PGP requires routine visual inspections (described below) 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 pesticide 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 pesticide discharges poses several challenges not generally encountered in "traditional" APDES permitting situations. For example, there is no "wastewater discharge" per se from pesticide applications that is analogous to end-of-pipe discharges. 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.

DEC considered requiring ambient water quality monitoring. However DEC determined 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 and state 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 2016 PGP.
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 this 2016 PGP 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, DEC has determined that there are suitable alternative monitoring activities to determine permit compliance, other than ambient water quality monitoring, for the 2016 PGP.

Additionally, in assessing the appropriateness of requiring ambient water quality monitoring, DEC also considered Whole Effluent Toxicity (WET) testing as a possible option for assessing Operator compliance with permit conditions; however, WET testing in an APDES permit program is best used to monitor whether an Operator's discharge is toxic and not whether a receiving stream (*i.e.*, the ambient environment), that may be influenced by a number of different discharges 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 water quality standards, it can be quite complex to identify the source of the toxicity, which may or may not actually be the APDES permittee performing the monitoring.

Thus, the monitoring program that DEC has developed for the 2016 PGP has been tailored to accommodate the unique situations related to pesticide applications. Routine visual monitoring is required in the 2016 PGP 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. Monitoring records required by those Operators who submit NOIs will establish a history that may indicate if or when practices need to be reconsidered.

3.4.1 Visual Monitoring Requirements for Pesticide Applicators (Part 4.1)

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.

3.4.2 Visual Monitoring Requirements for all Operators (Part 4.2)

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. DEC 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.

3.5 Pesticide Discharge Management Plan (PDMP) (Part 5.0)

Any Decision-maker who is or will be required to submit an NOI and is not a small entity[13] must develop a PDMP, except for any pesticide applications made in response to a Declared Pest Emergency situation, as defined in Appendix C of the 2016 PGP. DEC defines a Decision-maker that is not a small entity as a large entity in the permit. Large entity Decision-makers must prepare the PDMP by the time the NOI is filed.

Any Decision-maker who is or will be required to submit an NOI and is a small entity (*i.e.*, is below the Small Business Association (SBA) size standard, as defined in 13 CFR. 121.201, or is a public entity serving a population of 10,000 or less), is not required to develop a PDMP. Small entity Decision-makers are required to document activities as described in Section 3.7.3 of this fact sheet. DEC recognizes that the SBA defines "small entities" as including government entities that serve populations of less than 50,000 persons. However, DEC's APDES program considers "major" municipal APDES permits as those that serve greater than 10,000 persons (*i.e.*, with a wastewater treatment plant design of greater than one million gallons a day). 'Major APDES' permittees have increased recordkeeping and public notice obligations over 'minor APDES,' which is consistent with DEC's intent for the 2016 PGP to impose additional recordkeeping and reporting information only on these larger communities.

The PDMP itself does not contain effluent limitations; rather it constitutes a tool both to assist the Decision-maker in documenting what pest management measures it is implementing to meet the effluent limitations, and to assist the permitting/compliance authority in determining whether the effluent

[13] A small entity is any (1) private enterprise that does not exceed the Small Business Administration size standard as identified at 13 CFR 121.201, or (2) local government that serves a population of 10,000 or less.

limitations are being met. Developing a PDMP helps Decision-makers ensure they have (1) taken steps to identify the pest problem, (2) evaluated pest management options, and (3) selected appropriate pest management measures to control pesticide discharges. A PDMP is a "living" document that requires reviews and must be kept up-to-date. Where pest management measures are modified or replaced to meet effluent limitations, such as in response to a Part 6.1 triggering condition in the 2016 PGP, such changes must be documented in the PDMP. All changes to the PDMP must be made before the next pesticide application that results in a discharge, if practicable, or if not, no later than 90 days after any change in pesticide application activities. Failure of a Decision-maker to develop and maintain an up-to-date PDMP is a violation of the 2016 PGP. This recordkeeping violation is separate and distinct from a violation of any of the other substantive requirements in the permit (*e.g.*, effluent limitations, corrective action, monitoring, reporting requirements).

A PDMP must include identification of the pesticide discharge management team, a description of the pest problem, and a description of the pest management options evaluation. Decision-makers must also provide response procedures for spill response and adverse incident response. The size of a pest management area is determined by the Decision-maker responsible for and with the authority to conduct pest management activities. For example, the pest management area for a mosquito control district is the total area of the district. Once the plan is developed, the Decision-maker must maintain the plan thereafter for the duration of coverage under this general permit. For any Decision-maker for which the annual treatment area threshold triggers the NOI requirement (and the Decision-maker is a large entity), the Decision-maker must keep the plan up-to-date for the duration of permit coverage even if the annual treatment area subsequently falls below the annual treatment area threshold.

Decision-makers may choose to reference other documents, such as a pre-existing pest management plan or spill prevention and response plan, in the PDMP rather than recreating the same text in the PDMP. It is not required that a Decision-maker must have authored the pre-existing plan in order to use it. When referencing other documents, the Decision-maker is responsible for ensuring the PDMP and the other documents together contain all the necessary elements for a complete PDMP, as specified in Part 5.1 of the 2016 PGP. In addition, the Decision-maker must ensure that a copy of relevant portions of those referenced documents is attached to the PDMP and is located on-site and it is available for review, consistent with Part 5.3 of the 2016 PGP.

3.5.1 Contents of Your PDMP (Part 5.1)

The PDMP prepared under the 2016 PGP must meet specific requirements under Part 5.1 of the permit. Generally, Decision-makers must document the following: (1) a pesticide discharge management team; (2) a description of the pest management area and the pest problem; (3) a description of pest management options evaluation; (4) response procedures for spill response and adverse incident response; and (5) any eligibility considerations under other federal laws.

3.5.1.1 Pesticide Discharge Management Team (Part 5.1.1)

The 2016 PGP requires that a qualified individual or team of individuals be identified to manage pesticide discharges covered under the permit. Identification of a pesticide discharge management team ensures that appropriate persons (or positions) are identified as necessary for developing and implementing the plan. Inclusion of the team in the plan provides notice to staff and management (*i.e.*, those responsible for signing and certifying the plan) of the responsibilities of certain key staff for following through on compliance with the permit's conditions and limits.

The pesticide discharge management team is responsible for developing and revising the PDMP, implementing and maintaining the Pest Management Measures to meet effluent limitations, and taking corrective action where necessary. Team members should be chosen for their expertise in the relevant areas to ensure that all aspects of pest management are considered in developing the plan. The PDMP must clearly describe the responsibilities of each team member to ensure that each aspect of the PDMP is addressed. DEC expects most Decision-makers will have more than one individual on the team, except for those with relatively simple plans and/or staff limitations. The 2016 PGP requires that team members have ready access to any applicable portions of the PDMP and the permit.

3.5.1.2 Problem Identification (Part 5.1.2)

This section includes the pest problem description, action threshold(s), a general location map, and water quality standards.

a. Pest Problem Description.

The 2016 PGP requires that the PDMP include a description of the pest problem at the pest management area. A detailed pest management area description assists Decision-makers in subsequent efforts to identify and set priorities for the evaluation and selection of Pest Management Measures taken to meet effluent limitations set forth in Parts 2 and 3 of the 2016 PGP and in identifying necessary changes in pest management. The description must include identification of the target pest(s), source of the pest problem, and source of data used to identify the problem. The 2016 PGP allows use of historical data or other available data (*e.g.*, from another similar site) to identify the problem at your site. If you use other site data, you must document in this section why data from your site is not available or not taken within the past year and explain why the data is relevant to your site. Additionally, the pest management area descriptions should include any sensitive resources in the area, such as unique habitat areas, rare or listed species, or other species of concern that may limit pest management options.

b. 2. Action Threshold(s)

The 2016 PGP requires that the PDMP include a description of the action threshold(s) established for the target pest, including a description of how they were determined and method(s) to determine when the action threshold(s) has been met. An action threshold is a level of pest prevalence (or other indicator) at which an Operator takes action to reduce the pest population.

c. General Location Map

The PDMP must also contain a general location map of the site that identifies the geographic boundaries of the area to which the plan applies and location of the waters of the United States. To improve readability of the map, some detailed information may be kept as an attachment to the site map and pictures may be included as deemed appropriate.

d. Water Quality Standards

Operators must identify any Tier 3 Waters (Outstanding National Resource Waters) and any water(s) impaired for a specific pesticide or its degradates to which there may be a discharge. Internet links to state water quality standards are available at http://dec.alaska.gov/water/wqsar/wqs/index.htm. No Tier 3 waters have been designated at this time.

3.5.1.3 Pest Management Measures Options Evaluation (Part 5.1.3)

The 2016 PGP requires that the PDMP include a description of the Pest Management Measures implemented to meet the applicable technology-based or water quality-based effluent limitations. The

description must include a brief explanation of the Pest Management Measures used at the site to reduce pesticide discharge, including evaluation and implementation of the six management options (no action, prevention, mechanical/physical methods, cultural methods, biological control agents, and pesticides). Decision-makers must consider impact to non-target organisms, impact to water quality, feasibility, and cost effectiveness when evaluating and selecting the most efficient and effective means of Pest Management Measures to minimize pesticide discharge to waters of the United States.

All six management options may not be available for a specific use category and/or treatment area. However, the PDMP must include documentation of how the six management options, including combination of these options, were evaluated prior to selecting site specific Pest Management Measures. For the no action option, Operators should document the impact of this option without any current Pest Management Measures at the site. For the prevention management option, the Decision-maker should document the methods implemented to prevent new introductions or the spread of the pests to new sites, such as identifying routes of invasion and how these can be intercepted to reduce the chance of invasion. Prevention may include source reduction, using pathogen-free or weed-free seeds or fill; exclusion methods (*e.g.*, barriers) and/or sanitation methods, like wash stations, to prevent reintroduction by vehicles, personnel, etc. Some prevention management methods may fall under mechanical/physical or cultural methods, as well.

For the pesticide management option, Decision-makers should include a list of active ingredient(s) evaluated. Discussion should also identify specific equipment or methods that will prevent or reduce the risks to non-target organisms and pesticide discharges to waters of the United States.

3.5.1.4 Response Procedures (Part 5.1.4)

The following procedures necessary to minimize discharges must be documented in the PDMP:

a. Spill Response Procedures

The PDMP must document procedures for expeditiously stopping, containing, and cleaning up leaks, spills, and other release. In addition, the PDMP must include documentation of the procedures for notification of appropriate facility personnel, emergency response agencies, and regulatory agencies.

b. Adverse Incident Response Procedures

In the PDMP, Decision-makers must document appropriate procedures for responding to an adverse incident resulting from pesticide applications. Decision-makers must identify and document the following:

- Procedures for responding to any adverse incident resulting from pesticide applications;
- Procedures for notification of the adverse incident, both internal to the Decision-maker's agency/organization and external;
- State/Federal permitting agency contacts with phone numbers;
- Name, location, and telephone of nearest emergency medical facility; and
- Name, location, and telephone of nearest hazardous chemical responder (including police and fire department).

3.5.1.5 Signature Requirements (Part 5.1.5)

The PDMP must be signed and certified in accordance with the signatory requirements in the Standard Permit Conditions part of the 2016 PGP (Appendix A, Part 1.12). This requirement is consistent with standard APDES permit conditions described in 18 AAC 83.385 and is intended to ensure that the

Decision-maker understands his/her responsibility to create and maintain a complete and accurate PDMP. The signature requirement includes an acknowledgment that there are significant penalties for submitting false information.

3.5.2 Pesticide Discharge Management Plan Modifications (Part 5.2)

The 2016 PGP requires that the PDMP be updated whenever any of the triggering conditions for corrective action in Part 6.1 of the 2016 PGP occur, or when a review following the triggering conditions in Part 6.1 requires the Operator to revise his/her Pest Management Measures as necessary to meet the effluent limitations in the 2016 PGP (Part 2). Keeping the PDMP up-to-date will help the Decision-maker ensure that the condition that triggered the corrective action does not reoccur. All changes to the PDMP must be made before the next pesticide application that results in a discharge, if practicable, or if not, no later than 90 days after any change in pesticide application activities or after an annual review.

It is important to note that failure to update the PDMP in accordance with Part 5.2 of the 2016 PGP is a recordkeeping violation, not a violation of an effluent limit. For example, if the Decision-maker changes its spill response procedures, but fails to update its PDMP to reflect these changes, a recordkeeping violation will result. The Decision-maker must revise its PDMP to reflect the new procedures and include documentation of the corrective action (in accordance with Part 6 of the 2016 PGP) to return to full compliance.

3.5.3 Pesticide Discharge Management Plan Availability (Part 5.3)

The 2016 PGP requires that a copy of the current PDMP, along with all supporting maps and documents, be kept at the address provided on the NOI. The PDMP and all supporting documents must be immediately available to representatives of DEC or local agency governing pesticide applications, as well as representatives of the EPA, FWS, or the NMFS at the time of an on-site inspection or upon request. This requirement is consistent with standard APDES permit conditions described in the Permit Appendix A, Part 1.9. Part 5.3 of the 2016 PGP indicates that DEC may provide access to portions of your PDMP to a member of the public upon request. Confidential Business Information (CBI) may be withheld from the public, but consistent with Permit Appendix A, Part 1.13, may not be withheld from EPA or the Services.

3.6 Corrective Action (Part 6.0)

The purpose of including corrective action requirements in the 2016 PGP is to assist this relatively new universe of APDES permittees with effectively meeting technology-based and water-quality-based effluent limitations and implementing Pest Management Measures in the 2016 PGP. Corrective action requirements apply from the time any authorized Operator begins discharging under the 2016 PGP. These requirements are not tied to submission of an NOI. Corrective actions in the 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 2016 PGP 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 2016 PGP.

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.

3.6.1 Situations Requiring Revision of Pest Management Measures (Part 6.1)

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 associated with the application of pesticides (*e.g.*, spill, leak, or discharge not authorized by this or another APDES permit) occurs;
- Operators become aware, or DEC concludes, that Pest Management Measures are not adequate/sufficient for the discharge to meet applicable water quality standards;
- Any monitoring activities indicate failure to meet applicable technology-based effluent limitations in Part 2 of the 2016 PGP;
- An inspection or evaluation by a DEC official determines that modifications are necessary to meet the non-numeric effluent limitations detailed in Part 2 of the 2016 PGP; or
- An Operator observes or is otherwise made aware (*e.g.*, a third party notification) of an adverse incident.

DEC considers the above situations to be of significant concern. Thus, DEC 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 Part 6.1 of the 2016 PGP is to ensure compliance with corrective action requirements through increased accountability and oversight. DEC 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 the permit.

3.6.2 Corrective Action Deadlines (Part 6.2)

The 2016 PGP 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." DEC emphasizes that this timeframe is not a grace period within which an Operator is relieved of any liability for a permit violation. DEC 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. DEC 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 DEC or the Operator may determine that further monitoring is needed under Part 6.3 of the 2016 PGP 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.

3.6.3 Effect of Corrective Action (Part 6.3)

The occurrence of a situation described in Part 6.1 of the 2016 PGP may, but does not necessarily, constitute a violation of the 2016 PGP. The occurrence of a situation identified in Part 6.1 does require the Operator to immediately review and as necessary, revise the selection and implementation of their Pest Management Measures to eliminate the situation. Part 6.3 of the 2016 PGP 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. DEC will consider the appropriateness and promptness of corrective action in determining enforcement responses to permit violations. DEC 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 the permit. Those requirements and schedules will supersede those of Parts 6.1 and 6.2 of the 2016 PGP if such requirements conflict.

3.6.4 Adverse Incident Documentation and Reporting (Part 6.4)

Part 6.4 of the 2016 PGP 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 DEC within 24 hours and then follow-up with a written report within 30 days of becoming aware of the adverse incident. DEC defines an "adverse incident" in Appendix C of the 2016 PGP, 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.

Part 6.4.1 of the 2016 PGP requires Operators to call the DEC Division of Water Compliance and Enforcement Program 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 DEC to respond to these incidents as soon as reasonably can be expected, and (2) to provide a basis for potential corrective actions. DEC 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 2016 PGP requires Operators to document the information identified in Part 6.4.1, including the date and time that DEC was notified and a description of any deviations from Part 6.4.1 notification requirements based on nuances of the adverse incident. For example, an Operator may decide to notify multiple DEC 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.

Part 6.4.2 of the 2016 PGP requires Operators to provide a written report of the adverse incident to DEC Division of Water Compliance and Enforcement Program within 30 days of discovering the adverse incident. The adverse incident report must include the following information:

- Information required to be provided in Part 6.4.1.1 of the 2016 PGP;
- Date and time you contacted DEC notifying the Department 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 Department because the information:

- Provides the Department with an indication of the effectiveness of the permit in controlling discharges to protect water quality, including data upon which the Department may base future permit decisions (e.g., modifications to or reissuance of the 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 Department 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 APDES 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 2016 PGP. Although some pesticide product labels may require that adverse incidents 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 2016 PGP.

DEC 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 pesticides 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. DEC acknowledges that some degree of detrimental impact to non-target species may occur and may be acceptable during the course of normal pesticide application. DEC 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 DEC 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 the 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 DEC 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 those Decision-makers who are required to submit NOIs, pursuant to Part 7.3 and 7.4 of the 2016 PGP.

3.6.5 Reportable Spills and Leaks (Part 6.5)

Part 6.5.1 of the 2016 PGP requires Operators to call the appropriate DEC Area Response Team Office and the National Response Center 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.[14] Part 6.5.2 of the 2016 PGP 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 Part 6.5.1 and results in an adverse incident, then Operators must report the incident per the guidelines in Part 6.4.1 and 6.4.2 of the 2016 PGP. If the spill or leak triggers the notification in Part 6.5.1, but does not result in an adverse incident, then Operators must document and retain information outlined in Part 6.5.2 within 30 days of becoming aware of the situation. This documentation provides a written record of what you reported to DEC orally. It should also include a description of the reporting system that will be used to alert responsible managers and

[14] Reportable Spills and Leaks are defined as those that trigger the requirement to notify the DEC Area Response Team Office (40 CFR Part 110, 40 CFR Part 117, or 40 CFR Part 302, AS 75.300 and 18 AAC 75 Article 3) and the National Response Center (40 CFR Parts 110, 117, 302) based on the type of pollutant and quantity released.

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.

3.6.6 Documentation for Other Corrective Action (Part 6.6)

For any event described in Part 6.1 of the 2016 PGP, other than for adverse incidents or reportable spills or leaks, immediate reporting to DEC 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 Part 6.1, 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. DEC is not requiring Operators to submit this documentation to DEC. Rather, DEC expects Operators to retain this information on-site and upon request, to make any such records available to DEC or any other Federal, state, or local regulatory agency governing pesticide applications. A summary of this information must also be included in the annual report for Operators subject to the annual reporting requirement.

3.7 Recordkeeping and Annual Reporting (Part 7.0)

The 2016 PGP 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 under the 2016 PGP. These requirements are consistent with 18 AAC 83.405(k), but have been tailored to more closely reflect the requirements in the PGP. The 2016 PGP requires a basic set of records to be maintained by all Decision-makers and Applicators, as well as separate requirements depending on the type of Operator (*i.e.*, Applicator, For-Hire Applicators, NOI submitting Decision-maker that is a small entity and NOI submitting Decision-maker that is a large entity). Part 7 of the 2016 PGP 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.

DEC 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 2016 PGP requires different types of Operators keep, and enumerates the specific information items to be recorded.

3.7.1 Records to be kept by all Operators (all Decision-makers and all Applicators) (Part 7.1)

These records must be kept by all Operators, including those not submitting an NOI. 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 Part 6.4.2);
b. Rationale for any determination that reporting of an identified adverse incident is not required, consistent with allowances identified in Part 6.4.1.2;
c. A copy of any corrective action documentation (See Part 6.6); and,
d. A copy of any spill and leak or other unpermitted discharge documentation (See Part. 6.5.2)

3.7.2 Records to be kept by all For-Hire Applicators (Part 7.2)

All Operators who are For-Hire Applicators, as defined in Appendix C of the 2016 PGP, 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, DEC 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
    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.

3.7.3 Records to be kept by Small Entities, Submitting an NOI (Part 7.3)

Any Decision-maker that is required to submit an NOI and 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. Small entities are required to keep a basic records set, outlined in Part 7.3 of the 2016 PGP, all of which can be recorded on the Pesticide Discharge Evaluation Worksheet provided in the PGP Appendix D.

Decision-makers who are required to submit an NOI and who are defined as small entities are required to keep the following records at the address provided on the NOI, as identified in Part 1.2.2 of the 2016 PGP. A worksheet for documenting this information on each treatment area is provided in Appendix D of the 2016 PGP, Pesticide Discharge Evaluation Worksheet.

a. Copy of the NOI submitted to DEC, any correspondence exchanged between the Decision-maker and DEC specific to coverage under the permit, and a copy of the DEC acknowledgment letter with the assigned permit tracking 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., mosquito and other flying insects, weed and algae, animal pest, or forest canopy);
    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.

3.7.4 Records to be kept by Large Entities, Submitting an NOI (Part 7.4)

Any Decision-maker who is required to submit an NOI and is above the SBA threshold for a small business or a public entity who serves a population of 10,000 or more is defined as a large entity in the permit. Large entities are required to keep the records listed in Part 7.4 of the 2016 PGP. DEC expects that large entities will have a greater capability than small entities to record specific details of the pest treatment area, and is therefore requiring slightly more comprehensive recordkeeping. In addition, much of the records set for large entities are reflected in the annual report that these entities must submit. The reported information will allow DEC to better characterize the discharges resulting from pesticide applications in a variety of different circumstances.

Decision-makers who are to submit an NOI and are defined as large entities must keep the following records as identified in Part 7.4 of the 2016 PGP.

a. Copy of the NOI submitted to DEC, any correspondence exchanged between the Decision-maker and DEC specific to coverage under the permit, and a copy of the DEC acknowledgment letter with the assigned permit tracking number;
b. A copy of the PDMP, including any modifications made to the PDMP during the term of the permit;
c. Copy of annual reports submitted to DEC;
d. Documentation of equipment calibration (only if Decision-maker is also the Applicator);
e. 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 of the United States, 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) and explanation of need for pest control;
    4. Action Thresholds;
    5. Method and/or data used to determine that action threshold(s) has been met;
    6. Description of pest management measure(s) implemented prior to the first pesticide application;
    7. Company name and contact information for pesticide applicator;
    8. Name of each pesticide product used including the EPA registration number;
    9. Quantity of each pesticide product applied to each treatment area;
    10. Pesticide application date(s); and
    11. 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.

3.7.5 Retention of Records (Part 7.5)

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 three years from the date their coverage under the permit expires or is terminated. The recordkeeping requirements in Appendix A, Part 1.11 of the 2016 PGP include a more general statement of the APDES standard condition for records retention, but does not impose additional requirements on the Operator above what is required in Part 7 of the 2016 PGP.

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

3.7.6 Annual Reporting for Any Decision-maker Required to Submit an NOI and Who is a Large Entity (Part 7.6)

In addition to recordkeeping, DEC is requiring Decision-makers who are required to submit an NOI and are large entities as identified in Part 5 of the 2016 PGP to submit annual reports that contain basic information on their pesticide discharges to waters of the United States. An annual report form, along with instructions on how to complete it is available in Appendix D of the 2016 PGP.

The annual report must include information for the calendar year, with the first annual report required to include activities for the portion of the calendar year after the effective date of the NOI. If the effective date of the NOI is after December 1, the Operator is not required to submit an annual report for that first partial year but must submit annual reports thereafter, with the first annual report submitted also including information from the first partial year. When an Operator terminates permit coverage, as specified in Part 1.2.5 of the 2016 PGP, the Operator must submit an annual report for the portion of the year up through the date of the termination. The annual report is due no later than 45 days after the termination date, or February 15 of the following year, whichever is earlier.

This information in the annual report will be used by DEC to assess permit compliance and to determine whether additional controls on pesticide discharges are necessary to protect water quality. For example, this data will help DEC identify where pesticide discharges are occurring and the types of pesticides being discharged. The annual report provides specific information concerning the scope and nature of discharges permitted under the 2016 PGP.

The annual report is a summary of the pest control activities for each applicable use pattern and must contain:

a. Decision-maker's name and contact information;
b. APDES permit tracking number(s);
c. Contact person name, title, e-mail address (if any), and phone number; and
d. For each treatment area, report the following information:
    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., mosquito and other flying insects, weed and algae, animal pest, or forest canopy) and target pest(s);

3. Company name(s) and contact information for pesticide applicator(s), if different from the Decision-maker;
4. Total amount of each pesticide product applied for the reporting year by the EPA registration number(s) and by application method (e.g., aerially by fixed-wing or rotary aircraft, ground based spray, etc.);
5. Whether this pest control activity was addressed in a PDMP prior to pesticide application;
6. If applicable, any adverse incidents as a result of these treatment(s), for incidents, as described in Part 6.4.1; and
7. If applicable, description of any corrective action(s), including spill responses, resulting from pesticide application activities and the rationale for such action(s).

3.8 Electronic Reporting Requirement

Electronic reporting may be required during the permit cycle. Permittees will be notified in advance of any such requirement.

3.9 Permit Appendices

3.9.1 Standard Permit Conditions (Appendix A)

Appendix A of the permit contains standard regulatory language that must be included in all APDES permits. These requirements are based on the regulations and cannot be challenged in the context of an individual APDES permit action. The standard regulatory language covers requirements such as monitoring, recording, reporting requirements, compliance responsibilities, and other general requirements.

3.9.2 Acronyms and Definitions (Appendix B and C)

Appendix B and C of the PGP provides permit-specific definitions of statutory, regulatory, and other terms important for understanding its requirements. To develop these definitions, DEC 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.

3.9.3 Forms (Appendix D)

3.9.3.1 Notice of Intent Form

Part 1.2.2 of the 2016 PGP identifies certain Decision-makers required to prepare and submit a complete and accurate NOI form to be authorized to discharge under the 2016 PGP. Decision-makers must submit NOIs in accordance with the deadlines provided in Part 1.2.3 of the PGP. The NOI form provides DEC with the information necessary to determine a Decision-maker's eligibility to discharge under the permit, and enables DEC to better match up Operators with other reporting requirements and to prioritize oversight activities. Appendix D of the 2016 PGP contains information that is required to be provided on the NOI form.

3.9.3.2 Notice of Termination Form

Part 1.2.5 of the 2016 PGP requires certain Decision-makers (*i.e.*, those required to submit an NOI to be authorized under the permit) to submit a NOT form within 30 days of the occurrence of one of several different triggering events: (1) when a new Decision-maker has taken over responsibility for the pest control activity, (2) the Decision-maker has ceased aquatic pesticide application covered under the general permit, (3) there is not and no longer will be pesticide discharge, or (4) the Decision-maker has

obtained coverage under an individual permit or an alternative general permit. Appendix D of the PGP contains a copy of the information required to be submitted on the NOT form.

3.9.3.3 Pesticide Discharge Evaluation Worksheet

Part 7.3 of the 2016 PGP requires Decision-makers who are required to submit an NOI and are small entities, as defined in Appendix C of the 2016 PGP, to complete and retain a worksheet for at least 3 years from when an Operator's coverage under the PGP expires or is terminated. Decision-makers are required to make this worksheet available to DEC, including an authorized representative of DEC, upon request. Appendix D of the 2016 PGP contains a copy of the worksheet required to be retained by Decision-makers.

3.9.3.4 Annual Report Template

Part 7.6 of the 2016 PGP requires Decision-makers who are required to submit an NOI and are large entities, as identified in Part 5 of the 2016 PGP. The Annual Report must be submitted no later than February 15 of the following year for all pesticide activities covered under the PGP occurring during the previous calendar year. When Decision-makers terminate permit coverage, as specified in Part 1.2.5 of the 2016 PGP, an Annual Report must be submitted for the portion of the year up through the date of termination. Appendix D of the 2016 PGP contains a copy of the information required to be submitted with an Annual Report.

3.9.3.5 Adverse Incident Template

Part 6.4 of the 2016 PGP requires Operators to: (1) provide oral notice to DEC 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 PGP Appendix C, 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 D of the PGP contains a copy of the information required to be submitted to DEC within 30 days of discovering the adverse incident.

4.0 ANTIBACKSLIDING

18 AAC 83.480 requires that "effluent limitations, standards, or conditions must be at least as stringent as the final effluent limitations, standards, or conditions in the previous permit." 18 AAC 83.480(c) also states that a permit may not be reissued "to contain an effluent limitation that is less stringent than required by effluent guidelines in effect at the time the permit is renewed or reissued." The effluent limitations in the permit reissuance are consistent with 18 AAC 83.430. The permit effluent limitations, standards, and conditions are as stringent as in the previous permit.

Effluent limitations may be relaxed under two categories as allowed under 18 AAC 83.480 (CWA §402(o)) and CWA §303(d)(4). 18 AAC 83.480(b) allows relaxed limitations in renewed, reissued, or modified permits when there have been material and substantial alterations or additions to the permitted facility that justify the relaxation. CWA §303(d)(4)(A) states that, for water bodies where the water quality does not meet applicable water quality standards, effluent limitations may be revised under two conditions; the revised effluent limitation must ensure the attainment of the water quality standard (based on the water body's TMDL or the WLA) or the designated use which is not being attained is removed in accordance with the water quality standard regulations. CWA §303(d)(4)(B) states that, for

water bodies where the water quality meets or exceeds the level necessary to support the water body's designated uses, water quality-based effluent limitations may be revised as long as the revision is consistent with the State's antidegradation policy. Even if the requirements of CWA §303(d)(4) or 18 AAC 83.480(b) are satisfied 18 AAC 83.480(c) prohibits relaxed limits that would result in violations of water quality standards or effluent limitation guidelines.

5.0 ANTIDEGRADATION

Section 303(d)(4) of the CWA states that, for water bodies where the water quality meets or exceeds the level necessary to support the water body's designated uses, water quality-based effluent limitations (WQBELs) may be revised as long as the revision is consistent with the State's antidegradation policy. The Antidegradation Policy of the water quality standards (18 AAC 70.015) states that the existing water uses and the level of water quality necessary to protect existing uses must be maintained and protected.

The Department's approach to implementing the Antidegradation Policy, found in 18 AAC 70.015, is based on the requirements in 18 AAC 70 and the Department's *Policy and Procedure Guidance for Interim Antidegradation Implementation Methods*, dated July 14, 2010. Using these requirements and policies, the Department determines whether a water body, or portion of a water body, is classified as Tier 1, Tier 2, or Tier 3, where a higher numbered tier indicates a greater level of water quality protection. At this time, no Tier 3 waters have been designated in Alaska.

Tier 1 protection (18 AAC 70.015(a)(1)) applies to existing uses and level of water quality necessary to maintain them. The PGP does not contain specific effluent limits for pesticides nor are any water bodies in Alaska impaired for any pesticide. For this analysis, the department assumes that the quality of all water bodies is better than the water quality criteria. Therefore, a Tier 2 analysis is required.

Tier 3 water bodies are excluded from coverage under the PGP with the exception for discharges from pesticides 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. This exclusion is consistent with the Interim Antidegradation Implementation Methods recommendations.

The remainder of this antidegradation analysis conservatively assumes that all other waters are Tier 2 waters, which provides for the next highest level of protection. The Tier 2 analysis for these waters follows.

The State's Antidegradation Policy in 18 AAC 70.015(a)(2) states that if the quality of water exceeds levels necessary to support propagation of fish, shellfish, and wildlife and recreation in and on the water (i.e., Tier 2 waters), that quality must be maintained and protected. DEC believes that most pesticide applications, when done in accordance with the use directions and label restrictions will not result in a lowering of water quality; however, DEC recognizes that there may be circumstances where a pesticide application authorized under the PGP has the potential to result in a lowering of water quality. The Department may allow a reduction of water quality only after making five specific regulatory findings (18 AAC 70.015(a)(2)(A-E)). The Department's findings are as follows:

1. **18 AAC 70.015 (a)(2)(A)**. Allowing lower water quality is necessary to accommodate important economic or social development in the area where the water is located.

Large-scale application of pesticides is not widespread in Alaska. During the previous permit cycle, only 18 permit authorizations were issued. Permit authorizations were typically for removal of invasive species that are not native to the ecosystem under consideration, and whose introduction causes or is likely to cause economic or environmental harm or harm to human health.

Controlling target pests is beneficial for economic and social reasons. For example, treating lakes impacted with aquatic weeds enhances recreational opportunities (such as boating, fishing, and / or swimming) and can be beneficial to aquatic life uses. Elodia can damage fish habitat and displace native flora and fauna, make boat travel difficult and reduce recreation opportunities, endanger safe float plane operation, alter freshwater habitats, including decreased flow and increased sedimentation, and reduce property values of adjacent landowners. Similarly, reed canarygrass in Alaska which can grow too densely to provide adequate cover for small mammals and waterfowl, excludes and displaces other plants, and promotes silt deposition and consequent constriction of waterways, and may alter soil hydrology. Controlling invasive species such as northern pike in Southcentral Alaska can strengthen the quality of fishing and reduce the threat to wild and stocked fisheries in Southcentral Alaska.

The Department concludes that the pesticide wastewater discharge under the PGP accommodates the important economic and social development in the area of where the water is located and that the finding is met.

2. **18 AAC 70.015 (a)(2)(B)**. Except as allowed under this subsection, reducing water quality will not violate the applicable criteria of 18 AAC 70.020 or 18 AAC 70.235 or the whole effluent toxicity limit in 18 AAC 70.030.

The PGP does not limit specific water quality parameters or pollutants nor include any exceptions to water quality standards, such as mixing zones. Any discharges covered by the PGP must meet applicable state numeric and narrative water quality standards. Monitoring provisions in the permit are based on ensuring that operator equipment is maintained and that operations are visually monitored. A discharger required to submit a NOI is required to develop a monitoring plan. However, the Department has the authority to require additional receiving water monitoring for an activity under the PGP.

The PGP does not limit specific parameters but rather is based on pest management measures that minimize pesticide discharges to waters of the United States. Thousands of compounds are used to develop pesticides. Very few chemical components or degradates of pesticides are included in DEC's Water Quality Criteria Manual for Toxics, adopted in December, 2008 as part of 18 AAC 70. Those compounds listed do not always include criteria for all designated uses. However, State water quality standards contain narrative criteria for toxic and deleterious substances, which can be applicable to pesticide application.

Pesticide application is not a continuous discharge, such as a point source discharge from a treatment facility. Pesticide use is often seasonal. Use of pesticides is stopped when application frequency and concentration have been shown to be effective, based both on environmental impact reduction and cost-effectiveness. The PGP requires controlled and effective use of pesticides.

The Department has determined that reducing water quality will not violate the applicable criteria of 18 AAC 70.020 or 18 AAC 70.235 or the whole effluent toxicity limit in 18 AAC 70.030 and that the finding is satisfied.

3. **18 AAC 70.015(a)(2)(C)**. The resulting water quality will be adequate to fully protect existing uses of the water.

Application of pesticide to Tier 3 waters is excluded from coverage in the PGP except for discharges from 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. The most stringent designated uses of Tier 2 water bodies in 18 AAC 70.020 include protection of aquatic life and human health. Through FIFRA, toxicity of approved pesticides is reviewed. Through conditions in the PGP, protection of existing uses is based on pollution prevention methods described below. The PGP also prohibits discharges to waters of the United States already identified as impaired by any pesticide or its degradates.

DEC's Division of Environmental Health issued the *Alaska Pesticide Control Program Water Quality and Pesticides Plan* in 2015. The primary purpose of this Plan is to prevent and respond to pesticide contamination of ground and surface water that results from the normal, legal use of EPA and DEC registered pesticides. Continued implementation of this Plan provides additional protections for Alaska waters beyond that provided by EPA's pesticide registration process.

The Department has determined that the resulting water quality will be adequate to fully protect existing uses of the water and that the finding is satisfied.

4. **18 AAC 70.015(a)(2)(D)**. The methods of pollution prevention, control, and treatment found by the Department to be most effective and reasonable will be applied to all wastes and other substances to be discharged.

The PGP contains specific measures to avoid pollution. These include:

- Identification of the specific pest problem prior to first application each year and development of appropriate strategies, such as source reduction and habitat management.
- Use of lowest effective amounts of pesticide product per application and optimum frequency of pesticides necessary to control the target pest.
- Pest management strategies that must consider impacts to waters, impacts to non-target organisms, pest resistance, feasibility, and cost-effectiveness.
- Required site monitoring for visual observation of any potential adverse impacts.
- Requirement that operators with projects impacting larger areas must prepare pesticide discharge monitoring plans.
- Requirement that operators maintain equipment and properly apply pesticides and prevent spills.

The Department has determined the methods of pollution prevention, control, and treatment in the permit to be the most effective and reasonable, which will be applied to all wastes and other substances to be discharged, and the finding is satisfied.

5. **18 AAC 70.015(a)(2)(E)**. All wastes and other substances discharged will be treated and controlled to achieve (i) for new and existing point sources, the highest statutory and regulatory requirements; and (ii) for nonpoint sources, all cost-effective and reasonable best management practices.

Before DEC can authorized a lowering of water quality, DEC must assure that the highest statutory and regulatory requirements of point sources and cost-effective and reasonable best management practices for non-point sources shall be achieved in the watershed. DEC believes that this evaluation can be done on a statewide basis for both point and non-point sources of pesticides. Aside from the PGP, there are no other point source discharge permits that have effluent limitations for pesticides. Thus, DEC concludes that the highest statutory and regulatory requirements of point sources are already in place. If a point

source will discharge pesticides, then the discharge permit for the point source will require the highest regulatory and statutory control. For non-point sources of pesticides, DEC believes that compliance with the label use directions and restrictions constitutes the most cost-effective and reasonable best management practice for pesticide application. Additionally, the DEC Division of Environmental Health – Pesticide Control Program protects public health and the environment through regulation of pesticide use, sale, and distribution in Alaska. To do this, the Pesticide Control Program actively implements various programs such as applicator licensing and certification, pesticide registration, inspections, education, and enforcement. The federal pesticide re-registration process constitutes another layer of best management practices that will aid in controlling non-point sources of pesticides to waters of the United States. EPA continues to review the registrations of pesticide products and active ingredients. If evidence suggests unacceptable environmental or human health risks based on new information (e.g., new toxicity studies or newly evaluated exposure pathways), EPA will not re-register active ingredients or pesticide products or EPA will change the label restrictions to minimize such risks.

The Department has determined that the permit complies with the highest statutory and regulatory requirements for the industry and types of pollutants expected from this industry. The department concludes that this finding is satisfied.

6.0 OTHER PERMIT CONDITIONS

6.1 Standard Conditions

Appendix A of the permit contains standard regulatory language that must be included in all APDES permits. These requirements are based on the regulations and cannot be challenged in the context of an individual APDES permit action. The standard regulatory language covers requirements such as monitoring, recording, reporting requirements, compliance responsibilities, and other general requirements.

7.0 OTHER LEGAL REQUIREMENTS

7.1 Endangered Species Act

NMFS is responsible for administration of the ESA for listed cetaceans, seals, sea lions, sea turtles, anadromous fish, marine fish, marine plants, and corals. All other species (including polar bears, walrus, and sea otters) are administered by the FWS.

Section 7 of the ESA requires a federal agency to consult with the NMFS and the FWS to determine whether their authorized actions may harm threatened and endangered species or their habitats. As a state agency, DEC is not required to consult with NMFS or FWS regarding permitting actions; however, DEC interacts voluntarily with these federal agencies to obtain listings of threatened and endangered species and critical habitat. DEC contacted the Services (NMFS and FWS) on April 27, 2016 and requested them to identify any threatened or endangered species or critical habitat under their jurisdiction in the State of Alaska. Both NMFS and FWS responded. DEC will also provide these agencies with the draft permit and fact sheet during the public review period. Any comments received from the agencies regarding the listing of threatened or endangered species will be considered prior to the reissuance of the permit. Based on the results received from the Services, DEC may include additional or altered conditions in the final permit.

In the 2016 PGP a Decision-maker who is required submit an NOI per Permit Part 1.2.2 or that proposes to modify their NOI that includes endangered and threatened species or critical habitat is to contact the management authority over the endangered species and provide any recommended water quality based recommendations from the agency to DEC. DEC will consider the recommendations and may include additional site-specific criteria in the permit authorization.

Listings of endangered and threatened species and federally-listed critical habitat in Alaska and interactive maps is available at:

- National Oceanic and Atmospheric Administration (NOAA) Fisheries – Alaska Regional Office: https://alaskafisheries.noaa.gov/pr/esa-consultations,
    - Interactive map: http://alaskafisheries.noaa.gov/mapping/esa and
- U.S. Fish and Wildlife Service (FWS) http://ecos.fws.gov/ecp,
    - Interactive map: https://ecos.fws.gov/ipac

7.2 Essential Fish Habitat

Essential fish habitat (EFH) includes the waters and substrate (sediments, etc.) necessary for fish from commercially-fished species to spawn, breed, feed, or grow to maturity. The Magnuson-Stevens Fishery Conservation and Management Act (January 21, 1999) requires federal agencies to consult with NMFS when a proposed discharge has the potential to adversely affect (reduce quality and/or quantity of) EFH.

As a state agency, DEC is not required to consult with NMFS regarding permitting actions; however, DEC interacts voluntarily with NMFS. DEC will provide NMFS with the draft permit and fact sheet during the public review period. Any comments received from NMFS regarding EFH will be considered prior to the reissuance of the permit. Based on the results received from NMFS, DEC may include additional or altered conditions in the final permit.

NMFS information on EFH can be found on the following website: http://alaskafisheries.noaa.gov/habitat/efh and an EFH Designated Species Interactive Map http://www.habitat.noaa.gov/protection/efh/efhmapper/index.html .

Operators can also consult the Alaska Department of Fish & Game (ADF&G) Anadromous Water Catalog and Atlas at http://www.adfg.alaska.gov/sf/SARR/AWC/index.cfm?ADFG=maps.maps. The catalog and atlas identify waters that are important for spawning, rearing, or migration of anadromous fishes.

7.3 Permit Expiration

The permit will expire five years from the effective date of the permit.

8.0 References

1. Alaska Department of Environmental Conservation, 2003. *Alaska Water Quality Criteria Manual for Toxics and Other Deleterious Organic and Inorganic Substances*, as amended through December 12, 2008.
2. Alaska Department of Environmental Conservation, 2015. *Alaska Pesticide Water Quality Management Plan*. https://dec.alaska.gov/eh/docs/pest/Water%20Quality%20Plan%202015.pdf.
3. National Marine Fisheries Service, 2011. *NMFS' 2011 Endangered Species Act Section 7 Consultation Biological Opinion*. https://www.regulations.gov/#!documentDetail;D=EPA-HQ-OW-2010-0257-1265.
4. Alaska Department of Environmental Conservation, Division of Water, Policy and Procedure Guidance for Interim Antidegradation Implementation Methods, July 14, 2010. http://dec.alaska.gov/water/wqsar/Antidegradation/index.html.