Colorado Department of Public Health and Environment

COLORADO DISCHARGE PERMIT SYSTEM (CDPS)
FACT SHEET FOR PERMIT NUMBER COG860000
CDPS GENERAL PERMIT FOR DISCHARGES FROM APPLICATIONS OF PESTICIDES

FIRST RENEWAL

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B. Discharge to: Surface Water, Statewide

II. GENERAL PGP INFORMATION AND BACKGROUND

A. Clean Water Act and Colorado Water Quality Control Act

Section 301(a) of the Clean Water Act (CWA) provides that "the discharge of any pollutant by any person shall be unlawful" unless the discharge is in compliance with certain other sections of the Act. 33 U.S.C. 1311(a). The CWA defines "discharge of a pollutant" as "(A) any addition of any pollutant to navigable waters from any point source, (B) any addition of any pollutant to the waters of the contiguous zone or the ocean from any point source other than a vessel or other floating craft." 33 U.S.C. 1362(12). A "point source" is any "discernible, confined and discrete conveyance" but does not include "agricultural stormwater discharges and return flows from irrigated agriculture." 33 U.S.C. 1362(14). The Colorado Water Quality Control Act 25-8-502 has analogous requirements to the federal Act.

The term "pollutant" includes, among other things, "garbage… chemical wastes, biological materials …and industrial, municipal, and agricultural waste discharged into water."

B. NPDES Permits

A NPDES permit authorizes the discharge of a pollutant or pollutants into a receiving water under certain conditions. The NPDES program relies on two types of permits: individual and general. An individual permit is a permit specifically tailored for an individual discharger or situations that require individual consideration. Upon receiving the appropriate permit application(s), the permitting authority, e.g., the United States Environmental Protection Agency (EPA) or the Water Quality Control Division (Division), develops a draft permit for public comment for that particular discharger based on the information contained in the permit application (e.g., type of activity, nature of discharge, receiving water quality). Following consideration of public comments, a final permit is then issued to the discharger for a specific time period (not to exceed 5 years) with a provision for reapplying for further permit coverage prior to the expiration date.

In contrast, a general permit covers multiple facilities/sites/activities within a specific category for a specific period of time (not to exceed 5 years). For general permits, EPA or a state develops and issues the permit in advance, with dischargers then generally obtaining coverage under the permit through submission of an application. A general permit is also subject to public comment prior to issuance. Under Regulation 61.9(2) general permits may be written to cover categories of point sources having common elements, such as facilities that involve the same or substantially similar types of operations, that discharge the same types of wastes, or that are more appropriately regulated by a general permit. Given the significant number of pesticide operations requiring NPDES permit coverage and the discharges common to these operations, EPA and states believe that it makes more administrative sense to issue a general permit, rather than issuing individual permits to each Operator. This approach is supported through national court decisions. The general permit approach allows EPA or the state to allocate resources in a more efficient manner and to provide more timely coverage and may significantly simplify the permitting process for the majority of pesticide dischargers. As with any permit, the CWA requires the general permit to contain technology-based effluent limitations, as well as any more stringent limits when necessary to meet applicable state water quality standards.

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

D. Historical Court Decisions

Over the years, several courts addressed the question of whether the CWA requires NPDES permits for pesticide applications. These cases resulted in some confusion among the regulated community and other affected citizens about the applicability of the CWA to pesticides applied to Waters of the United States. In 2001, the United States Court of Appeals for the Ninth Circuit held in *Headwaters, Inc. v. Talent Irrigation District* (Talent) that an applicator of herbicides was required to obtain an NPDES permit under the circumstances before the court. 243 F.3rd 526 (9th Cir. 2001). The Talent decision caused considerable confusion among public health authorities, natural resource managers, and others who rely on pesticides regarding their potential obligation to obtain an NPDES permit when applying a pesticide consistent with FIFRA.

In 2002, the Ninth Circuit, in *League of Wilderness Defenders et al. v. Forsgren* (Forsgren) held that the application of pesticides to control Douglas Fir Tussock Moths in National Forest lands required an NPDES permit. 309 F.3d 1181 (9th Cir. 2002). The court in Forsgren did not analyze the question of whether the pesticides applied were pollutants, because it assumed that the parties agreed that they were. In fact, the United States expressly reserved its arguments on that issue in its brief to the District Court. Id. at 1184, n.2. The court instead analyzed the question of whether the aerial application of the pesticide constituted a point source discharge, and concluded that it did. Id. at 1185.

Since *Talent* and *Forsgren*, California, Nevada, Oregon, and Washington, all of which are within the jurisdiction of the Ninth Circuit Court of Appeals, have issued permits for the application of certain types of pesticides (e.g., products to control weeds and algae and products to control mosquito larvae). Other states have continued their practice of neither requiring nor issuing permits to people who apply pesticides to Waters of the

United States. These varying practices reflected the substantial uncertainty among regulators, the regulated community, and the public regarding how the CWA applies to discharges to Waters of the United States from the application of pesticides.

Additionally, the Second Circuit Court of Appeals addressed the applicability of the CWA's NPDES permit requirements to pesticide applications. In *Altman v. Town of Amherst* (Altman), the court vacated and remanded for further development of the record a District Court decision holding that the Town of Amherst was not required to obtain an NPDES permit to spray mosquitocides over Waters of the United States. 47 Fed. Appx. 62, 67 (2nd Cir. 2002). In its opinion, the Second Circuit stated that "[u]ntil the EPA articulates a clear interpretation of current law – among other things, whether properly used pesticides released into or over water of the United States can trigger the requirement for NPDES permits * * * – the question of whether properly used pesticides can become pollutants that violate the CWA will remain open." Id. at 67.

In *Fairhurst v. Hagener*, the Ninth Circuit again addressed the CWA's applicability to pesticide applications. The court held that pesticides applied directly to a lake in order to eliminate non-native fish species, where there are no residues or unintended effects, are not "pollutants" under the CWA because they are not chemical wastes. 422 F.3d 1146 (9th Cir. 2005).

E. 2006 Agency Rulemaking Excluding Pesticides from the NPDES Permitting Program

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 Federal Insecticide, Fungicide and Rodenticide Act (FIFRA) requirements in both instances. The rule became effective on January 26, 2007.

F. Legal Challenges to the 2006 NPDES Pesticides Rule and Court Decision

On January 19, 2007, EPA received petitions for review of the 2006 NPDES Pesticides Rule from environmental and industry groups. Petitions were filed in eleven circuit courts with the case, National Cotton Council, et al, v. EPA, assigned to the Sixth Circuit Court of Appeals.

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.

In response to this decision, on April 9, 2009, EPA requested a two-year stay of the mandate to provide the Agency time to develop general permits, to assist NPDES-authorized states to develop their NPDES permits, and to provide outreach and education to the regulated community. On June 8, 2009, the Sixth Circuit granted EPA the two-year stay of the mandate.

On November 2, 2009, industry petitioners of the Sixth Circuit Case petitioned the Supreme Court to review the Sixth Circuit's decision. On February 22, 2010, the Supreme Court denied the request to hear industry's petition. On March 3, 2011, EPA requested an extension from April 9, 2011 to October 31, 2011 to allow sufficient time for EPA to engage in Endangered Species Act (ESA) consultation and complete the development of an electronic database to streamline requests for coverage under the Agency's general permit. EPA also requested more time to allow for authorized states to finish developing their state permits and for permitting authorities to provide additional outreach to stakeholders on pesticide permit requirements. On March 28, 2011, the U.S. Court of Appeals for the Sixth Circuit granted EPA's request for an extension to October 31, 2011.

As a result of the Court's decision to vacate the 2006 NPDES Pesticides Rule, on October 31, 2011, Operators must comply with NPDES permit requirements for discharges to Waters of the United States of biological pesticides, and of chemical pesticides that leave a residue. In response to the Court's decision, EPA proposed a general permit on June 4, 2010 to cover certain discharges resulting from pesticide applications. EPA Regional offices and State NPDES authorities may issue additional general permits or individual permits if needed. After consideration of comments received on the proposed permit and engaging in ESA consultation, EPA is issuing its final permit.

G. Implications of the Court's Decision

Irrigation return flow (which includes surface and subsurface water that leaves a crop field following irrigation of that field) and agricultural stormwater runoff do not require NPDES permits, as exempted by the CWA. For example, runoff into engineered conservation measures on a crop field such as grassy swales and other land management structures that direct flow from the crop field is considered either irrigation return flow or agricultural stormwater. 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 stormwater, and do require NPDES permit coverage. This is because such pesticide discharges are not only point sources, but also that these pesticides are now defined as "pollutants" under the CWA due to the Sixth Circuit Court's decision. Some irrigation systems may not be Waters of the United States and thus discharges to those waters would not require NPDES permit coverage.

Neither the 2006 NPDES Pesticides Rule, the Sixth Circuit Court vacatur of that rule, nor this PGP have changed in any way the determination of whether certain types of stormwater runoff are required to obtain permit coverage, or under which permit coverage is required. This is true whether the runoff contains pesticides or pesticide residues resulting from the application of pesticides. In particular, non-agricultural stormwater runoff that may contain pesticides would not be eligible for coverage under this permit, and is not required to obtain NPDES permit coverage unless it was already required to do so prior to the Sixth Circuit decision or EPA designates a source for future stormwater permitting. Existing stormwater permits for construction, industry, and municipalities already address pesticides in stormwater. Thus, stormwater runoff is either: (a) already required to obtain NPDES permit coverage as established in section 402(p) of the CWA or (b) classified as a discharge for which NPDES permit coverage is not currently required. The regulations that specify what types of stormwater require NPDES permits can be found in 40 CFR §122.26.

The Division agrees with EPA's determination that the four use patterns included in the PGP would encompass the majority of pesticide applications that would result in point source discharges to Waters of the State, and also generally represent the use patterns intended to be addressed by the 2006 rule that is now vacated. This 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 State 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 State and the control of pests on plants grown in state waters, such as perennial obligate hydrophytes, is within the scope of coverage of this permit. This fact sheet does not identify every activity which may involve a point source discharge of pesticides to Waters of the State that would require a permit; rather, the fact sheet focuses on the activities for which coverage under the PGP is available. The existence of this general permit does not alter the requirement that discharges of pesticides to Waters of the State that are not covered by this permit be covered by an individual permit or another general permit.

III. SUMMARY OF PERMIT DEVELOPMENT IN COLORADO

EPA and many states that have been delegated Clean Water Act permitting authority have prepared general permits to provide coverage for discharges from the applications of pesticides in order to implement the 2009 Sixth Circuit decision (*National Cotton Council v. EPA*), requiring discharges from applications of pesticides that occur on or over water, to have NPDES permit coverage beginning October 31, 2011. In 2011, the Division developed and issued a CDPS general permit that modeled EPA's general permit, with the few notable exceptions described in the fact sheet for the first Colorado PGP.

Preparation of the 2015 PGP Renewal

The scope of this renewal is notably different from the development of the first CO PGP in that the Division reviewed the terms and conditions of the previous permit to determine what changes might be appropriate for this permit term. The ability to conduct a comprehensive permit renewal process was possible due to funding provided by the Colorado General Assembly to implement a PGP in Colorado.

In preparation for this renewal, the Division held three stakeholder meetings between October and December 2013. These meetings were designed to give stakeholders an opportunity to communicate input about problems and issues they have encountered over the previous two years and any input they would like considered as part of permit development. Stakeholders were encouraged to provide information that would be useful to the Division in terms of Colorado-specific problems that could not be addressed by the national EPA permit. Through this process the Division was able to better understand concerns from the regulated community and respond to those concerns by using the discretion authorized by EPA for states that have permitting authority.

Justification for these state-specific changes can be drawn from the EPA's PGP Fact Sheet, which states the following:

"States that are authorized to issue NPDES permits for the control of discharges to Waters of the United States from the application of pesticides will be developing their own NPDES permits to cover such discharges. Nothing in the federal regulations precludes a state from adopting or enforcing requirements that are appropriate to address discharges in their state or are more stringent or more extensive than those required under the NPDES regulations. In fact, the Clean Water Act is meant to serve as a baseline for state environmental protection. The Clean Water Act and corresponding NPDES regulations require that permits, at a minimum, include the requirements detailed in Part 122.44 (but not necessarily in the same way as in this permit). States are free to incorporate additional or different requirements that they feel are necessary to adequately protect water quality. Similarly, how EPA and states interpret information from which permit requirements are developed may differ. For example, the regulations, as written at 122.44(i) specify that monitoring requirements be included to assure compliance with permit limitations. One permit writer may make a best professional judgment (BPJ) determination that monitoring of discharges reasonably should occur during pesticide application while a second permit writer may make a BPJ determination that monitoring of discharges should reasonably be performed after pesticide application. It is reasonable that the two different permit writers may come to different conclusions about how best to incorporate this requirement into the permit."

IV. SUMMARY OF STAKEHOLDER PROCESS AND MAJOR CHANGES FOR THE RENEWAL PERMIT

The three stakeholder meetings that were held by the Division provided a number of suggestions for changes to the renewal permit. The following is a discussion of those ideas and how they informed the Division's approach for developing this draft permit.

The three areas discussed below led to the most substantive changes between the draft 2015 PGP and the 2011 PGP. The Division has developed the draft permit conditions for these three areas based on the best information available, to inform decisions for Colorado at the time of draft permit development. The Division specifically solicits additional information on these topics, particularly for situations where reviewers find that the information presented in this draft permit, upon which the Division relied to make draft decisions, is incomplete. **The Division also specifically solicits comments on the specific permit language that resulted from the Division's approach.** The most useful comments clearly

indicate agreement or disagreement with the draft permit language, and to the extent there is disagreement, provide recommended alternative permit language with a supporting basis.

A. Compliance Certifications vs Annual Reports; Due Dates

Stakeholders expressed confusion about why Compliance Certifications were due prior to pesticide applications. Stakeholders cited the lack of reliability and questioned the usefulness of submitting "estimated usage" data to the Division. The Division agreed that estimating the amount of pesticide used in a given year would not reflect true impacts to surface water and would thus skew the results of any future evaluation of said data. Stakeholders also pointed out that the Division's lack of resources (1 FTE) would impact the ability to provide timely review of the information during times of the year when many applicators are preparing to apply pesticides and for which a timely application of those pesticides is critical.

The result of these discussions was the Division's decision to change reporting requirements from a "prior to application" due date for Compliance Certifications to an end-of-year due date for Annual Reports. Also, the Division decided to no longer use the term Compliance Certification and instead use the term Annual Report as its replacement. The term Compliance Certification was originally derived in an effort to distinguish the submittal from a permit application, which requires Division action to accept and then authorize a discharge, while also distinguishing the submittal from an annual report, since the content of the compliance certification was modeled after EPAs NOI form and the certification did in fact need to be submitted prior to application, in some circumstances. The Division intends to revise the content of the template to ensure that the required contents of the submittal conform to the refined approach.

The due date for the first Annual Reports required by the 2015 renewal permit will be February 1, 2016, and shall report on discharges made in the previous calendar year (January 2015-December 2015). Until the time that the new permit becomes effective (estimated to be January 1, 2015), Compliance Certifications will remain due according to the schedule outlined in Table 7-3 of the current permit.

B. Applications to Dry Ditches

Applications to dry ditches comprised the bulk of conversation at stakeholder meetings. Applicators felt that language in the original EPA PGP, which was adopted by Colorado, was over-prescriptive and did not reflect conditions that operators face in Colorado. Stakeholders from both western and eastern Colorado weighed in on the fact that recordkeeping and monitoring of applications to dry ditches was overly burdensome considering the fact that there are thousands of miles of ditches that are dry throughout the year or that terminate without a discharge to classified surface waters of the state.

Numerous options were presented in an effort to reduce the burden to these types of operators, including redefining "state waters" for purposes of the PGP; looking to the applicability of the Agricultural Exemption clause for pesticide applications in ditches, exempting discharges of pesticides to dry ditches under the Division's Low Risk Policy,

increasing PGP application thresholds for applications to dry ditches, and carving out the requirement to report certain applications of pesticides to dry ditches under the PGP.

Ultimately, the Division felt that it was most appropriate to reduce the burden of reporting application of pesticides to dry ditches by carving out reporting requirements for certain applications of pesticides to dry ditches. The other options the Division considered and discussed with stakeholders are presented below along with the basis for the Division's decision to accept or reject a particular option. The Division is presenting this information to document the range of options discussed, particularly for those who did not participate in the stakeholder process.

1. Change the definition of Waters of the State to exclude dry ditches

   This option was discussed briefly but was rejected due to the complexity of changing a definition that is accepted statewide and the implications such a change might have on other programs throughout the state.

2. Provide relief under the Agricultural Exemption clause

   This option as discussed would consider exempting some discharges to ditches through interpretation and application of the agricultural waste exemption provided in the Water Quality Control Act at 25-8-504. This section of the statute provides exemptions for "flow or return flow of irrigation water", and for "animal and agricultural waste on farms, ranches and horticultural or floricultural operations," "except as may be required by the federal act or regulations". The exemption for return flow of irrigation water is consistent with the federal exemption for irrigation return flow, and was specifically addressed in development of the EPA permit. The Division contemplated whether some of the applications to ditches for weed control could be considered "animal and agricultural waste on farms, ranches and horticultural or floricultural operations" and ruled this out for two reasons. First, application of the exemption would result in the need to determine when discharge of these "agricultural wastes" would be to waters of a US, and secondly, it would require the need to define which applications to ditches are on "farms or ranches" and which are not. Both of these would result in more, and not less, complexity in program implementation.

3. Provide relief under the Division's Low Risk policy
   The Division considered excluding permit coverage for discharges to ditches through the use of the Low-Risk Policy. This policy states that the Division will not issue general permits for discharges with the lowest potential risk to water quality, and instead develops guidance that includes best management practices intended to be protective of water quality. This policy does not change the legal framework that defines types of point sources subject to permit coverage, but instead acknowledges that it is not practical to permit all sources that meet the definition and allows the Division and operators to focus resources on the types of sources with higher potential risk. This idea was rejected for pesticide discharges primarily due to

external concern about Third Party lawsuits. While for the most part, the Division expects that ditches that are waters of the state are not waters of the US, the Division does not have authority to make jurisdictional determinations for waters of the US. This authority lies with EPA and the US Army Corps of Engineers. In addition, there is tremendous uncertainly and change regarding how determinations are made due to the split circuit decision and evolving guidance from EPA and USACE regarding waters of the US jurisdictional determinations.

The Division also considered excluding just a portion of ditches from permit coverage such as "roadside ditches". The Division contemplated that there would be higher certainty that roadside ditches would not be considered waters of the US, then for example irrigation ditches that have return flow to rivers and stream. However this option was eliminated in that it may create additional complexity in the need to define and distinguish a "roadside ditch" from other types of ditches that would continue to need permit coverage.

4. Provide relief by increasing threshold values
   The Division discussed with stakeholders the concept of increasing the threshold values that trigger submission of a Annual Report (formerly Compliance Certification) and in some cases the need to develop a pesticide discharge management plan (PDMP). The rationale being that by doing so, the burden would be reduced for some of the smaller applicators who generally treat smaller areas, particularly when the bulk of their applications were made to dry ditches. For larger applicators, the threshold would have been held well below their normal areas of treatment and they would still be required to submit a Annual Report (formerly Compliance Certification) and develop a pesticide discharge management plan (PDMP) where necessary.
   Though other states have adopted higher thresholds, none were as high as those being discussed and it was decided that to make a difference, the thresholds would need to be raised to a point that the Division felt uncomfortable authorizing. As a result, this idea was rejected.

5. Provide relief by "carving out" certain *applications* of pesticides to dry ditches
   Stakeholders in attendance at the meetings discussed the Division's suggestion of "carving out" certain applications of pesticides to dry ditches in order to reduce recordkeeping and reporting requirements under the PGP. Carving out certain applications of pesticides to dry ditches would not exempt applicators from obtaining and complying with the permit itself, but certain applications of pesticides would be exempt from recordkeeping and reporting conditions requirements under the 2015 PGP. Discharges that meet these eligibility requirements are not required to be counted toward threshold limits; however all other terms and conditions of the permit remain effective. Application of pesticides to ditches that are wet at the time of application still count toward threshold limits.

C. Irrigation Districts and Irrigation Companies

Colorado has one of the most complex water rights systems in the United States. Irrigation in the state is highly monitored, and irrigators are broken down into a complex system of different legal entities organized with the purpose of diverting water and delivering it to end users. Based on input from stakeholders and other outside entities, there is a lot of confusion among members of the irrigation community about how the PGP may apply to them. Some of the confusion stems from the use of the term "Irrigation District" in the PGP, and whether mutual ditch companies, unincorporated ditch companies, irrigation companies, carrier right ditches, drainage ditches, and other similar entities organized under Colorado law would fall under this definition.

The 2011 EPA PGP regulates all applications of pesticides by irrigation districts to irrigation canals and ditches, regardless of the size of the application area:

> "*Irrigation control districts (or other similar public or private entities supplying irrigation waters) – In many parts of the country, special districts have been established for the purpose of maintaining irrigation canals and ditches. Generally, these districts treat large areas that exceed EPA's annual treatment area thresholds; however EPA is requiring any such district, regardless of the area treated, to submit an NOI. Similar to pest control districts described above, the Agency believes weed control is a critical component of irrigation control district operation and should also be expected to meet the highest standards established in the permit."*

The Division held two separate meetings with irrigators to discuss this topic and develop a common-sense approach that would modify the 2015 PGP renewal to recognize Colorado's unique water rights system. The Division recognizes that most irrigation districts and ditch companies in Colorado have long histories and operate under rules set up as long as a century ago. It is difficult for the Division to write an encompassing general permit that will be able to support all of the variations in operating procedures for all of the various entities in the state. The Division worked with stakeholders to propose some modifications to the PGP to decrease the regulatory burden on smaller irrigators. In these meetings, the Division discussed the application of pesticides to different parts of the ditch or canal system, and the relationships between the irrigation districts and irrigation ditch companies that divert water, the intermediate and end users (farmers) who use water for irrigation and the legal responsibility for maintenance of the irrigation infrastructure.

In many instances, irrigation infrastructure is not solely operated and maintained by the irrigation district itself. In Colorado, it is quite common for portions of the irrigation canal or ditch to be operated and maintained by intermediate irrigation delivery systems or end user of the ditch. These users, such as carrier right ditch companies or drainage ditch companies, are legally distinct from the larger irrigation district and have control over small pieces of irrigation infrastructure contained within a larger system. Pesticides may be applied by these end users as part of their individual ditch maintenance responsibilities. Many of these intermediate and end users would not exceed the application thresholds under the PGP. However, these users currently fall into EPA's

broad definition of an "irrigation district," and are required to submit individual Compliance Certifications under the 2011 version of the PGP.

The Division worked with stakeholders to find a solution that wouldn't force these intermediate and end-users to comply with the same set of rules intended for larger irrigation companies. Much of the discussion focused on where maintenance responsibility ends for the irrigation company/district, and to what degree irrigation districts should be held accountable for reporting pesticide applications that are out of their control.

For development of this draft permit the Division determined that the most efficient approach was to define "irrigation control district" for the purpose of the Colorado PGP. By including this definition within the framework of the PGP, the Division was able to clarify the types of entities subject to specific requirements in the permit, and reduce the burden associated with development of a PDMP and submitting an annual report, for smaller irrigation operators. The Division included language in the 2015 PGP to clarify that irrigation districts, ditch companies, mutual ditch companies, unincorporated ditch companies, and other similar entities organized to deliver water for irrigation fall under the PGP's definition of an "irrigation control district" as long as they operate at least seven miles of irrigation districts or canals. The seven mile designation was selected based on the Division's understanding that most carrier rights ditches are shorter than seven miles.

The *current (2011)* permit requires all "irrigation control districts" to prepare and submit Compliance Certifications regardless of the size of the treatment area. For the renewal permit "irrigation control district" now includes a seven mile designation and therefore only those that meet the seven-mile criteria will need to submit an Annual Report.

In this 2015 permit renewal, the Division clarified that operators are not responsible for any discharges and associated permit terms and conditions for which they do not have operational control. Irrigation control districts, as defined in Appendix A of the PGP, are not responsible for applications made by smaller end-users on the irrigation district system that are outside of the District's control. It is incumbent on individual entity to make the determination about where the irrigation control district's responsibility for discharges of pesticides to water terminates, and where end user's responsibilities along the ditch system begin.

For intermediate and end users that are downstream (or outside) of the irrigation district's responsible area that apply pesticides to irrigation canals and ditches, compliance with the PGP is still mandatory. However, these end users will not be defined as "irrigation control districts" that are required to submit an Annual Report (formerly Compliance Certification) regardless of treatment application area. Instead, these users will only need to submit an Annual Report if they exceed treatment thresholds. Based on the Division's discussions with irrigators, it is expected that most end users will not exceed the threshold limits under the PGP, and therefore would not be responsible for submitting an Annual Report.

V. EDITORIAL CHANGES

In the 2015 Colorado PGP renewal, additional changes have been made to the permit document and, subsequently the Annual Report (formerly Compliance Certification) document. These changes were driven through interaction with stakeholders during meetings held between October and December 2013 and, in many cases, the language changes in the permit reflect issues that were challenging stakeholders with regard to the Annual Report.

- Because operators often use less product than can accurately be measured in terms of gallons, stakeholders suggested that the Division provide another avenue for reporting quantities of pesticides used. This, they said, would reduce the burden to dischargers who previously had to convert the amount of product used from ounces to gallons to meet the requirement in the reporting table of the Compliance Certification. The Division agreed that accuracy in reporting is necessary and as a result made a change in the Annual Report (formerly Compliance Certification) that will allow dischargers to report the amount of product used for a particular application in ounces. Space was retained for operators to report product usage in gallons and pounds as well.
- Due to stakeholder concern, language was added to the permit that clarifies that larvaciding for mosquitoes should not be counted toward threshold limits. This is in conjunction with the EPA permit and is presented in the Colorado permit as further clarification.

- Stakeholders suggested that the Division provide space in the table under question 12 of the Annual Report (formerly Compliance Certification) where they could include the active ingredient in their product, in addition to the product name. This would provide the Division with a quick reference to the actual chemical agent responsible for pest control rather than simply providing the product name. The Division agreed that this would be a beneficial addition and therefore provided space in the document to enter this information.

- Stakeholders were unhappy with the timing of the reporting period. In the previous permit, Compliance Certifications were due according to timelines set by EPA. These timelines were often coming due during the busiest times of the operator's seasons and stakeholders requested that a different avenue be used. The basis for the EPA timeline was such that Notices of Intent (NOIs) would be sent to EPA 10-days prior to discharge which, in turn, would give EPA time to review those plans and be able to comment on them. This scenario has created confusion among dischargers due to the fact that they could only estimate the amount of product they would be using in an entire year. They felt that if the Division was collecting data, that at the very least the data should be accurate. The Division agreed. Additionally, the Division felt that with limited staff on hand, they could conceivably run into a situation where the turnaround time would exceed the discharger's window to perform their application which in turn could be harmful to business since many types of applications are time sensitive. As a result, the timeline for Annual Report (formerly Compliance Certification) submittal has been changed in this permit as well as the name of the document itself. The new date for what will now be called an Annual Report is February first of each calendar year and will

cover applications of pesticides to water from the previous year. For example, Annual Reports for the year 2015 will be due on February first of 2016.

VI. SCOPE OF THE GENERAL PERMIT

The Pesticide General Permit (PGP), whether state or federal, authorizes discharges from the application of pesticides to surface waters in the state of Colorado. Colorado has delegated authority to implement the NPDES program within the state of Colorado, except for federal facilities and tribal lands. Colorado has jurisdiction to administer the NPDES program over non-tribal member activities on fee lands located within a Reservation. The distinction in choosing which permit to obtain lies in whether applications are being made to federally or tribally controlled areas. Where a treatment area is controlled by a federal agency or tribe, the federal permit should be obtained through EPA and applicable rules for acquiring that permit shall be adhered to (e.g submission of an Annual Report). All other applications of pesticides that discharge to surface water, including application of pesticides on privately held lands within a Reservation, and fall within one of the use patterns described in the permit are within the scope of the Colorado PGP. The Division offers the following overview with respect to the use patterns of chemical pesticides covered by the Colorado PGP.

A. Application of a Pesticide Over Waters of the State

If the application of a chemical pesticide is made over Waters of the State to control pests over the water, any amount of the pesticide that falls into Waters of the State is "excess" pesticide and would require coverage by an NPDES permit. Based on field studies of pesticide applications, the Division expects that some portion of every application of a pesticide made over Waters of the State will fall directly into such waters and thus assumes that applications will trigger the requirement for an NPDES permit. A permit is not necessary if no portion of a chemical pesticide applied over Waters of the State will fall into those waters.

B. Application of a Pesticide Into Waters of the State

If the application of a chemical pesticide is made into Waters of the State 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 NPDES permit. Additionally, as the Sixth Circuit reasoned, the residual is discharged at the time of a pesticides initial application. Based on field studies of pesticides applied into water, the Division expects that some portion of every application of a pesticide made into Waters of the State will leave a residual in those waters and thus assumes every application will trigger the requirement for an NPDES permit. The Division expects that an entity applying pesticides with a discharge to Waters of the State 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 State.

C. Indirect Application of a Pesticide to Waters of the State

This 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 State 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 this general permit if all eligibility requirements are met. For example, discharges to control pests in or near areas that are Waters of the State, even when these areas are dry for much of the year, may be covered by this permit, if one is required. This would include discharges on forest or range lands that include dry washes and ephemeral streams, to control pests that may be found in these occasionally wet areas, including pests that may also be found in upland 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." The Division 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 State. The category forest canopy pest control is for applications to a forest canopy. The Division 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 State.

D. Applications of Pesticides to Federal Facilities, Trust and Tribally Owned Lands

The Pesticide General Permit (PGP), whether state or federal, authorizes discharges from the application of pesticides to surface waters in the state of Colorado. Colorado has delegated authority to implement the NPDES program within the state of Colorado, except for federal facilities, trust and tribally-owned lands within an Indian reservation, and activities of tribal members on a reservation. Where a treatment area is controlled by a federal agency or tribe, or where the activity (application of pesticides) is being conducted by a tribal member, the federal permit should be obtained through EPA, and applicable rules for acquiring that permit should apply. Colorado has jurisdiction to administer the NPDES program over non-tribal member activities on privately-owned fee lands located within tribal reservation boundaries. EPA, through its NPDES program, also claims jurisdiction over non-tribal member activities on privately owned fee lands located within tribal reservation boundaries. Thus, under this latter scenario, an application for permit coverage can be made to EPA, the WQCD, or both.

VII. SUMMARY OF PERMIT CONDITIONS

A. Permit Term

The Division issued a short term two-year permit in 2011. The duration of the term was based on the time frame the Division anticipated would be required to obtain the resources necessary to implement state level implementation of the NPDES program requirements for this category of discharges, including permitting, data management, and compliance assurance. The Division determined that a short term permit was appropriate because it would be necessary to revisit the terms and conditions of the pesticide permit at that time, including the requirement to submit an application, commensurate with resources available to implement the program elements.

The Division modified the term of the permit in 2013 by a period of one year. This was done to provide the Division time to hold stakeholder meetings, write the permit, receive public comment, respond to public comment and issue the permit. The term for this renewal is five years in accordance with normal Division practice and the regulatory requirements at 40 CFR 122.46(a).

B. Coverage Under This Permit

1. Eligibility and Activities Covered - 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 State from the application of pesticides will be in violation of the CWA, unless the Operator has obtained coverage under another permit or the Clean Water Act exempts these discharges from NPDES permit requirements. The activities covered by this permit generally include the use patterns and types of pest control activities described in the vacated 2006 NPDES Pesticides Rule. As was discussed in that rule, agricultural stormwater and irrigation return flow are exempt from NPDES permits. Also, applications that do not reach Waters of the State do not need permit coverage. Thus, the final PGP, consistent with the permit as proposed, covers the discharge of pesticides (biological pesticides and chemical pesticides which leave a residue) to Waters of the State 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:

a. 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 State. 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.

b. 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 State 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.

c. Animal Pest Control - This use pattern includes the application, by any means, of pesticides into Waters of the State 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.

d. 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 State 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. EPA understands that for this use pattern pesticides will be unavoidably discharged into Waters of the State 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: EPA 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 stormwater, discharges into Waters of the State.

Consistent with the 2006 NPDES Pesticides Rule, this PGP does not cover spray drift resulting from pesticide applications. Instead, to address spray drift, EPA established a multi-stakeholder workgroup under the Pesticides Program Dialogue Committee (PPDC), an advisory committee chartered under the Federal Advisory Committee Act (FACA) to explore policy issues relating to spray drift. The goals of the workgroup are to: (1) improve the understanding of the perspectives of all stakeholders regarding pesticide spray drift; (2) find common ground for further work toward minimizing both the occurrence and potential adverse effects of pesticide spray drift; (3) develop options for undertaking work where common ground exists; and (4) explore the extent of drift, even with proper usage, and the range and effectiveness of potential responses to unacceptable levels of off-target drift. On November 4, 2009, EPA issued a draft Pesticide Registration Notice (PR Notice) for public comment. The actions detailed in the PR Notice focus on improving the clarity and consistency of pesticide labels to reduce spray drift and prevent harm to human health and the environment. The draft PR Notice and related documents are available in Docket EPA-HQ-OPP-2009-0628 at www.regulations.gov. EPA is currently reviewing the public comments received and Colorado will act accordingly depending on the outcome of EPA evaluations.

e. Limitations on Coverage - .

i. Discharges to Water Quality Impaired Waters - The Water Quality Control Division is responsible for sampling and data acquisition from surface waters across the state. This information provides state administrators with the tools necessary to evaluate the overall status regarding the health and viability of state waters. The results of these evaluations drive decisions on surface waters that are impaired for particular pollutants. The Division reports on surface waters that are impaired, and for specifies which parameter is responsible for the impairment. Results are compiled for commission approval in Regulation 93 which denotes which surface waters are to be monitored and evaluated (M&E) for future determinations of impairments, which surface waters are definitively impaired. For impaired waters, the Division develops a Total Maximum Daily Load (TMDL) which identifies sources of impairment and assigns wasteload allocations (to point sources) and load allocations (to non point sources) which equate to reductions in pollutant loading intended to restore the waterbody (i.e. eliminate the impairment). There is a duty for applicators to consult Regulation 93 prior to applying pesticides which may contain ingredients, or degradates of ingredients, for which a surface water of the state is impaired. For example, application of the pesticide copper sulfate to a waterbody impaired for either copper or sulfates would not be eligible for coverage under this 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 this permit, the Division determined that it does not have information warranting a limitation of coverage 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 this permit allows the Division, 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 based on additional information that may be gathered by the Division.

For purposes of this permit, impaired waters are those that have been identified as not meeting applicable water quality standards, for which a TMDL is needed, and waters that have been identified as impaired, for which a TMDL is not needed (Category 4 waters). The listing for impaired waters in Colorado (Regulation 93) can be found on the Division's website in the regulations section. The listing for impaired waters in Colorado for which a TMDL is not needed can be found in the most recent Colorado Section 305(b) Report on the Division's website.

ii. Discharges to Outstanding Waters - Discharges from the application of pesticides to Outstanding Waters in Colorado are not eligible for coverage, 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. Operators are not eligible for coverage under this permit for discharges to surface waters of the state if the water is designated by the Water Quality Control Commission as Outstanding Waters for antidegradation purposes under Regulation 31.8(2)(a). A list of Outstanding waters in geographic areas covered under this permit is available at http://www.cdphe.state.co.us/regulations/wqccregs/index.html.

iii. Discharges Currently or Previously Covered by Another Permit - Discharges are not eligible for coverage under this permit when the discharge is covered by another CDPS permit, or when the discharge was included in a permit that has, in the last 5 years, been or is in the process of being denied, terminated or revoked by the Division (this does not apply to the routine reissuance of permits every 5 years).

C. Authorization to Discharge Under This Permit

To obtain authorization under this permit, an Operator must meet the permit eligibility provisions in Part 1.1.
Those Operators meeting the eligibility provisions in Part 1.1 are automatically authorized by this permit without submission to the Division of an application.

In its 2011 permit, EPA had no requirement to submit an application for a subset of discharges authorized under the permit. In accordance with Regulation 61.9(2)(b)(ii)(F), dischargers are not required to submit an application, as the Division is giving notice of coverage in this General Permit. This notice conforms to the federal requirements found at 40 CFR 122.28 (b)(2)(v).

For the first permit term, the Division did not require ***any*** entities seeking coverage under the permit to submit an application, or notice or intent, for any discharges from the application of pesticides. The Division did, however, include a requirement to submit a Compliance Certification, which in part was intended to provide a means of identifying the subset of discharges covered under the permit that would have been required to submit an application or Notice of Intent if EPA were the permitting authority rather than the Division.

For this renewal the Division decided to continue the practice from the current CO PGP of not requiring a permit application to be submitted in advance of a discharge. Division finds that an application requirement would be inappropriate in accordance with 61.9(2)(b)(ii)(E), the Division has considered 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, and has decided that a permit application is not appropriate.

The Division has considered the typical pesticide discharge covered under this permit, the expected nature of that discharge and its potential for releasing toxic and conventional pollutants into Waters of the State. In this case the Division determined that factors are in place to mitigate the water quality risk posed by this type of discharge, including the regulation of pesticide applications under FIFRA and the level of awareness of the PGP requirements. The Division does not believe that the regulatory burden of requiring submission of an application will directly improve environmental protection. The Division also has determined it has sufficient means of identifying both the discharges under the permit and the number of large dischargers covered by the permit. The Division has determined it can rely on information from dischargers who submitted an annual report for the previous year to identify large entities in the state who will be applying pesticides to state waters in subsequent years. Therefore, the Division has concluded that submission of an application is not required to obtain coverage under this permit.

1. Authorization Date - Operators are authorized to discharge under the permit upon the effective date of this renewal permit.

2. Terminating Coverage - Operators covered under this permit are terminated from permit coverage when they no longer have a discharge from the application of pesticides or their discharges are covered under a CDPS individual permit or alternative CDPS general permit. Since the Division is continuing the practice of not requiring a permit application, there continues to be no requirement in this permit for a permit termination approval process or notification to the Division.

3. Alternative Permits

   a. Requirements for Coverage Under an Alternative Permit - In accordance with Regulation 61.3(1)(a), the Division may require Operators to apply for and/or obtain authorization to discharge under either a CDPS individual permit or an alternative CDPS general permit.

      If the Division requires an Operator to apply for a CDPS individual permit, the Division will notify the Operator in writing that a permit application is required. Such a notification will include a brief statement of the reasons for the decision and will provide application information. In addition, for Operators whose discharges are authorized under this permit, any notice will set a deadline to file the permit application and will include a statement that on the effective date of the CDPS individual permit, coverage under this general permit will terminate. The Division may grant additional time to submit the application if an Operator submits a request setting forth reasonable grounds for additional time. If covered under this permit and the Operator fails to submit a CDPS individual permit application as required by the Division, the applicability of this permit to such Operator is terminated at the end of the day specified by the Division as the deadline for application submittal. The Division may take enforcement action for any unpermitted discharge or violation of any permit requirement.

   b. Operator Requesting Coverage Under an Alternative Permit - If an Operator does not want to be covered by this general permit but needs permit coverage, the Operator can apply for a CDPS individual permit. In such a case, the Operator must submit an individual permit application in accordance with the requirements of Regulation 61.4(1) with reasons supporting the request, to the Division at the address listed in Part 8 of this permit. The request may be granted by issuance of a CDPS individual permit or authorization of coverage under an alternative CDPS general permit.

      When an individual CDPS permit is issued, or the Operator is authorized under an alternative CDPS general permit to discharge a pollutant to surface waters of the State as a result of a pesticide application, authorization to discharge under this

permit is terminated on the effective date of the CDPS individual permit or the date of authorization of coverage under the alternative CDPS general permit.

4. Severability

Invalidation of a portion of this permit does not render the whole permit invalid. The Division's intent is that the permit will remain in effect to the extent possible; if any part of this permit is invalidated, the remaining parts of the permit will remain in effect unless the Division issues a written statement otherwise.

5. Other State and Federal Laws

Operators must comply with all other applicable federal and state laws and regulations that pertain to the application of pesticides. For example, this permit does not negate the requirements under the Federal Insecticide, Fungicide, and Rodenticide Act (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 this permit.

D. Discussion Of Effluent Limitations

Part two of the permit contains the technology-based effluent limitations. Part three 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. Under the CWA these effluent limitations can be narrative rather than numeric.

The technology-based effluent limitations, developed by EPA, require the Operator to minimize the discharge of pesticides to Waters of the State 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 State through the use of Pest Management Measures/Integrated Pest Management to the extent technologically available and economically achievable and practicable for the category or class of point sources covered under this 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/Integrated Pest Management that involve the following: (1) identifying and assessing the pest problem; (2) assessing effective pest management; and (3) following specified procedures for pesticide application.

In addition to the technology-based effluent limitations, 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 water quality standard is prohibited. In general, based on the data included in the record and the additional requirements in this permit in addition to FIFRA, the Division expects that compliance with the technology-based effluent limitations and other terms and conditions in this permit will meet applicable water quality-based effluent limitations. However, if at any time, the Operator or the Division 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, and document and report the excursion(s) to the Division as required in Part 7. Furthermore, the Division 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 required reports, or from other sources indicates that, after meeting the technology-based limitations in this permit, the discharges are not controlled as necessary to meet applicable water quality standards. The Division also notes that among the eligibility requirements for coverage under this permit are requirements that the permit does not cover discharges of any pesticide into a water impaired by a substance which either is an active ingredient in that pesticide or is a degradate of such an active ingredient, or into an Outstanding 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.

For the purposes of this permit, numeric effluent limitations are not always feasible because the discharges pose challenges not presented by other types of NPDES-regulated discharges. The technology-based effluent limitations developed by EPA in this 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 state 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 numeric effluent limitations for pesticide applications extremely difficult. 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 pesticide 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.

- Information needed to develop numeric effluent limitations is not available at this time. To develop numeric technology-based effluent limitations, EPA must fully 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, EPA estimates that more than 400 pesticide active ingredients contained in over 3,500 pesticide products may be covered under this permit.

In the context of this general permit, the Division 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. The Division 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 this 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 State, thereby protecting the receiving waters, including to the extent necessary to meet applicable water quality standards. The Division notes that this permit 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 this permit are expressed as specific pollution prevention requirements for minimizing the pollutant levels in the discharge. In the

context of this general permit, these requirements represent the best technologically available and economically practicable and achievable controls. EPA has determined that the combination of pollution prevention approaches and structural management practices required by these limits are the most environmentally sound way to control the discharge of pesticide pollutants to meet the effluent limitations. Pollution prevention continues to be the cornerstone of the NPDES program.

EPA has found that the requirements of this permit represent the appropriate level of control representing BPT, BCT, and BAT. For example, many states already require operators to evaluate pest management options or produce an IPM plan before applying pesticides. This permit is not requiring IPM, but is requiring certain Operators to implement pest management measures to meet the technology-based effluent limitations that are based on IPM 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. EPA determined that calibrating, cleaning, and repairing pesticide application equipment is technologically available and based on EPA's evaluation of this industry, is currently being implemented by many operators and is a practice that every operator should be doing when using pesticides as a way to prevent leaks, spills, and other unintended discharges, such as over-applying pesticides as a result of poorly maintained equipment.

EPA has determined that the requirements of this permit are economically achievable. In determining "economic achievability" under BAT, EPA has considered whether the costs of the controls can reasonably be borne by the industry. EPA typically evaluates "closures," whereby the costs of requirements are evaluated to see whether they would cause a facility or Operator in this case to go out of business. To evaluate potential economic impacts of this permit, EPA estimated the applicable thresholds below which average per entity compliance cost could exceed a percentage of annual revenues/sales. EPA used percentages of 1% and 3% of revenues/sales to characterize the potential for significant impact. Based on this analysis, EPA concludes that the technology-based effluent limitations in this permit are unlikely to result in a substantial economic impact to the permitted universe, including small businesses. The economic analysis is available in the docket for this permit. In addition, EPA considered the non-water quality environmental impacts, including energy impacts, of the controls required under this permit and found that they are acceptable. EPA expects that the permit will result in few non-water impacts because in many cases, the permit is reflective of practices currently implemented by Operators. Hence, EPA interprets this analysis to indicate that the BAT limits are economically achievable.

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

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, EPA 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 EPA would not specify what technology should be employed to meet that limitation. For pesticides, namely mosquitocides, for example, 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 this permit are similar to 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 your situation in order to meet the effluent limitation. In this permit, Operators are required to implement site-specific Pest Management Measures to meet these effluent limitations. The permit along with this fact sheet provides 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.

Implementation of Pest Management Measures - Part 2.0 of this permit 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). EPA recognizes that not all of these considerations will be applicable to every pest management area nor will they always affect the choice of Pest Management Measures. EPA expects 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.

EPA believes flexibility is needed for Operators to tailor Pest Management Measures to their situation as well as improve upon them as necessary to meet the technology-based effluent limitations; with the selection of Pest Management Measures based on available information and best professional judgment of personnel who are qualified to make pest management decision. For example, while Part 2.2 requires Decision-makers to evaluate other means than pesticide use, it remains the best professional judgment what ultimate pest control method is employed. Thus, while mechanical pest removal or less toxic chemicals may be possible options, the Decision-maker is in the best position to know what method is most appropriate and effective against the target pest.

Pest Management Measures and Technology-Based Effluent Limitations – Definition of "Minimize" - EPA has found that the requirements of this permit represent the appropriate level of control to address BPT, BCT, and BAT. 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. EPA believes that 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 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, EPA will presume that the effluent limitation to minimize pesticides entering the Waters of the United States has been violated under the NPDES permit. EPA 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. EPA would find that this application was a misuse of the pesticide under the FIFRA label and because of the misuse; the Agency might also determine that the effluent limitation that requires the Operator to minimize discharges of pesticide products to Waters of the United States was also 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 - In this permit, 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 this permit for any single discharge from the application of pesticides. EPA has delineated the non-numeric effluent limitations into tasks that EPA expects the Applicator to perform and tasks that EPA expects the Decision-maker to perform. In doing so, EPA has assigned the Applicator and the Decision-maker different responsibilities.

1. Responsibilities for All Applicators - Part 2.1 of the permit 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 State. All Applicators are required to minimize the discharge of pesticides to Waters of the State by doing the following:

   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.

   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 state waters. 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 state waters. 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.

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.

2. Responsibilities for Decision Makers

As noted above, NPDES permits must contain technology-based effluent limitations. Part 2.2 of this 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 state waters from the application of pesticides, through the use of Pest Management Measures by using only the amount of pesticide and frequency of pesticide application necessary to control the target pest.

In addition, Part 2.3 of this permit requires that any Decision-maker who is or will be required to submit an Annual Report (formerly Compliance Certification) to identify the pest problem, implement effective and efficient pest management options, and adhere to certain pesticide use provisions.

Decision-makers are required to perform each of these permit conditions prior to the first pesticide application covered under this permit and at least once each calendar year thereafter. These additional technology-based effluent limitations are based on integrated pest management principles. EPA is requiring certain Decision-makers to also comply with different technology-based effluent limitations than Applicators because we have found that they are the Best Available Technology Economically Achievable for these Operators. These requirements are aimed at reducing discharge of pesticides to state waters 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.

EPA expects that many Decision-makers are already implementing Pest Management Measures that are likely to meet these technology-based effluent limitations. EPA 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. Based on comments received on the proposed permit, the Applicators' main role is to apply pesticide when needed.

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 evaluating available and relevant information, EPA found that some commercial

(For-Hire Applicators) and non-commercial (e.g., state governments, federal governments, local governments, utilities) entities are currently implementing integrated pest management or components of integrated pest management to minimize pesticide use. For example, federal agencies are required to implement integrated pest management under 7 USC 136r-1, "Federal agencies shall use Integrated Pest Management techniques in carrying out pest management through procurement and regulatory policies, and other activities." In addition, Executive Order 13514 (October 5, 2009) requires the head of each federal agency to implement integrated pest management and other appropriate landscape management practices as a means to promote pollution prevention and eliminate waste. EPA has 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 and any Decision-maker who is or will be required to submit Annual Report (formerly Compliance Certification) must conduct the following actions 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 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 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) 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 this 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.

Investigate Pest Management Options

Decision-makers are required to implement efficient and effective means of Pest Management Measures that most successfully minimize discharges to state waters 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 pesticide 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.

a. Mosquito and Other Flying Insect Pests Control

Mosquitoes Background - There are over 2500 different species of mosquitoes throughout the world with approximately 200 species occurring in the United States. 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. Over 20,000 human cases of West Nile virus have been reported in the United States. Symptoms of human illness can range from mild flu-like symptoms to severe encephalitis, meningitis, or acute flaccid paralysis. Over 800 people have died from West Nile virus since its emergence in North America in 1999 (CDC).

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.

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 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 suggests 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 1800 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 co ntrol in Colorado improves 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 Colorado is primarily through the use of larvicides.

i. Identify the Problem

Prior to the first pesticide application covered under this permit that will result in a discharge to Waters of the State, and at least once each calendar year thereafter prior to the first pesticide application for that calendar year, any Decision-makers who is or will be required to submit an Annual Report must do the following for each pest management area.

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

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 mosquito prior to the first pesticide application covered under this 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 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 1 to 3 in 1 minute. The action threshold for aerial spraying is 12 mosquitoes per minute. For larvae control, action thresholds are determined by standard mosquito dipping techniques. For example, in Canyon County Mosquito Abatement District, Idaho, 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 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 State.

Prior to the first pesticide application covered under this 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 this 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 State.

<u>Identify known breeding sites for source reduction, larval control program, and habitat management.</u>

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 State. 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 this 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 State.

<u>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.</u>

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.

<u>In the event there are no data for the pest management area in the past calendar year, use other available data as appropriate</u>

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

ii. Pest Management Options

Prior to the first pesticide application covered under this permit that will result in a discharge to Waters of the State, 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 Annual Report 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 State prior to the first pesticide application covered under this permit. For blackflies, Pest Management Measures will vary by locality (i.e. stream size, stream substrate, and stream vegetation), black fly species (i.e. 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 black flies. 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 State.

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 stormwater 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 stormwater/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.

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. Recently, concerns over placing *Gambusia* in habitats where other fish species assemblages are threatened have arisen. 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. An example of this is *Rivulus* fish species. The potential of Rivulus as mosquito predators is currently being evaluated in saltwater habitats, especially in Brevard County, Florida.

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 this general permit must be met.

iii. Pesticide Use **–**

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 environment 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, 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 State, 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 State.

Notably, the use of larvaciding for aquatic pest control does not count toward threshold values for those Operators that fall into the category of, "Local governments or other entities that exceed the annual treatment area threshold," and for whom threshold counts may trigger the requirement to submit an Annual Report (formerly Compliance Certification).

<u>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.</u>

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 of the pestiferous adult are now the primary means of black fly control in the United States.

b. Weed and Algae Pest Control

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 a 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 permit requirements for weed and algae pest control, apply to pesticide discharges associated with management of weeds, algae, and plant pathogens in water and water's edge, 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 plant 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 that 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 State that are not always "wet" (eg, 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 will 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 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 forceable 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.

i. Identify the Problem

Prior to the first pesticide application covered under this permit that will result in a discharge to Waters of the State, 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 Annual Report (formerly Compliance Certification) must do the following for each pest management area.

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

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

Decision-makers must be well-acquainted with the unique regional conditions of their sites and available Pest Management Measures for controlling the pest present. Intended use goals for the water bodies that are being impeded because of nuisance pest infestation must also be considered based on the control site. The use of the best available mapping information to aid in identifying the problem areas is suggested. Mapping may include aerial photo assessments, topographic maps, and satellite imagery where available and/or practicable. Mapping can be essential to identify problem areas which can and cannot be controlled using non-pesticide preventative measures (e.g., mechanical control). Mapping can also be used in plotting the regional desired 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 sources 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.
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.
Decision-makers may use historical data or neighboring district data to identify the pest and establish action thresholds.

ii. Pest Management Options

Prior to the first pesticide application covered under this permit that will result in a discharge to Waters of the State, 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 Annual Report (formerly Compliance Certification) 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 State prior to the first pesticide application covered under this permit. As noted above, combinations of various management options are frequently the most effective Pest Management Measures over the long term. The goal should be to emphasize long-term control rather than a temporary fix. Decision-makers must reevaluate every year prior to the first pesticide application for that calendar year. All Pest Management Measures must be 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 pest 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. Use pond dyes to 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.

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.

iii. Pesticide Use

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 a different Pest Management Measures tailored to the 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.

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

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.

c. Animal Pest Control

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" (eg, ephemeral streams, seasonal waters).

The requirements in this Part apply to pesticide discharges associated with management of animal pest including fish, lampreys, insects, mollusks, and microorganisms. Animal pest control includes management of nuisance species in Waters of the State 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 State 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.

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 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.

i. Identify the Problem

Prior to the first pesticide application covered under this permit that will result in a discharge to Waters of the State, 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 Annual Report (formerly Compliance Certification) must do the following for each pest management area.

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

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

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

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

Identify target pest(s).
Positive identification of the pest is required because many pests within the same genus may require different levels and types of Pest Management

Measures. Animal identification is important when determining the best Pest Management Measures for each particular pest and for determining application areas. Decision-makers must develop Pest Management Measures based on identification of the targeted pest which occur in their area.

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

Establish any pest- and site-specific action threshold
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.
Decision-makers may use historical data or neighboring district data to identify the pest and establish action thresholds.

ii. Pest Management Options

Prior to the first pesticide application covered under this permit that will result in a discharge to Waters of the State, 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 Annual Report (formerly Compliance Certification) 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 State prior to the first pesticide application covered under this permit. As noted above, combinations of various management options are frequently the most effective Pest Management Measures over the long term. The goal

should be to emphasize long-term control rather than a temporary fix. Decision-makers must reevaluate every year prior to the first pesticide application for that calendar year. All Pest Management Measures must be conducted in a manner that minimizes impacts to non-target species. The following describes the management options that must be evaluated.

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, 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.

iii. Pesticide Use

Conduct surveillance in an area that is representative of the pest problem prior to each application to assess the pest management area and to determine when the action threshold(s) is met.
Often, each animal and pest management area warrants a 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 proper best management practices. If pesticides are used, they must only be used as needed as determined by an action threshold, and proper 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 down 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. The Division 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.

d. Forest Canopy Pest Control

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 this permit are treetop pesticide applications that may inadvertently expose Waters of the State 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 Colorado.

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.

i. Identify the Problem

Prior to the first pesticide application covered under this permit that will result in a discharge to Waters of the State, 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 Annual Report (formerly Compliance Certification) must do the following for each pest management area.

In order to reduce pesticide discharges into Waters of the State 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 failure to implement Pest Management Measures.

Establish any pest- and site-specific action threshold.
Decision-makers must develop action thresholds for the target pests prior to first pesticide application covered under this 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 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 State. 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.
Decision-makers may use historical data or neighboring district data to identify the pest and establish action thresholds.

ii. Pest Management Options

Prior to the first pesticide application covered under this permit that will result in a discharge to Waters of the State, 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 Annual Report (formerly Compliance Certification) 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 proper 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 (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. These

products are aerially applied. As described below, once the determination is made to use pesticides, additional requirements must be met.

iii. Pesticide Use

Conduct surveillance in an area that is representative of the pest problem prior to each application to assess the pest management area and to determine when the 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 pesticide 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 in to 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 Pest Management Measures efficacy 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 State. Surveillance is necessary not only to establish the pest presence and their 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 will 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.

E. Water Quality-Based Effluent Limitations

The CWA requires NPDES permits to include technology-based effluent limitations for all discharges, and then if necessary for a specific discharge, 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, have the reasonable potential to cause, or contribute to an excursion above any state water quality standard, including state narrative criteria for water quality (see Regulation 61.8(2)(b)(i)(E)). 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, the Division includes a narrative statement that addresses WQBELs. In this permit the WQBEL is as follows:

All Operators must control discharges as necessary to meet applicable numeric and narrative state, territory, or tribal water quality standards, for any discharges authorized under this permit, with compliance required upon beginning such discharge.

If at any time an Operator becomes aware (e.g., through self-monitoring or by notification from the state, tribe, or territory), or the Division 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 and Appendix B, Section B.3, 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 the Division 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, that specifies that the Division may determine that additional technology-based and/or water quality-based effluent limitations are necessary, or may deny coverage under this permit and require submission of an application for an individual NPDES permit.

Each Operator is required to control its discharge as necessary to meet applicable water quality standards. In general, the Division expects that compliance with the other conditions in this 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 analyzed:

- Under FIFRA, EPA evaluates risk associated with pesticides and mitigates unreasonable ecological risk. Compliance with FIFRA is assumed.

- The Division conducted two sampling trips to collect ambient data from the South Platte River and the Arkansas River. These collection activities were performed in July and October 2013 respectively with the intent of identifying specific pesticides that may be the cause of water impairments and to assess whether pesticide residues are currently present in waters at levels that would exceed Colorado water quality standards. The monitoring data, although limited in scope, show that, for most samples, pesticides were below water quality standards adopted in Colorado. Continued sampling efforts by the Division will continue and will focus on provision of different temporal data in order to try and reflect the seasonal nature of pesticide applications.

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

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

- The PGP excludes pesticide applications that result in discharges of any pesticide to (1) waters impaired for that pesticide or (2) any Outstanding Waters in Colorado 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.

This permit requires Operators to control discharges as necessary to meet applicable water quality standards. When the Operator or the Division determines a discharge will cause or contribute to an excursion above any WQS, 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, the Division 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 PGP.

F. Site Monitoring

Monitoring is required in any NPDES permit to demonstrate compliance with the permit conditions. Monitoring requirements apply from the time any authorized Operator begins discharging under this permit. There are a variety of monitoring methods that a "traditional" NPDES permit may require, including end-of-pipe monitoring to show compliance with relevant water quality-based and technology-based effluent limitations prior to discharging 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 NPDES permits unless it is required to determine among other things, compliance with mixing zone dilution standards or some other special permit condition.

Pursuant to CWA sections 308 and 402(a)(2), 61.8(4) of the Colorado Discharge Permit System Regulations and other applicable implementing regulations, the following requirements have been included in the permit, as discussed below. The monitoring requirements of this permit are narrative and demonstrate compliance with permit conditions by using currently established pesticide use routines for monitoring pest control. For instance, the permit requires routine visual inspections (described below) 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.

In addition, the Division will collect information required from permittees. The Division will also solicit and collect information and water quality monitoring data from federal agencies, and other entities on water quality to help determine the presence of pesticides, degradates, metabolites, etc.

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

In writing the national PGP, EPA considered requiring ambient water quality monitoring. However EPA determined that it was infeasible for the following reasons:

- 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.

- Lack of applicable measurable standards: Federal pesticide-specific ambient water quality criteria do not exist at this time for the vast majority of constituents in the products authorized for use under this PGP.

- 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.

- Difficulty of residue sampling for chemical pesticides: For chemical pesticides, the "pollutant" regulated by the 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.

- 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, the Division has determined that there are suitable alternative monitoring activities to determine permit compliance, other than ambient water quality monitoring, for this permit.

Additionally, in assessing the appropriateness of requiring ambient water quality monitoring, the Division also considered Whole Effluent Toxicity (WET) testing as a possible option for assessing Operator compliance with permit conditions; however, WET testing in an NPDES permit program is best used to monitor whether an Operator's discharge 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 NPDES permittee performing the monitoring.

Thus, the monitoring program that the Division has developed for this PGP has been tailored to accommodate the unique situations related to pesticide applications. Routine visual monitoring is required in the 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 Annual Reports (formerly Compliance Certifications) will establish a history that may indicate if or when practices need to be reconsidered.

1. Visual Monitoring Requirements for Pesticide Applicators

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

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

a. Applications made from an aircraft
b. Applications made from a moving road vehicle when the Applicator is the driver
c. Applications made from moving watercraft when the Applicator is the driver
d. Applications made from a moving off-road wheeled or tracked vehicle when the Applicator is the driver.

2. Visual Monitoring Requirements for all Operators

Visual monitoring must also be conducted during any post-application surveillance, such as to determine the efficacy of the pesticide application. Visual monitoring of this type is required of all Operators but only if the Operator, be it the Applicator or the Decision-maker or both, performs post application surveillance in the course of business. The Division 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.

G. Pesticide Discharge Management Plan

Any Decision-maker who is or will be required to submit an Annual Report (formerly Compliance Certification) and is not a small entity (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) must develop a Pesticide Discharge Management Plan (PDMP), except for any pesticide applications made in response to a Declared Pest Emergency situation. The Division defines a Decision-maker that is not a small entity as a *large entity* in the permit.

Local governments or other large entities that rely on thresholds in the determination of whether or not to submit an Annual Report must complete a PDMP based on whether or not they exceeded thresholds in the prior calendar year. Given that there is no application requirement in this permit, this was the most straightforward way of aligning the determination on when to develop a PDMP with the objective of not requiring estimations of application rates to be used to significantly distinguish the burden associated with development of the PDMP. This means if a local government for example, has an annual treatment area that exceeds the threshold for calendar year 2014, that entity would be required to develop a PDMP for calendar year 2015. If that same entity did not exceed the annual treatment area thresholds for calendar year 2015, they would not be required to develop a PDMP for calendar year 2016. This approach in theory could result in entities switching from needing to have a PDMP to not, repeatedly. The Division determined that the risk of that happening was small, and an acceptable risk when weighed against the benefit of increased clarify regarding when a PDMP is required and the reduced burden gained by the lack of a permit application requirement and distinguishing requirements based on past actual application rates instead of estimates. The Division encourages any entity that finds itself switching from needing to

not needing a PDMP to maintain a PDMP, even if that is going above and beyond the permit requirement.

The Division intentionally allowed time for a decision maker that meets the annual treatment area threshold that is a large entity that did not trigger the requirement for development of a PDMP in the previous calendar year, to have time to develop a PDMP following submittal of the Annual Report (until April 1). In addition to allowing time to compile and report applications from the previous year before developing a PDMP, this timeline generally corresponds to the start of the pesticide application season in Colorado and was deemed adequate to have the additional measures in place in time for the new application season.

Any Decision-maker who is or will be required to submit an Annual Report and is a small entity, is not required to develop a PDMP. The Division recognizes that small business administration defines "small entities" as including government entities that serve populations of less than 50,000 persons. However, the Division's NPDES program has historically considered "major" municipal NPDES 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 NPDES permittees have increased recordkeeping and public notice obligations over minor NPDES which is consistent with the Division's intent for the 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 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, 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 permit. 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, and state-specific 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.

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 his/her PDMP and the other documents together contain all the necessary elements for a complete PDMP, as specified in Part 5.1. 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.

1. Contents of Your PDMP

The PDMP prepared under this permit 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.

a. Pesticide Discharge Management Team

The permit 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. The Division 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 permit requires that team members have ready access to any applicable portions of the PDMP and the permit.

b. Problem Identification

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

i. Pest Problem Description. The permit 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 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 permit 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.

ii. Action Threshold(s) The permit 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.

iii. 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 State. 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.

iv. Water Quality Standards Operators must identify any Outstanding Waters and any water(s) impaired for a specific pesticide or its degradates to which there may be a discharge.

c. Description of Pest Management Measures Options Evaluation

The permit 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 State.

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 a 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 State.

d. Response Procedures

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

i. 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.

ii. 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;
- Name, location, and telephone of nearest hazardous chemical responder; and (including police and fire department).

e. Signature Requirements

The PDMP must be signed and certified in accordance with the signatory requirements in the Standard Permit Conditions part of the permit. This requirement is consistent with standard NPDES permit conditions described in 40 CFR 122.22 and Regulation 61.8(4)(m) 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.

2. Pesticide Discharge Management Plan Modifications.

This permit requires that the PDMP be updated whenever any of the triggering conditions for corrective action in Part 6.1 of the permit 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 this permit. Keeping the PDMP up-to-date will help the Decision-maker ensure that the condition that triggered the corrective action does not recur. 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 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 to return to full compliance.

3. Pesticide Discharge Management Plan Availability.
The PDMP and all supporting documents must be immediately available to representatives of the Division, EPA, Tribal, or local agency governing pesticide applications, as well as representatives of the United States Fish and Wildlife Service (USFWS) at the time of an on-site inspection or upon request. This requirement is consistent with standard NPDES permit conditions described in 40 CFR 122.41 and Regulation 61.8(3)(c). The Division 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 40 CFR Part 2 and Regulation 61.5(4)(b), may not be withheld from the Division, EPA or the Services.

H. Corrective Action

The purpose of including corrective action requirements in this permit is to assist this new universe of NPDES permittees with effectively meeting technology-based and water-quality-based effluent limitations and implementing Pest Management Measures in this permit. Corrective action requirements apply from the time any authorized Operator begins discharging under this permit. These requirements are not tied to submission of an Annual Report (formerly Compliance Certification). Corrective actions in this permit are follow-up actions an Operator must take to assess and correct problems. They require review and revision of Pest Management Measures and pesticide application activities, as necessary, to ensure that these problems are eliminated and will not be repeated in the future. The permit makes clear that the Operator is expected to assess why a specific problem has occurred and document what steps were taken to eliminate the problem. The Division believes this approach will help Operators in complying with the requirements of the permit on a consistent basis. Compliance issues with some of the permit's requirements -- for instance, those related to reporting and recordkeeping and some of those related to operation and maintenance -- may be able to be corrected immediately simply by following already established procedures, and therefore, are not considered problems that trigger the corrective action provisions of the permit.

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

1. <u>Situations Requiring Revision of Pest Management Measures</u>

   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 NPDES permit) occurs;
   - Operators become aware, or the Division 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;
   - An inspection or evaluation by a Division official, EPA, or local or Tribal entity, determines that modifications are necessary to meet the non-numeric effluent limitations detailed in Part 2 of the PGP; or
   - An Operator observes or is otherwise made aware (e.g., a third party notification) of an adverse incident.

The Division considers the above situations to be of significant concern. Thus, the Division 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 is to ensure compliance with corrective action requirements through increased accountability and oversight. The Division views ongoing assessment of the effectiveness of Pest Management Measures and corrective actions as integral to an effective pesticide management program. Written records associated with corrective action assessments must be kept with the other recordkeeping documentation required by this permit.

2. Corrective Action Deadlines

The permit requires that corrective action be completed "before or, if not practicable, as soon as possible after the next pesticide application that results in a discharge." The Division emphasizes that this timeframe is not a grace period within which an Operator is relieved of any liability for a permit violation. The Division 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. The Division 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 the Division or the Operator may determine that further monitoring is needed under Part 6.3 of the permit to pinpoint the source of the problem, and this monitoring may need to be conducted during future pesticide application activities. However, the Division believes that in the vast majority of cases, 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. Effect of Corrective Action

The occurrence of a situation described in Part 6.1 may, but does not necessarily, constitute a violation of the permit. 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 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. The Division will consider the appropriateness and promptness of corrective action in determining enforcement responses to permit violations. The Division may impose additional requirements and schedules of compliance, including requirements to submit additional information concerning the condition(s) triggering corrective action, additional site-specific water-quality based limitations, additional monitoring requirements, or other schedules and requirements more stringent than specified in

this permit. Those requirements and schedules will supersede those of Parts 6.1 and 6.2 if such requirements conflict.

4. Adverse Incident Documentation and Reporting

Part 6.4 of the 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 the Division within 24 hours and then follow-up with a written report within 30 days of becoming aware of the adverse incident. The Division defines an "adverse incident" in Appendix A of the permit, but generally it is defined as any effect of a pesticide's use that is unexpected or unintended in which there is evidence that a person or non-target organism has likely been exposed to a pesticide residue and suffered a toxic or adverse effect.

Part 6.4.1 requires Operators to call the appropriate Division Incident Reporting Contact within 24 hours of any identified adverse incident and provide basic information about it. The purpose of this requirement is twofold: (1) to provide an opportunity for the Division to respond to these incidents as soon as reasonably can be expected, and (2) to provide a basis for potential corrective actions. The Division does not expect this initial notification to be detailed but merely a reporting of the date of the finding, a general discussion of the incident and a review of the necessity to conduct corrective action. The permit requires Operators to document the information identified in 6.4.1, including the date and time that the Division was notified and a description of any deviations from 6.4.1 notification requirements based on nuances of the adverse incident. For example, an Operator may decide to notify multiple Division 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 requires Operators to provide a written report of the adverse incident to the Division 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;
- Date and time you contacted the Division notifying the Division 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 individual 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.

The Division believes adverse incident information associated with discharges from the application of pesticides is useful because the information:

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

The Division 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. However, the Division believes that it is important 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. The Division acknowledges that some degree of detrimental impact to non-target species may occur and may be acceptable during the course of normal pesticide application. The Division 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 the Division in any review of current or future pesticide use, adherence to Pest Management Measures, or effectiveness of these measures. Reporting of adverse incidents is not required under this permit in the following situations: (1) you are aware of facts that indicate that the adverse incident was not related to toxic effects or exposure from the pesticide application; (2) you have been notified in writing by the Division 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 Annual Reports (formerly Compliance Certifications), pursuant to Part 7.3 and 7.4 of the permit.

5. Reportable Spills and Leaks

The Colorado Water Quality Control Act requires any spill that may impact waters of the state to be reported to the Division. The Division maintains guidance on the web site regarding spill reporting, including guidance on how to distinguish spills that may impact waters of the state from those that would not. The Guidance also includes information on recordkeeping, and the Division provides more specific details to operators as part of the follow up process once spills are reported. Because Colorado has distinct requirements for spill reporting, and those requirements apply to all operators in the state regardless of whether they do or do not have NPDES permit coverage for discharges associated with an activity that may be an activity related to a spill, no specific conditions were included in the permit regarding spill reporting and recordkeeping. However, if a spill or leak results in an adverse incident, then Operators must report the incident per the guidelines in Part 6.4.1 and 6.4.2.

6. Documentation for Other Corrective Action

For any event described in Part 6.1 of the permit, other than for adverse incidents, immediate reporting to the Division 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 any revision to Pest Management Measures is not necessary, the Operator must still document the review and the basis for this determination. The Division is not requiring Operators to submit this documentation. Rather, the Division expects Operators to retain this information on-site and upon request, to make any such records available to the Division, EPA or any other Federal, tribal or local regulatory agency governing pesticide applications.

I. Recordkeeping and Annual Reporting

This permit requires all Decision-makers and Applicators to maintain certain records to help them assess performance of Pest Management Measures and to document compliance with permit conditions. Recordkeeping and reporting requirements apply from the time any authorized Operator begins discharging under this permit. These requirements are consistent with Federal regulations at 40 CFR 122.41(j) and Regulation 61.8(3), but have been tailored to more closely reflect the requirements in the PGP. This permit 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, Decision-maker that is a small entity and Decision-maker that is a large entity). Part 7 of the permit sets forth the recordkeeping requirements for each of these types of Operators. Operators can rely on records and documents developed for other programs, such as requirements under FIFRA, provided all requirements of the permit are satisfied.

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

1. <u>Records to be kept by all Operators (all Decision-makers and all Applicators)</u>
   These records must be kept by *all* Operators, including those not submitting an Annual Report (formerly Compliance Certification). 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;
   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; and,
   d. A copy of any spill and leak or other unpermitted discharge documentation

2. <u>Records to be kept by all For-Hire Applicators</u>

All Operators who are For-Hire Applicators 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, the Division 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:

i. 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;

ii. Pesticide use pattern(s) (i.e., mosquito and other flying insects, weed and algae, animal pest, or forest canopy);

iii. Target pest(s);

iv. 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;

v. Name of each pesticide product used including the EPA registration number;

vi. Quantity of each pesticide product applied to each treatment area;

vii. Pesticide application date(s); and

viii. 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. <u>Records to be kept by Small Entities, Submitting an Annual Report (formerly Compliance Certification)</u>

Any Decision-maker that is required to submit an Annual Report (formerly Compliance Certification) 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 as outlined in Part 7.3 of the permit.

Decision-makers who are required to submit an Annual Report (formerly Compliance Certification) and who are defined as small entities are required to keep the following records:

a. Copy of the Annual Report (formerly Compliance Certification) submitted to the Division and any correspondence exchanged between the Decision-maker and the Division specific to coverage under this permit,

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:

i. Description of treatment area, including location and size (acres or linear feet) of treatment area and identification of any Waters of the State, either by name or by location, to which pesticide(s) are discharged;
ii. Pesticide use pattern(s) (i.e., mosquito and other flying insects, weed and algae, animal pest, or forest canopy);
iii. Target pest(s) and explanation of need for pest control;

iv. Description of pest management measure(s) implemented prior to the first pesticide application;

v. Company name and contact information for pesticide applicator;

vi. Name of each pesticide product used including the EPA registration number;

vii. Quantity of each pesticide product applied to each treatment area;

viii. Pesticide Application Start Date;

ix. Pesticide Application End Date; and

x. 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.

4. <u>Records to be kept by Large Entities, Submitting an Annual Report (formerly Compliance Certification)</u>

Any Decision-maker that is required to submit an Annual Report (formerly Compliance Certification) and is above the Small Business Administration (SBA) threshold for a small business or a public entity that 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 permit. The Division 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 the Division to

better characterize the discharges resulting from pesticide applications in a variety of different circumstances.

Decision-makers who are to submit an Annual Report (formerly Compliance Certification) and are defined as large entities must keep the following records as identified in Section 7.4 of the permit.

a. Copy of the Annual Report (formerly Compliance Certification) submitted to the Division and any correspondence exchanged between the Decision-maker and the Division specific to coverage under this permit

b. A copy of the PDMP, including any modifications made to the PDMP during the term of this permit;
c. Documentation of equipment calibration (only if Decision-maker is also the Applicator);
d. Information on each treatment area to which pesticides are discharged, including:

i. 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;

ii. Pesticide use pattern(s) (i.e., mosquito and other flying insects, weed and algae, animal pest, or forest canopy);

iii. Target pest(s) and explanation of need for pest control;

iv. Action Thresholds;

v. Method and/or data used to determine that action threshold(s) has been met;

vi. Description of pest management measure(s) implemented prior to the first pesticide application;

vii. Company name and contact information for pesticide applicator;

viii. Name of each pesticide product used including the EPA registration number;

ix. Quantity of each pesticide product applied to each treatment area;

x. Pesticide application date(s); and

xi. 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.

5. <u>Retention of Records</u>

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

The Division recommends that all Decision-makers keep records of acres or linear miles treated each calendar year for all applicable use patterns covered under this general permit. This record will help Decision-makers estimate when they will exceed the annual treatment area threshold (requiring submission of an Annual Report (formerly Compliance Certification)).

J. Definitions –

Definitions for the following terms were added and/or modified for the 2015 PGP renewal

- Annual Treatment Area Threshold
- Decision Maker Who is Required to Submit an Annual Report
- Impaired Water
- Irrigation Control District
- Operator
- Pest Management Measure

VIII. REFERENCES

A. Basic Standards and Methodologies for Surface Water, Regulation No. 31, Colorado Department of Public Health and Environment, Water Quality Control Commission, effective January 31, 2013.

B. Colorado Discharge Permit System Regulations, Regulation No. 61, Colorado Department of Public Health and Environment, Water Quality Control Commission, effective January 30, 2012.

C. Regulations for Effluent Limitations, Regulation No. 62, Colorado Department of Public Health and Environment, Water Quality Control Commission, effective July 30, 2012.

D. Section 303(d) List of Water Quality Limited Segments Requiring TMDLs, Regulation No 93, Colorado Department of Public Health and Environment, Water Quality Control Commission, effective March 30, 2012.

E. Colorado's Section 303(d) List of Impaired Waters and Monitoring and Evaluation List, Regulation No 93, Colorado Department of Public Health and Environment, Water Quality Control Commission, effective March 30, 2012.

F. Antidegradation Significance Determination for New or Increased Water Quality Impacts, Procedural Guidance, Colorado Department of Public Health and Environment, Water Quality Control Division, effective December 2001.

G. Memorandum Re: First Update to (Antidegradation) Guidance Version 1.0, Colorado Department of Public Health and Environment, Water Quality Control Division, effective April 23, 2002.

H. Determination of the Requirement to Include Water Quality Standards-Based Limits in CDPS Permits Based on Reasonable Potential, Colorado Department of Public Health and Environment, Water Quality Control Division, effective December2002.

I. Implementing Narrative Standards in Discharge Permits for the Protection of Irrigated Crops, Water Quality Control Division Policy WQP-24, March 10, 2008.

J. Regulation Controlling discharges to Storm Sewers, Regulation No. 65, Colorado Department of Public Health and Environment, Water Quality Control Commission, effective May 30, 2008.

K. United States Environmental Protection Agency (EPA), National Pollutant Discharge Elimination System (NPDES), Pesticide General Permit (PGP) for Discharges from the Application of Pesticides.

L. Appendix A to United States Environmental Protection Agency (EPA), National Pollutant Discharge Elimination System (NPDES), Pesticide General Permit (PGP) for Discharges from the Application of Pesticides.

IX. PUBLIC COMMENTS RECEIVED BY THE DIVISION

The following are summaries of comments received by the Division during Public Notice of the Pesticide General Permit. Comments were received from Mountain West PEST (Pesticide Education and Safety Training), the Colorado Department of Transportation and The Bijou Irrigation System. Division responses follow each comment.

Comment 1: Mountain West PEST commented that an expiration date listed for the permit was incorrect in that a 2020 expiration date would make the permit term 6 years long.

Response 1: This has been corrected. The permit shall expire December 31, 2019.

Comment 2: Mountain West PEST commented on its support for the Annual Report over the Compliance Certification, the due date of the Annual Report (February 1) and that large entities who were required to provide and Annual Report in the previous year (but not prior to that), have a Pesticide Discharge Management Plan (PDMP) completed by April 1 of the following year.

Comment 3: Mountain West PEST supports the clarifying definition of "Irrigation Control District" and the decision to provide reduced reporting requirements for smaller dischargers along those lengths of ditches that do not exceed 3 miles in length.

Response 3: See Response 10 below for further information about irrigation ditch lengths.

Comment 4: Mountain West PEST appreciates the emphasis placed on the fact that larvaciding does not count toward thresholds that trigger submission of Annual Reports; noting, however, that a permit is still required for discharge.

Comment 5: Mountain West PEST appreciates the clarification that Pest Management Measures (PMM) are components of an Integrated Pest Management (IPM) plan.

Response 5: This was identified as an issue in the previous permit where confusion arose concerning the definitions of PMM and IPM. Some dischargers, used to the term IPM, were unfamiliar with PMM. The Division uses PMM as sub-parts to an overall IPM plan.

Comment 6: Mountain West PEST commented on discharges to dry ditches asking for clarification on whether the Division means dry roadside ditches or dry irrigation ditches in the permit. This is due to the fact that, "Right-of-way applicators think of ditch as the drainage ditch beside the road. This area is usually dry. Aquatic applicators think of ditches as irrigation ditch[es] or canals. At times the ditch is dry and an application can be made to the dry canal."

Further: "The Federal Insecticide, Fungicide and Rodenticide Act (FIFRA) only allows pesticides to be used on a labeled site, i.e., aquatic, right-of-way. 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 or are applied to the water in either a liquid or pellet form. Some, but not all, aquatic herbicides may also be used in dry ditches."

"Obviously no aquatic weeds would be in dry ditches. A better approach would be to say that Aquatic or Terrestrial herbicides labeled for use on roadsides, right-of-ways, or dry ditches but that do not prohibit application to water [are allowable]."

Response 6: The Division agrees that applying aquatic herbicides to a dry ditch would be a violation of the label and therefore a violation of FIFRA and possibly the Clean Water Act. Therefore the Division has modified the language in the permit to clarify that aquatic or terrestrial pesticides, approved for applications to roadside ditches, right-of ways or dry ditches, and that do not prohibit discharges to water, may be used. To help identify these types of products, operators should look for label language that approximates the following:

> *"For Terrestrial Uses, do not apply directly to water, or to areas where surface water is present, or to intertidal areas below the mean high water mark. Do not contaminate water when disposing of equipment wash water. For Aquatic Uses, do not apply directly to water except as specified on this label."*(Reward).

Comment 7: CDOT commented that the change from Compliance Certification to Annual Report with a due date of February 1 is workable; and that the five year permit term is preferable as it allows the, "ability to build longer term weed management plans."

Comment 8: CDOT would like clarification about what herbicides are allowable for use in dry ditches.

Response 8: See Response 6

Comment 9: CDOT commented that they were unsure, since they are not a threshold entity, if applications to dry ditches need to be included in the Annual Report.

Response 9: The Division expects all applications of pesticides to be counted and included in Annual Reports, regardless of whether or not the entity is a "threshold entity". The Division does not expect that applicators performing spot spray applications will be able to measure coverage exactly. Reasonable estimates of coverage may be calculated by multiplying application rates by the amount of product used. These estimates may then be reported to the Division. Note that estimates are only acceptable for spot spray applications. All other applications should be tracked and reported using accurate, robust methods.

Comment 10: The Bijou Irrigation System provided information about the size and components of the system. Additionally they asked for clarifying definitions for what does and what does not constitute an Irrigation Control District, and provided supporting language to create these definitions. Finally, the System suggested that the 3-mile limit, below which irrigation ditch applicators were not obligated to report, be extended to 15 miles.

Response 10: The Division has considered these comments and has modified the definition of "Irrigation Control District". In the final PGP, "Irrigation Control District" is defined as "Any irrigation district (which may or may not be organized as special districts under Colorado law), ditch company (including mutual ditch companies, unincorporated ditch companies), or other similar private entity that supplies irrigation water, which also operates a system of irrigation ditches or canals greater than seven miles in length. 'Irrigation control districts' does not include end users of irrigation water (i.e. farmers) or carriage right ditches, drainage ditches, or similar intermediate irrigation delivery systems that are under seven miles in length, or do not directly contribute surface water return flows to Waters of the State."

The definition was modified for two reasons. First, the ditch-mile size threshold was increased from three miles to seven miles in response to Bijou's contention that a three mile limit was too short to effectively exclude those end users operating independently controlled, intermediate irrigation delivery systems that include carriage ditches of longer lengths. The Division felt that seven miles was an appropriate threshold that would provide reporting relief for most intermediate irrigation delivery systems. Secondly, the Division has explicitly carved out any intermediate irrigation delivery systems, regardless of size, that do not directly contribute return flows via a surface water connection. This language carves out other intermediate irrigation control systems which may be larger than seven miles in length but terminate before they can contribute return flows to larger irrigation ditches or state waters, such as those intermediate irrigation ditches which terminate in a percolation pond or, as is often the case, a farm field.

The Division believes this language will achieve two important objectives: first, it ensures that larger irrigation systems that EPA intended to be covered by the PGP will remain covered. Two, it decreases the administrative recordkeeping and reporting burden on smaller, independent irrigators that are separate and distinct from larger irrigation systems. The Division believes the modified definition strikes an appropriate Colorado-specific balance based on the limited number of comments received from irrigation districts during the stakeholder meeting and public notice processes.

Division Note: The Division added language to the **fact sheet** (Scope of the General Permit section) that clarifies Division/EPA jurisdictional responsibilities on federal and tribal lands. This language change was made after the public notice period had expired and was Division initiated with the intent of providing operators with guidance about which permit (EPA or Division) will be appropriate for those pesticide applications where jurisdictional obscurities may exist.