



ALASKA PESTICIDE MANAGEMENT PLAN TO PROTECT AND RESTORE WATER QUALITY

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“We think of our land and water and human resources not as static and sterile possessions but as life-giving assets to be directed by wise provisions for future days.” Franklin D. Roosevelt



ALASKA PESTICIDE MANAGEMENT PLAN TO PROTECT AND RESTORE WATER QUALITY

Introduction – the Plan’s Context and Purpose

The Alaska Pesticide Management Plan to Protect and Restore Water Quality (the Plan) is part of the Alaska Department of Environmental Conservation (ADEC) Pesticide Cooperative Agreement with the U.S. Environmental Protection Agency (EPA). The Pesticide Cooperative Agreement work plan describes the yearly priorities and work activities for ADEC with regards to pesticide enforcement and compliance, applicator certification and training, worker protection education, endangered species protection and water quality protection. This Alaska Pesticide Management Plan to Protect and Restore Water Quality describes ADEC’s approach to preventing and responding to pesticide contamination of water, while the yearly Cooperative Agreement work plan describes the water quality work priorities to implement this Plan during a specific year. That yearly work plan is available by contacting the ADEC Pesticide Program at 800-478-2577.

The primary purpose of this Plan is to prevent and respond to pesticide contamination of ground and surface water that results from the normal, legal use of EPA and ADEC registered pesticides. Implementation of this Plan provides additional protections for Alaska waters beyond that provided by EPA’s pesticide registration process. When registering a pesticide under the Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA), EPA considers the potential impact of the pesticide to water quality. EPA places restrictions or advisory statements on the pesticide label to mitigate that impact. However, those national level controls may not always produce the desired effects for the people of Alaska. Implementation of this Plan will provide additional protection to prevent contamination from occurring or, if it does occur, to reduce that contamination.

The Plan describes the lead role that the ADEC Pesticide Program – in cooperation with other State agencies and ADEC programs – will take to protect ground and surface water from pesticide contamination. The Plan places a strong emphasis on prevention of contamination to protect the

quality of this critical resource for all Alaskans. The Pesticide Program is already doing many of the activities described in this Plan.

Background – the Water Resource and the Use of Pesticides

Alaska is home to over 600,000 people from a wide variety of cultural and socioeconomic backgrounds. Clean, abundant water and healthy aquatic habitat are critical to Alaska's social and economic well-being. Alaska's waters and resources are the backbone of Alaska's economy, from fisheries to tourism. These same resources are the heart of the traditional subsistence lifestyle and are vitally important for nutrition, cultural integrity, spiritual well-being, and the quality of life Alaskans treasure.

The state is huge in size, encompassing over 589,000 square miles or 378,000,000 acres, an area roughly equivalent to one-fifth of the contiguous 48 states. Alaska contains over 3 million lakes, 365,000 miles of rivers and streams, over 174 million acres of wetlands, 44,000 miles of coastline and 11 Ecosystems. Sixty percent of the land is federal, 28% State of Alaska, 11.7 % native land and 0.3 % private land. A remarkable 40% of the nation's water resources are in Alaska. Alaskans use approximately 90 million gallons of water each and every day for domestic use. About 60 million gallons comes from surface waters and 30 million from groundwater.

There are approximately 1,598 federally regulated public water systems (PWS) in the State of Alaska. PWS are those systems that provide drinking water to a group of individuals and do not include single family homes or duplexes with their own private wells. Many "new" small community-type systems are starting up in the areas of rapid growth, such as Alaska's Matanuska-Susitna Valley. Alaska is a primacy state for drinking water and has direct oversight of public water systems within the state. Both the State of Alaska and the federal government regulate public water systems regardless of the source of drinking water, whether groundwater or surface waters.

Alaska's groundwater resources may be among the greatest in the nation. However, very few of Alaska's aquifers have been studied (or even located) and little water quality data is available. Groundwater is a source of drinking water for about 50% of Alaska's population and 90% of the state's rural residents. Eighty-seven percent of Alaska's public drinking water systems are supplied by groundwater. A small number of public

water systems (e.g. Anchorage and several southeastern communities) serve a large number of people from primarily surface water sources. Ninety percent of private drinking water supplies are groundwater. Of the 275 million gallons of water used each day for domestic, commercial, industrial and agricultural purposes in Alaska, roughly 23% is derived from aquifers. Groundwater is available in most areas of Alaska, except in the northern part of the state where permafrost is very deep. South-central and interior Alaska has the greatest dependence on groundwater. Residents living in arctic, western, and southeastern Alaska make more frequent use of streams, rivers, lakes, and rainwater catchments. The largest groundwater withdrawals occur in the Anchorage and Fairbanks areas and, to a lesser extent, the Matanuska-Susitna and Kenai Peninsula Boroughs in the south-central portion of the state.

General Groundwater Withdrawals in Alaska	
Private Water Supplies	9.8%
Agriculture	0.3%
Industrial, Commercial & Power Production	22.5%
Commercial	13.7%
Public Water Supplies	53.7%

Most of Alaska’s aquifers consist of unconsolidated materials derived from glaciers, rivers, and streams. Producing aquifers are typically unconfined (i.e., not protected by a layer of clay or silt), and the depth to groundwater can range from a few feet to more than 400 feet. Although water quality data is sparse, most of the state’s groundwater is suitable for domestic, agriculture, aquaculture, commercial, and industrial uses with moderate or minimal treatment. A range of activities either have affected or have the potential to affect groundwater quality (e.g., nonpoint pollution in urban areas, natural resource extraction activities in remote locations, and a wide range of potential point sources of pollution). The cost of cleaning up (remediating) contaminated groundwater can be staggering. For instance, using 2003 information, the EPA estimated that the average cost for remediating hazardous waste sites ranges from \$1 million to \$3 million. Estimates of the present and potential costs of remediation of contaminated Alaskan groundwater have not been compiled.

Alaska has 174,683,900 acres of wetlands comprising approximately 43% of the surface area of the state. By comparison, the entire remainder of the U.S. contains 103,000,000 acres of wetlands, comprising approximately 5% of the surface area. Significant percentages of wetlands in urbanized areas including Anchorage, Juneau, Fairbanks, the Matanuska Susitna Valley and the North Slope, have been lost or impacted. Because there is a strong correlation between water bodies that are listed as impaired by DEC and areas where wetlands have been impacted or developed, wetlands need restoration and mitigation of

impacts associated with development and/or protection. Specifically, wetland functions need to be maintained to enhance or protect water quality for drinking water, spawning, and other uses.

Historically, pesticide use in Alaska has been relatively low compared to other states primarily because of the small population and the limited number of pests. The amount of pesticide use has continually increased along with the population growth and the introduction of new pest species. Pesticide use has the potential to occur in a large array of Alaskan industries including oil and gas exploration, seafood processing, food plants, aquaculture, forest management, agriculture, and landscaping. There is additional use of pesticides by private and government, including military users. Currently there are no pesticide manufacturers or formulators in the state. Because of the vast and remote nature of the state, pesticide regulation poses some unique challenges. There are over 6,000 pesticide products registered annually in the state, and some of these pesticides have the potential to contaminate ground and/or surface water. The majority of the pesticide use is in urban, agricultural and industrial areas, such as the North Slope. 2, 4 D and glyphosate are the most commonly used herbicides for landscaping and carbaryl for spruce bark beetle control in urban settings. Various fungicides and herbicides are used in agriculture to manage Late Blight in potatoes and invasive weeds in hay production. The agricultural areas of the state are located in the Matanuska Susitna Borough, Fairbanks, Delta Junction, and Kenai Peninsula. Invasive weeds are also becoming a significant problem on government-owned land. The greatest volume of use continues to be biocides and disinfectants. There are also a few communities that have ADEC issued permits to control mosquitoes and biting flies, several of these products are applied directly to water.

State Water Protection Policy

“It is the policy of the state to conserve, improve, and protect its natural resources and environment and control water, land, and air pollution, in order to enhance the health, safety, and welfare of the people of the state and their overall economic and social well-being.”
[Alaska Statutes, Section 46.03.010]

Contamination Prevention

The Pesticide Program places a high priority on preventing contamination. Even if pesticides are not detected in water, the Program will continue their State-wide efforts to prevent contamination. These activities range from providing general information on protecting water quality for the

public to State-wide bans on the use of certain pesticides. Rather than responding to contamination of a pesticide – or a mixture of pesticides for which the toxic effects may not be well documented – detected through a limited monitoring network, the Pesticide Program believes the people of Alaska are best served through a strong State-wide prevention program.

ADEC will continue to select the appropriate prevention actions based on sound data. ADEC will continue to base these decisions largely on toxicological and environmental data available from EPA, such as that provided in Re-registration Eligibility Decisions. See: <http://www.epa.gov/pesticides/reregistration/status.htm>.

Many of the prevention activities described here will also be used in a more locally focused way if contamination is detected. The Pesticide Program's response to actual contamination is described later in this Plan.

State Pesticide Registration

Although EPA registers pesticides under federal regulations, ADEC also registers pesticides at the State level to ensure that they do not pose an “unreasonable adverse effect on human health, safety, or welfare, animals, or the environment.” ADEC will continue to use its pesticide registration authority under Title 18 of the Alaska Administrative Code, Sections 90.200 – 90.235 [18AAC 90.200-90.235] to evaluate and possibly place limitations on pesticides to protect the waters of the State from pesticide contamination. The Department may refuse to register a pesticide which would make its sale and use illegal in Alaska. During the registration process, ADEC can also classify a pesticide as Restricted Use, prohibit its use in designated areas, require a permit for its use, or limit its application rate or frequency [18 AAC 90.215]. For example, the Pesticide Program currently has denied State registration for all products containing picloram and outdoor use of any products containing atrazine due to water quality concerns. The Pesticide Program will continue to conduct marketplace and pesticide use inspections to enforce State registration restrictions. The current Cooperative Agreement Work plan contains information on the number of these inspections that are projected to be accomplished each fiscal year.

Education of the Public

The Pesticide Program will continue to provide information to the public on ways to protect ground and surface water from pesticide contamination. The emphasis of public education is on the use of pesticides by homeowners. This is typically done through displays at fairs, workshops and conferences plus presentations at schools and meetings. The Program also has relevant information on its website. For example, see “Consumer Tips” at: <http://www.dec.state.ak.us/eh/pest/index.htm>. The ADEC Pesticide Program also operates a toll-free telephone to answer

any and all inquiries about safe and legal pesticide use. All these phone calls are logged and reviewed.

Education of Pesticide Applicators and State Restricted Use Classification

Voluntary and mandatory education of pesticide users is a key part of the prevention program. Voluntary pesticide applicator education will continue through the Pesticide Program's newsletter, which is mailed to all certified pesticide applicators in the State and typically provides information on protecting water quality. The Program will also continue to make presentations on water quality protection at professional meetings attended by pesticide applicators.

Mandatory education of certain pesticide applicators will continue to be a primary focus of the prevention program. According to 18 AAC 90.300 - 90.315, all users of "Restricted Use Pesticides" plus commercial applicators of general use pesticides must be adequately trained, pass an examination, and be certified in the proper pesticide category of use before they can apply these pesticides. Pesticide products are classified as Restricted Use if they present a serious hazard to human health or the environment. Due to the required training and testing, users of Restricted Use Pesticides are expected to be more knowledgeable and in better compliance with the additional use restrictions on the product label that are aimed at mitigating the pesticide's hazards.

Although some pesticides are classified as Restricted Use by EPA due to water quality concerns, ADEC may classify other pesticides as State Restricted Use in order to protect the waters of the state from pesticide contamination [18 AAC 90.215(b)(3)]. Although they are not EPA Restricted Use, ADEC currently classifies products containing the following active ingredients as State Restricted Use due to water quality concerns: dacthal (DCPA), sulfometuron methyl, and sulfentrazone.

In Alaska, pesticide applicator training includes information on preventing water quality impacts and the tests contain questions related to water quality protection. Certified applicators are required to keep their knowledge up-to-date. A person's certification must be renewed every three years by attending a training session, completing a correspondence course, or obtaining a minimum of twelve continuing education hours approved by ADEC; plus, they must pass a written or oral renewal examination.

The Pesticide Program will continue to enforce the Restricted Use classification and applicator certification requirements [18 AAC 90.020 – 90.030]. They conduct routine inspections of certified dealers to ensure that these dealers are only selling Restricted Use Pesticides to certified applicators. The Program also conducts inspections of marketplaces

where pesticides are sold to ensure that Restricted Use Pesticides are not being sold by unlicensed dealers to the general public. The Program also conducts inspections of pesticide users to ensure they are properly certified. Please see the current Cooperative Agreement work plan for information on the number of each of these inspections projected to be accomplished and for more information on the “Certification and Training” program.

Enforcement of Pesticide Label Restrictions

As mentioned above, the labels on pesticide products contain restrictions on how the product can be used. Under FIFRA, ADEC has primary responsibility for enforcing these use restrictions. According to 18 AAC 90.020, it is illegal for any person to use a pesticide inconsistent with its labeling instructions. ADEC will continue to enforce the label directions designed to protect water quality as a basic component of its prevention approach.

The Pesticide Program will continue to conduct inspections and investigations to ensure compliance with water quality protection requirements on pesticide labeling. Those inspections include routine inspections of pesticide labeling in the marketplace to ensure that the labeling includes the restrictions required by EPA and routine inspections of pesticide users to ensure they are following those label restrictions. The Program also will continue to conduct investigations of all complaints of pesticide misuse. Again, the current Cooperative Agreement work plan contains information on the numbers of these inspections projected to be accomplished.

Pesticide Application Permits

Under 18 AAC 90.500 – 90.540, ADEC-issued permits are required for pesticide use on state-owned land or on land owned separately by two or more people, for pesticides applied by aircraft and for pesticides applied to the waters of the State. Compliance with the use requirements on the pesticide label is one of the basic requirements of a permit. The Department will continue to include additional conditions, for example “buffers” around surface water bodies, in a permit to protect human health and the environment [18 AAC 90.525], including water quality. However, if ADEC finds that the pesticide would still present an unreasonable adverse effect when used even with additional conditions, the Department will, at its discretion, deny that permit. The Pesticide Program will continue to conduct pesticide use inspections to enforce permit conditions. All ADEC Pesticide Permits require the permittee to submit a “Summary of Treatment Results” 90 days after the permit expires according to 18 AAC 90.535 which includes monitoring results and any observed effect on human health, safety or welfare, animals, or the environment.

Coordination with other programs

The agencies and programs listed below actively participate in activities that protect water quality in Alaska. With the exception of the Alaska Cooperative Extension, with which the Program routinely coordinates, the Program's interaction with these other programs typically occurs only when pesticide issues arise.

University of Alaska Cooperative Extension

Includes Integrated Pest Management, Sustainable Agriculture Research and Education, Pesticide Safety Education Program, and Water Quality Program.

See: <http://www.uaf.edu/ces/programs/lrpro.html>

ADEC Drinking Water Program and Source Water Program

See: <http://www.dec.state.ak.us/eh/dw/index.htm> and
http://www.dec.state.ak.us/eh/dw/DWP/source_water.html

ADEC Nonpoint Source Water Pollution Control Program

Includes storm water, wetlands, restoration and protection, and forestry sections

See: <http://www.dec.state.ak.us/water/wnpspc/index.htm>

Alaska Department of Natural Resources – Divisions of Agriculture and Forestry

See: <http://www.dnr.state.ak.us/ag/> and
<http://www.dnr.state.ak.us/forestry/>

Alaska State Soil and Water Conservation Districts

<http://www.alaskawcds.org/alaska/>

EPA Underground Injection Control Program See:

<http://yosemite.epa.gov/R10/water.nsf/476d8e2e8829cf19882565d400706530/51bbc02148429af1882568730082f6fa!OpenDocument>

EPA Hazardous Waste Program See:

<http://yosemite.epa.gov/R10/OWCM.NSF/webpage/homepage?opendocument>

Water Quality Monitoring

The Pesticide Program will use water quality monitoring to identify contamination to define the extent and likely source of contamination so that appropriate pesticide management actions can be chosen and also to

demonstrate that those management actions to reduce contamination are effective. While EPA's 2008-2010 Pesticide Cooperative Agreement Guidance encourages pesticide programs to conduct water quality monitoring, EPA does not require it. The Guidance allows state pesticide programs to rely on available monitoring. Nevertheless, if additional water quality monitoring is necessary to respond to contamination in Alaska, the Pesticide Program will identify and pursue available options.

Currently, there have been very few confirmed detections of pesticides in water in Alaska. This may be because pesticide use is relatively low but it also may be because there is little routine water quality monitoring for pesticides, especially for the more recently registered pesticides in the State.

Pesticide Program Approach to Monitoring

Monitoring conducted by public drinking water systems is the major monitoring conducted throughout the State for pesticides. The results of that monitoring are posted on the state website "Drinking Water Watch" at: <http://map.dec.state.ak.us/eh/dww/index.jsp>. The Pesticide Program will review these monitoring results at least quarterly each year and coordinate with the ADEC Drinking Water Program before taking steps to address any detection. Arrangements are being made with the Drinking Water Program for the Pesticide Program to be notified if there are any pesticide detections at or above the MCL.

Several government agencies may also monitor for private drinking water wells and the Pesticide Program will also evaluate that information when it becomes available. How well owners are notified about the monitoring results may depend on the agency procedures conducting the monitoring. Since the ADEC Drinking Water Program does not have the authority to regulate private wells, and this is an issue that still needs some resolution. The pesticide program in conjunction with the Alaska Cooperative Extension and the toxicologist at the Alaska Department of Health and Social Services Division of Public Health, Section of Epidemiology will notify and educate the private well owners about the toxicological significance of the detection. New options for managing private well contamination will be identified and pursued as the plan evolves.

The Pesticide Program will also evaluate any special pesticide water quality studies that become available. Each year, the Pesticide Program will continue its efforts to identify these types of studies through literature searches and contacts at the U.S. Geological Survey (USGS), the University of Alaska, the Municipality of Anchorage, and other programs within ADEC.

As it has in the past, the Pesticide Program may conduct limited sampling

of ground or surface water and analyze those samples via immunoassay. The Program does not consider immunoassay results to be appropriate for regulatory purposes but may use this cost-saving technique as an initial screening for other monitoring purposes. Any positive immunoassay results will be confirmed via standard pesticide analysis methods.

Pesticide application permits will also be a source of water quality data. When appropriate, the Department will continue to require the permit holder to submit an approved monitoring plan and conduct water quality monitoring as a condition of the permit. Monitoring is usually required to ensure that the stipulations included in the pesticide permit issued by ADEC are effective in preventing contamination. The Pesticide Program will continue to review this monitoring data.

The Pesticide Program will investigate all pesticide detections in water as soon as the Program is aware of the detection. The first step will be to verify the detection. The site where the detection occurred will be investigated by ADEC Pesticide Program staff or other cross-utilized ADEC staff to determine the likely source and extent of the contamination. Dealers and users of Restricted Use Pesticides are required to maintain records of all sales and applications and make them available to ADEC on request [18 AAC 90.400 – 90.415]. The Pesticide Program may survey dealers and users in an area to help determine the source of contamination. However, additional monitoring will likely be needed. The Program will explore options for conducting that monitoring. Options may include requiring additional monitoring from a permit holder, shifting funding to monitoring from within the Pesticide Program cooperative agreement or from the State pesticide registration program, requesting the manufacturer conduct some monitoring as a condition of state registration, or working with other agencies or ADEC programs to conduct the monitoring.

Following implementation of actions to control the use of a pesticide (see Response to Contamination); the Pesticide Program will use water quality monitoring or other methods to determine if those actions are effective. As described in the previous paragraph, the Pesticide Program will explore options for conducting water quality monitoring. Because water quality monitoring can be expensive, the Program may instead choose to conduct inspections to assess compliance with proven controls, such as State-wide or local bans on the sale and use of a pesticide.

Water Quality Monitoring and Assessment Strategy

The ADEC long term Water Quality Monitoring and Assessment Strategy (June 2005) addresses pesticides under the terms “toxic and other deleterious organic and inorganic substances” and “persistent organic pollutants.” See the link to the Strategy on:

<http://www.dec.state.ak.us/water/wqsar/index.htm>. In the Strategy, a key mechanism for prioritizing surface water monitoring is Alaska's Clean Water Actions (ACWA) initiative. See: http://www.dec.state.ak.us/water/acwa/acwa_index.htm. Under ACWA, the ADEC Division of Water works with the Department of Natural Resources and Department of Fish and Game to focus State and federal resources on the waters of greatest need. The Pesticide Program will work with the Division of Water to identify surface water monitoring needs for pesticides.

Quality Assurance

The Pesticide Program will collect water samples using the "Quality Assurance Project Plan for State of Alaska/EPA Pesticide Cooperative Agreement" (QAPP) and Quality Management Plan (QMP), which have been approved by EPA. The Pesticide Program will consult with the ADEC Water Quality Assessment and Monitoring Program regarding the design of any monitoring studies.

Data obtained from other sources is expected to be collected and analyzed using their quality assurance procedures. In those cases, the Pesticide Program will examine the quality control that was used in collecting the data. The data will only be used when it is of sufficient quality for the intended purpose. For example, data of questionable quality would not be used to create regulations but would be used to initiate follow-up sampling and to increase outreach activities until the follow-up results are available.

Response to Contamination

As the lead agency for regulating pesticide use, ADEC has the responsibility for selecting pesticide management actions that prevent unreasonable adverse effects on human health, wildlife or the environment, taking into account the economic, social, and environmental costs and benefits of a pesticide's use. [18 AAC 90.225 and 90.990(54)] A variety of voluntary and regulatory measures are available to the Department that may allow continued use of a beneficial pesticide while minimizing its risk.

Reference Points

The Pesticide Program will utilize a toxicological reference point for judging the severity of risk to human health and the environment posed by the contamination. The severity of contamination relative to the pesticide's reference point will be a major factor in ADEC's selection of pesticide management measures.

For those pesticides for which a State or federal standard exists, the reference point will be the established State Maximum Contaminant Level (MCL), EPA Health Advisory Level (HAL), or State Water Quality Criterion as described in the *Alaska Water Quality Criteria Manual*, (<http://www.dec.state.ak.us/water/wqsar/wqs/pdfs/70wqsmanual.pdf>.) The State Water Quality Criteria apply to groundwater and surface water. If an MCL, HAL, or Water Quality value exist for a pesticide, the Pesticide Program will choose the most restrictive value.

For pesticides that do not have a State standard of any kind or an EPA HAL, the Pesticide Program will consider using information from other sources, such as human health benchmarks calculated by USGS or EPA aquatic life benchmarks. See: http://www.epa.gov/oppefed1/ecorisk_ders/aquatic_life_benchmark.htm. These reference points from other sources might not be appropriate to use as a basis for regulatory action but could serve as a means to judge the severity of contamination until a State criterion is set. Because many currently used pesticides do not have numerical State standards of any kind, the Pesticide Program will work closely with the ADEC Division of Water and Drinking Water Program to ensure that an appropriate reference point is used.

Surface Water – Coordination with ADEC Division of Water

The ADEC Division of Water identifies “impaired waters” that do not meet State water quality standards. An important mechanism for focusing State and federal resources to restore waters of greatest need is the Alaska Clean Water Actions (ACWA) initiative. See: http://www.state.ak.us/dec/water/acwa/acwa_index.htm.

Currently, no impaired water bodies due to pesticides are listed in the Final 2006 Integrated Water Quality Monitoring and Assessment Report. However, this may change as additional water quality monitoring information becomes available.

See:

http://www.dec.state.ak.us/water/wqsar/waterbody/2006_final_integrated_report.htm

The Pesticide Program will review subsequent integrated reports to identify any impairment due to pesticides. Should a pesticide be the reason for impairment, the Pesticide Program will offer its expertise plus the pesticide management options discussed in this Plan to assist the Division of Water in developing and implementing a TMDL. If the Pesticide Program identifies any surface water monitoring data that might lead to an impairment designation or might lead to removal of a future designation, the Program will share that data with the Division of Water.

The Pesticide Program will work with the ADEC Division of Water to respond to pesticide detections in surface waters that are not listed as impaired. Under ADEC's charge to protect waters of the State from pesticide contamination [18 AAC 90.215], the Program will take action (described below) to prevent pesticides from reaching a State water quality criterion, with an ultimate goal of returning the water to pristine (no pesticide detection).

Groundwater – Coordination with State and Federal Programs

ADEC does not currently have a separate groundwater protection program. Responsibilities for groundwater protection are spread among several ADEC divisions and EPA. Protection of Alaska's groundwater is largely accomplished through the regulation of contaminated sites, storage tanks, spill response, and specific waste disposal activities under state and federal programs at this time. ADEC manages several programs that contribute to the protection of groundwater, including ADEC's Contaminated Sites, Storage Tank, Prevention & Emergency Response, Industry Preparedness & Pipeline, Solid Waste, Pesticides, Drinking Water, Wastewater, Watershed Development, Water Quality Protection, and Community Assistance & Information programs. US EPA's Underground Injection Control Program and a number of other important EPA programs, can also have a significant impact on groundwater quality in Alaska.

The Pesticide Program will coordinate its activities in response to any groundwater contamination with the ADEC Drinking Water Program, other appropriate ADEC divisions, and EPA.

Development of Response Strategy

If a pesticide is detected in ground or surface water, the Pesticide Program's first steps will be to confirm the detection and determine the likely source of the contamination and geographical extent of the contamination by conducting a site-specific investigation. The Program will work with the State Department of Health toxicologist and the Alaska Cooperative Extension to ensure that the well owner and/or well users are notified and provide appropriate information on the toxicological significance of the detection. Because the Drinking Water Program only works with public drinking water systems, the Pesticide Program will take the lead for working with private well owners if their wells become contaminated with pesticides. If the Pesticide Program determines that the contamination resulted from illegal use, spills, or illegal disposal of the pesticide, it will pursue enforcement action under 18 AAC 90.020 or refer the case to EPA for enforcement under federal hazardous waste law. If the contamination is from normal, legal use of a pesticide, the Pesticide Program will take a lead role in developing a response strategy in consultation with other water quality protection programs such as those

listed in the Contamination Prevention section. In developing the response strategy, the Pesticide Program will solicit the involvement of representatives of affected pesticide users, environmental groups, and water users. The response strategy will coordinate actions among water quality protection programs, describe the specific management actions that ADEC and other agencies/programs will take, describe the geographic scope of those actions, and describe Pesticide Program responsibilities for informing pesticide users of the management actions.

Pesticide Management Response Actions

ADEC will choose pesticide management actions that, based on available information and ADEC's judgment, will return the water to pristine conditions (no pesticide detection). In selecting a management action, ADEC will consider factors such as the availability of information demonstrating the effectiveness of management options for the pesticide, the economic value of the pesticide's use, the likelihood of adoption of voluntary measures, and the Pesticide Program's ability to enforce mandatory measures. ADEC will also consider the likelihood of the pesticide contaminating areas of the State where it has not yet been detected and may implement management actions in those areas.

The management actions described in the Contamination Prevention section of this Plan will typically be those considered in response to pesticide detections in water. These actions include voluntary measures such as general education of pesticide applicators and implementation of best management practices (BMPs) or integrated pest management practices. Other management options involve ADEC regulatory action, such as requiring pesticide applicator education by classifying a pesticide as State Restricted Use, adding additional requirements to a pesticide's use under a permit, limiting its application rate or frequency, or prohibiting a pesticide's use in designated areas or the whole State.

As described in the Monitoring section, the Pesticide Program will use water quality monitoring or other methods to determine if the implemented actions have been effective. If the actions have not been effective, more stringent actions will be needed. The Pesticide Program will then modify the original response strategy, in consultation with representatives of the group that helped develop it.

Contamination Action Levels

To meet its goal of protecting the waters of the State from pesticide contamination, ADEC will select pesticide management measures that are increasingly stringent in response to higher contamination concentrations. The table below does not replace ADEC's consideration of its legal mandates but provides insight into the stringency of possible management

actions at various levels of contamination compared to the reference point.

Contamination Action Levels and Prevention / Response Options

* These options may be modified if contamination is detected in multiple locations

Concentration Relative to Reference Point	Potential Prevention / Response Options
Action Level 1 – No Detection	Conduct Statewide water quality education Include stipulations/restrictions in permits Classify as State Restricted Use Pesticide Deny or place additional conditions on State registration
Action Level 2 – Detection to 50% of Reference Point	Level 1 actions plus: Implement voluntary actions (e.g., BMPs) in local area per response strategy Implement similar actions in other areas of similar vulnerability
Action Level 3 – 50% up to 100% of Reference Point	Levels 1 & 2 actions plus: Implement mandatory (instead of voluntary) use restrictions in local area
Action Level 4 – 100% or more of Reference Point	Revoke/deny permits in local area Prohibit use in local area Prohibit sale, distribution, and use in State

Performance Measures and Reporting

Under the Pesticide Cooperative Agreement, the Pesticide Program will use the performance measures described in the 2008 – 2010 Pesticide Cooperative Agreement to evaluate the implementation of this Plan. These EPA measures do not influence the mechanisms that ADEC uses to protect waters of the State or respond to contamination.

The Pesticide Program will use EPA's three-tier approach. The steps are: 1) evaluate "pesticides of interest," 2) manage "pesticides of concern," and 3) demonstrate progress of the management actions.

A "pesticide of interest" is one that is listed in the EPA Guidance (see Appendix) plus any pesticides that the ADEC has deemed "of interest" only in Alaska. The Pesticide Program will evaluate these pesticides to determine if they are likely to be detected in ground or surface water in Alaska, consistent with the pesticide registration criterion of "protection of waters of the state from pesticide contamination" [18 AAC 90.215]. The evaluation will be based on the Program's review of information on use of the pesticide in Alaska, available water quality monitoring data, and environmental fate data. The Program may decide that some of the pesticides on the EPA list are not likely to be detected in Alaska. The EPA performance metric is:

$$\frac{\text{Evaluated pesticides of interest}}{\text{Number of pesticides of interest}} \times 100\%$$

The Program will consider a "pesticide of concern" to be one that is likely to be detected in ground or surface water in Alaska and therefore needs to be managed under this Plan. The EPA performance measure is:

$$\frac{\text{Number of pesticides of concern managed}}{\text{Number of pesticides of concern identified}} \times 100\%$$

EPA's third measure is aimed at quantifying the number of pesticides for which some form of management has demonstrated progress toward keeping (or returning) pesticide concentration in water below a reference point. This measure is:

$$\frac{\text{Number of pesticides of concern managed for which there is demonstrated progress toward reduction or maintenance of concentrations below the reference point}}{\text{Number of pesticides of concern managed}} \times 100\%$$

Again, the Pesticide Program will measure progress toward returning water to pristine (no pesticide detection) conditions. For all three metrics the goal is to reach 100%. However, it may take many years to reach that goal. Therefore, milestones in reaching the goals will be incorporated into the yearly Pesticide Cooperative Agreement work plan.

Under the Cooperative Agreement, the Program will report progress on these three performance measures plus certain information upon which the measures are based. EPA is currently (2007) developing a database that will compile this information so that it can be shared within EPA and among states.

APPENDIX

Pesticides that are listed as pesticides of national interest

and also in Alaska 2007

Pesticide	Leachability	Registration Status in Alaska	Detects?
Acetochlor	High Leachability	Not Registered in Alaska	No Detects
Acifluoren	High Leachability	Not Registered in Alaska	No Detects
Alachlor	Medium Leachability	Not Registered in Alaska	No Detects
Aldicarb	High Leachability	Not Registered in Alaska	No Detects
Atrazine	High Leachability	Not Registered in Alaska	No Detects
Bentazon	High Leachability		No Detects
Bromacil	High Leachability		No Detects
Carbaryl	High Leachability		No Detects
Carbofuran	High Leachability	Not Registered in Alaska	No Detects
Dacthal	High Leachability	State RUP	No Detects
Diazinon	Medium Leachability		No Detects
Dicamba	High Leachability		No Detects
Diuron	High Leachability		No Detects
EPTC	Medium Leachability	Not Registered in Alaska	No Detects
Fenamiphos	High Leachability	Not Registered in Alaska	No Detects
Fluometuron	High Leachability	Not Registered in Alaska	No Detects
Hexazinone	High Leachability		No Detects
Lindane	High Leachability	Not Registered in Alaska	No Detects
Linuron	High Leachability		No Detects
Metalaxyl	High Leachability	Not Registered in Alaska	No Detects
Methomyl	High Leachability		No Detects
Metolachlor	High Leachability	Not Registered in Alaska	No Detects
Metribuzin	High Leachability		No Detects
Norflurazon	Medium Leachability	Not Registered in Alaska	No Detects
Picloram	High Leachability	Not Registered in Alaska	No Detects *
Prometon	High Leachability		No Detects
Propachlor	Medium Leachability	Not Registered in Alaska	No Detects
Simizine	High Leachability		No Detects
Terbufos	High Leachability	Not Registered in Alaska	No Detects
Tebuthinuron	High Leachability	Not Registered in Alaska	No Detects

*Detect 8 years ago in Public Drinking Water system (not near MCL). Investigation could not find a cause, and system undetectable now for 6 years.

Additional Alaska State Interests:

Pesticide	Leachability	Registration Status in Alaska	Detects?
2,4 D	High Leachability		No Detects**
Sulfometuron Methyl	High Leachability	State RUP	No Detects
Bromoxynil	High Leachability		No Detects
Butachlor	High Leachability	Not Registered in Alaska	No Detects
Diclofopmethyl	High Leachability	Not Registered in Alaska	No Detects
Propazine	High Leachability	Not Registered in Alaska	No Detects
Terbacil	High Leachability	Not Registered in Alaska	No Detects
Triallate	High Leachability	Not Registered in Alaska	No Detects
DCPA	High Leachability	State RUP	No Detects
Sulfentrazone		State RUP	No Detects

** 2 detects one surface water (pond in Anchorage), private well (in Mat-Su Valley) 7 years ago, currently no detects.

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