Rick Mystrom, Mayor

1999 ANCHORAGE PESTICIDE USE SURVEY

Document No.: WMP CPr99001

MUNICIPALITY OF ANCHORAGE
WATERSHED MANAGEMENT PROGRAM

DECEMBER 1999

WATERSHED MANAGEMENT

Department of Public Works

Rick Mystrom, Mayor

1999 Anchorage Pesticide Use Survey

MUNICIPALITY OF ANCHORAGE
WATERSHED MANAGEMENT PROGRAM

DECEMBER 1999

Document No.: WMP CPr99001

WMS Project No.: 99001

Prepared for:

Watershed Management Section
Project Management and Engineering
Department of Public Works
Municipality of Anchorage

Prepared by:

URS Greiner Woodward Clyde

WATERSHED MANAGEMENT

Department of Public Works

CONTENTS

Section **Page**

INTRODUCTION

The Municipality of Anchorage (MOA) Pesticide Survey has been developed to comply with the United States Environmental Protection Agency's (EPA) National Pollutant Discharge Elimination System (NPDES) Permit No. AKS05255-8. The permit requires that a program be developed to control the discharge of pesticides into the municipal separate storm sewer system (MS4). The Pesticide Survey addresses the following NPDES permit stipulations:

- *[Part II A (1)(e)] Pesticide, Herbicide, and Fertilizer Application. Permittees shall implement the following program to control the discharge of pesticides, fertilizers, and herbicides to the MS4:*
- *[Part II A (1)(e)(1)] Permittees shall develop a pesticide screening program which, at a minimum, shall incorporate the following elements:*
    - *[Part II A (1)(e)(1)(a)] Permittees shall evaluate the use of pesticides, herbicides, and fertilizers in Anchorage by compiling readily available information from sources including, but not limited to, the Cooperative Extension Service, Alaska Department of Environmental Conservation (ADEC) pesticide program, primary retail and wholesale outlet sources, and commercial applicators. The end result of this effort shall be to determine the types of products recommended and used in the Anchorage area. The information gathered through this effort shall be provided to the Regional Administrator and ADEC as part of the first annual report required by Part IV.G. of this permit.*

Pesticide Regulations

In 1947 the Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA) gave the United States Department of Agriculture administrative authority to register and control the use of pesticides in the United States. The Federal Environmental Pesticide Control Act of 1972 amended FIFRA, expanded the scope of the original law, and transferred authority for pesticide regulation to the EPA. FIFRA regulations address the manufacture, classification, registration, labeling, transportation, and disposal of pesticides as well as many other criteria.

ADEC is designated as the lead agency in Alaska for implementation of certain aspects of FIFRA. Title 36 Chapter 03 Article 5 Section 46.03.320 gives ADEC statutory authority to implement pesticide controls in the State of Alaska. Pesticide regulations are found in 18 Alaska Administrative Code (AAC) 90, effective February 15, 1998. 18 AAC 90 subsections address:

- Prohibitions; distribution, sale, and purchase requirements; and discharge notification requirements;
- Pesticide registration;
- Certification and record keeping requirements for applicators;
- Pesticide program permit requirements;
- Pesticide handling requirements;
- Inspection and enforcement procedures; and
- General provisions.

The ADEC Pesticides Services Program maintains a website with detailed information regarding Alaska pesticide regulations (ADEC 1999a).

Standards and guidelines have been established for many pesticides. In general, the criteria are estimates of concentrations in water below which adverse effects on human health or aquatic life are not expected

to occur. Alaska water quality standards for pesticides are promulgated in 18 AAC 70 (as amended through May 27, 1999).

Pesticide water quality standards have several limitations:

- Criteria for both human health and aquatic life have not been established for many pesticides.
- Criteria have not been established for most pesticide transformation/breakdown products.
- Established criteria do not take into account possible additive or synergistic effects of combinations of pesticides, pesticide transformation products, or other chemicals that may be present in water.

Pesticide Definition

A "pesticide" is defined by the State of Alaska as: "a chemical or biological agent intended to prevent, destroy, repel, or mitigate plant or animal life and any substance intended for use as a plant regulator, defoliant, or desiccate, including insecticides, fungicides, rodenticides, herbicides, nematocides, and biocides." For the purposes of MOA's pesticide program the term "pesticide" will represent fungicides, herbicides, and insecticides.

Historical Pesticide Data

Past investigations have not detected pesticide compounds in MOA storm water runoff samples (MOA 1992). The United States Geological Survey (USGS) established a Cook Inlet Basin study unit as part of National Water Quality Assessment Program (NAWQA) and began water quality sampling in 1997. Two of the six basic fixed sites are located within MOA: Chester Creek at Arctic Boulevard and South Fork Campbell Creek. Water samples collected at these two sites from October 1998 to September 1999 were analyzed for the presence of pesticide compounds and other parameters, however validated data is not yet available (USGS 1999a). The unvalidated data indicate that pesticides were not detected in the NAWQA Anchorage water samples. The Chester Creek site will be sampled as an intensive fixed site in 2000, and will include analysis for pesticide compounds.

PESTICIDE USE SURVEY

Information regarding the types of pesticides available in Anchorage for non-commercial and commercial applications and potential usage is reviewed and summarized below.

This survey was conducted using readily obtainable information and has certain limitations that should be kept in mind:

- Only three types of "pesticides" are included; fungicides, herbicides, and insecticides.
- ADEC marketplace surveys from every retail/wholesale outlet in Anchorage were not included.
- Pesticide use studies and surveys conducted in the lower-48 are not necessarily comparable with Anchorage conditions.
- Survey information addressing private/homeowner pesticide use is not currently available.

Alaska Department Of Environmental Conservation

The ADEC Pesticide Program conducts annual marketplace surveys of retail/wholesale outlet and commercial applicator pesticide inventories. The surveys are not necessarily conducted at the same locations each year. These surveys provide valuable information regarding the types of pesticides available for use in the Anchorage area. However, Anchorage residents do not necessarily use all pesticide types available for sale since retail and wholesale outlets in Anchorage serve consumers statewide. Information from ADEC pesticide marketplace surveys conducted at retail establishments in 1998 and 1999 are presented in Table 1 (ADEC 1999c).

Based on experience, ADEC Pesticide Program personnel were able to provide information regarding the type of pesticides commonly used by Anchorage commercial applicators (ADEC 1999b). This information has also been included in Table 1, and is listed below by the active ingredient of the pesticide followed by trade names in parentheses.

- **2, 4-D (multiple trade names):** herbicide for the control of broadleaf weeds.
- **Glyphosate (multiple trade names):** herbicide for weed control.
- **Bendiocarb (Ficam):** insecticide for control of nuisance household insects.
- **Carbaryl (multiple trade names):** insecticide for control of aphids, spruce bark beetle and numerous other insect pests.
- **Cyfluthrin (Tempo):** insecticide for control of nuisance household insects.

ADEC has conducted environmental fate analyses on selected pesticides (ADEC 1997). The pesticides chosen were based on marketplace surveys and pesticide "use" surveys targeted at the agricultural community. Several of the pesticides evaluated are available through Anchorage retail outlets in various formulations (i.e., 2, 4-D, glyphosate, lindane, methoxychlor, and oxamyl). Pertinent information on these pesticides has been included in Table 1.

University Of Alaska Cooperative Extension Service

The University of Alaska Cooperative Extension Service (CES) is a key source of pest control information for the general public. The CES has numerous publications available in hard copy and electronically on the Internet that address various pest control strategies. The publications provide a range of control approaches based on different potential pest problems. CES also has an Integrated Pest Management (IPM) information call-in service for more in-depth help with pest problems and questions (CES 1999a).

CES Pesticide Impact Assessment Program personnel were able to provide information regarding pesticides most commonly asked about by the general public (CES 1999b). The pesticides are referenced in Table 1 and listed below by active ingredient only.

- **2, 4-D (multiple trade names):** herbicide for the control of broadleaf weeds.
- **Dicamba (multiple trade names):** herbicide for weed control.
- **Carbaryl (multiple trade names):** insecticide for control of aphids, spruce bark beetle and numerous other insect pests.

CES conducted a pesticide use survey in 1994 via questionnaires distributed to agricultural growers, retail/wholesale pesticide outlets, and commercial applicators (CES 1995). Commercial applicators commonly purchase pesticides with a higher percentage of active ingredients than those available through retail outlets. Pesticides listed as used by commercial applicators in this survey are referenced in Table 1.

CES has also classified pesticides that are used in Alaska for their potential surface movement from surface water runoff (CES 1992). Many properties affect the potential for pesticide surface runoff therefore numeric values are not assigned when classifying a pesticide. Available potential surface loss classifications are presented in Table 1 for pesticides identified in this survey.

United States Geological Survey

The USGS recently published the results from the first phase of the NAWQA testing for pesticides in streams of the United States (USGS 1999b). Water quality samples were collected from agricultural and urban basins and analyzed for 83 pesticide compounds. Although the sample locations were located in the lower-48, the results may provide insight for potential pesticide use in Anchorage.

Herbicides found more often in urban streams than agricultural streams were 2,4-D, prometon, diuron, simazine, and tebuthiuron. This survey has identified two of these herbicides as being available for use in Anchorage.

- **2, 4-D (multiple trade names):** herbicide for the control of broadleaf weeds.
- **Prometon (multiple trade names):** herbicide for weed control.

Insecticides found more frequently in urban streams than in most agricultural streams were carbaryl, chlorpyrifos, diazinon, and malathion. This survey has identified all four of these insecticides as being available for use in Anchorage.

- **Carbaryl (multiple trade names):** insecticide for control of aphids, spruce bark beetle and numerous other insect pests.
- **Chloropyrifos (multiple trade names):** insecticide for control of various insects on vegetable and fruit crops.
- **Diazinon (multiple trade names):** insecticide for the control of various ornamental and household insects.
- **Malathion (multiple trade names):** insecticide for the control of various vegetable, ornamental, and household insects.

Miscellaneous Surveys

American Pest Management (APM) personnel were contacted to obtain information regarding common pesticides used by commercial applicators for landscape maintenance (APM 1999). The information is referenced in Table 1 and listed below by the active ingredient of the pesticide, followed by a trade name in parentheses.

- **Thiophanate-ethyl (Cleary's 3336WP):** fungicide applied 3 to 4 times during the spring to control black knot (*Dibotryon* sp.) on chokecherries.
- **Triclopyr (Confront):** herbicide applied approximately 3 times annually to control dandelions (*Taráxacum* sp.).
- **Carbaryl (Sevin FL):** insecticide applied on an as-needed basis for the control of aphids (Aphididae) on ornamentals.
- **Methyl anthranilate (Turf Shield):** feeding repellant for geese (tribe *Anserini*) applied seasonally to large turf areas.

The EPA conducted a statewide pesticide profile for Alaska in the late 1980's (EPA 1986). Since the information was dated, the EPA data was not included in this survey; however, it should be noted 2, 4-D was identified as the most widely used herbicide at that time.

A marketing survey conducted in the lower-48 as part of a study to look at runoff from lawns identified the herbicides 2,4-D and mecoprop; and the insecticides chloropyrifos and diazinon as the most commonly used pesticides on residential lawns (Schueler 1995).

Summary

A review of the information presented in this survey indicates that currently the herbicide 2,4-D and the insecticide carbaryl are among the most commonly used pesticides in the Anchorage area at the present time. Seasonal pest trends will influence which pesticides are used commercial and non-commercial purposes. For instance, the abundance of the spruce bark beetles (*Dendtroctonus refipennis*) has likely increased the use of carbaryl. Seasonal trends aside, 2,4-D and carbaryl are both broad spectrum pesticides that can be used for control of various broadleaf weeds and insects; therefore, it is likely that both of these pesticides will continue to be commonly used within the MOA boundaries.

Table 1. 1999 Anchorage Pesticide Use Survey

COMMON NAME ACTIVE INGREDIENT[1,2]	AVAILABLILITY[3,4] RETAIL	AVAILABLILITY[3,4] COMMERCIAL	POTENTIAL USAGE IN MOA[5,6,7]	PRINCIPAL USES[1,2]	SURFACE LOSS POTENTIAL[2,8]	TOXICITY CATEGORY[9]
FUNGICIDES						
BENOMYL	X	X	Low	fungal diseases of crops and ornamentals; snow mold	LOW	IV
CAPTAN	X	X		fungal diseases of crops and ornamentals	LOW	I-IV
CHLOROTHALONIL	X	X		fungal diseases of crops and ornamentals	HIGH	II
COPPER SULFATE	X			bacterial/fungal diseases of crops and ornamentals	LOW	I
CYPRIC (copper) HYDROXIDE	X			fungal diseases of vegetables and fruits		III
ETRADIAZOLE		X		soil fungal diseases of crops and ornamentals		II
MANCOZEB	X			fungal diseases of vegetables and fruits	HIGH	IV
MANEB	X	X		fungal diseases of vegetables and fruits	MEDIUM	III
SULFUR	X			fungal diseases of crops and ornamentals	HIGH	IV
THIOPANATE		X	Low	black knot on chokecherries in Anchorage		III, IV
THIRAM	X			fungal diseases of crops and ornamentals	MEDIUM	III
TRIFORINE	X			fungal diseases of crops and ornamentals	MEDIUM	I
VINCLOZOLIN		X		fungal diseases of crops and ornamentals	LOW	IV
HERBICIDES						
2,4-D	X	X	High	annual and perennial broadleaf weed control	MEDIUM	II - IV
DALAPON	X			annual and perennial grass control	HIGH	III
DICAMBA	X		Medium	annual and perennial broadleaf weed control	LOW	II
DICHLOBENIL	X			annual broadleaf and grassy weeds	MEDIUM	III
DIQUAT	X			non-crop and aquatic weed control		III,IV
EPTC	X			annual grassy weeds	MEDIUM	III
FLUAZIFOP-P-BUTYL	X			annual and perennial grass control		III,IV
GLUFOSINATE	X			nonselective weed control		III,IV
GLYPHOSATE	X	X	High	nonselective weed control	HIGH	II
IMAZAPYR	X			grassy, broadleaf, and vine weed control		I
LINURON	X			selective grassy and broadleaf weed control	HIGH	III, IV

Table 1. 1999 Anchorage Pesticide Use Survey Con't

COMMON NAME ACTIVE INGREDIENT[1,2]	AVAILABLILITY[3,4]		POTENTIAL USAGE IN MOA[5,6,7]	PRINCIPAL USES[1,2]	SURFACE LOSS POTENTIAL[2,8]	TOXICITY CATEGORY[9]
	RETAIL	COMMERCIAL				
HERBICIDES con't						
MECOPROP	X			selective control of creeping broadleaf weeds	HIGH	III,IV
METRIBUZIN	X			annual grasses and broadleaf weed control	MEDIUM	III
OXYFLUORFEN	X			selective broadleaf weed control		I
PENDIMETHALIN	X			annual grasses and broadleaf weed control	LOW	III
PROMETON	X			nonselective weed control	HIGH	III,IV
SODIUM CHLORATE	X	X		nonselective weed control		II
TRICLOPYR	X	X	Low	annual and perennial broadleaf weed control		III,IV
TRIFLURALIN	X			annual grassy and broadleaf weeds	HIGH	II, III
INSECTICIDES						
ACEPHATE	X	X		various insects on vegetables, fruits, and ornamentals	LOW	III
AZADIRACHTIN	X			various insects on vegetables, fruits, and ornamentals		III, IV
BACILLUS THURINGIENSIS, ISRAELENSIS	X			aquatic immature mosquito and black fly control		III
BACILLUS THURINGIENSIS, KURSTAKI	X			caterpillar control on vegetables, fruits, and ornamentals		III
BENDIOCARB	X	X		nuisance household insects	LOW	II
BORIC ACID	X			nuisance household insects		
BUTYLCARBITYL	X			nuisance household insects		III, IV
CARBARYL	X	X	High	aphids, spruce bark beetles and numerous other insects		II
CHLOROPYRIFOS	X			various insects on vegetables and fruits	HIGH	III, IV
CYFLUTHRIN	X	X		nuisance household insects	LOW	I, II
DIAZINON	X	X		nuisance household insects	MEDIUM	II, III
DICHLORVOS	X			various insects on ornamentals and in household	LOW	I
DICOFOL	X			mite control on vegetables, fruits, and ornamentals	HIGH	II, III
DISULFOTON	X	X		sucking insects on crops and ornamentals	MEDIUM	I
ESFENVALERATE	X			various insects on vegetables, fruits, and nut trees	HIGH	II
FENBUTATIN-OXIDE	X			mite control on ornamentals, fruit and nut trees	HIGH	I

Table 1. 1999 Anchorage Pesticide Use Survey Con't

COMMON NAME ACTIVE INGREDIENT[1,2]	AVAILABLILITY[3,4]		POTENTIAL USAGE IN MOA[5,6,7]	PRINCIPAL USES[1,2]	SURFACE LOSS POTENTIAL[2,8]	TOXICITY CATEGORY[9]
	RETAIL	COMMERCIAL				
INSECTICIDES con't						
HYDRAMETHYLNON	X			fire ants and cockroaches	LOW	III
LINDANE	X	X		control of lice and mites on humans; spruce bark beetle	HIGH	II
MALATHION	X	X		wide spectrum control of insects, lice and, mites	LOW	III
METHOXYCHLOR	X	X		wide spectrum control of insects	LOW	III
MGK 264	X			fly control on livestock and poultry	LOW	
NAD (1-NAPHTHALENE ACETAMIDE)	X			Moth balls; cloths moths and carpet beetles	LOW	III, IV
OXAMYL		X		wide spectrum of insects, mites, and ticks	LOW	I
PETROLEUM OILS	X			scale insects, aphids, and mites	MEDIUM	IV
PERMETHRIN	X	X		various insects on vegetables and ornamentals	HIGH	II, III
PYRETHRIN	X			various insects on ornamentals and in household		III, IV
RESMETHRIN	X			flying and crawling insects in household	LOW	III, IV
ROTENONE	X			Nuisance household insects	LOW	
SULFLURAMID	X			Roach and ant control		IV
TETRAMETHRIN	X			Nuisance household insects	LOW	III, IV

References and Notes: Blanks in table indicate data is unknown or unavailable.

1 CPCR 1990

2 PMEP 1999

3 ADEC 1999c

4 CES 1995

5 APM 1999

6 ADEC 1999b

7 CES 1999b

8 CES 1992

9 Toxicity Categories:

I = Danger

II = Warning

III = Caution

IV = Caution

Surface Loss Potential: refers to potential for a pesticides to move in surface water runoff

REFERENCES CITED

Alaska Department of Environmental Conservation (ADEC). 1997. Regulated SOC/OOC Physical, Chemical, and Use Characteristics. Pesticide Program.

_____ 1999a. Pesticides Services Program. http://www.state.ak.us/local/akpages/ENV.CONSERV/deh/pesticides/

_____ 1999b. Pesticide Program. Personal communication with Rosemarie Lombardi.

_____ 1999c. Pesticide Program Market Place Surveys from 1998 and 1999.

American Pest Management (APM). 1999. Personal communication with Larry Jones.

CPCR. 1990. Crop Protection Chemicals Reference. 6th Edition. Chemical and Pharmaceutical Press and John Wiley & Sons, New York.

Municipality of Anchorage (MOA). 1992. NPDES Permit Application Part 1, Table 4-3.

Pesticide Management Education Program (PMEP). 1999. Pesticide Active Ingredient Profiles. Cornell University. http://pmep.cce.cornell.edu/profiles/index.html

Schueler, Tom. 1995. Urban Pesticides: From Lawn to the Stream. Watershed Protection Techniques. 2(1). http://www.pipeline.com/~mrrunoff/pest.htm

United States Environmental Protection Agency (EPA). 1986. Alaska Pesticides Profile. EPA 910/9-86-139. Alaska Operations Office.

_____ 1999. Restricted Use Products (RUP) Report. Office of Pesticide Programs. http://www.epa.gov/RestProd/

United States Geological Survey (USGS). 1999a. Water Resources Divisions, Anchorage. Personal communication with Gary Sorin.

_____ 1999b. Pesticides in Streams of the United States – Initial Results from the National Water Quality Assessment Program. Water Resources Investigations Report 98-4222.

University of Alaska Cooperative Extension Service (CES). 1992. Factors Affecting Pesticide and Nutrient Movement in Alaska Soils. Document No. 100G-00543. University of Alaska Fairbanks and United States Department of Agriculture.

_____ 1995. 1994 Alaska Pesticide Use Survey. University of Alaska Fairbanks.

_____ 1999a. University of Alaska Cooperative Extension Service Home Page. http://www.uaf.edu/coop-ext/

_____ 1999b. Pesticide Impact Assessment Program. Personal communication with Bob Gorman.

Pesticide Survey Project Contributors

Plan Preparation: Joyce Bowers, URS Greiner Woodward Clyde
Kim Busse, URS Greiner Woodward Clyde

Plan Reviewers: Kristi Bischofberger, MOA Watershed Management
Sue Ban, URS Greiner Woodward Clyde