

**RECOMMENDATIONS FOR  
ALTERNATIVES TO  
PESTICIDE, HERBICIDE, AND  
FERTILIZER USE FOR  
FREDERICK COUNTY**

Prepared for

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## I. INTRODUCTION AND PURPOSE OF REPORT

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Pesticides, herbicides, and fertilizers, when properly used, are helpful tools for property managers. However, excess use can threaten natural ecosystems, particularly through runoff to streams and rivers or by infiltration to groundwater. Because of this concern for environmental health, the Maryland Department of Environment (MDE), through the requirements of National Pollutant Discharge Elimination System (NPDES) Municipal Separate Storm Sewer System (MS4) Permits, requires local jurisdictions to evaluate their current uses of pesticides, herbicides, and fertilizers and to seek opportunities to reduce use of these materials.

To address this requirement, Frederick County sponsored a study to characterize current uses of pesticides, herbicides, and fertilizers by County agencies and to identify potential reduction strategies. This report documents the findings of that study conducted by Versar, Inc., in support of Frederick County's NPDES permit (Permit No. MD0068397). This report was prepared by Versar, Inc. under contract to the Frederick County Division of Public Works (Task Order No. 02-CSC-04-49239).

## II. BACKGROUND

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Frederick County's NPDES stormwater permit, Part III.E.7, requires that "The County shall examine the use, control, and reduction of herbicides, pesticides, and fertilizers for all Frederick County departments. A report describing the present application activities and proposed reduction strategies shall be submitted...". In addition, Part III.E.6 states that the County "... shall develop and implement a plan to reduce pollutants associated with road maintenance activities..." to include reducing "the use of pesticides, herbicides, fertilizers, and other pollutants associated with roadside vegetative management practices...". The purpose of this report is to document the amount of pesticides/herbicides/fertilizers currently being used by Frederick County agencies and departments and to recommend actions to reduce their use. Although road maintenance activities, specifically, were addressed in a previous report (Versar, Inc. 2002), this report does include more recent data on herbicide use in County road maintenance activities.

Overall, current use does not appear to require a drastic reduction in application practices. Many of the pesticides and fertilizers reported to be used are organic in nature (i.e., of natural origin) and the amounts currently being applied do not appear to be excessive (see Appendix C). Organic pesticides are usually perceived as being more "natural" than man-made pesticides and therefore safer to use and less harmful to people and the environment. However, this is not always the case. There are some "natural" or "organic" pesticides that have proven to be quite toxic to humans or non-target organisms (Pesticide Education Resources, University of Nebraska-Lincoln 2003).

In most cases, our overall recommendation is to continue current chemical control practices, while considering possible alternative controls that could be used in place of or in combination with current practices. Combinations of chemical and organic controls could be initiated to allow for further reduction in pesticide, herbicide, and fertilizer use.

### **III. CURRENT USES OF PESTICIDES, HERBICIDES, AND FERTILIZERS**

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To address the above NPDES permit requirements, Frederick County Division of Public Works initiated a study in fall 2002 of pesticide, herbicide, and fertilizer use for all County-owned facilities and by all Frederick County Government agencies or departments. This report presents the results of a survey of Frederick County agencies/departments on current uses, including information on the chemicals employed, amounts applied, and application practices. In addition, we recommend various reduction strategies that may be appropriate, including descriptions of several untraditional and emerging technologies. In the future, the County will consider recommended methods of reducing the use of the chemicals and, if appropriate, implement these strategies.

To gather the necessary data to determine the use of the subject chemicals, Versar staff worked with Frederick County Division of Public Works to develop a survey and to compile and collate the appropriate data on the current use of the subject chemicals. Versar developed a memorandum explaining the project and soliciting from the various Frederick County divisions/agencies the necessary information for all phases of the project (see Appendix A). The memorandum included specific survey questions to assess current quantities of materials used as well as application practices. The County's NPDES Project Manager distributed the memorandum after making telephone contact with the various divisions/agencies.

Five departments responded to the information request with use information: (1) the Maryland Department of Agriculture's (MDA) Vector Control Program in conjunction with the Frederick County Mosquito Control Program, (2) the Division of Public Works, Department of Parks and Recreation, (3) Frederick County's Office of Highway Operations, (4) the Frederick County Weed Control Program, and (5) Frederick County Public Schools. Local fire companies were also polled, however, most fire stations within the County are owned and operated by independent, incorporated volunteer fire companies and are not technically County agencies. Some local fire companies provided data voluntarily for the survey. Frederick County Animal Control indicated that they do not use any additional pesticides/herbicides/fertilizers on their grounds other than those used by the Parks and Recreation department.

Note that the survey was exhaustive and covered all County agencies and departments. The five agencies reporting use are the only ones that currently do application of pesticides, herbicides, and fertilizers. In some cases, they do this work for other County agencies as well. Some additional departments reported "no use", noting they do not conduct application themselves, but are covered by one of the five responding departments.

The responses from the five departments listed above to the questions posed in the memorandum are included in Appendix B. The responses received from individual fire companies are provided in Appendix C. A set of spreadsheets showing pesticide, herbicide, and fertilizer use is included in Appendix D. Listed in those spreadsheets is the amount of each formulation that was used in a specified time period. Appendix E lists specific information about each chemical formulation, taken from the formulation's MSDS; and Appendix F is a list of contacts at each of the five departments and the fire companies.

The information provided by the Frederick County departments was for outdoor chemical use on an annual basis, unless stated otherwise. The Frederick County Weed Control Program provided numbers specifically for its 2002 season, while the other departments provided typical annual use information. The chemicals identified as being used by the County include six brands of pesticide, eleven herbicides, and nine fertilizer formulations. In terms of total amounts used by the five departments, approximately 3,000 pounds of pesticides, 1,200 gallons of herbicides, and 30,000 pounds of fertilizer are used per year. Reported use by Frederick County Public Schools, which maintains school grounds and playing fields (including eight high school athletic fields), made up the highest percentage of the total amount for each category of chemical (approximately 80-90%).

A number of current practices are already employed to control the application of chemicals and, where possible, to use minimal amounts. In general, most Frederick County departments apply pesticides on an "as needed" basis, while fertilizer applications are performed 1-3 times per year at specific locations. The locations where the chemicals are applied were reported by each department (see Appendix B). For example, the Frederick County Office of Highway Operations applies herbicides to guardrails and district yards throughout the County. Most of the departments indicated that application rates are based on label instructions (which can vary according to application method, location, and intended use) and are made at the lowest rate required for effectiveness.

The MDA's Vector Control Program and Frederick County Public Schools both indicated that Integrated Pest Management (IPM) programs are followed. IPM programs identify and control pest problems through staff training, inspection and sanitation practices, which minimize and/or eliminate the need for pesticide use. Under IPM, improvements in cleaning, sanitation, occupant education or other non-chemical methods are required before pesticide use can be authorized.

Frederick County's Parks and Recreation Department and the Frederick County Weed Control Program both indicated that weather conditions are monitored around the time of application and applications are not performed if heavy rain is expected within 2 hours of application. The Weed Control Program also indicated that all application personnel are registered with the MDA Pesticide Regulation Section and are either licensed applicators or work directly under the supervision of one. The Parks and Recreation Department indicated that they have six certified applicators on staff and already use some organic fertilizer.

Last year, Frederick County Division of Public Works completed an evaluation of the County's road maintenance activities and their effect on stormwater runoff quality (Versar, Inc., 2002). In that report, the County's Highway Operations staff indicated that spraying of herbicides along

roadside guardrails is typically performed twice each year, in spring and summer, by certified applicators. At that time, staff included 14 certified applicators, including one senior applicator with many years of experience. The road maintenance report also presented data on two herbicides, Razor and Pendulum, which were used by the County's Office of Highway Operations in 2001. Pendulum, with 37.4% pendamethalin as the active ingredient, was noted to be an environmentally unfriendly chemical with potential impacts to aquatic life, and the report recommended that the County review its use and consider alternative treatments. The information provided by the Office of Highway Operations for the present study indicates that they accepted this recommendation, as use of Pendulum was not reported in response to the fall 2002 survey. In addition, it should be noted that Gly Star Pro (another herbicide containing glyphosate) is now used in place of Razor by the Office of Highway Operations.

#### **IV. ALTERNATIVES TO PESTICIDE USE**

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The majority of pesticides currently being used in Frederick County are for the control of mosquitos by MDA's Vector Control Program and for the control of pest insects by Frederick County Public Schools.

The pesticides used by the Vector Control Program for mosquito control include two larvicides, Vectobac and Vectolex, which contain naturally occurring bacteria commonly found in soils in the United States. These pesticides have not been shown to cause any serious health effects in humans. Minor effects include mild eye and skin irritations. The third pesticide currently being used to control mosquitos, Altosid, contains the product methoprene, which is an insect growth regulator. This pesticide has also not been shown to be harmful to humans, except for mild irritations. The use of these larvicides is consistent with recommendations of MDA (2003a) for use of nonresidual products in mosquito larvae habitats in Maryland, including freshwater marshes, salt marshes, woodland pools, ditches and dredged spoil disposal areas.

In terms of the pesticides used by the public schools, the amounts applied are not excessive and are applied on a case by case (as needed) basis. In addition, one of the pesticides, Merit, is known for its low percentage of active ingredient compared with other pesticides. With respect to one of the pesticides used by the school system, Statesman Insect Control with diazinon, it should be noted that EPA announced plans to phase out diazinon for all lawn, garden, and turf use by December 2003 (U.S. EPA 2000). Diazinon is an organophosphate, which can affect the nervous system and cause nausea, headaches, vomiting, etc. In addition, diazinon's use on turf poses a risk to birds, and is one of the most commonly found pesticides in air, rain, drinking and surface water. Therefore, we recommend that the public schools discontinue use of Statesman Insect Control with diazinon and select a safer, more appropriate product to be used in its place. The public schools have indicated that there is only 40 pounds of Statesman Insect Control product left and its use will be discontinued once this inventory is consumed.

Based on Frederick County's current pesticide use history and the possible alternatives described above, the recommendation of this report would be to continue applying the pesticides currently being used at the current rate, with the exception of the diazinon pesticide. Depending on the resources of the County, new approaches such as biocontrol, discussed in Section VII, might be a

possible alternative for mosquito control or for controlling certain insects on the athletic fields, perhaps in combination with a reduced application of the chemical pesticides.

## V. ALTERNATIVES TO HERBICIDE USE

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The majority of herbicides currently being applied in Frederick County are by the Parks and Recreation Department, Highway Operations and the Weed Control Program, which operates in the Old National Pike Regional Park and along county roads. The amounts applied Countywide on an annual basis do not appear to be excessive; however, there are alternatives, which could be initiated in Frederick County to decrease the amount of herbicides used.

A possible alternative to herbicide use includes prevention techniques, such as planting of native vegetation. Planting desirable vegetation and encouraging native plants can effectively prevent the spread of weeds. In some counties, road crews mow around the desired native vegetation. The native plants not only slow the spread of weeds but also help to prevent erosion. In Frederick County, crown vetch is a non-native plant, which can invade and dominate various vegetation types. If mowing and other forms of control are used to reduce the population, native plants such as switchgrass (*Panicum virgatum*) can be used to shade the crown vetch, and may eventually recolonize the area (Tu 2003).

Another common method of weed prevention is the use of barriers, which can be made of fabric, cement, or rubber. This method is more appropriate for small park areas, rather than roadsides. The City of San Francisco uses weed-barrier fabric and mulches to prevent weeds from germinating in flower beds (San Francisco Public Utilities Commission 2003). The porous black material blocks the weeds but lets air, water, and nutrients pass through to the roots of the desired plants. A major benefit of the use of prevention techniques is the relatively low cost to benefit ratio.

For roadside weed prevention, mowing can be used to curb the growth of non-native plants and invasive weeds. San Francisco uses mowers to cut roadside brush in city-owned watersheds. Studies are currently underway to determine the best frequency and season to mow in order to suppress flammable woody brush and encourage the growth of more fire-resistant vegetation to grow in its place (San Francisco Public Utilities Commission 2003).

Based on Frederick County's current herbicide use history and the possible alternatives listed above, our recommendation would be to continue applying the herbicides currently being used at the current rate, but to examine whether these alternatives would be effective in meeting the County's specific weed control needs. Depending on the County's resources, it may be possible to reduce the current amount of synthetic herbicide applied by combining chemical efforts with alternative controls. Planting more native vegetation and perhaps identifying areas where manual weeding would be cost-effective could help to reduce the amount of chemical herbicides required.

## **VI. ALTERNATIVES TO FERTILIZER USE**

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The fertilizers currently being used by Frederick County agencies are mainly by the Public Schools for the maintenance and upkeep of the school athletic fields. In addition, the Department of Parks and Recreation uses fertilizers annually on its facilities, including some organic fertilizer. It is acknowledged that in order to maintain green and healthy fields, nitrogen in the form of fertilizers must be applied. The Frederick County Public Schools do make use of one type of organic fertilizer, Milorganite, which is composed of composted sewage sludge. Organic fertilizers tend to release their nutrients slowly at a speed at which plants can use them, which minimizes the possibility of run-off of chemicals. They tend to have lower levels of nutrients, which means that in order to get the same amount of nitrogen in the soil as from inorganic fertilizers, a larger amount of fertilizer may have to be applied. Their effect, however, is much more long-lasting and steady. Other types of possible organic fertilizers include those made from naturally occurring materials such as bone meal, blood meal, fish or kelp, or manure.

Each fertilizer used by the Frederick County Public Schools was identified to be used to address specific site amendments. For example, 18-24-12 fertilizer, is used as a winterizer when more potassium is needed. One recommendation, if not already done by the Public Schools and the Department of Parks and Recreation, would be to regularly test the soil to determine if and how much fertilizer needs to be applied.

Aside from using artificial turf on the athletic fields, which is not a reasonable alternative, the recommendation for Frederick County would be to continue applying the fertilizers already used. It is also recommended, however, that a policy be developed outlining an approved County plan for fertilizer use, indicating maximum amounts and rates of application for specific areas (e.g., parks versus athletic fields). Information on the amount of fertilizer used per acre in the County by different departments would provide another means of tracking use for various areas. In addition, this would ensure that the rate of application is kept to a minimum. Depending on the County's resources, other types and combinations of organic fertilizers could also be investigated to determine their effectiveness and to reduce the amount of synthetic fertilizers used.

## **VII. EMERGING TECHNOLOGIES/UNTRADITIONAL ALTERNATIVES**

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Several technologies for pest and weed control are only beginning to develop, which in time could potentially be used as viable alternatives to the use of pesticides and herbicides. The following is a brief description of those technologies/alternatives.

### Biocontrol Alternatives to Pesticides

Even though the current mosquito control program in Frederick County uses mostly organic pesticides (including bacterial-based controls), one additional alternative that could be introduced into the program would be the use of biocontrol. Biocontrol involves the practical use of natural enemies to reduce the damage caused by pests. This technique is somewhat untraditional and is not widely practiced, but several case studies have proven it to be a viable alternative to the use of pesticides or to help in reducing the amount of pesticides applied. An

example of biocontrol for mosquitos is the use of the mosquito fish. Mosquito fish are predators of mosquitos and can control the population during the part of the mosquito life cycle spent in water (pupae and larvae).

MDA (2003b) offers guidance on the use of biological control as one aspect of an integrated approach to mosquito control to reduce reliance on the use of pesticides. When used correctly, mosquito fish (*Gambusia affinis holbrooki*) offer an efficient, cost-effective, and environmentally sound method for the control of mosquito populations. Not all bodies of water are suitable for introduction of mosquito fish, but some examples of mosquito habitats where fish may be introduced include:

- stormwater management facilities,
- ditches and swales,
- dredge spoil impoundments,
- artificial containers - i.e., ornamental ponds, abandoned swimming pools and foundations,
- excavated sites such as farm ponds, and
- sewage lagoons and/or waste-water facilities.

Mosquito fish have a high fecundity (i.e., potential reproductive capacity), a short life cycle and a broad tolerance for temperature and organic pollution. Mosquito fish are opportunistic feeders, however, and will feed on invertebrates and other juvenile fish indeterminately. Therefore, the stocking of this fish in state waters is very carefully monitored and limited. Although mosquito fish are native to Maryland, MDA (2003b) cautions that they should not be introduced into natural wetlands or in areas with threatened or endangered species of fish or amphibians. MDA (2003b) provides additional guidance on the appropriate numbers of fish to introduce in various habitats.

Another drawback is that many places that would be potential breeding areas for mosquitos might not be conducive to the breeding of mosquito fish (e.g., stagnant pools of water). The cost for mosquito fish from a commercial hatchery has been reported to be around \$1/fish (in batches of 200-1000 fish). However, the NJ State Biocontrol Program, which started its own stock using previously stocked fish, achieved an effective cost per fish in 1994 of \$0.09 (Kent 1994).

In the past 10 years, mosquito fish have become an increasingly large part of the mosquito control program in NJ. A study was performed over a period of 3 years to examine the effectiveness of this program. The study examined use of mosquito fish in various environments, including ditches, brackish and freshwater swamps, and stormwater management facilities. In the swamp environments, it was found that the limiting factor was the amount of water available to introduce an initial stock. When there was sufficient water, the mosquito fish appeared to work quite well. In stormwater management facilities, effective larval control has been established with the use of mosquito fish as evidenced by the fact that some facilities have not needed pesticide treatments for years following the introduction of *Gambusia* in Ocean County, NJ (Rutgers University 2003).

Biocontrol is also a possible alternative for the control of pest insects on the athletic fields of public schools. Insect-parasitic nematodes can be used to control larval stages of several turfgrass insect pests. No single nematode can control all turfgrass pests and therefore, selection of an appropriate species is very important. Different species have been reported to control sod webworms, billbug, mole cricket, cutworm, and white grubs. It should be noted that some nematodes are not compatible with certain chemicals and therefore it is usually recommended that nematode applications be made 1-2 weeks before or after any other chemical application (Grewal 2003).

### Biocontrol Alternatives to Herbicides

Although biocontrol is a somewhat new technology, unwanted weeds can also be reduced to varying degrees by natural enemies. Occasionally, several natural enemies are introduced into an area to best control a pest weed. Insects are typically introduced as the natural enemy and they control weeds by feeding on seeds, flowers, leaves, stems, roots or combinations of these, or by transmitting plant pathogens. In addition to insects, nematodes and vertebrates can also be introduced. In all cases, before introducing a non-native species, the possible consequences must be carefully considered.

The use of biocontrol in the case of weeds is beneficial because there is less overall expense as compared to herbicides; once a population is established, minimal effort is required to conserve it. Natural enemies are also less disruptive ecologically and therefore natural biodiversity is maintained. The limitations of biocontrol of weeds are that it is a long-term method for weed management (i.e., results take a long time to manifest), bio-agents may be site specific, and bio-control agents will minimize, but not eradicate the weeds. After insects are introduced it is not guaranteed that they will establish. If the biocontrol agent does establish, then it may take several years (e.g., 5-7 years) for the agent to reach a density where it will have an impact on the weed. Biological agents will not eradicate the weed population because they depend on the weed for their life cycle.

The cost for establishment of biocontrols can vary according to the agent involved (range from \$30-\$50/100-250 biocontrol individuals). Once established, however, biocontrol costs nothing. In Illinois, a program to control the purple loosestrife population started up in 1995 and has continued to develop over the years (Midwest Institute for Biological Control 2003). Two species of beetle were used as biological controls, *Galerucella californiensis* and *G. pusilla*. In 1997, close to 390,000 beetles had been released in 9 counties of Illinois. Various stages of success were observed. In one county, the feeding of the beetles had only reduced loosestrife to a "background" plant, while in another county, extreme devastation of the loosestrife plants was observed. In both cases, there was little to no impact on other native plant species.

However, there have been documented cases of mis-use of biocontrols. An example of a case where the use of biocontrols did not go as planned is the use of the lace bug in East Africa (Muir 2003). The lace bug was introduced into East Africa to control the weed lantana. It did successfully control the weed, however, it also became a pest of sesame, which is a major crop in that area. The lace bug's host range, or the plants a biocontrol organism will eat, parasitize or cause disease to, had not been investigated thoroughly prior to its introduction.

One of the weeds sprayed with herbicides by the Frederick County Weed Control program is thistle. Depending on the species of thistle found in Frederick County, biocontrol may be a possible alternative to the use of herbicides. Two biocontrol agents feed on thistle: the thistle-head weevil, *Rhinocyllus conicus*, and the rosette weevil, *Thrichosirocalus horridus*. The thistle-head weevil feeds mainly on thistles belonging to the *Carduus*, *Cirsium* and *Silybum* group in the family of Asteraceae, while the rosette weevil feeds only on thistles in the *Carduus* and *Cirsium* groups. The thistle-head weevil is very effective at controlling musk or nodding thistle and has been shown to reduce musk thistle stands by 85-90% in Virginia (Weeden et al. 2003).

### Mechanical Controls

A possible alternative to chemical herbicides includes mechanical control, or manually pulling weeds. Hand-pulling weeds can be a useful technique in certain circumstances, such as along certain sections of roadsides, parking lots, schoolyards, etc. Depending on the type of weed and the extent of the spreading of the weed, hand-pulling might be an alternative. An obvious potential drawback is finding available labor for the job. Possibilities could include prisoners who would get little or no pay for the work or organizing a volunteer effort through community organizations. The City of San Francisco utilizes volunteers in its Integrative Pest Management (IPM) program to control invasive weeds and restore native vegetation. Another potential drawback is the time required for execution of this technique. In the City of Boulder, volunteers and work crews from jail have devoted close to 700 hours per year to hand-pulling of weeds. This volunteer program was developed by the Open Space and Mountain Parks Department and is called "Weed Warriors" and organizes weed-pulling projects to remove invasive weeds such as Dalmatian Toadflax, Myrtle Spurge, Knapweed, and Purple Loosestrife (City of Boulder, Open Space and Mountain Parks Department 2003).

### Heat Treatment

The use of heat to kill and eradicate weeds is another possible herbicide alternative. Two types of heat weeding are currently becoming more popular, radiant heat weeding and steam heat weeding. Even though these techniques are becoming more popular, they are still in the early stages of use.

Radiant heat weeders are made of ceramic tiles heated by propane. The tiles are heated to temperatures close to 1,000 degrees (assumed to be Fahrenheit) and are slowly passed over the weeds, with dwelling times of about 1.5 seconds. The high temperatures cause the protein and moisture cells within a plant to burst, which then causes photosynthesis to cease and the weed to die. The radiant heat only penetrates 1 to 2 mm into the soil, so microorganisms living below that depth are not affected. Broadleaf vegetation is more easily damaged than grasses by heat because the growing tips of grasses are encased in a heat resistant sheath, which makes it possible to selectively control weeds in turf. The fuel efficiency of the heat weeders allow for use of smaller fuel containers (as compared to steam heat weeders), which can be carried on the back or on the belt, increasing mobility. Repeat treatments are needed for established perennial weeds, but control of annual weeds has been reported to be very effective. Heat weeders use about 2.5 gallons of propane per 8 hour day. The cost of heat weeders depends on the specific model and size of the model, but is approximately \$150-\$200. Heat weeders have been shown to be very effective in controlling weeds in perennial and shrub beds and along fence lines (City

of Seattle 2000). The use of radiant heat weeders could be a possible alternative for use by Frederick County Parks and Recreation, the Public Schools, and the Weed Control Program (depending on the area to be treated).

Steam heat weeders melt the waxy coating of plant foliage, thereby preventing the plant from retaining moisture and resulting in severe dehydration. The initial design of the steam weeder was comprised of a water tank, which holds approximately 400 gallons of water and a diesel powered heat exchanger. The system is placed on a trailer and pulled on a tractor. The water passes through the heat exchange coils and is heated to its boiling point. It is then sprayed at low pressure, approximately 15 gallons/minute, through a series of nozzles, which extend to the side of the tractor. A smaller system has been developed which can be used on curbs, roadsides, parks, garden, golf courses and athletic fields (Robinson 2003).

The effects of steam heat weeding are fairly immediate, with weeds becoming withered and brown within 24 to 28 hours. As with radiant heat weeding, perennial weeds with buds underground cannot be killed using this method, but can be top-killed and severely weakened. Most annual weeds can be killed with steam. Some disadvantages of this method include the bulk and expense of the equipment, the noise of operation, labor intensity, repeat applications, fuel usage and exhaust emissions, and the demand for water. Steam weeders are more expensive than radiant heat weeders and generally machines can cost up to \$15,000 (Robinson 2003).

In Santa Barbara, California, the city's pest control specialist uses steam heating in place of Roundup to control weeds in the city's parks. The steam heater replaces the use of approximately 300 gallons of diluted Roundup each year in one of its parks, Palm Park. In order to offset the cost of the weeder, the city split the cost with the Santa Barbara School District, which will use the steam heater to mark lines on the athletic field, rather than using chalk (Bolton 2002).

### Corn Gluten

Another possible alternative to synthetic herbicides is a very new and relatively expensive technique using corn gluten. Corn gluten is a byproduct of the extraction of corn syrup from the seed and is sold in the pellet form. Application of corn gluten pellets at a rate of 10-20 pounds per 1,000 square feet has been proven to be effective at controlling both grasses and broadleaf weeds (Californians for Alternatives to Toxics 2003). Organic materials, such as corn gluten, could be combined with synthetic herbicides, applied at a lower rate, helping to reduce the overall amount of synthetic herbicides applied. Corn gluten is not harmful to people or to the environment and actually biodegrades into a natural nitrogen fertilizer. Corn gluten must be applied early in the growing season to be most effective and can be spread using mulching equipment. A disadvantage of corn gluten at this point is its cost. The cost of corn gluten when sold in bulk as a herbicide is \$24 per 50 lb. At the recommended application rate, this is \$9.60 per 1000 ft<sup>2</sup> or \$418/acre.

## VIII. TRACKING PROGRESS

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As specified in Frederick County's NPDES permit, the County is to include an update on the status of implementing reduction strategies in each subsequent NPDES Annual Report (i.e., the 2005-2007 Annual Reports). Under an additional specific requirement, the County is to annually report on reductions in use of pesticides, herbicides, fertilizers, and other pollutants associated with roadside vegetation management practices through IPM.

We recommend that Frederick County develop a schedule for implementation of selected measures and track the implementation of each measure. It may also be helpful to track annually the actual amounts of pesticides, herbicides, and fertilizers used by each agency/department, including Highway Operations, using survey methods similar to those employed for this report. This will allow the County to determine the degree to which actual uses of pesticides, herbicides, and fertilizers are reduced by these recommendations or by other measures implemented by individual agencies or departments.

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**APPENDIX A**  
**SURVEY MEMORANDUM**

**DRAFT MEMO FOR SHANNON MOORE, FREDERICK COUNTY DIVISION OF PUBLIC WORKS, TO SEND TO APPROPRIATE FREDERICK COUNTY DIVISION/DEPARTMENT STAFF**

**MEMORANDUM**

**TO:** \_\_\_\_\_

**FROM:** Shannon Moore - Project Manager, NPDES Program  
Division of Public Works  
Office of Development Review

**DATE:** \_\_\_\_\_

**SUBJECT: Request for Information on Pesticide/Herbicide/Fertilizer Use**

Under the conditions of Frederick County’s National Pollutant Discharge Elimination System (NPDES) stormwater discharge permit, Part III.E.7 of the Standard Permit Conditions: Management Programs states that “The County shall examine the use, control, and reduction of herbicides, pesticides, and fertilizers for all Frederick County departments. A report describing the present application activities and proposed reduction strategies shall be submitted..... .” In addition, Part III.E.6 states that the County “... shall develop and implement a plan to reduce pollutants associated with road maintenance activities...” to include reducing “the use of pesticides, herbicides, fertilizers, and other pollutants associated with roadside vegetative management practices.... .” The reason for the required study and report is ultimately to estimate the affect on stormwater runoff from applying these chemicals, and then to evaluate and implement methods of reducing the use of the chemicals, if necessary.

Because of the above permit requirement, Public Works has initiated a study of pesticide, herbicide, and fertilizer use for all County-owned facilities, and/or by all County agencies. To that end, the County has contracted a local environmental consulting firm Versar, Inc. (as part of its ongoing NPDES support contract to Frederick County), to initially compile and collate the appropriate data on the use of the subject chemicals. Versar will then draft a report relative to use of the chemicals. Subsequently, a report will be drafted including these findings and any applicable proposed “reduction strategies” to fulfill NPDES reporting requirements.

The purpose of this memorandum is to inform you that during the information-gathering phase of this project, Versar or this office may be contacting your Division/Department seeking any or all of the information on the attached Information Request Form.

It is recognized that you may not have the answers to each of the questions on the Form, but to the extent that you can supply the data it would be much appreciated, and hasten the County’s ability to fulfill the study and reporting requirements of our permit. During the later

phase of this project, Versar or this office may also solicit your input as reduction strategies are developed.

Thank you very much for your cooperation in this matter. Should you have any questions or comments please feel free to call my office at 694-1413, or e-mail me at: [smoore@fredco-md.net](mailto:smoore@fredco-md.net).

## INFORMATION REQUEST FORM

### Pesticide/Herbicide/Fertilizer Use

1. Develop a list of the commercial and/or chemical names of all the pesticides, herbicides, and fertilizers used.
2. Include all the Material Safety Data Sheets (MSDSs) for each of the chemicals identified in Item 1.
3. What is the total amount of each chemical used (e.g., pounds per year, 55-gallon drums per year)?
4. What is the frequency of application for each chemical (e.g., monthly, as needed, at least annually, once each summer, varies on site-specific basis)?
5. What are the specific locations (i.e., addresses, names, and/or road segments) of the applications? Include, for example: golf course, roads, school landscaping.
6. What is the approximate amount of chemical used at each of the locations identified in Item 5 (e.g., 25 pounds per year, 1ea 5-gallon pail)?
7. Is the application is indoors or out-of-doors?
8. What is the amount of each chemical that is typically stored (e.g., 5ea 55-gallon drums, 10ea 5-gallon pails)?
9. Where are the storage locations of each chemical (e.g., address and/or name of storage facility)?
10. What storage methods are used (e.g., 55-gallon drums on a pallet out-of-doors)?
11. What is the methodology or rationale for using each chemical?
12. What are the Standard Operating Procedures (SOPs) for mixing and applying each chemical (e.g., diluted 1:10 with water, and sprayed at 100 gallons per acre), if any?
13. How is the application equipment for each chemical cleaned after use (e.g., unused herbicide and equipment rinses are used to make up next batch)?
14. If applicable, how are the unused chemicals and equipment rinses disposed of (e.g., placed in container, and shipped to hazardous waste disposal site)?
15. What are the reasons for disposing of unused chemicals (e.g., expired shelf-life)?
16. Are there any current practices that are aimed at minimizing use and/or environmental damage from each chemical (e.g., no spraying if rain is predicted within two days, use only biodegradable chemicals)?

**APPENDIX B**  
**SURVEY RESPONSES**

Question/Department	Vector Control Program	Parks and Recreation	Highway Ops	Weed Control Program	Public Schools
<b>1. List of Chemicals used</b>	Altosid, Vectobac, Vectolex	Roundup-Pro, Surflan, Pramitol 25E, Sahara, Root Turf Food	Glystar Pro	Transline, Gly Star Pro, Velpar L	Milorganite 6-2-0, Milorganite 14-1-11, Fertilizer 18-24-12, Fertilizer 39-0-0, Fertilizer 15-3-7, Fertilizer 26-4-18, Fertilizer 10-10-10, Pelletized Lime, Statesman Insect Control w/ Diazinon, Dylox, Merit, Roundup
<b>2. MSDS Sheets provided</b>	Obtained through internet search	Yes	Yes	Yes	Obtained through internet search except for Statesman Insect Control w/Diazinon: unable to locate MSDS sheet for product; obtained product label for similar product, Lebanon Lawn and Garden Insecticide w/Diazinon 5G
<b>3. Total amount used</b>	Provided in spreadsheet in Appendix C				
<b>4. Frequency of application</b>	Varies according to site; Altosid can be applied on 30 day intervals, Vectobac and Vectolex applied as needed	Pesticides/herbicides applied as needed, fertilizer applied annually	Spring and Fall	Used as needed	Lime used once a year on competition and stadium fields; milorganite and fertilizers used 3 times/year on fields; Statesman Insect control w/ diazinon, Dylox, and Merit used on case by case basis; Roundup used "primarily" in summer months
<b>5. Specific locations applied</b>	County-wide; mostly to vernal woodland pools and a variety of habitats in City of Frederick and Thurmont	22 locations listed in information provided	Guardrails and district yards	Used along county road right-of-ways; transline also used in tree plantings	Fertilizers, Diazinon, Dylox, and Merit used on competition and stadium fields at all high school locations (8); IPM methods used at all schools for insect control so that the use of insecticides is very limited; Roundup used at most schools in areas adjacent to wild areas, fence lines, and graveled areas

Question/Department	Vector Control Program	Parks and Recreation	Highway Ops	Weed Control Program	Public Schools
<b>6. Approximate amount used at each location</b>	Varies based on size of habitat and/or amount of standing water	Roundup applied at all 22 locations, ranging from 1 pint to 2.0 gallons; Surflan applied at 9 locations, ranging from ½ pint to 0.57 gallons; Pramitol applied at 1 location, 6.5 gallons; Sahara applied at 1 location, 9 lbs; Root Turf Food applied at 5 locations, ranging from 950 lbs to 2400 lbs	Amount varies from year to year depending on growth; ranges provided	Not provided	Each site visited to control noxious weeds or unwanted grass receives 40 gallons or less of Roundup; have never sprayed areas that have active water sources
<b>7. Application indoors or outdoors?</b>	Outdoors	Outdoors	Outdoors	Outdoors	Outdoors
<b>8. Amount stored</b>	Altosid: up to 800 units; Vectobac and Vectolex: up to 80 lbs	Three 2.5 gallon containers of Roundup stored	50-75 gallons; on site	Transline: 5-10 gallons; Gly Star Pro: 10-15 gallons; Velpar L: 5 gallons or less	Typically do not store chemicals, purchase only what is needed for project; if Roundup stored, typically no more than 1-5 bottles (12.5 gallons) of straight product
<b>9. Storage locations</b>	Maryland Department of Agriculture in Frederick, MD	Parks Maintenance Shop in Frederick, MD	Stored in storage trailer with vent, secondary containment, and temp control	Stored in Weed Control Program storage building in Frederick, MD	Chemicals—N/A Fertilizers—stored at Hayward Road Annex; all products clearly marked and stored separately so identifying each product is simple and easy
<b>10. Storage methods</b>	Packaged in plastic bags and cardboard boxes or in rigid containers; individual packages stored in locking, weatherproof container	Pesticide storage is in heated pesticide storage building; fertilizer storage is indoors on pallet	Stored in 2½ gallon jugs “in small pools”	Herbicides stored in original containers with secondary containment; container size is 2½ gallon plastic jugs	Palletized, outdoors separate from facility, in outdoor storage containers

Question/Department	Vector Control Program	Parks and Recreation	Highway Ops	Weed Control Program	Public Schools
<p><b>11. Methodology or rationale for using chemicals</b></p>	<p>Mosquito larvicides used to eliminate mosquito larvae in aquatic habitats; dry granular materials applied by hand or with mechanical spreaders</p>	<p>Herbicides used to eliminate trim mowing and reduce manpower; fertilizer applied to sports fields</p>	<p>Choose to spray because more effective and decreases man-hours</p>	<p>Transline: v. effective for control of thistle species, not volatile and safer than other less effective herbicides;</p> <p>Gly Star Pro: non-volatile and non-residual;</p> <p>VelparL: only herbicide that can be used in Crown Vetch areas that will not kill Crown Vetch</p>	<p>Each fertilizer has specific soil amendments: Milorganite (6-2-0 and 14-1-11) used in open areas, most often practice areas or as a boost to existing turf; 18-24-12 used as a winterizer (more potassium); 39-0-0 and 26-4-18 used for springtime growth periods; 15-3-7 used primarily in warmer months when weeds become an issue; Dylox, Diazinon, and Merit used after White Grubs are actually seen, may be used as a preventive measure in future; lime used when grass is not deep green in color (indication of low phosphorus)</p>
<p><b>12. SOPs for mixing and applying chemicals</b></p>	<p>Mosquito larvicides are purchased and used in end-use formulations</p>	<p>Applications based on labels, 1% solution of Roundup used; 1 lb of nitrogen per 1000 sq ft</p>	<p>Spray rate is 1¼ % or 2½ gallons to 200 gallons; average of 20 gallons/acre</p>	<p>Label mixing instructions, rates, and personal protective equipment requirements are followed</p>	<p>Only chemical mixed is Roundup; typically mixed at shop, using a ratio of 1½ ounces/gallon, using a 40 gallon sprayer mounted in the rear of a standard pick-up truck, with a hand sprayer powered by the battery of the vehicle</p>
<p><b>13. How application equipment cleaned</b></p>	<p>Mostly hand applied; dry granular larvicides require very little clean up</p>	<p>All pesticide sprayed out onto targets; sprayers are triple rinsed and hung upside down to dry</p>	<p>Never have left over chemicals after application; do not rinse equipment</p>	<p>Equipment cleaned when changing material; rinses are used in another sprayer with the same material as the one being cleaned; empty herbicide containers triple rinsed and recycled</p>	<p>If and when occurs, tank and sprayer are cleaned using water as a rinsing agent; both tank and hand sprayer are thoroughly rinsed before different products used</p>

Question/Department	Vector Control Program	Parks and Recreation	Highway Ops	Weed Control Program	Public Schools
<b>14. How unused chemicals disposed of (if applicable)</b>	Larvicides have long shelf life; unused portions stored for following season	Chemicals are turned into the Frederick County Landfill; sprayer rinses are sprayed onto targets	Unused chemicals stored in labeled containers; empty jugs rinsed and sent to MDA recycling program at Frederick County Landfill	All herbicides used up through labeled use	If measured and mixed properly, all chemicals are used when applying; product bags are disposed of at Annex after completely emptied; plastic Roundup bottles are triple-rinsed and punctured before disposal
<b>15. Reasons for disposal of unused chemicals</b>	NA	If no longer have a valid application for the pesticide	Never had problem w/ unused chemicals	Not provided	If necessary, public schools have an on-site hazardous waste facility where chemicals are recorded, stored and picked up bi-annually for removal
<b>16. Current practices for minimizing use and/or environmental damage</b>	IPM guidelines; applications of larvicides limited to safest products available; used at minimum effective rates; larvicide use based on larval surveillance of breeding habitats	Roundup label precautions are followed: not applied if heavy rain is expected within 2 hours of application; use smallest quantities of pesticides as possible	None	All label restrictions followed; all personnel registered with the MDA Pesticide Regulation Section and are either licensed applicators or work directly under supervision of one; weather conditions monitored	Use fertilizers at a three-quarter rate because of unpredictability of rain and restrictions on irrigation; try to use natural products to help in the growing and maintenance of sports turf

**APPENDIX C**

**SUMMARY OF SURVEY RESPONSES FROM FREDERICK COUNTY FIRE COMPANIES ON  
PESTICIDE/HERBICIDE/FERTILIZER USE**

**Fire/ Rescue Services**

Brunswick Volunteer Fire Company #5  
Braddock Heights Volunteer Fire Company  
Carroll Manor Volunteer Fire Company #14  
Emmitsburg Ambulance Company #26  
Gaurdian Hose Company #10  
Independent Hose Company #1  
Jefferson Volunteer Fire Company #20  
Junior Fire Company #2  
  
Lewistown District Fire Company #22  
Middletown Fire Company #7  
New Market District Fire Company #15  
New Midway Volunteer Fire Company #9  
Rocky Ridge Volunteer Company #13  
Thurmont Community Ambulance Company #30  
United Fire Engine Company #3  
Urbana Volunteer Fire/Rescue Company #23  
Vigilant Hose Company #6  
Wolfsville Volunteer Fire Company #21

**Pesticide/Herbicide/Fertilizer Use**

Fire Department has no grounds  
No use reported  
Ant spray, bee spray, roundup when needed  
No use reported  
Fire Department has no grounds  
No use reported besides application done by the Department of Parks and Recreation on/near their property  
No use reported  
Applications only performed by Department of Parks and Recreation  
  
Round-up applied once each summer around building and sidewalks; do not spray when rain predicted  
No use reported  
No use reported  
No use reported  
No use reported  
No use reported  
Fire Department has no grounds  
No use reported  
Fire Department has no grounds  
No use reported

**APPENDIX D**

**SUMMARY OF REPORTED PESTICIDE, HERBICIDE, AND FERTILIZER USE**

**Frederick County Public Works Study of Pesticide, Herbicide, and Fertilizer Use**

Department	Pesticide	Herbicide	Fertilizer	Total amount used			Comments	
				Range	Average	Units		
Maryland Department of Agriculture, Vector Control Program	Altosid			12.5-125	69	lbs/season	(1) averages are based on ranges provided; (2) amount depends on precipitation and amount of standing water; (3) Altosid purchased as plaster of paris pellets (units) which weigh approx. 1 ounce--can treat 100 square feet of surface area for 30 days; (4) season approx 6 months	
	Vectobac			20-200	110	lbs/season		
	Vectolex			20-200	110	lbs/season		
Division of Public Works, Department of Parks and Recreation		Roundup Pro			11	gallons	Pesticides/herbicides applied as needed, fertilizers applied annually	
		Surflan			2.8	gallons		
		Pramitol 25E			6.5	gallons		
		Sahara			9	pounds		
			Root Turf Food			6350		pounds
			Citrine			43		pounds
Frederick County Office of Highway Operations		Aquashade			14	gallons		
		Glystar Pro			88.5	gallons/year		
Maryland Department of Agriculture and Frederick County, Weed Control Program		Transline			10.5	gallons/year	Totals are for 2002 season	
		Glystar Pro			12	gallons/year		
		Velpar L			0.66	gallons/year		
Frederick County Public Schools	Statesman Insect control w/Diazinon				200	pounds/year	(1) Amounts provided for pesticides would be maximum amount. Applied on a very limited, case by case, basis. (2) Lime used once a year on competition fields and stadium fields. (3) Milorganite and fertilizers are used three times a year (early winter, spring and summer) on competition and stadium fields. (4) Round-up used "primarily" in the summer months when students not present, typically used on fenced areas where poison ivy has become problem.	
	Dylox				1000	pounds/year		
	Merit				1000	pounds/year		
			Milorganite 6-2-0			4000		pounds/year
			Milorganite 14-1-11			4000		pounds/year
			Fertilizer 18-24-12			4000		pounds/year
			Fertilizer 39-0-0			2000		pounds/year
			Fertilizer 15-3-7			4000		pounds/year
			Fertilizer 26-4-18			4000		pounds/year
			Fertilizer 10-10-10			200		pounds/year
			Pelletized Lime			4000		pounds/year
		Round-Up			1000	gallons/year		

**APPENDIX E**

**PESTICIDE/HERBICIDE/FERTILIZER CHEMICAL INFORMATION**

## Chemical Information

### PESTICIDES

Name	Active ingredient	Chemical Name	CAS #	% of formulation (by weight)	lb active ingredient/gallon	Comments
Altosid	(S)-Methoprene	isopropyl (2E,4E,7S)-11-Methoxy- 3,7,11-trimethyl-2,4-dodecadienoate	65733-16-6	4.25	0.35	methoprene mosquito growth regulator; lb ai/gallon and density of formulation not provided; assumed density of water in calculating lb ai/gallon (8.34 lbs/gallon)
Vectobac	<i>Bacillus thuringiensis</i> , subsp. <i>Israelensis</i>	NA	NA	0.2		<i>Bacillus thuringiensis</i> var. <i>Israelensis</i> , bacterial mosquito larvicide
Vectolex	<i>Bacillus sphaericus</i> Serotype (H-5a5b), strain 2362	NA	NA	7.5		<i>Bacillus sphaericus</i> , bacterial mosquito larvicide
Statesman Insect control w/Diazinon	Diazinon	Diazinon	333-41-5	5.0		Information is from product label of similar pesticide: Lebanon Lawn and Garden Insecticide w/Diazinon 5G
Dylox	tri chlorofon	dimenthyl-(2,2,2-trichloro-1-hydroxyethyl) phosphonate	52-68-6	Dylox 6.2G: 6.2% active ingredient granular; Dylox 80: 80% active ingredient soluble powder		Information provided did not indicate which formulation of pesticide used.
Merit	imidacloprid	1-[(6-chloro-3-pyridinyl)methyl]-N-nitro-2-imidazolidinimine	138261-41-3	Merit 75 WSP and Merit 75 WP: 75 % active ingredient wettable powder (and in water-soluble packets); Metit 0.5 Granular: 0.5% active ingredient granular		Information provided did not indicate which formulation of pesticide used.

**Chemical Information (cont.)**

**HERBICIDES**

Name	Active ingredient	Chemical Name	CAS #	% of formulation (by weight)	lb active ingredient/gallon	Comments
Roundup Pro	Isopropylamine salt of glyphosate		38641-94-0	41	4	
Surflan	Oryzalin	3,5-dinitro-N4, N4-dipropylsulfanilamide	019044-88-3	40.4	3.4	lb ai/gallon and density of formulation not provided; assumed density of water in calculating lb ai/gallon (8.34 lbs/gallon)
Pramitol 25E	Prometon	2,4-bis(isopropylamino)-6-methoxy-s-triazine	1610-18-0	25	1.95	Calculated lb ai/gallon from the density of formulation provided on MSDS sheet (7.8 lbs/gallon)
Sahara	Diuron	2-[4,5-dihydro-4-methyl-4-(1-methylethyl)-5-oxo-1H-imidazol-2-yl]-3-pyridinecarboxylic acid;	330-54-1	62.22	4	Calculated lb ai/gallon from the density of formulation provided on MSDS sheet (40 lbs/cu ft)
	Imazapyr	N'-(3,4-dichlorophenyl)-N,N-dimethylurea N'-(3,4-dichlorophenyl)-N,N-dimethylurea	081334-34-1	7.78	0.5	Calculated lb ai/gallon from the density of formulation provided on MSDS sheet (40 lbs/cu ft)
Glystar Pro	Isopropylamine salt of glyphosate		38641-94-0	41	4	
Transline	Clopyralid	3,6-dichloro-2-pyridinecarboxylic acid, monoethanolamine salt	057754-85-5	40.9	3.4	lb ai/gallon and density of formulation not provided; assumed density of water in calculating lb ai/gallon (8.34 lbs/gallon)
Velpar L	Hexazinone	3-cyclohexyl-6-(dimethylamino)-1-methyl-1,3,5-triazine-2,4 (1H,3H)-dione	51235-04-2	25	2	
AB Aquashade	Water Soluble Dye; Acid Blue 9 and Acid Yellow 23			Acid Blue 9: 24%; Acid Yellow 23: 2.4%		
AB Cutrine Plus Granular	Copper Carbonate		12069-69-1			
Round-Up	Isopropylamine salt of glyphosate		38641-94-0	41		

**Chemical Information (cont.)**

**FERTILIZERS**

<b>Name</b>	<b>Active ingredient</b>	<b>Chemical Name</b>	<b>CAS #</b>	<b>% of formulation (by weight)</b>	<b>lb active ingredient/gallon</b>	<b>Comments</b>
Root Turf Food						
Milorganite 6-2-0	activated sewage sludge	NA	NA	86.8-90.8		fertilizer product manufactured from sewage sludge amended with coagulants (iron salts)
Milorganite 14-1-11	activated sewage sludge	NA	NA	86.8-90.8		fertilizer product manufactured from sewage sludge amended with coagulants (iron salts)
Fertilizer 18-24-12						
Fertilizer 39-0-0						
Fertilizer 15-3-7						
Fertilizer 26-4-18						
Fertilizer 10-10-10						
Pelletized Lime	calcium carbonate		471-34-1			

**APPENDIX F**

**CONTACT INFORMATION FOR  
FREDERICK COUNTY DEPARTMENTS AND PROGRAMS RESPONDING TO SURVEY**

**Contact information for Departments and Programs of Frederick County Responding to Survey**

<u>Department</u>	<u>Contact name</u>	<u>Phone number</u>
Maryland Department of Agriculture, Vector Control Program	Mike Cantwell	301-927-8357
Division of Public Works, Department of Parks and Recreation	Earl Eyler	301-694-1654
Frederick County Office of Highway Operations	Nicole Willson	301-631-3597
Maryland Department of Agriculture and Frederick County Weed Control Program	Tim Pry	301-694-1586
Frederick County Public Schools	Laura Olsen	301-644-5150
Animal Control	Clara Bowens	
Sheriffs Office	Randy Weisman	
Brunswick Volunteer Fire Company #5	Clair Arbosal	301.834.8300
Braddock Heights Volunteer Fire Company	John Payton	301.371.6820
Carroll Manor Volunteer Fire Company #14	Ed Arnold	301.831.8362
Emmitsburg Ambulance Company #26	Jamie Eyler	301.447.6626
Gaurdian Hose Company #10		301.271.3413
Independent Hose Company #1	Sergeant George Thomas	
Jefferson Volunteer Fire Company #20	Chief Bill Phelps	301.473.5150
Lewistown District Fire Company #22		301.898.9988
Middletown Fire Company #7	Ronnie Huffer	301.371.6907
New Market District Fire Company #15	Shirley King/ Candy Wood	301.865.5700
Green Valley Fire Company		301.865.5900
New Midway Volunteer Fire Company #9	Chief Greg Warner	301.898.0543
Rocky Ridge Volunteer Company #13		301.271.2666
Thurmont Community Ambulance Company #30	Chief Hummerick	301.271.7550
Urbana Volunteer Fire/Rescue Company #23	Jim May	301.663.3822
Vigilant Hose Company #6		301.447.2728
Wolfsville Volunteer Fire Company #21	David Doyle	301.293.1453