

Recommendations and Guidelines for the
Development of the ARA Virginia Sky-Line Company, Inc.
Integrated Pest Management Plan

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I. INTRODUCTION

The National Park Service (NPS) is dedicated to the development of pest management programs based upon the principles of Integrated Pest Management (IPM). IPM maximizes utilization of non-chemical methods of pest population suppression including modification of habitat, modification of human behavior, and biological and physical controls. Chemical pesticide, if required, is used in concert with an array of non-chemical controls to reduce pest populations to tolerable, predetermined levels. This report will give ARA Virginia Sky-Line Company, Inc., sufficient information and background material to develop a comprehensive Integrated Pest Management Plan, and to work with Pest Control Operators and the National Park Service's IPM coordinator to implement that plan into a fully operational IPM program at all ARA sites in Shenandoah National Park.

MAKING THE TRANSITION TO IPM

IPM is a decision-making process which helps managers decide if treatment action is needed, where treatment activity should be directed, when actions would be most effective, and which mix of strategies and tactics would be the best to use. An IPM program consists of five major components: (1) monitoring, (2) action threshold levels, (3) treatment strategy and timing, (4) evaluation, and (5) education.

MONITORING

Monitoring, or regular inspection, is conducted to accurately identify the problem pest, determine when and where the problem is occurring, and how the actions of people might be contributing to the problem. Natural enemies of the pest, and potential pests which might cause secondary problems if treatment actions are taken against the principal pest, are identified. To be effective, monitoring must be done carefully and systematically. Good written records are essential.

THRESHOLD LEVELS

Monitoring results are used to establish injury and action thresholds. An injury threshold level is the point in the growth of a pest population when the pest numbers are high enough to cause unacceptable injury or damage at a particular site. An action threshold is the level of pest population size for a specific site at which action must be taken to prevent reaching the injury level (Figure 1).

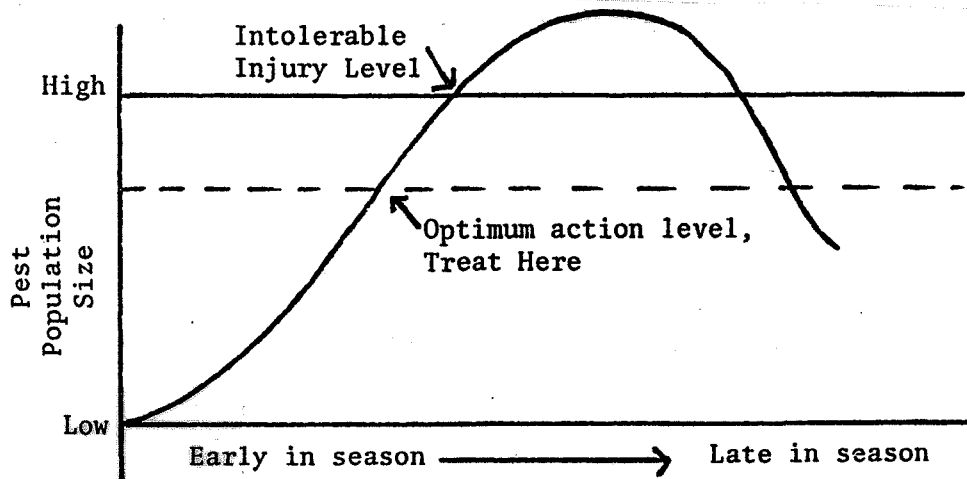


Figure 1. Injury and action level concepts.

TREATMENT STRATEGIES

In situations where treatment means application of a pesticide, action often takes place long before it can be predicted that the injury level will be reached. These are sometimes thought of as "preventive treatments," often applied on a calendar basis, but in reality are premature and probably trigger more pest problems than they prevent. Sometimes action takes place after the injury level has been reached and the pest population has begun to decline naturally. Such "revenge" treatments are useless (at best), wasteful, and may trigger new problems (at worst). Correct timing of the treatment is very important for maximum effectiveness.

Treatment strategies are designed for a specific pest/site. A wide array of tactics may be employed together when formulating a strategy. A good IPM strategy will be: least disruptive of natural controls; least hazardous to human health; least toxic to non-target organisms; least damaging to the general environment; most likely to produce permanent reduction in the pest; easiest to carry out effectively; and the most cost-effective in short- and long-term.

EVALUATION

Evaluations are conducted to assess the effectiveness of treatment strategies, as well as the overall IPM program. Evaluation of IPM programs often demonstrate substantial decreases in the cost of pest management operations over conventional methods.

EDUCATION

The fifth primary component of IPM is education. It is very important that management, employees, and Park visitors all understand what IPM is, and why the National Park Service has chosen to adopt IPM to manage pests. Together, ARA and Park staff can demonstrate the effectiveness of IPM technology, while educating the visiting public to be more tolerant of the native creatures which also live in the Park.

II. REPORT OF FINDINGS: ARA SITE INSPECTIONS AND RECOMMENDATIONS

NPS representatives and ARA Virginia Sky-Line managers met at Park Headquarters on May 22, 1987 to discuss pest problems confronting concession operations. At that time it was agreed that Shenandoah National Park (SNP) would provide technical assistance to ARA in developing a comprehensive IPM Plan. The Plan will be tailored to recommend specific management actions for each problem pest at each site. In order to supply a body of information to ARA, on-site inspections were made of all ARA facilities during June 1987. During the inspections, site managers and key personnel were interviewed to gather information pertaining to past and current pest problems and control methods. Structural design and maintenance of buildings, as well as management activities were observed. Following are site-by-site descriptions of conditions as they were explained and observed during those inspections.

ELKWALLOW WAYSIDE

Walt Gordon and I inspected Elkwallow Wayside on June 24, 1987. Consisting of snack bar, groceries, and souvenirs. The Wayside is open from mid-May through October. Carpenter ants were reported traveling from a ground nest in the lawn approximately 50 feet to the snack bar area of the building. Upon inspection, numerous dead ants were seen in the vicinity of the nest and no living ants were observed. Mice were reported to be the chief pest at this facility, and I observed a native mouse (Peromyscus) in a live trap. Live-trapped rodents were disposed of by drowning. Shells from pilfered peanuts in a corner of the grocery area provided further evidence of rodent pests. The rough-sawn construction of the building makes it highly unlikely that all potential pest entrances could be caulked and filled. No signs of the presence of wood-boring insects were observed or reported in this interesting, rustic building. Mr. Gordon is sensitive to environmental concerns regarding pesticides, and mentioned that bats live in the eaves of the building, and provided free, non-toxic control of flying insects in the evenings. Pheobe and bluebird nests on the grounds gave evidence of other insect-eaters at work. Several species of moths were observed, indicating survival of non-target Lepidopterans from the previous month's gypsy moth control operation conducted by the Park.

Management Recommendations: Continue to live trap or snap trap rodents indoors as necessary. Block gap under door of trash house. Monitor for presence of ants during spring and early summer months.

PANORAMA

Delores Mink and I toured this facility on June 24, 1987. The large kitchen and food storage areas in an old, poorly sealed building provides ideal conditions for a variety of pests, including several species of roaches, rodents, flies, and ants. Although only in her first year as site manager, Delores was aggressively working toward improving sanitary conditions in the food preparation areas, and decreasing available habitat for pests. New caulking was evident around wall joints and sink seams. Long-term grease deposits were cleaned out of a floor drain in the kitchen. Exhaust fan ventilation vents were scheduled for a thorough cleaning. A pest control contractor, Dodson Brothers, is contracted to provide periodic services to control roaches, as well as other pests. Glue boards are used to some extent as a monitoring device, and also a control tool for mice. Occasional damage to stored food products, including bread, is caused by rodents. Several IPM tactics were noted, including an electric fan mounted over the basement door to discourage fly entry, and the clever placement of bay leaves in a candy display case to repel ants. A black light fly trap was in operation in the dining room.

Delores reported that large numbers of flies emerge and cover sunny windows in the gift shop on warm fall days. It is likely that new caulking and tight-fitting trim moldings around the windows will exclude these pests.

Management Recommendations: Continue to upgrade sanitary conditions in food preparation and storage area. Ensure that beverage syrup tanks are clean before bringing them into facility. Continue to seal cracks and crevices. While no amount of caulk will ever make Panorama pest-proof, particular attention to food preparation, handling, and storage areas will greatly decrease the habitat available to pests.

As sanitation improves and habitat reduction proceeds, the need for routine insecticide application will diminish. Monitoring programs should be instituted which comply with NPS criteria determining injury/action thresholds, and any pesticide applications should be based on these monitoring results.

SKYLAND

On June 25, 1987, manager Steve Fox led me on a guided inspection of this large, complex establishment. Operating from the first of April through November, and employing a seasonal staff of 135, Skyland presents a wide range of pest management challenges. Roaches, rodents, ants, and flies occur in pest

proportions seasonally throughout the facility. Roaches have been associated with beverage syrup tanks in the downstairs storage area. Dampness in the area is a problem. A limited number of glue boards were observed, one containing a roach, however, the number of glue boards was insufficient for good monitoring. Rats and mice were reported to be a problem in crawl space areas under the building. No glue boards or traps were found in these areas. Several species of flies were observed in the trash house. The trash house drain and drums of cooking grease, some leaking, aggravated this problem. Occasional rats and mice were reported in the laundry area.

The older visitor units were more pest prone than the newer construction, as might be expected due to the use of rough-sawn materials and lack of caulking. Mice seemed to be the main pest associated with the older structures, but were being adequately controlled by trapping for the most part. Guests bringing food into the units encourages invasion by pests. A rat had recently been seen in the conference room. New glue boards had been placed in an effort to catch it.

Several of the new units have period problems with flushes of insects emerging from the rafters into the rooms. Winged forms of carpenter ants were collected from several rooms. These pests are associated with moisture in wooden construction, indicating probable leaks in the roof.

Inspection of the horse stables revealed stalls which were not adequately cleaned. Manure is hauled from the site approximately once a week.

Management Recommendations: Stalls should be cleaned daily, and the manure stored under fly-proof cover until it is picked up and hauled away. Steve indicated that this would be done. Continue to inspect all roofs for leaks, and repair as necessary. Encourage guests to not eat in rooms, or at least store all edibles in pest-proof containers. Work with pest control contractor to upgrade monitoring system for all pests, especially roaches and rodents in food preparation, eating, and storage areas.

Steve was very helpful in sharing his time and knowledge with me while visiting Skyland. He is interested in employing IPM techniques wherever possible, and collected pest specimens for accurate identification in order to approach solving the problem in the best manner possible.

BIG MEADOWS

On June 25, 1987, Sally Campbell accompanied me through the Big Meadows concession area. The Lodge has periodic emergencies of winged ants, which may indicate water leakage in the roof. Carpenter ants may also invade buildings by gaining access to upper floors from adjacent shrubs and trees. The kitchen area

has not had a roach problem, although roaches are present in the laundry area. Exposed troughs behind washing machines for draining soapy water make ideal habitat for roaches, which can digest and utilize detergent as food.

The trash house sanitation was inadequate. Trash containers were not covered and were overflowing. Being immediately adjacent to the kitchen door, it was a major source of flies into the food area of the Lodge.

The older cabins are prone to nesting by stinging insects. Cracks, gaps, and knotholes provide access into wall hollows. From these nesting area, wasps, hornets, and yellowjackets find their way into the interior living areas through unsealed wall and window casing seams.

Management Recommendations: Trim any trees or shrubs which touch walls or roof of building. Close up laundry drain. Increase cleanliness of trash house and frequency of trash pick-up. Install forced-air fan blowing outward at kitchen door to repel flies. Check roof for leaks, repair as necessary. Replace siding, soffet, and facia boards on cabins as necessary to prevent access for nesting insects. Seal seams, cracks, and crevices on all interior living spaces to prevent entrance of pests from exterior walls.

I would like to thank Sally for her help and cooperation in the preparation of this report, and for her continuing interest in the principles and techniques of IPM.

BIG MEADOWS WAYSIDE

Walter Davis showed me around the Wayside on June 26, 1987. He indicated that the facility is generally open from late February through December, and although the water lines are drained, some heat is left on throughout the closed period. Past pest control practices included placing d-Con baits for rodents, and a thorough fogging for roaches and mice when the building was closed for the winter. In addition, periodic night fogging was conducted during non-business hours in the spring, summer, and fall. Currently, snap traps are used for rodent control, and roach control is conducted by a pest control contractor. Walter indicated that boric acid had been tried for roach control.

Flies were identified as a major pest problem in kitchen and dining areas, with complaints from visitors being noted on comment cards, and mentioned on Ranger concession operations inspection reports.

An electric fly trap had been purchased and tried, but is currently not in use. Sticky fly ribbons are used to control flies in food preparation area. A screen door leading from the employee break room, where bread and rolls are also stored, out to the trash house had a large gap under it with inward air

flow. Trash was hauled weekly, or more often if needed, and the trash house hosed down and disinfected after pick up. A glue board was in place under the front counter area near the beverage syrup canisters, but no trapped roaches were noted. A concrete block building used for storing paper goods and syrup canisters appears tightly constructed, but an occasional rat was reported. Spilled straw and manure from the trash truck may be a source of flies to this facility.

Management Recommendations: Continue sticky fly ribbons, containerize all garbage, put weatherstripping or new threshold under door leading to trash house. Install fan blowing outward against kitchen doors. Double screen doors at the visitor's entrance to the restaurant will reduce flies. Continue to work with pest control contractor to monitor roach and rodent populations. Thanks to Mr. Davis for his cooperation.

LEWIS MOUNTAIN

I visited with Mr. Foote on June 26, 1987. He reported that the Dodson technician was currently monitoring with glue boards for roaches, but was finding none. Mice were being controlled with glue boards, live traps, and snap traps. Mr. Foote preferred snap traps for rodent control because they were more effective and humane. I agree.

A former bat problem in Cabin #7 was corrected by closing cracks with molding strips. Sawdust above the bathroom in units #11 and #12 indicated the presence of wood damaging insects. Periodic swarms of small, hard-shelled insects which made a snapping sound were drawn to an outside porch light outside of the manager's quarters. Identification of these insects has not been made.

Management Recommendations: Continue glue board monitoring for roaches. Continue current rodent control tactics. Investigate wooden roof structures above bathroom in units #11 and #12 for source of insect infestation and possible leak in roof, or moisture infiltrating from shower steam. Turn outside porch light off when not in use to discourage swarming of nocturnal insects. Thanks to Mr. Foote for showing me the Lewis Mountain facility and for supporting IPM principles.

LOFT MOUNTAIN

Dixie Gray toured the Wayside with me on June 29, 1987. He indicated that no roaches had ever been detected at the facility, nor were rodents a problem. Flies created a nuisance periodically, and he felt that the number of flies observed around the Wayside were more than could be produced at the site. It was suggested that the old sewage plant under the terrace, which is now graded and mowed, or the sewage treatment facility currently in use at the bottom of the hill might be a source of flies. Floor drains in the building are periodically treated

with ammonia to help control the problem. Trash is hauled from the trash house once a week, and the building is disinfected with ammonia at that time.

Small red ants were reported to be a nuisance in spring when the Wayside is first opened for the season. An apparent increase in the number of visitors suffering insect stings has been noted.

Management Recommendations: Install a forced-air fan blowing outward above the kitchen door leading to the trash house. Trap flies with sticky ribbons. Continue to explore possible fly breeding sites. Thanks to Dixie for his helpful insight to possible pest control solutions.

III. DEVELOPMENT OF THE ARA-IPM PROGRAM

The NPS will continue to assist ARA by supplying technical assistance, insect pest identification, and a range of control techniques which have been demonstrated and proven effective in other, similar situations. Park support will be in the form of on-site inspections by the Park IPM coordinator, written articles, video presentations, and bringing in outside experts to demonstrate new control technology.

ARA will continue to be responsible for selecting a PCO to perform necessary inspection, monitoring, and treatment of pests on a contract basis. The Park IPM coordinator will not act as contractor's representative or liaison between ARA and the PCO, but will meet with the selected PCO to explain NPS Pest Control Policies and the principles of IPM.

Pesticide Approvals

The Park will assist ARA's COAR and PCO in completing Pesticide Approval Form 10-21A, and provide detailed instructions for maintaining the required Pesticide Use Log. The Park will forward completed 10-21A's requesting use of a particular pesticide to the Regional and Washington offices for timely review, and will respond to all completed 10-21A requests within five (5) working days. Where advance approval of a pesticide project is necessary (as may be the case with contracted pest control services) all required forms must be completed and submitted to the Park IPM coordinator at least sixty (60) days prior to the anticipated execution date of the project. Requests for pesticide approvals must be accompanied by a complete copy of the product label. Every proposal must be submitted and receive approval annually. No pesticide use proposal will be approved solely on the basis of prior approval.

Written records of inspections and monitoring results will be required to justify all requests for pesticide applications. Records should show: the identification of the pest (genus and species if possible); size of the pest problem, distribution of the pest problem; information on treatment alternatives; and

short- and long-term effects of treatment actions on pest and non-target species. It is important to standardize both the format and the process by which the records are kept. It is also important to specify that the same one or two technicians be assigned to the contract. These steps will aid in achieving continuity.

SITE PLANS

ARA should develop site-specific plans for the management of pest species. The full range of control options, including physical, mechanical, social, and biological, should be explored. Physical tactics include altering temperature, relative humidity, and air current movements. Mechanical controls include caulking and sealing openings, installing screens, or trimming trees and shrubs which are in contact with buildings. Tactics which reduce favorable habitat, or living conditions, for a pest most likely will be a combination of physical, mechanical, and social modifications. It is important to identify and eliminate sources of food, water, and shelter whenever possible. Chemical suppression techniques, if required, will only be used in conjunction with an array of other non-chemical tactics.

PEST CONTROL CONTRACTORS

Critical to the success of an IPM program is the ability of the manager, in this case ARA Virginia Sky-Line, to deal effectively with a pest control operator. This relationship must be based on a solid understanding, by both parties, of the policies which guide the use of pesticides on NPS lands, in addition to all applicable state and Federal laws. This understanding is formalized by means of a contract.

Sample contract specifications are provided here for the purpose of enabling ARA to develop a clear and comprehensive contract which specifies, in detail, what a PCO must do in providing inspection, monitoring, and treatment services for ARA, while complying with all policies and regulations of the National Park Service.

Sample Contract Specifications

The following specifications can be used as a model in writing pest control contracts for most structural pests other than those responsible for wood destruction.

Three categories of service should be performed: inspection, monitoring, treatment, and accurate record keeping and reporting. The extent to which these services should be performed in-house or by contract will depend on the availability and expertise of in-house personnel. For example, inspection and monitoring may be performed by qualified ARA employees, while, treatment with pesticides would most likely be made by a licensed Pest Control Operator (PCO). This arrangement would require contracting for PCO services on an "as needed" basis.

Inspection and Monitoring

Contractor shall:

1. Perform an initial overall inspection of all listed facilities and their surrounding environment no later than ____ days following award of the contract.

Note: An inspection may be required prior to bid.

2. Be accompanied by the Contracting Officer's Appointed Representative (COAR), usually the ARA site manager, on the inspection.

3. Report the results of the inspection on the prescribed form (Appendix 1) indicating: areas where pests or signs of pests are evident (maps, diagrams and/or floor plans should accompany the inspection report form), relative severity of active infestations, potential pest problems and factors contributing or leading to pest problems.

4. Make recommendations for prevention and/or remedy of problems indicated on the form and state possible consequences if prescribed actions are not taken.

5. Interview the facility manager and appropriate employees and report facility functions or personnel activities which affect pest problems.

6. Provide inspection results to the COAR no later than ____ days following the inspection.

7. If repeat inspections are required, frequency should be specified (e.g., repeat inspections quarterly).

8. Be accompanied by the COAR or his appointed representative on all visits.

9. Monitor the facilities listed at the intervals prescribed. (Different facilities may require different monitoring frequencies, e.g., food handling areas may require more frequent monitoring than offices).

10. Perform monitoring by examining thoroughly all facilities and their surrounding exteriors for the pests listed and/or signs of these pests. List pests here:

11. Examine all areas where employee or visitor complaints have originated. COAR will direct the contractor to these areas.

12. Monitor by trapping (sticky traps for cockroaches and flies, glue boards or snap traps for rodents) in all areas where monitoring and/or complaints indicate a possible infestation.

13. Provide a written monitoring report after each visit. The inspection report form (Appendix 1) or any other form or certificate acceptable to the COAR may be used when specific pest trap monitoring is not warranted. If trapping is performed, data shall be recorded on forms provided by COAR or PCO.

Injury and Action Thresholds

Injury and action levels must be determined for each pest at each site. The simple presence of some species does not automatically constitute a pest problem. The population level of the organism must be correlated to an unacceptable damage or nuisance level, and treatment strategies applied at the pre-determined action level to prevent the damage from occurring.

Treatment

Contractor shall:

1. On the basis of monitoring information consult with COAR on the necessity and type of treatment required.
2. Not apply any treatment, particularly pesticides, on a routine, calendar basis.
3. Apply or recommend physical controls first or in conjunction with chemical controls.
4. Limit treatments to infested areas only.
5. Control cockroaches with crack and crevice applications of boric acid or silica gel and/or pyrethroid treatments for quick knock down. Specific areas treated with boric acid and silica gel will be reported to the COAR.
6. Not use any other pesticide for cockroach control unless the Park Service IPM coordinator, COAR, and contractor agree the infestation is sufficiently severe to warrant the use of more toxic pesticides.
7. Notify employees when and where pesticides are being applied.
8. Time application to minimize employee and visitor exposure.
9. Use all pesticides according to label directions and specific safety procedures found on label.
10. Seal all cracks and crevices which monitoring indicates as cockroach focal points.
11. Control mice with glue boards or snap traps and maintain record of catches.
12. Control rats by baiting with approved chemicals, or snap trapping. All snap traps and rat baits will be used indoors and

baits placed in tamper-proof bait boxes. In order to be effective, baits may have to be placed at a frequency greater than the specified routine monitoring interval.

13. Control other pests with treatments agreed to by the NPS IPM coordinator, COAR, and contractor prior to application.

14. Complete a NPS Pesticide Reporting Form, 10-21A for all pesticides to be used with the assistance of NPS IPM coordinator ___ days after the award of the contract, and prior to any pesticide treatments. 10-21A approvals will be made only for the current calendar year.

15. Notify the COAR whenever a substitution for an approved product is intended so necessary review and approval can be obtained.

16. Maintain a NPS Pesticide Use Log for all pesticides used and submit the log to the COAR upon request. Completed annual NPS Pesticide Use Log must be submitted to NPS IPM coordinator by December 15.

17. Continue monitoring and consult with the COAR in evaluating treatment efficacy after each visit.

Evaluation

Periodic evaluation of treatments and the overall IPM program are essential to the success of the program. At the end of the season, the ARA COAR should produce an evaluation report on all treatments. The report should answer the following questions:

1. Was the pest population adequately suppressed (below injury level) in a timely manner?
2. Was the planned procedure used? If not, what was different?
3. Was the cost of suppression equal to or less than the expected damage?
4. What damage was produced? What damage was tolerable?
5. Were natural enemies affected by treatments? How? Will this cause problems elsewhere or at a later period?
6. Were there any other side effects from the treatments?
7. Were the side effects added to the cost of treatments?
8. If ineffective, should the treatments be repeated or should another kind of treatment be evaluated?
9. Can the site be changed to eliminate or reduce the problem for the same costs as treatment?

10. Was equipment available at the appropriate time?

Educational Program

An educational program should be developed by ARA management to teach employees IPM techniques and the principles upon which IPM is built. Misconceptions about IPM need to be cleared up. Pests will be controlled, and pesticides may be used, when required, to achieve reduction of the pest population. The difference between conventional spray programs and IPM is that chemical suppression is usually used after other non-chemical tactics have proven to be ineffective in driving pest populations below the injury threshold, instead of as an initial attack response. (There are some situations where a pesticide may be used initially to knock down existing high pest populations so that other IPM controls will be effective.) The goal of the IPM program in developed areas of the National Park Service is to reduce pesticide usage to the greatest degree possible.

ARA is fortunate in having a very high percentage of employees returning season after season, as well as low turnover in the permanent staff. A strong IPM program can be infused into operations over the next few years with periodic training sessions. The Park IPM coordinator will provide training material, including videotapes related to the IPM approach, for use by ARA managers, if desired.

The Park will work with ARA in developing an IPM interpretive program to explain the policy to Park visitors. Exhibits, signs, and other techniques may be used to encourage visitors to be more tolerant of the native creatures living in the Park. Visitors should be made to understand that they are visiting a large, natural National Park, and that they are, in fact, only visitors, while the wild animals are permanent residents.

TRANSITION PERIOD

The Park Service realizes that the conversion from the current pest management program to a complete IPM system will require time, and thus will be instituted in phases, according to a planned timetable. ARA will develop an implementation schedule for completing necessary repairs and modifications of structures which are identified as contributing factors to pest problems. Many minor repairs or alterations may be done relatively quickly, while more major jobs will require a longer time for completion. ARA will also review Park inspection reports, site manager's recommendations, and PCO inspection reports to develop a timetable for incorporating changes in management and employee activities which are contributing to pest problems. Sanitation procedures, trash hauling schedules, food storage (including beverage syrup canisters), and stables management will all be re-evaluated to identify and correct conditions conducive to buildup of pest populations.

During the transition phase, a Transitional Plan should be developed describing interim strategies which will be used until the full array of IPM tactics and structural modifications can be instituted. The final Comprehensive IPM plan should contain the Transitional Plan within it, and clearly distinguish the differences between transitional objectives and the ultimate goal of IPM.

ARA should submit a timetable for: (1) implementation of transitional IPM strategies; (2) development of the IPM plan; (3) implementation of the final IPM program.

ARA managers should feel free to contact Rick Potts, Natural Resource Specialist and Park IPM coordinator, with any questions relating to clarification of responsibilities, contents of this report, and technical assistance for suggested control methods for specific pests.

Appendix I
SUGGESTED
INSPECTION/MONITORING REPORT FORM

Name of Firm: _____ Date: ____/____/____

Inspector: _____

Accompanying ARA Inspector: _____

Building/Room/Area: _____

Item	Problem Verification	Comments**
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	No	Yes	Specific Locations*
<u>RODENTS</u>			
Visual sightings of rodents			
Droppings			
Gnaw marks/other damage			
Smudge marks			
Urine stains			
Odors			
Nests and food caches			
Rat holes (exterior)			
Adequate housekeeping			
Adequate garbage disposal			
Water availability			
Rodent access to building			
Open sewers/drains			
Loose doors and windows			

	No	Yes	Specific Locations*
Structural defects			
Food storage			
Food preparation			
Food consumption			
Other			
<u>COCKROACHES</u>			
Cockroach sightings			
Fecal pellets			
Damage			
Available habitat, e.g., clutter, stored paper, cardboard boxes			
Adequate housekeeping			
Adequate garbage disposal			
Water availability			
Food storage			
Food preparation			
Food consumption			
Other			
<u>OTHER PESTS</u>			
Visual sightings			
Signs			
Damage			
Habitat factors			

General Comments and Recommendations:

Signature (Inspector): _____ Date: __/__/__

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- \* Give as specific a location as possible, making reference to diagrams, maps, and floor plans when necessary.
- \*\* For each problem verified, specific recommendations should be made to prevent, remedy, or treat the problem. Consequences if action is not taken also should be indicated.

## Appendix II

### PEST CONTROL PROGRAM REPORT (FORM 10-21A)

All requests for pesticide usage require the submission of a Form 10-21A. Each item must be completed in accordance with the following instructions. A new Form 10-21A must be submitted for each project annually, even if the project had been approved in previous years. A blank form is included.

1) TARGET PEST: List the common name (and scientific name where possible) of the pest(s) to be controlled. Also specify the life stage of the pest to be controlled (e.g., egg, immature, adult, pre-emergent, post-emergent, flowing, pre-seed, mature, dormant, stump).

2) PRODUCT NAME: List the complete trade name of the product as it appears on the label. Also list the manufacturer [e.g., Sevin FR (Union Carbide), Garlon 4 (Dow)].

3) EPA REG. #: An EPA registration number appears on the label of every registered pesticide. Copy the number, which should always contain at least two numbers separated by hyphens, exactly as listed on the label. The first set of numbers may contain as many as six digits, while the second may contain up to five (i.e., 464-360, 264-345, 677-242-AA). Letters referring to State registrations may follow the numbers (i.e., 464-360 FL).

4) ACTIVE INGREDIENT: List the active ingredient(s) in the product by its/their approved common name(s) (e.g., Carbaryl, Triclopyr). If common name is not available use the chemical name (i.e., Boric acid).

5) % OR #/G ACTIVE INGREDIENT: If the pesticide is in powdered/solid form, list the percentage (%) of the active ingredient. If the pesticide is in liquid form, list the pounds per gallon (#/G) of active ingredient as it appears on the label.

6) MIX OF PRODUCT WITH DILUENT: Give the amount of product to be mixed with diluent, i.e., (3 pounds of Carbaryl 50W mixed with 100 gallons of water, or 3 tablespoons of Garlon 3A mixed with diesel oil).

7) PRODUCT USAGE RATE: Give the amount of product to be used per unit treated. Examples of units include acre, animal, burrow, cubic feet, linear feet, plant, and square feet.

EXAMPLE: If a 5-pound package of a pesticide dust formulation is applied to 5 acres of turf, write "1 lb./acre."

8) PRODUCT AMOUNT USED PER APPLICATION: List the exact product amount to be used per application.

EXAMPLE: If three one-pint bottles of 50 percent malathion are to be used per application, write "3 pints."

9) METHOD OF TREATMENT: List the equipment to be used for pesticide application (e.g., aerosol can, bait station, direct application, dust gun, fogger, helicopter, hand placement, hand pressure sprayer, mist blower, rodding and trenching, tent fumigation, wick applicator).

10) FORM APPLIED: List how the product is formulated (e.g., bait, dust, emulsifiable concentrate, granules, liquid, suspension, wettable powder).

11) AREA OR UNITS TO BE TREATED: Give actual area that you are proposing to treat.

EXAMPLE: If you are broadcast treating 3 acres of turf, write "3 acres-broadcast treatment."

EXAMPLE: If you are spot treating 6 trees on 4 acres of turf, write "6 trees on 4 acres-spot treatment."

12) NUMBER OF SITES: List the number of sites to be treated.

13) DESCRIPTION OF SITES: Give a brief description of the sites to be treated (e.g., cherry trees, structures, native prairie). Also include the management zone (natural, historic, development, or special use).

14) NO. OF APPLICATIONS: List the number of times that you expect to apply the dosage of pesticide described above.

15) AMT. PRODUCT USED TOTAL: List the total amount of product to be used for the entire project.

16) REGION: List the National Park Service Region (Mid-Atlantic).

17) YEAR: List the calendar year for which the project is proposed.

18) ORGANIZATION: List the official name of the Park.

19) PROJECT: List the official four-letter organization code (SHEN), the last two digits of the calendar year, and a unique number assigned by the Park IPM Coordinator to the project (separated by hyphens). An example is "SHEN-88-01" for project number 1 in 1988.

20) PURPOSE: Describe the purpose of the project

|                               |                                |
|-------------------------------|--------------------------------|
| Crop (name) protection        | Ornamental protection          |
| Employee health               | Pasture protection             |
| Endangered species protection | Public health protection       |
| Exotic plant control          | Quarantine (agricultural)      |
| Forest Insect and Disease     | Site protection and            |
| Project Research              | Restoration                    |
| Greenhouse plant protection   | Roadside and trail maintenance |
| Historical preservation       | Utility right-of-way clearance |
| Household protection          | Soil sterilization             |
| Lawn and turf protection      | Structural protection          |
| Livestock protection          | Orchard protection             |
| Museum specimen protection    |                                |

21) SEASON OR PERIOD OF APPLICATION: Use either months or seasons to complete this category. If possible, give exact dates.

22) AREAS TO BE AVOIDED: List any areas which should be avoided as indicated on the label or in the product literature.

23) AREAS TO BE TREATED WITH CAUTION: List any areas that should be treated with caution, as specified on label.

24) PRECAUTIONS: List any precautions such as extra safety procedures needed, as prescribed on the label.

25) USE OF TRAINED OR CERTIFIED PERSONNEL: Specify the number of certified pesticide applicators (include specific federal or state applicator program and certification category) and uncertified applicators involved in the project.

26) MONITORING: List any planned monitoring activities, both pre- and post-treatment. Briefly describe method.

27) PERSON TO CONTACT: List the name and phone number of the Park IPM Coordinator. He/she should be able to answer technical questions about the project.

28) REMARKS: Include any comments which you feel are necessary to clarify any of the preceding items. List any non-chemical alternatives which have been considered as possible solutions to the problem and give reasons for their rejection. Give reasons for the importance of this project, such as damage or destruction of resources or threats to health, which could occur if control operations were not accomplished.

FORM 10-21A

UNITED STATES DEPARTMENT OF INTERIOR  
NATIONAL PARK SERVICE  
PEST CONTROL PROGRAM REPORT

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TARGET PEST:

REGION: Mid-Atlantic

YEAR:

PRODUCT NAME:

ORGANIZATION: Shenandoah National Park

PROJECT:

(e.g., SHEN-84-01)

EPA REG. #:

PURPOSE:

ACTIVE INGREDIENT:

SEASON OR PERIOD

OF APPLICATION:

% OR #/G (/)

ACTIVE INGREDIENT:

AREAS TO BE AVOIDED:

MIX OF PRODUCT  
WITH DILUENT:

AREAS TO BE TREATED  
WITH CAUTION:

PRODUCT USAGE RATE:

PRODUCT AMOUNT USED  
PER APPLICATION:

PRECAUTIONS:

METHOD OF TREATMENT:

USE OF TRAINED OR  
CERTIFIED PERSONNEL:

FORM APPLIED:

MONITORING:

AREAS OR UNITS TO  
BE TREATED:

PERSON TO CONTACT:

NUMBER OF SITES:

OTHER REMARKS:

DESCRIPTION OF SITES:

NO. OF APPLICATIONS:

AMT. PRODUCT USED TOT:

### Appendix III

#### PESTICIDE USE LOG

A Pesticide Use Log must be maintained for each Park area. This should consist of a loose-leaf binder containing forms as illustrated at the end of this section. Extra copies of these forms may be photocopied or obtained from the Regional Office or WASO.

Each Park should maintain a running account of actual pesticide use by making an entry to the form immediately following each pesticide application. This will require submission of the needed information from the non-NPS applicators and points up the need to closely coordinate and seek approval for all application of pesticides by contractors, concessionaires, leasees, and others. Proper maintenance of this log will facilitate retrieval of the pesticide use information necessary for year-end reporting. Pesticide Use Logs covering the entire calendar year will be due in WASO on February 1 of the succeeding year.

Each log sheet contains enough space for fifteen entries. Use one space for each active ingredient that appears on the label. See instructions below for completing form (blank form attached). This form may be expanded to meet additional local reporting requirements. Anyone having difficulty with the requested calculations may contact their Regional IPM Coordinator for assistance.

- Park: List the official name of the Park.
- Region: State the Regional Office to which the Park reports.
- Year: State the calendar year for which the listed projects are covered. DO NOT USE A SHEET FOR MORE THAN ONE CALENDAR YEAR.
- Location/Project No.: List the four letter organization code for the Park area and the sequential project number (e.g., SHEN-88-01).
- Date: List the date that the application was performed. If a project takes more than one day, make separate listings.
- Applicator: List the name of the applicator(s) who are actually applying the pesticides. This includes both contract and lease personnel.

- Trade Name: List either the trade mark or trade name that is listed on the label for the product.
- Active Ingredient: List the common name of the active ingredient in the product. If more than one active ingredient is contained in a particular product, make separate entries.
- EPA Reg. Number: List the complete EPA registration number for the product. This number will appear on the label of every registered pesticide.
- Pest: List, as specifically as possible, the target pest(s) of your application.
- Amount of Product: State the actual amount of product applied.
- EXAMPLE: If two one-pint bottles of 22.5 percent Chlorpyrifos solution was used, then list "2 pints."
- Area Treated: State the total area treated in square feet or acres.
- EXAMPLE: If two acres of weeds were broadcast with Glyphosate, then state "2 acres-broadcast."
- If 15 trees in an area of 30 acres were spot treated, state "15 trees on 30 acres-spot treatment."
- Amount of 100% Active Ingredient: State the total amount of actual active ingredient used in terms of lbs. (pounds). Examples are given below to illustrate the information needed to make necessary conversions.
- Powders, Dusts, etc.  
If the product is purchased as a powder, the amount (weight) used should be converted to pounds. This number is then multiplied by the percent active ingredient, divided by 100 to give the "Amount of 100% Active Ingredient."

EXAMPLE: 4 ounces of 10 percent Carbaryl dust are applied to ornamental plants.  
16 oz. = 1 pound  
4 oz. = 1/4 or 0.25 pounds  
Since the Carbaryl dust contains 10 percent active ingredient, make the following computation:  $10/100 = 0.10$ . Then multiply the weight of the active ingredient (0.25 lb.) by the proportion of active ingredient (0.10) to give the "Amount of 100% Active Ingredient" ( $0.25 \times 0.10 = 0.025$  lb.).

Solutions, Liquids, Emulsions, etc.

If the product is purchased as a liquid, then the volume used must be converted to units of weight. Pesticide labels contain a conversion factor to make this calculation.

EXAMPLE: The label for Dursban 2E insecticide states "contains 2 pounds of Chlorpyrifos per gallon."

The applicator mixes 2 fluid ounces of the product with 2 quarts of water and applies it according to the label instructions. To determine the "Amount of 100% Active Ingredient" used, the following calculations are necessary:

a) Convert fluid ounces to gallons:

32 fl. oz. = 1 quart  
4 quarts = 1 gallon  
128 fl. oz. = 1 gallon

2 fl. oz. = 0.016 gallons of  
product used

b) Since the product contained 2 pounds of Chlorpyrifos per gallon, make the following calculations to determine the actual weight of active ingredient used.

2 lbs. Chlorpyrifos  $\times$  0.016  
= 0.032 lbs

PARK :  
REGION :  
YEAR :

- 25 -