

2020 PARKS DIVISION PESTICIDE REPORT

POLICY REGARDING PEST MANAGEMENT ON CITY PROPERTY

Policy Adopted 5/18/2004

1. The purpose of this policy is to eliminate or reduce pesticide use to the greatest possible extent. The City of Madison agrees with the US EPA that “all pesticides are toxic to some degree, and the commonplace, widespread use of pesticides is both a major environmental problem and a public health issue.” For this reason, all departments will evaluate and give preference to non-pesticide management practices and use reasonably available alternative pest control methods, will minimize their pesticide use through Integrated Pest Management, and will use least risk pesticides as a last resort.
2. Definitions of terms used in this policy.
 - a. Integrated Pest Management (IPM) is a decision making process. The essential parts of IPM are monitoring, setting threshold levels for pests, identifying the causes of the pest problem, addressing the cause of the problem, and using the most effective, least harmful, methods to control the problem, before using chemical controls. IPM develops ways to change the conditions that cause the pest problem, so that pests will be prevented in the future or minimized. Preventive maintenance using pesticides for pest problems does not adhere to IPM. Prevention of pests should be managed with non-toxic methods.
 - b. Biological Controls – support or introduction of natural predators or parasites of the pests to be controlled.
 - c. Cultural Controls - practices that can reduce pests by making the environment less favorable, such as improved sanitation or horticultural practices.
 - d. IPM Coordinator – Department staff person who is responsible for developing and implementing the pest management plan for the Department.
 - e. Mechanical Controls - direct measures that either kill the pest or make the environment unsuitable for their entry, dispersal, or survival, such as tilling the soil to expose insects or hand pulling weeds.
 - f. Physical Controls - practices that physically keep pests from places where they're not wanted, such as window screens and sealing cracks and crevices.
 - g. Pesticides – substances that destroy or repel pests. For the purpose of this document, they include herbicides, insecticides, fungicides, and rodenticides.
3. Chemical pesticide may be considered if:
 - a. The non-toxic methods of pest control, such as Cultural Controls, Physical Controls, Mechanical Controls, and Biological Controls have been shown to be ineffective; and,
 - b. Monitoring has indicated that the pest will cause unacceptable health or safety hazards, or an unacceptable reduction in the intended use of the property.
4. All departments will maintain appropriate records on pest monitoring data collected, pest control actions attempted (both non-chemical and chemical), and results of pest control activity. All departments will submit by February 1st an annual report to the Public Health Commission. This report will contain the following information:

- a. Completed Pesticide Application Summary for all pesticide applications made in the previous year. Application data must include: purpose, location, and amount of each pesticide product applied, including the amount of active ingredient.
 - b. Annual summary of non-chemical pest control activities.
 - c. Estimated size of the total area managed for each pest problem in a given year. The area managed will likely exceed the area treated.
 - d. A summary of any complaints received regarding use or the perceived need for use of pesticides, including the date complaint(s) was (were) received and the nature of the complaint(s).
 - e. A pest management plan for the coming year. The plan will contain the following information for each type of pest problem:
 1. Definition of Roles. Identify who will: serve as the IPM Coordinator, perform pest monitoring, evaluate pest control alternatives, decide which pest control alternative to use, and implement pest control measures.
 2. Pest Management Objectives. Identify the action thresholds (i.e., pest population levels) to be used to decide when some type of action should be taken to control the pest problem.
 3. Monitoring Plan. Describe the methods to be used to monitor the pests and the frequency of monitoring.
 4. Control Method Selection. Describe the types of pest control methods to be evaluated and the criteria used to choose the appropriate control method. IPM control methods may include:
 - i. Modifying the environment to increase the effectiveness of biological, mechanical, cultural, or physical controls such as blocking mouse holes, keeping areas clean where insects may be attracted, improving soil health, etc.
 - ii. Destroying pests breeding, feeding, or shelter habitat.
 - iii. Using pest resistant varieties of seeds, ornamentals, trees, etc.
 - iv. Using chemical control strategies as a last resort only after a mix of other strategies is shown to be ineffective.
 - v. Using mechanical methods and biological methods (parasites, predators, disease).
 - vi. Spot-treating pest problems when chemical methods are used.
 - f. Parks Division Pesticide Report A standard notification plan that provides, at a minimum, readily visible posting for a period of 24 hours prior to a pesticide application (when possible) and a minimum of 48 hours following the application. These time intervals may be extended based on health or safety concerns. For areas that receive pesticide applications on a regular basis, permanent signs will be posted
5. Annual evaluation of pest management activities on City property will be performed in the following manner:
- a. Public Health Department staff will summarize pest management activities. This summary and individual Department reports and plans will be provided to the Pest Management Advisory Subcommittee of the Public Health Commission and the oversight commission of each department applying pesticides.
 - b. The Pest Management Advisory Committee, a commission of experts to be recommended by the Public Health Department and appointed by the Mayor's office, shall review the annual report and make recommendations to the Public Health Commission, will:

1. Review the available data and make recommendations concerning compliance with this Policy to the Public Health Commission.
 2. Following review of the available data a list of pesticides acceptable for use on city property will be generated.
 3. Report any contractors that are not complying with this policy to the Public Health Commission.
- c. The Public Health Commission will submit recommendations and concerns to each commission charged with oversight of a department that applies pesticide on City property. The public Health Commission will also forward to the Purchasing Supervisor of the Comptroller's office the names of any contractor that does not comply with the City's pesticide policy.
- d. The oversight commission of each Department with a need to manage pests on City property will have the following responsibilities:
1. Review the Department's pest management activities and plans,
 2. Consider recommendations and concerns from the Public Health Commission, the Common Council, and the public.
 3. Take appropriate action to ensure that the Department's pest management activities and plans are in compliance with this Policy
6. All Departments with a need to manage pests on City property will assign a staff person to serve as IPM coordinator. This person will be responsible for developing and implementing the Department's plan.
- a. IPM Coordinators from all Departments will be required to meet annually to discuss past experiences and recent advances in pest management practices. The group may choose to meet more frequently as needed.
- b. IPM Coordinators will receive IPM training.
7. All Departments will report any complaints regarding health effects possibly related to pesticide applications to the Public Health Department at the earliest opportunity.
8. Any unusual amount of pesticide use due to unusual circumstances will be reported to the Director of Public Health or his/her designee at the earliest opportunity.
9. The IPM Coordinator and all supervisors having responsibility for the handling, application, disposal or storage of pesticides shall be State certified under the Department of Agriculture, Trade and Consumer Protection's Pesticide Applicator Certification Program for the appropriate type of pesticide application engaged in. All employees and volunteers applying pesticides shall be State certified or working under the direct supervision of a certified applicator. All employees having any involvement with pesticide handling, application, disposal or storage shall receive basic training in pesticide safety.
10. All Departments storing, using and disposing of pesticides and pesticide containers will do so safely, according to label directions and any State and Federal regulations where applicable.
11. If the pest control program is performed through a private contractor, the contracts for these services will require the contractor to comply with this policy. The contractor must furnish the IPM Coordinator for the Department served with the following for each pesticide applied:

- a. Date, purpose, location, amount of product, and amount of active ingredient for each application.
- b. Product labeling and material safety data sheets for each product applied,
- c. Documentation of applicator certification and conformance with other Federal and State laws.

Monitoring should not be solely performed by the contractor hired to treat the pest problem. The IPM Coordinator should oversee the monitoring.

- 12. If a private contractor is found to be out of compliance with this policy by the Pest Management Advisory Subcommittee, this non-compliance will be considered grounds for terminating an existing City contract with the contractor and the contractor will not be allowed enter into a contract with any City department for 1 year after the date that non-compliance was determined.
 - a. A list of non-compliant contractors will be kept by the Purchasing Supervisor. The Purchasing Supervisor shall notify all IPM coordinators of non-compliant contractors.
- 13. This policy does not apply to disinfectants used in the routine maintenance of city facilities.
- 14. The City shall NOT USE pesticides to control dandelions and other broadleaf weeds on general parklands, median strips, street terraces, roadsides, general lawn areas, and athletic fields that are not reserved, nor are fees paid for their use.
 - a. Guidelines for Pesticide Use
 - 1. Cosmetic use of lawn and garden areas (including medians) will be managed using non-toxic methods. These methods can be sought out and used on all city properties.
 - 2. Because of concern over the health of children with repeated exposure to pesticides when playing sports, lower priority athletic fields in particular should have a much higher tolerance for weeds and should use non-toxic weed management methods if desired.
 - 3. Golf courses have the opportunity for pesticide reduction by incorporating more cultural method and increasing weed tolerance of golfers through educational efforts, following guidelines set forth by the Audubon Golf Sanctuary Program.
 - 4. Olbrich Gardens and other city property managing large garden areas ought to continually seek out resources for non-toxic garden management.
 - 5. An Integrated Pest Management professional ought to be used as a resource by the city to help coordinate and integrate non-toxic pest management methods.
 - 6. All use of pesticides for conservation purposes for the control of invasive species, must be managed by the conservation supervisor and comply with all other aspects of the pest management policy including reporting and posting requirements. No pesticide will be used for conservation management in areas dedicated for use by children.
- 15. Any use of a pesticide under EPA Special Review is prohibited.

Pesticide Report – Parks Division 2020

The I.P.M. Coordinator for the Parks Division is Assistant Parks Superintendent, Lisa Laschinger. She can be reached at 608-266-9214. The Parks Division consists of several Sections with each Section Supervisor being responsible for complying with the City's Pesticide Policy. The Section Supervisors are also responsible for following the guidelines of Integrated Pest Management, establishing thresholds, considering alternative control measures, the application of any pesticide, and all record keeping as required.

The Park Division is happy to report that their 2019 Annual Report was reviewed by Public Health of Madison and Dane County. Due to COVID-19, the 2019 report was not reviewed by the Habitat Stewardship Subcommittee in 2020, but is scheduled to be reviewed by the subcommittee in February 2021. Parks is compliant with the policy and regulations.

GENERAL PARKS

General Parks, divided into Central, East and West Parks, is comprised of a wide variety of properties with various uses. This includes small neighborhood parks, area parks, community parks, regional parks, natural areas, medians, bike paths, and specialty areas such as tennis courts, disc golf, football, soccer, baseball and softball fields. Total land managed by General Parks is in excess of 4,000 acres.

Parks is thankful to all of the volunteers that assisted us in our non-pesticide control efforts throughout the year. The list of groups and organizations that provides this valuable stewardship assistance is far too great to list without missing critical partners. The projects included flower gardening, natural area restoration, prairie maintenance and establishment, as well as removal of invasives, such as buckthorn, honeysuckle and garlic mustard, etc., from many park areas. Though complete hours have yet to be compiled, approximately several thousand hours of labor for mechanical and cultural control was provided by volunteers in both general and conservation parks in 2020!

The Parks Division uses a number of practices to maintain our parks year-round. We are conservative in our use of pesticides and aim to use them only where reservation fees are collected (ie. athletic fields, shelters and immediately adjacent spaces) and in natural areas to control invasive species. In some cases, we use pesticides to control weeds in our highest use areas because heavy landscaping makes hand weeding very time-consuming and less efficient. We continue to work to enhance the surfaces of our athletic fields, as use and consequently wear of the fields continue to increase each year. We constantly strive to balance competing needs and demands of diverse user groups, constituents and policy makers in all services provided. Any staff applying herbicides are trained and certified in the appropriate State of WI Commercial Pesticide Applicator category, as are any volunteers that apply herbicides. When contractors are hired for Land Management projects, they too must be licensed and certified in the appropriate category.

EXOTIC WOODY SPECIES CONTROL

Targeted Species: Buckthorn, honeysuckle, boxelder, black locust, poison ivy, sumac, privet, elm, mulberry, Oriental bittersweet, maple, willow, ash, hawthorn and euonymus.

Purpose: To control invasive woody species growing in landscaped beds, managed meadows, overgrown natural areas, park borders athletic fence lines, and natural shoreline buffers.

Locations: Applied as cut stump treatments or spot foliar treatment. Droster, Elver, Galaxy, Olin, Reservoir, Waltham, James Madison, Goodman, Merrill Springs, Olin, Starkweather, Tenney, Walter St., Wingra Creek, Yahara River Parkway

Pesticides Applied For Exotic Woody Species Control:

Product(s) Used	Active Ingredient (A.I.)	Total Amount of A.I. Used
Pathfinder II Garlon Garlon 3A Garlon 3 Garlon 4 Element	Triclopyr	1.567 pounds
Polaris	Isopropylamine salt of Imazapyr	0.2416 pounds
Escort	metsulfuron methyl	0.0156 pounds
Vanquish	diglycolamine salt of 3, 6-dichloro-o-anisic acid	0.0216 pounds

HERBACEOUS WEED CONTROL

Targeted species: Weedy grasses and broadleaf annual and perennial weeds, including teasel, burdock, Japanese knotweed, tansy, dame's rocket, garlic mustard, Canadian thistle, birdsfoot trefoil, crown vetch and wild parsnip.

Purpose: To control weed populations in areas that park users rent and reserve, which include athletic fields, ball diamonds and areas of park shelters, fence lines, adjacent parking lots, basketball and tennis courts, and landscaped planting beds. Also to control invasive species in newly established managed meadow plantings.

Locations: Spot treatment and foliar applications were made at Burke Heights, Burrows, Demetral, Door Creek, ELVEJHEM, Hawthorne, Heistand, Heritage Heights, High Crossing, Honeysuckle, Kennedy, Kingston-Onyx, Mayfair, McClellan, Meadow Ridge, Monona, Northport/Packers, Northstar Olbrich, Portland, Reindahl, Sandburg, Secret Places, Sycamore, Warner, Whitetail Ridge, Beld St. Triangle, Bowman, Goodman, Brittingham, Cypress, Elver, Forest Hill Cemetery, Garner, Goodman Pool, James Madison, Olin, Rennebohm, Reservoir, Elver, Waltham, Starkweather, Tenney, Walkter St., Wingra Creek, Wingra Park, Yahara River Parkway, Mallards Stadium

Pesticides Applied For Herbaceous Weed Control:

Product(s) Used	Active Ingredient (A.I.)	Total Amount of A.I. Used
Ranger Pro Kleenup Pro Cropsmart Makaze Round-up Journey Aquaneat	Glyphosate	73.6942 pounds
Trimec:	2-4,D Propionic Acid 3,6 dichloro-o-anisic acid	1.7518 pounds 1.3536 pounds 0.1858 pounds
Preen	Trifluralin	0.0912 pounds
Polaris AC Habitat	isopropylamine salt of Imazapyr	0.1959 pounds
Element 4 Vastlan	Triclopyr	0.7681 pounds
Escort	Metsulfuron methyl	0.4878 pounds
Intensity	Clethodim	0.8559 pounds
Journey	Imazapic Glyphosate	0.0018 pounds 0.0035 pounds
Milestone	Aminopyralid	0.1266 pounds

BROADLEAF WEED CONTROL IN TURF

Targeted species: Broadleaf annual and perennial weeds

Purpose: To control weed populations on playing surfaces of designated playing fields and fenced field spaces, to improve health of turf and user experiences.

Locations: Bowman, Burrows, Demetral, Door Creek, ELVEJHEM, Glacier Hill, Goodman, Heistand, Kennedy, McPike, Northstar, Olbrich, Orlando Bell, Reindahl, Richmopnd Hill, Secret Places, Sycamore, Tenney, Veterans Memorial, Warner, Wingra

Pesticides Applied For Broadleaf Weed Control in Turf:

Product(s) Used	Active Ingredient (A.I.)	Total Amount of A.I. Used
Speed Zone	2,4-D, 2-ethylhexyl ester	1.9125 pounds
	Mecoprop-p Acid	0.6 pounds
	Dicamba acid	0.175 pounds
	Carfentrazone-ethyl	0.0625 pounds
Horse Power	2-Methyl-4-Chlorophenoxyacetic Acid	192.5175 pounds
	3,5,6-Trichloro-2-Pyridinyloxyacetic Acid	19.2517 pounds
	3,6-Dichloro-o-Anisic Acid	19.2517 pounds
T-Zone	Triclopyr	0.7617 pounds
	Sulfentrazone	0.9140 pounds
	2,4-D, 2-ethylhexyl ester	2.6660 pounds
	Dicamba Acid	0.3046 pounds

EXOTIC PLANT (woody & herbaceous) CONTROL APPLICATIONS BY VOLUNTEERS IN PARKS

Targeted Species: Bird's-foot trefoil, buckthorn, crown vetch, honeysuckle, Japanese barberry, and reed canary grass.

Purpose: To control aggressive exotic plant species while populations are small. They threaten native plant diversity if left unmanaged.

Locations: Westmoorland, Odana Golf, Hoyt, 1000 Oaks, Apple Ridge, Blackhawk, Eagle Trace, Elver, Flagstone, Garner, Glenway Golf Woods, Haen, High Point, Huegel, Ice Age Ridge, Junction Ridge, Manchester, Maple Prairie, Odana Woods and Golf, Raymond Ridge, Sauk Creek, Valley Ridge, Walnut Grove, Wexford, Woodland Hills

Pesticides Applied by Volunteers For Control of Exotic Plant Species:

Product(s) Used	Active Ingredient (a.i.)	Total Amount of A.I. Used
Milestone	aminopyralid	0.0026 pounds
Ranger Pro Makaze CropSmart	glyphosate	2.9934 pounds
Intensity	Clethodium	0.1656 pounds
Crossbow	2,4-D, 2-ethylhexyl ester Triclopyr	0.0008 pounds 0.0004 pounds
Pathfinder 2 Garlon 3A Garlon 4	Triclopyr	9.0538 pounds
Amine 4	2,4-D	.3710 pounds

Adopt-A-Park Tree Program

The Parks Division allows interested parties to contract with pre-qualified contractors to inject approved trees with insecticide. This is intended to protect the ash trees against the Emerald Ash Borer, and the application must be repeated every 2-3 years as long as the insect remains a concern (likely for the remaining life of the tree).

Targeted species: Emerald Ash Borer

Purpose: To control insect populations in Ash trees and help prolong the life of trees by preventing harmful infestation.

Locations: Meadowood, Pilgrim, Lucy-Lincoln, Waunona, Rimrock, Penn

Pesticides Applied to Park Trees:

Product(s) Used	Active Ingredient (A.I.)	Total Amount of A.I. Used
ArborMectin Mectinite	Emamectin Benzoate	0.079123 pounds

Non-Chemical Means of Pest Control

Numerous hours were spent by staff and volunteers hand-weeding in general park areas. In addition, staff controlled weeds by mowing and string trimming. Other methods used to improve the quality of turf grass and allow it to out-compete weeds and withstand heavy traffic included core aeration, over-seeding, fertilizing, as well as returning mulched leaves and clippings to the turf. Mulch was used in areas to help decrease weed populations. Staff and volunteers removed seed heads from invasive species and mechanically removed woody invasives.

New in 2020

The use of Flea Beetles as a biocontrol for the invasive plant called Leafy Spurge. The new Land Stewardship Technician gathered the beetles from Ft. McCoy and transported them to areas in Warner and Meadow Ridge Parks.



Staff further advanced the Division's initiative to promote and establish pollinator habitat by establishing pollinator gardens in Flad Park. The former playground's pea gravel was removed and the planting bed established without the use of pesticides.



Complaints/Inquiries Received

We received two complaints/inquiries in 2020. During the summer an individual inquired about the a small amount of pesticide signage at Demetral Park not realizing that the only areas that a herbicide had been applied was to the skinned softball infields. The individual then asked to be notified prior to any more applications. At Wingra Park following a November turf herbicide application an individual complained about the strong odor and questioned the need for such applications to the athletic area.

Plan for 2021

The overall land management and pesticide plan for 2021, in accordance with our approved Land Management Plan, is much the same as that of 2020. We do intend to continue increasing our efforts on natural and prairie areas as well as continuing work on athletic fields. We will do this through a combination of cultural practices and, when necessary, judicious use of herbicide, when cultural and mechanical methods are not effective or efficient. We will continue to refine athletic field management program by combining herbicide and fertilizer applications along with proper mowing, aeration and overseeding. We are also working with a consultant company through a grant opportunity provided by Stonyfields Organic for an organic maintenance trial at Olbrich Softball #2 and Flagstone Park athletic area. We hope that with success of this trial we will be able to grow the organic maintenance program to many more parks in the future.

FOREST HILL CEMETERY

No pesticides were used at Forest Hill Cemetery in 2020.

Non-Chemical Means of Pest Control

Forest Hill Cemetery uses a variety of cultural practices to control or manage cemetery grounds as an alternative to chemical use. These mechanical and cultural control practices include, but are not limited to, the following: regular mowing to maintain height of 3" or higher, string trimming around trees and more than 30,000 headstones, hand removal of volunteer trees, suckers and weeds between markers and in flower/shrub beds, mechanical trapping of rodents in buildings, installation of door sweeps, cleaning gutters to deter interior insect issues.

THE MALL CONCOURSE

No pesticides were used on the Mall Concourse service area in 2020.

Non-Chemical Means of Pest Control

Numerous hours were spent hand-weeding landscaped beds, and cracks in sidewalks. In addition, staff controlled weeds by mowing and string trimming. Other methods used to improve the quality of turf grass and allow it to out-compete weeds and withstand heavy traffic included core aeration, compost topdressing, over-seeding, fertilizing, as well as returning mulched leaves and clippings to the turf. Mulch was used in areas to help decrease weed populations.

Complaints

We received no complaints in 2020 for pesticide use in Mall/Concourse Maintenance.

Plan for 2020

The Mall Concourse maintenance plan for 2021 is the same as that of 2020

WARNER PARK COMMUNITY RECREATION CENTER (WPCRC)

Primary pest pressures at WPCRC are due to rodents. Due to COVID19, WPCRC was temporarily converted to use as an overnight shelter for single men experiencing homelessness. This resulted in an increased need for pest monitoring in the building.

Pesticides Used by Plunkett Pest Control

Product Used	Active Ingredient (A.I)	Amount Used	Purpose
Firststrike	defathialone	120 blocks	Insect control
Weatherblok XT	3-(3-(4'bromo[1,1'- pipehnyl]-4-yl)-4- hydroxy-2h-1- benzopyran-2-one	24 blocks	Rodent Control

Non-Chemical Means of Pest Control

Trash is removed and facilities cleaned daily to reduce insect issues, such as ants. Trash is removed from building and stored in exterior dumpsters. Door sweeps and vents are kept in good working order to prevent pests from entering.

Complaints

We received no complaints in 2020 for pesticide use in at WPCRC.

Plan for 2020

The WPCRC maintenance plan for 2021 is the same as that of 2020

CONSERVATION PARKS

WOODY PLANT CONTROL APPLICATIONS BY STAFF

Targeted Species: Black locust, buckthorn, burning bush, honeysuckle, Kentucky coffee-tree, Norway maple, privet, Asiatic bittersweet, porcelain-berry, white mulberry, white poplar, and multi-flora rose. Certain ash, black cherry, elm, and hickory were also targeted as part of oak woodland restoration efforts.

Purpose: The purpose of herbicide applications is to reduce the presence of these species in Conservation Parks in order to preserve the native diversity of plants and animals. Controlling woody vines is becoming an increasing point of emphasis as these species are spreading rapidly. Trail improvement projects also require herbicide to prevent re-sprouting.

Locations: Cut stump treatment, spot foliar, and basal bark applications were made at Cherokee Marsh (North and South units), Edna Taylor, Owen, Prairie Ridge, Stricker's Pond, and Turville Point Conservation Parks.

Pesticides Applied by Staff For Control of Woody Species

Product(s) Used	Active Ingredient (a.i.)	Total Amount of A.I. Used
2,4-D	2,4-dichlor-phenoxyacetic acid	0.75 pounds
Makaze	glyphosate	3.71 pounds
Garlon 3A	triclopyr amine	1.29 pounds
Element 4 Garlon 4	triclopyr	9.8 pounds

EXOTIC HERBACEOUS PLANT CONTROL APPLICATIONS BY STAFF

Targeted Species: Bird's-foot trefoil, burdock, crown vetch, cut-leaf teasel, dame's rocket, garlic mustard, Japanese hedge parsley, Japanese knotweed, Miscanthus, and spotted knapweed.

Purpose: To control aggressive exotic plant species while populations are small. They threaten native plant diversity if left unmanaged.

Locations: Cherokee Marsh (North, South, and Mendota units), Edna Taylor, Elvehjem Sanctuary, Heritage Sanctuary, Heritage Prairie, Owen, and Prairie Ridge Conservation Parks.

Pesticides Applied by Staff for Control of Exotic Herbaceous Plants:

Product(s) Used	Active Ingredient (A.I.)	Total Amount of A.I. Used
2,4-D	2,4-dichlor-phenoxyacetic acid	7.50 pounds
Makaze	glyphosate	0.12 pounds
Garlon 3A	triclopyr amine	11.31 pounds
Intensity	clethodim	0.02 pounds

EXOTIC PLANT (woody & herbaceous) CONTROL APPLICATIONS BY VOLUNTEERS

Targeted Species: Bird's-foot trefoil, buckthorn, crown vetch, garlic mustard, honeysuckle, Japanese barberry, Phragmites, porcelain-berry, and reed canary grass.

Purpose: To control aggressive exotic plant species while populations are small. They threaten native plant diversity if left unmanaged.

Locations: Cherokee Marsh (South Unit), Owen, Stricker's Pond, and Turville Point Conservation Parks, and the wooded northern tract of Sycamore Park, which is managed as a natural area.

Pesticides Applied by Volunteers For Control of Exotic Plant Species:

Product(s) Used	Active Ingredient (a.i.)	Total Amount of A.I. Used
Milestone	aminopyralid	0.01 pounds
Intensity	clethodim	0.09 pounds
Aquaneat Makaze	glyphosate	4.35 pounds
Garlon 3A	triclopyr amine	0.18 pounds
Garlon 4 Pathfinder II	triclopyr	1.20 pounds

HERBICIDE APPLICATIONS BY CONTRACTORS

Targeted Species: Applications made as part of large scale Oak Woodland, Prairie and Wetland restoration projects to control woody species including autumn olive, bittersweet nightshade, black locust, buckthorn, mulberry, honeysuckle, sumac, Asian bittersweet, and porcelain berry. Herbaceous species targeted include burdock, garlic mustard, dame's rocket, Himalayan pokeweed, Japanese hedge parsley, motherwort, and reed-canary grass.

Purpose: To control aggressive exotic plant species while populations are small. They threaten native plant diversity if left unmanaged.

Locations: Cherokee Marsh (North and South units), Edna Taylor, Knollwood, Moraine Woods, Owen, Stricker's Pond, and Turville Point Conservation Parks.

Pesticides Applied by Contractor:

Product(s) Used	Active Ingredient (a.i.)	Total Amount of A.I. Used
Milestone	aminopyralid	0.04 pounds
Intensity	clethodim	21.56 pounds
Vanquish Progeny (<i>in part</i>)	dicamba	0.91 pounds
Aquaneat Cropsmart	glyphosate	38.69 pounds

Product(s) Used	Active Ingredient (a.i.)	Total Amount of A.I. Used
Progeny (<i>in part</i>)	MCPA	1.20 pounds
Escort	metsulfuron methyl	3.92 pounds
Element 4 Garlon 4 Garlon XRT Progeny (<i>in part</i>) Vastlan	Triclopyr	99.02 pounds

NON-CHEMICAL PEST CONTROL MEASURES

Hand-pulling: Staff spent a total of **150 hours** hand pulling garlic mustard and Japanese hedge parsley at Cherokee Marsh, Edna Taylor, Heritage Sanctuary, Owen, and Prairie Ridge.

The Friends of Cherokee Marsh, Friends of Owen, and other volunteers spent **141 hours** hand-pulling garlic mustard and hedge parsley, collecting dame's rocket seed heads, hand-digging sweet clover, and spading burdock and wild parsnip at North and South Cherokee Marsh, Owen, and Stricker's Pond.

Prescribed Fire: The use of fire is an important land management practice which helps promote native species over exotics. The timing of burns can help set back exotics (e.g., late spring burns harm cool season weeds but promote native warm season plants). Burns can also cause mortality to small woody exotics like buckthorn and honeysuckle. If the timing is perfect, fire can even kill entire cohorts of first year garlic mustard seedlings. Unfortunately, the number of days suitable for burning is limited by both weather conditions and staffing levels. The COVID-19 pandemic decreased this window even further in 2020, as burn permits were suspended in spring to reduce any potential or perceived strain on emergency resources. Burning resumed mid-summer, and Conservation staff burned approximately **60 acres** in the Conservation parks in fall 2020.



Prescribed grazing: Goats were used to graze 16 acres at Acewood and Turville Point in 2020 to control woody invasive species and brambles and promote the establishment of native vegetation. This grazing included the use of goats, confined to specific targeted areas, to manage and suppress invasive vegetation. Grazing is an important management tool for natural areas, and a key component of an Integrated Pest Management (IPM) plan. Advantages to grazing include reducing the need for chemical control methods, minimizing erosion risks, and improved access to difficult terrain.



Mowing: Considerable time (**approx. 160 hours**) was spent spot-mowing bird's-foot trefoil, crown vetch, Japanese hedge parsley, sweet clover, teasel and wild parsnip, as well as invasive brush. Mowing was used at Cherokee Marsh, Edna Taylor, Elvehjem, Owen, Prairie Ridge, and Turville Point.

PLAN FOR 2021

Conservation's IPM Program will be implemented in 2021 similarly to how it was in 2020 in accordance to the Parks Division's Adopted Land Management Plan. Staff will continue to target priority invasive species, striving for complete control, in priority management units. These efforts will be complemented by volunteer-led efforts in adjacent management units. Visual estimates of canopy cover will be used to prioritize areas for brush mowing, and to determine thresholds for hand-pulling versus mowing versus foliar herbicide applications, for those invasive species that can be effectively controlled with mechanical methods only. Chemical control will be used in conjunction with mechanical methods wherever possible, in order to reduce the amount of pesticide required.

Large-scale restoration efforts are planned for Cherokee Marsh, Knollwood, Moraine Woods, Owen, and Turville Point. Contractors will be hired to make cut-stump applications to buckthorn and honeysuckle, as well as foliar applications to bird's-foot trefoil, burdock, crown vetch, daylily, garlic mustard, dame's rocket, Himalayan pokeweed, and reed canary grass. Some areas will be forestry mowed, and woody re-sprouts sprayed early in the growing season while they are still small.

Following invasive species control efforts, native grasses, forbs, shrubs, and trees will be seeded or planted to complement recovery from the natural seed bank as part of the restoration process.

Prescribed fire, mowing, and hand-pulling will continue to be used as management tools in 2021, and prescribed grazing will be expanded to a total of 43 acres at Acewood, Knollwood, Owen and Turville Point as part of the long-term management strategy at these sites.

OLBRICH BOTANICAL GARDENS

PEST CONTROL IN EUGENIE MAYER BOLZ CONSERVATORY

Since the Bolz Conservatory opened to the public in November of 1991, the insect control program has strived to use the least toxic methods of insect and pest control. No pesticides are used on the plant collection within the Conservatory.

Pesticides Used by Orkin Pest Control to Control Pests in Conservatory

Product Used	Active Ingredient (A.I)	Total A.I. Used	Purpose
Talstar Professional	Bifenthrin	16 ounces	Insect control
Phoantom Termiticide	Chlorofenapyr	4 ounces	Insect control
InTice Grannular Bait	Orthonoric	32 ounces	Insect control
Tempo SC Ultra	B-Cyflthrin	12 ounces	Insect control

Non Chemical Pest Control Measures in Conservatory

Several beneficial insects have been used to control the plant damaging insects. Over the years some target insect species have been all but eliminated while new pests continue to appear at various intervals. Some of the beneficial insects that we have released into the conservatory have a broad diet of target insects while others control a single insect. The control of plant damaging insects has not been as simple as releasing large numbers of ladybeetles. Some of the “good bugs” are actually parasitized by other insects so that timing of the release of the beneficial insects is very important. In addition, specific climatic conditions of temperature and humidity are needed for a successful release. Following is a list of the beneficial insects that are released into the conservatory from time to time as the situation warrants.

Beneficial Insect	Target Pest
Amblyseius cucumeris (predator)	Thrips, Mites
Aphidius colmani	Aphids
Phytoseiulus persimilis	mites
Chrysoperla spp. (predator)	Several Insects
Cryptolaemus montrouzieri (predator)	Mealybugs, Scales, Aphids
Encarsia formosa (parasite)	Whitefly
Delphastis pusillus	Whitefly
Orius spp. (predator)	Thrips, Aphids, Mites

Birds, specifically Quail (*Coturnix coturnix*), have been effective at controlling the nuisance palmetto bugs found in the conservatory. Assorted frogs, toads, and geckos living in the conservatory also use the palmetto bugs as a food source. Populations of these animals are maintained as part of the pest control program.

Vigorous daily or weekly washing of the plants in the conservatory has also proven to be very effective at controlling unwanted insects. This practice will continue as part of the pest control program.

The conservatory insect control program will continue to evolve as new beneficial insect species and additional control methods are carefully trialed. It is obvious from past success that it is possible to maintain a healthy plant collection while relying on least toxic and non-traditional methods of insect control.

PEST CONTROL IN PRODUCTION GREENHOUSES (NOT OPEN TO THE PUBLIC)

In 2019 construction was completed on the new production greenhouses and production plant growth resumed in 2020. Conservatory staff continually try to keep chemical pesticide use in the production greenhouses as low as possible. We continue to investigate and use additional least toxic or non-traditional pest control methods.

Pesticides Used to Control Pests in Production Greenhouses

Product Used	Active Ingredient (A.I)	Total A.I. Used	Purpose
SuffOil-X	80% Mineral Oil	21.6062 pounds	Spray oil emulsion fungicide, insecticide, and miticide.
Zerotol 2.0	27.1%Hydrogen Peroxide 2.0%Peroxyacetic Acid	2.608 pounds	Fungicide, Bactericide, and Algaecide for pest prevention and suppression
Marathon Granular	Imadacloprid	3.00 pounds	Insect control
Decathalon 20WP	Cyfluthrin	0.0595 pounds	Insect control
Mainspring GNL	Cyantraniliprole	0.1323 pounds	Insect control
Attain TR	Bifenthrin	0.5 pounds	Insect control
Avid 0.15 EC	Abamectin	0.1304 pounds	Insect control
Safari 20 SG	Dinotefuran	0.875 pounds	Insect control
Botanigard 22 WP	Beauveria bassiana strain GHA	1.9781 pounds	Insect control
NoFly WP	Isaria fumosorosea strain FE 9901	0.29 pounds	Insect control
Rootshield Plus	Trichoderma harzianum Rifai strain KRL-AG2	0.0625 pounds	Biological fungicide

Non Chemical Pest Control Measures in Greenhouses

Use of Rootshield Plus®, a non-chemical product that is composed of beneficial soil organisms, continues to be successful in reducing the need for traditional chemical-based soil fungicides. Beneficial insects are also released as the situation warrants for specific pest control. Following is a list of the beneficial insects that were released into the greenhouses as the situation warranted, with an increase in use on a regular basis.

Beneficial Insect	Target Pest
<i>Amblyseius cucumeris</i> (predator)	Thrips, Mites
<i>Aphidus colemani</i> (parasite)	Aphids
<i>Chrysoperla spp.</i> (predator)	Several Insects
<i>Cryptolaemus montrouzieri</i> (predator)	Mealybugs, Scales, Aphids
<i>Encarsia formosa</i> (parasite)	Whitefly
<i>Hypoaspis miles</i> (predator)	Gnats, Thrips, Soil Insects
<i>Orius spp.</i> (predator)	Thrips, Aphids, Mites

Some plant material is washed with water or pruned to control the problem. Other times manual removal or a treatment with oil, soap, hydrogen peroxide solutions or isopropyl alcohol is used for insect control.

FACILITY RODENT CONTROL

Rodent control is practiced only in areas where there is a known problem. This may include many sites throughout the facility. The material is contained in bait stations which are concealed and tamper proof and are not accessible to the public. Some of the stations are used within the Conservatory. Orkin Pest Control, a commercial pest control company, routinely checks and services the stations.

Pesticides Used by Orkin Pest Control to Control Pests in Conservatory

Product Used	Active Ingredient (A.I.)	Total A.I. Used	Purpose
Final All-Weather Blox EPA# 12455-89	Brodifacoum	458 blocks	Rodent control

PEST CONTROL IN OUTDOOR GARDENS

Olbrich Botanical Gardens is committed to gardening for the environment, as well as our visitors that expect to see gardens maintained at a high aesthetic standard. In addition, horticulturists continue to face new disease and insect attacks, some of which may be tied to our changing climate. As always, the principles of Integrated Pest Management (IPM) are applied to gardening practices

Pesticides Used to Control Pests in Outdoor Gardens:

Product Used	Active Ingredient	Total A.I. Used	Purpose
Avid	Abamectin	0.00041	Pest control
Bt	<i>Bacillus thuringiensis</i> (subspecies <i>kurstaki</i> strain)	0.138 pounds	Insect control
Conserve	Spinosad	0.178 pounds	Insect control
Glyphosate Pro	glyphosate	6.24 pounds	Weed control
K-Tea	Copper trimethylamine	0.347 pounds	Algae control
M-Pede	potassium salts of fatty acids	0.287 pounds	Insect control
Safari	Dinotefuran	0.123 pounds	Insect control
Subdue Maxx	Mefenoxam	0.00016 pounds	Fungus control
Suffoil-X	Mineral oil	0.2 pounds	Insect control
Tordon	Picloram 2-4D, 2-ethylhexyl ester Dicamba acid	0.0049 pounds 0.0191 pounds	Weed control
Tzone SE	triclopyr BEE, butoxyethyl ester Sulfentrazone 2,4-D, 2-ethylhexyl ester Dicamba acid	0.0288pounds 0.0025 pounds 0.11 pounds 0.0085 pounds	Scilla control

Non Chemical Measures Taken in Outdoor Gardens

Continuing a program that began in the 2011 season, a contractor was engaged that specializes in applications of compost tea, a product that inoculates the soil with a multitude of beneficial microorganisms. This leads to healthier soils and more resilient plants, minimizing the need for synthetic fertilizers and pesticides. Multiple areas were given season long applications last year. These locations continue to be monitored for long term results.

In 2020, Olbrich continued its efforts to keep chemical pesticide use in the outdoor gardens as low as possible. This can be challenging, given the high aesthetic standards expected at a highly regarded botanical garden. Horticulturists continue to face new disease and insect attacks, some of which may be tied to our changing climate. As always, the principles of Integrated Pest Management (IPM) are applied to gardening practices. IPM stresses evaluating a wide range of criteria to decide when and what treatments are necessary for dealing with garden pests; and, selecting solutions that minimize the amount and types of products used to combat them. Below is a listing of some of the strategies that fall under the guidelines of Olbrich Botanical Garden's IPM program.

Select disease and pest resistant varieties. One good example is the collection of ornamental crab apples, prone to fungal diseases, which was eliminated from the gardens reducing the need for fungicide use.

Assess damage thresholds. Staff are willing to tolerate some damage, both aesthetic and pathological. For instance, minor cases of powdery mildew on ornamental plants, while easily cured by common fungicides, are usually ignored. The same holds true for many of the minor insect problems that are present. Pesticides are applied only if the health of the plant is compromised or the visual attraction of the plant is greatly affected. Turf weeds are tolerated within the aesthetic standards of the Garden. Less toxic solutions are utilized before selecting a more toxic product. Minor localized problems may be pruned out rather than treating the entire plant with a chemical, for instance a single branch on a fruit tree with tent caterpillars. Olbrich does treat selected valuable specimen trees, and two ash trees were treated against Emerald Ash Borer in 2020.

Manual/cultural controls. The great majority of weed control in the gardens is accomplished by manually pulling and preventing them in the first place by liberal and frequent applications of leaf and wood mulches. In 2020 the COVID-19 pandemic dramatically limited volunteer labor in the gardens, but one volunteer hand-picked 1,775 Japanese beetles from the gardens.

Let nature help. When gardens are healthy, there is a natural balance between predator and prey that helps keep plant collections and gardens protected from visible damage. When the gardens function as an ecosystem, there are natural checks and balances that minimize the amount of chemical inputs required. Birds and beneficial insects help keep pest insects in check and resident foxes, red-tail hawks and mink have helped reduce rodent and rabbit problems. Rabbits are live trapped and relocated when their population reaches damaging levels. A cyclical increase in the population causes an increase in efforts in this area, which continues into the winter.

Complaints Received:

There were no visitor complaints regarding chemical use in the gardens in 2020.

Pesticide Management Plan for the 2021 Season

The garden staff will continue to work with an Integrated Pest Management (IPM) program. Staff will monitor the Garden's indoor and outdoor plant collections for optimum health and vigor, strive to improve the cultural and biological environment, provide mechanical eradication if possible, use resistant plant varieties, eliminate the plant if the problem persists and, as a final option, use pesticides to control plant pests. This past year saw a continuation of the use of beneficial insects in the Bolz Conservatory with satisfactory results. Canopy birds and ground quail also assist in keeping pest populations low in the Bolz Conservatory. The outdoor garden staff will continue to seek out less toxic pesticides that will provide control of pests while providing a safe environment for visitors. Staff will continue to experiment with alternatives to the use of traditional pesticides, including the use of beneficial insects in the greenhouse.

GOLF ENTERPRISE PROGRAM (GEP)

The Madison Parks' Golf Enterprise Program (GEP) consists of 72 golf holes at four facilities (Yahara Hills, Odana Hills, Monona, Glenway golf courses) encompassing approximately 750 acres of city owned property. GEP's Integrated Pest Management (IPM) philosophy is a multi-faceted approach that integrates all beneficial measures into a comprehensive program that controls pests in golf settings. Through the implementation of comprehensive Integrated Pest Management strategies that include establishing pest thresholds, monitoring for pests, cultural practices (mowing, rolling, irrigation, fertilization) and judicious use of pesticides the City of Madison golf division balances the expectations of our customers/golfers and manages our sites and golf courses in an environmentally sustainable and responsible manner.

Turf Insect Management in GEP

The 2020 golf season saw little in the way of major insect problems at our facilities. Some white grub damage, primarily resulting from secondary damage caused by animals (skunks, raccoons etc.) feeding on these grubs is being reported on areas of rough that currently we do not treat with insecticides. Should damage continue to increase in these non-treated areas it may necessitate making preventative insecticide applications to rough areas. Additional future insecticide treatments will follow best management practices for protecting pollinators in turf settings. Recently published guidelines are available; (<http://ncipmc.org/action/bmpturf.pdf>) and will be implemented in our pest management programs.

Pesticides Used for Control of Insect Pests

Product(s)	Active Ingredient	Total A.I. Used	Areas Treated
Merit Lesco fertilizer with Merit Prokoz Zenith 75 WSP, 2F	Imidicloprid	59 pounds	tees, fairways, Rough
Syngenta Acelepryn	Chlorantraniliprole	3.09 pounds	greens, tees
Aloft	Bifenthrin	0.79 pounds	greens
Arena, Aloft	Clothianidin	1.58 pounds	greens, tees

Turf Disease Management

The 2020 golf season was moderately challenging in terms of disease management. Turf diseases such as Pithium Blight, which are rarely observed made appearances again this season and necessitated fungicide treatments (mefenoxam). More moderate weather patterns and less heavy rainfalls resulted in less disease pressure in certain areas that are prone to flooding. While drought conditions on some turf areas caused increased disease pressure (Anthracnose) in these areas. While a good percentage of our focus of disease management relates to dollar spot and preventing the snow molds; increasing incidence of anthracnose on poa annua is becoming problematic. We are collaborating with the University of Wisconsin and offering them fairway turf for them to study control products/strategies for this particular disease and will continue to work with the University in this regard. Some of the diseases spotted this season were pithium blight, brown patch, dollar spot, anthracnose (both foliar and basal rot), necrotic ring spot and fairy ring.

Fungicides Used for Control of Turfgrass Disease

Products	Active Ingredient (A.I.)	Total A.I. Used	Areas Treated
Daconil Ultrex, Lesco Manicure Ultrex	Chlorothalonil	478.5 pounds	greens, tees, fairways
Bayer Chipco 26019, Lesco 18-Plus	Iprodione	462.44 pounds	greens, tees, fairways
Torque Fungicide, Omni Tebuconazole 3.6 Foliar Fungicide, Albaugh Tebuconazole 3.6F T&O	Tebuconazole	149.38 pounds	greens, tees, fairways
Banner Maxx II Fungicide, Lesco Spectator Ultra 1.3 Fungicide, Albaugh Agri Star Propi-Star EC	Propiconazole	157.4 pounds	greens, tees, fairways and trees in rough
BASF Insignia, Lexicon brand fungicides	Pyraclostrobin	18.69 pounds	greens
Syngenta Heritage, Quali-Pro Azoxy 2SC	Azoxystrobin	2.0 pounds	greens
Quali-Pro Mefenoxam 2AQ	Mefenoxam	7.5 pounds	tees
Armor Tech Rotator Atticus Detour 4 SC Syngenta Secure	Fluazinam	97.48 pounds	greens, tees, fairways
Syngenta Posterity Fungicide	Pydiflumetofen	1.92 pounds	greens, tees
BASF Xzemplar, Lexicon brand fungicides	Fluxapyroxad	12.49 pounds	greens, tees

Plant Growth Regulation

Ethephon, trinexapac-ethyl are plant growth regulators that slow down the growth of turfgrass and used to suppress seed head formation on Poa Annua. They are being further implemented into our IPM programs. They are useful for their plant health attributes, as well as, the application resulting in a reduction of mowing frequency. Reducing mowing saves the city money in fuel, labor and equipment wear and tear, and reduces golf's carbon footprint.

Chemicals Used to Regulate Plant Growth

Product(s)	Active Ingredient	Total A.I. Used	Areas Treated
Bayer Proxy, Helena Oskie	Ethephon	90 pounds	greens
Syngenta Primo Maxx, Quali-Pro T-Nex	Trinexapac-ethyl	27.6 pounds	greens, tees, fairways

Turf Weed Management

As a general rule; the necessity and application of herbicides to highly maintained turf grass stands such as found in a golf setting is significantly less than that of non-irrigated, non-fertilized

turf areas. A healthy actively growing turf is fairly good at out competing lawn weeds and it should come as no surprise the golf division's reliance and application of turf herbicides is fairly limited in scope. A slight decrease in herbicide treatments was observed in 2020.

Herbicides Used to Control Turf Weeds

Product(s)	Active Ingredient	Total A.I. Used	Areas Treated
Bayer/Monsanto Roundup Lesco Ranger Pro	Glyphosate	37 pounds	Tree circles within rough and bunkers
Lesco 3-Way Gordons Trimec Classic	2,4-D	69.74 pounds	rough
Lesco 3-Way Gordons Trimec Classic Helena Vision Herbicide	Dicamba	20.13 pounds	fairways, roughs
Dimension Lesco Fertilizer with Dimension	Dithiopyr	43.09 pounds	tees, fairways, rough
Quicksilver	Carfentrazone-Ethyl	1.43 pounds	greens
Lesco 3-Way Broadleaf Gordons Trimec Classic	MCP	18.29 pounds	rough

Contracted Pest Control of GEP Facilities

GEP contracts with KwikKill Pest Control to provide year-round pest control at Odana and Yahara, and seasonal pest control at Monona and Glenway Clubhouses. The contractor monitors pest populations, makes applications only when necessary, uses glue and spring traps, fills holes to prevent rodent entry and makes recommendations to staff based on observations. Facilities are cleaned daily and trash is removed daily to outdoor receptacles.

Insecticides and Rodenticides Used by KwikKill to Control Pests in Golf Clubhouses

Product Used	Active Ingredient (A.I.)	Amount Used	Purpose
Talstar Pro	Bifenthrin	0.31 pounds a.i.	Insect control
Weatherblok XT	Brodifocoum	0.129 pounds a.i.	Rodent Control
Temprid FX	Imidacloprid	0.2 pounds a.i.	Interior insect control
Termidor SC	fipronil	0.09 pounds a.i.	Interior insect control

Non-Chemical Means of Pest Control

Golf relies heavily on cultural practices to manage the turf stand. These cultural practices include, mowing, vertical mowing, watering, fertilizing, aerification, topdressing and rolling. Regular mowing controls many annual weed species and regular mowing promotes the rhizomatous and stoloniferous growth habitat of most turf species that crowds out many if not most weed species. Additionally, the height of cut of the turf can affect the presence and population of many weeds and pests. As a general rule; higher heights of cut promote healthier turf stands. A rough grass stand mowed at 3 inches of cut will have far less crabgrass populations than a turf cut at 1.5 inches. Furthermore, a putting green cut at 5/32 of an inch will have much less disease, algae and moss infestations than a green cut at 1/8 of an inch or less. Staff carefully monitors moisture

levels and irrigates to ensure the turf is not drought stressed. A semi-regular fertilization program is utilized to promote a healthy lawn. Regular aerification promotes a healthy water, soil, air mix that allows the turf to grow vigorously and withstand traffic and pests. Topdressing with sand provides smooth putting surfaces, increases drainage and dilutes out organic matter, which allows the turf to withstand traffic and pest damage, such as anthracnose. Rolling helps smooth the playing surface, reduces mowing frequency, and has been shown to directly reduce the severity and incidence of the common turf grass disease dollar spot.

Complaints

The Golf Department did not receive any complaints in 2020 related to pesticide usage.

Plan for 2021

The Integrated Pest Management plan and pesticide use for 2021 is expected to be similar to that of previous years. As always pesticide use in the golf division will be highly dependent on budgetary constraints, managing the expectations of customers and seasonally evolve due to unforeseen factors such as increases/decreases of play/traffic and weather conditions.