

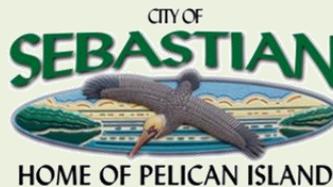


Integrated Pest Management Plan



For City Parks and Properties

October 2020



ACKNOWLEDGEMENTS

This Integrated Pest Management Plan is the collaborative product of hard work, in-depth discussion, thoughtful review, and peer-reviewed scientific research conducted over five (5) months, by the following charter members of the **IPM Sub-Committee:**

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The IPM Sub-Committee hereby approves this IPM Plan, in its entirety, on the 20th day of July, 2020.

The Parks and Recreation Board hereby approves this IPM Plan, in its entirety, on the 27th day of July, 2020.

The Natural Resources Board hereby approves this IPM Plan, in its entirety, on the 4th day of August, 2020.

The aforementioned collectively present this IPM Plan and accompanying Resolution (R-20-12) for City Council approval on the 27th day of August, 2020.



*The City of Sebastian's IPM Plan is a Sustainable Sebastian Initiative.
For more information about Sustainable Sebastian visit:
<https://www.sebastiannrb.com/>*

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I. INTRODUCTION

Scope

The City of Sebastian's Leisure Services Department is the steward of over 300 acres of land at more than 25 locations, including community parks, city grounds, street medians, pathways, and sports facilities. Large park areas comprise 280 acres of the properties. Within the City's parks there are: 10 tennis courts, 11 playgrounds, 8 pickle ball courts, 4 basketball courts, 3 football/soccer fields, 5 baseball/softball fields, 3 volleyball courts, a dog park, a splash pad, and a skate park. This plan will not cover any of the ponds, canals, and ditches within these properties. These features are managed collectively by the City's Stormwater Department and will be addressed with a separate IPM Plan. The park lands offer a large array of recreation and enrichment opportunities for people of all ages.

The City's Municipal Cemetery is managed by the Public Facilities Department. The 11 acre property consists primarily of sodded groundcover and is subject to frequent foot traffic, beyond its roads and paths. Therefore, for the purposes of controlling pests on the property, the cemetery will be included into the Integrated Pest Management (IPM) Plan as a part of the City parks and properties (*Figure 1*).

The Leisure Services and Public Facilities Departments are charged with maintaining these diverse landscapes in a safe, attractive, healthy, and useful condition. These properties represent a major component of the City's capital assets and the City recognizes its responsibility to its employees, park users, and the general public, and seeks to employ the highest professional standards in the performance of its duties. To best manage pests on City properties, City staff and contractors will continue utilizing the principles of Integrated Pest Management (IPM) through the implementation of an IPM Plan.



The Sun Rises Over the Indian River at Riverview Park.

IPM Sub-Committee

In February of 2020, the IPM Sub-Committee was formed to assist City staff in the development of an Integrated Pest Management Plan for the City of Sebastian's parks and properties. The sub-committee is to be comprised of the Leisure Services Director, IPM Coordinator, three Natural Resource Board Members, and two local scientific consultants.

The role of the IPM Sub-Committee is to assist in the development of a cohesive IPM Plan, advise on pest management issues, and evaluate the City's progress towards the goals of the IPM Plan. The Sub-Committee will review and approve the annual IPM report before it is presented to City Council. As part of the annual review, Sub-Committee Members will evaluate the current techniques and products to ensure they are based on the best available technologies and scientific information available. Recommendations will be made regarding changes to the annual reporting process and the IPM Plan document.

In the development of the initial IPM Plan, the IPM Sub-Committee will meet weekly. Following adoption of the final IPM Plan by City Council, the committee will meet annually, unless more frequent meetings are needed, as determined by staff. All IPM Sub-Committee meetings will be held in compliance with Florida's Sunshine Laws, with public notice, posted agenda, and minutes taken by a recording secretary.

IPM Coordinator

In order to provide for the planning and oversight of the IPM program, the position of IPM Coordinator is established. The appointed IPM Coordinator shall be a member of City staff who is in a position related to environmental or planning, who shall coordinate with the Leisure Services Director. Together, they will lead the creation and implementation of the IPM Plan, which will apply to the City's pest management activities on all of its parks and properties. Their responsibilities will also include the following:

- Serve as liaison to IPM Sub-Committee
- Monitor that City staff are adhering to the IPM Plan Standard Operating Procedures
- Maintenance of accurate records on IPM implementation and use
- Keep records of staff training in Green Business Best Management Practices and staff pesticide applicator certification
- Assure the inclusion of City IPM policies and practices in any applicable third party contracts or purchase orders for pest management
- Implement outreach efforts and maintain City's IPM Website.

The IPM Coordinator will prepare an annual report of the City's IPM activities, which will be reviewed each March, by the IPM Sub-Committee and Leisure Services Director in an effort to assess the effectiveness of pest control methods, feasibility of new methods and technologies, and decide whether revision of the IPM Plan is required.

IPM Plan

For the purposes of this plan, a pest may be any plant (weed), vertebrate (bird, rodent, or other mammal), invertebrate (insect, tick, mite, or snail), **nematode**, or **pathogen** (bacteria, virus, or fungus), which may cause disease, inflict damage, or out-compete the more desirable species for an area. In addition, a pest may be aesthetically undesired, or threaten to impact human/animal health. Any substance, or combination of substances which is intended to prevent, destroy, repel, or mitigate pest species is called a **pesticide**.

The City adopts the following IPM definition as established by the City's IPM Sub-Committee:

"To promote the most **sustainable** pest management methods, based on planning and prevention; which aim to minimize risks to human and environmental health through the limited use of chemicals, while also remaining economically feasible."

Goals

- Protect environmental resources by reducing the amount of pollutants entering surface and ground water and minimizing effects on native plants, animals and habitats
- Ensure effective, economic pest management on City property, while minimizing health risks to the public, City staff, and the environment
- Promote the transparency of the City's pest management activities
- Increase public awareness of IPM methods and benefits

IPM Program

IPM Policy. The IPM plan, as well as future modifications or amendments will be reviewed and voted on initially and annually by the IPM Sub-Committee, Natural Resources Board, Parks & Recreation Board, and then presented to City Council for final approval. The plan will then be incorporated as City policy through the adoption of Resolution R-20-12 by City Council (*Appendix A*).

IPM Program Coordination. The Leisure Services Director and the IPM Coordinator are responsible for coordinating, tracking, and reporting the implementation of the City's IPM Program.

Tracking Pesticide Use. City Staff and Contractors conducting pest management activities within City parks and properties are required to record thorough field data. Accurate records will be maintained on pesticide use and non-chemical methods utilized that are accessible for reference. All records will be retained for 1 year and stored on the City's Laser fiche system per record retention schedule.

Staff Training. All City employees who, within the scope of their duties, apply or use pesticides will be trained on the City's IPM Policies as well as proper chemical storage and use of personal protective equipment (PPE). A certification course on Green Business Best Management Practices will be provided through partnership with the University of Florida

Indian River County Extension Office as needed. The training sessions are coordinated by the Human Resources Director, who will track employees' attendance and ensure that City field staff hold an active certification.

Licensed Applicators. At all times a minimum of 2 City staff members must be state certified pesticide applicators. The Human Resources Director and IPM Coordinator will keep a copy of all staff certifications on file. All pesticide applications will be in compliance with state regulations regarding applicator licensing.

Information Resources for Staff. The IPM coordinator will act as a resource for City staff to help identify new pests and pest related concerns, and to assist in determining the best course of action consistent with the established IPM SOPs. The IPM Coordinator will also seek out and provide access to expert resources when needed.

Public Outreach. Education and outreach efforts will include distribution of information, either created internally, or obtained through partnership with local and state government agencies. The IPM Coordinator will coordinate and keep records of the following:

- A City webpage where the public may obtain information on IPM practices for their property, view the City's IPM Plan, annual IPM reports, IPM Sub-Committee minutes, and pest management treatment records.
- The City's efforts to promote the reduction of urban pesticide use through social media, the City's website, print and television media.
- The City's outreach to pest control operators (PCO's) and landscapers.
- Distribution of IPM information and resources at public outreach and community events.
- IPM information distributed to residents through the "New Homeowner Folders" during the final planning and zoning inspection.
- Updates and status reports following the annual report and as requested by City officials.

Contract Provisions. The Procurement Coordinator will review contract provisions and/or amendment(s) to agreements that provide pest management services within city maintained parks, properties and facilities covered under this IPM Plan. All such contractors shall be required to review and sign the "contractor agreement" (*Appendix B*). Contract work will be monitored to ensure that City IPM policies and practices are adhered to by all contractors performing pest management work.

Regulatory Reporting. The IPM Coordinator will handle reporting to regulatory agencies, which credit the adoption of an IPM Plan as a Best Management Practice (BMP).

- Incorporate the IPM Plan into the Florida Department of Environmental Protections (FDEP)'s National Pollutant Discharge and Elimination System (NPDES) **Phase II, MS4 Permit** Cycle 4, Year 2 Annual Report (September, 2022) and the Cycle 5 NOI

(September, 2024) as a new BMP for Element 6: Pollution Prevention/ Good Housekeeping.

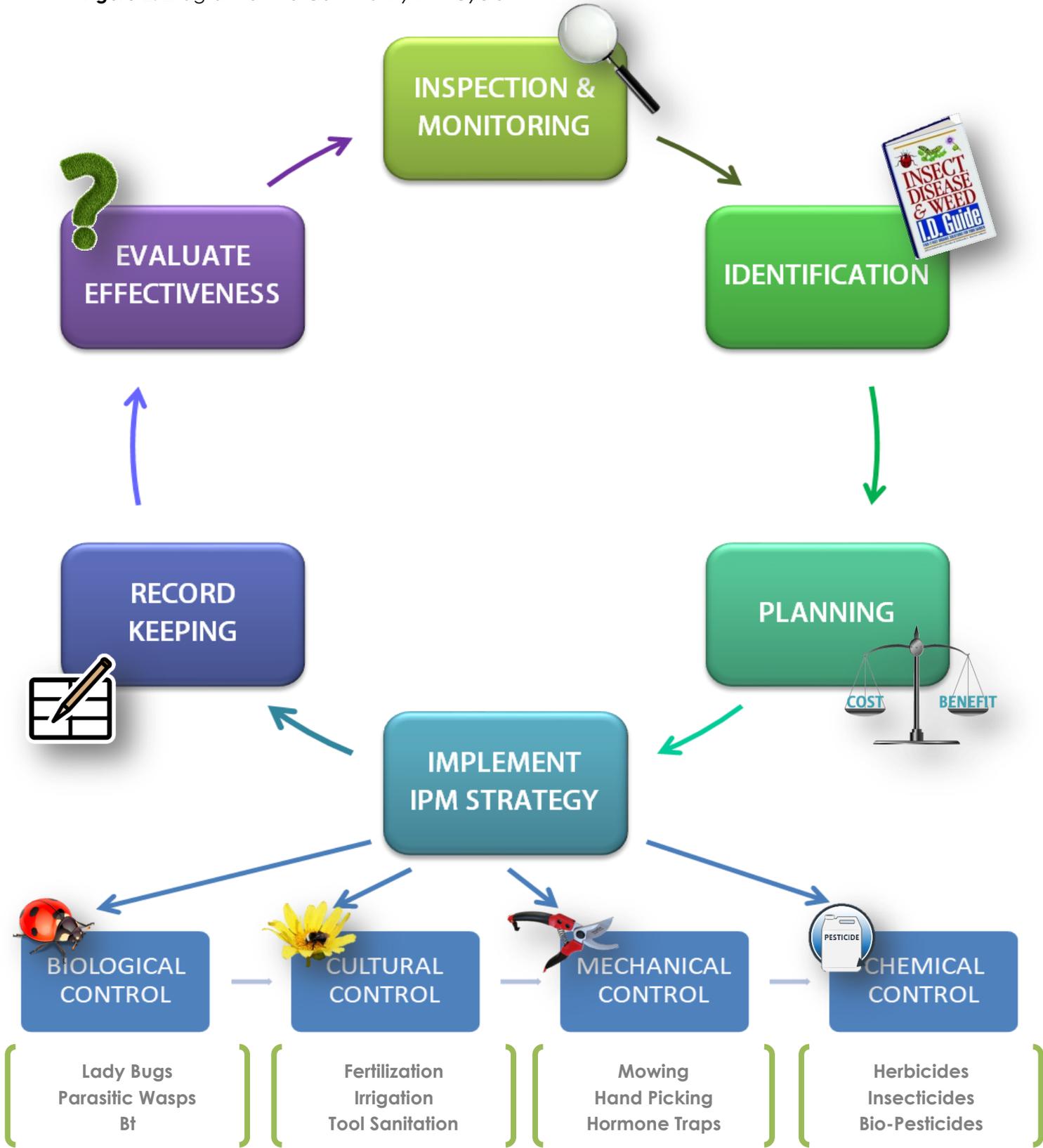
- Add as new project and update through the statewide Basin Management Action Plan (BMAP) annual report on water quality projects.
- Add as new activity and provide update to the Indian River Lagoon Council for the Indian River Lagoon Comprehensive Conservation and Management Plan (CCMP) annual report on lagoon-related accomplishments.

Community IPM Cycle

This established cycle (*Figure 2*) will serve as the guideline for IPM Plan development and is based on planning and prevention, with the use of chemicals as the last resort for pest control.

1. **Inspection and Monitoring:** Staff routinely scouts the landscapes and buildings to locate pests. Pest populations are monitored by visual checks and traps.
2. **Identification:** Pests must be accurately identified. Life history attributes are to be known for each pest identified. This step is key to effective treatment.
3. **Planning:** The focus is on prevention- what it takes to keep pests out. Determine what action is needed and whether a threshold has been crossed. Proper techniques and timing are for required management.
4. **Implement Strategy:** All pest management strategies are classified as biological, cultural, mechanical, or chemical. All methods are combined to maintain pests at acceptable thresholds.
 - Biological Control: enhances natural enemy populations by creating habitat or adding populations
 - Cultural Control: Disrupts the pest's environment by removing pest attractants or utilizing pest resistant variety of desired species
 - Mechanical: Creates physical barrier to pest entry
 - Chemical Control: the last tool in the IPM toolbox, the goal is evaluate costs and benefits to choose the least-toxic and most feasible option available that will do the job
5. **Record Keeping:** Accurate record keeping is essential to a successful IPM program. Data must be kept on control methods implemented, chemical usage by staff, and purchase orders. Determine if control methods were effective by knowing what has changed through trap counts and observation.
6. **Evaluate Effectiveness:** Document if the program is meeting expectations. Establish if all actions have been in compliance with the City's IPM Standard Operating Procedures (SOPs). Assess what was learned and determine whether the plan needs revised.

Figure 2: Diagram of the Community IPM Cycle



Standard Operating Procedures

When selecting and implementing a pest management strategy, from this plan, the following will be considered by City Staff:

Site Factors. Use and function of the landscape.

- Considering the use and function of the landscape, parks are divided into three functional categories (*Figure 3*) in which the action threshold and methods are decided:
 - Passive: neighborhood parks which can more likely be maintained with a natural approach. Some of these parks have playgrounds, which will need to be assessed regularly.
 - Active: do not contain Bermuda turf, and receive the most activity on a daily basis. They need to be treated proactively, due to the number of park patrons on a daily basis and the nature of the activities that take place.
 - Athletic: turf grass must be maintained to a higher standard to ensure the playability and safety of the participants. Proactive treatments are necessary in order to provide the standard of care that is required.
- Erosion and runoff potential of site
- Proximity to surface, surficial, and groundwater resources

Figure 3: Parks and Properties Classification Table

Athletic Parks	Active Parks	Passive Parks	
Barber Street Complex	Riverview Park	Easy Street	Kildaire Park
Friendship Park Field	Schumann Park	Filbert Park	Historical Park
	Hardee Park	Bryant Park	George Street Park
	Friendship Park	Periwinkle Park	Blossom Park
	Bark Park	Cheltenham Park	Garden Club Park
	Pickleball Complex	Yacht Club	Main St. Boat Ramp
	Barber St. Common Areas	Community Center	Stormwater Park
	Cemetery	Medians	City Hall/ PD Grounds

Costs. Both short and long term costs, as they relate to:

- Costs of the material or method
- Application and labor costs
- Effectiveness and duration of effects on pest populations
- Overall feasibility

Other Factors. Additional factors relevant to the selection

- Special equipment or storage required for method
- Method of delivery

- Chemical application must adhere to the standards of the City's Fertilizer Ordinance Ch.50 Sec.50-5 (Appendix C)
- How all criteria may be affected by weather conditions
- Previous pesticide applications on site and interval between treatments
- Chemical application set-backs from slopes along waterways
- Possibility of pest resistance
- Equipment cleaning consideration before and after use
- Potential synergistic effects of pesticide combinations

The following considerations are addressed through the use of the **Environmental Impact Quotient (EIQ)**, which is explained on page 21.

Health and Safety Concerns. Potential effects on City staff and park visitors.

- Toxicological properties and potential health effects of materials or methods
- Equipment operation safety issues
- Staff safety and injury concerns

Environmental Considerations. Protection of native plants, animals and **pollinators**.

- Consider toxicity or potential harm caused by the method to non-target organisms and habitat.
- Potential for **bioaccumulation** of materials within soils and groundwater
- Know if there is potential for negative effects from any pest control method or lack thereof on any federally or state **protected species** that may be in the area
- Be aware of any nesting birds in the area and potential affects the method may cause
- Understand the effects the method may have on pollinators
- The effects of reduced control of invasive plants or pests to native biodiversity

Product Characteristics. Specific product features

- Possible residual effect and decomposition products
- Volatility and flammability
- Product formulation, recommended dilution and package size
- **Leachability** and **solubility**



Morning View at the Stormwater Park

II. ATHLETIC PARKS

Overview

At approximately 25 acres, athletic parks are the smallest size-wise of the City's park classifications. However, these parks arguably hold the most importance for its visitors and the community. The City's athletic parks host hundreds of sporting events each year. Athletic facilities play a major role in the physical, mental, and social well-being of all age groups. Youth are provided the opportunities to improve their confidence, self-esteem, and mental alertness. Adults are given a chance to become more physically active and socialize. Our athletic facilities promote a sense of community and provide safe spaces for our park patrons. Friendship Park and the Barber Street Sports Complex are the only parks classified as "athletic parks."

On athletic fields, **Bermuda Turf** is the dominant groundcover and it must be maintained to a higher standard than other parks and public areas to ensure the playability and safety of the participants. Proactive pest treatments are necessary in order to provide the standard of care that is required. Therefore, the tolerance threshold for pest activity, before action is taken is considered low.

Key Pests

Bermuda Turf is associated with its own unique assortment of animal and plant pests. These include, but are not limited to:

- **Insects:** Fire Ants, Sod Webworms, Mole Crickets, Japanese Beetle Grubs, Cut Worms
- **Vertebrates:** Mice, Moles
- **Weeds:** Broadleaf Weeds, Signal Grass, Goose Grass, Crab Grass, Dollar Weed, Pennywort, Torpedo Grass, Sedges

Non-Chemical Methods

Maintaining the vigor and health of a groundcover is the focus to preventing damage from insects, weeds, and disease. Understanding the biological needs and growth of Bermuda Turf groundcover is essential to reducing the use of chemical pest control methods. In order to prevent pests, the following cultural and mechanical methods will be conducted routinely as part of standard proactive park maintenance procedures within the City's athletic parks:

- **Maintain healthy soils.** Florida soils are very sandy and well-drained. Amending with organic material and microorganisms can increase water-holding capacity and reduce the need for fertilizers. Seasonal testing of pH and nutrient levels are integral to making the best decisions regarding soil management.
- **Irrigate uniformly and efficiently.** Maintain efficient **irrigation** equipment and schedule irrigation in correlation with weather conditions and temporal requirements of the groundcover. Water should be uniformly distributed. Conduct regular water audits to

ensure systems are not leaking and the pressure, alignment, and distribution of the heads are correct.

- **Fertilize properly.** Annual testing of the soil should be conducted to ensure that the proper nutrients are being added. The addition of micro-nutrients at the appropriate time of the year will enhance the root system. Fertilization activities must be in compliance with City Ordinance Ch.50 Sec.50-5 (*Appendix C*)
- **Aerate regularly.** Compacted soils can inhibit water, air, and nutrient infiltration. Compacted soil also is more susceptible to weed invasion. Aeration of ground covered area receiving the most traffic creates pores in the root zone for air, water, and nutrient uptake that facilitate root growth. Often **aeration** is combined with a compost top dressing for maximum results.
- **Mow at correct height.** Mowing at the incorrect height for the groundcover species can thin out and starve the grass, or encourage the build-up of thatch. Bermuda Turf is to be mowed at 1" height. Mowing is conducted often enough so that no more than 1/3 of the leaf height is cut.
- **Always mow with sharp blades.** Dull mower blades cause uneven cutting and weaken the grass blades. The City owns its own blade sharpener and all mowing blades are sharpened as needed.
- **Tool Sanitation.** Pests can easily spread among sites by hitchhiking on un-sanitized lawn equipment. Cleaning the mower and all landscape tools between areas minimizes pest transport. In addition, separate mowers are used for Bermuda Turf than is used on the St. Augustine common areas.
- **Verticutting.** Thatch buildup can impede air and water infiltration, much like compaction. **Verticutting** allows the grass to absorb nutrients and moisture more efficiently by ensuring that all the moisture is absorbed by the fresh, young blades of grass instead of the thatch.
- **Over-Seeding.** The appearance and/or removal of pests as well as extensive drought conditions often leave open patches of disturbed soil behind, which are favored habitat for many weeds. Broadcasting Rye Grass seeds over Bermuda Turf will fill in these areas and prevent weed infiltration, while enhancing the greenness and overall aesthetics of turf areas.
- **Mulching.** To prevent weeds and promote water retention, **mulch** has been amended to areas surrounding some of the trees and shrubs bordering athletic parks. The mulched areas will be amended annually, as needed to maintain its effectiveness.
- **Infield Dragger.** A wide row of metal spikes, attached to a tractor is routinely dragged along the baselines and infield of baseball and softball fields. This levels the ground for running and prevents infiltration of groundcover and weeds.

III. ACTIVE PARKS

Overview

Active Parks are parks that do not contain Bermuda turf, and receive the most activity on a daily basis. Active parks feature open grassed areas for play, paths for walking and playgrounds. Predominantly, the groundcover in these parks is **St. Augustine**, and occasionally **Bahia grass**. Depending on the pest, active parks also need to be treated proactively, due to the number of park patrons they receive on a daily basis and the nature of the activities that take place.

The City's active parks include: Riverview Park Complex, Schumann Park, Hardee Park, Friendship Park, Bark Park, the Pickleball Complex, Barber Street Park common areas, and the cemetery property. Groundcover in these parks does not have to be maintained to as high a standard as on athletic fields, as playability is not a factor. However safety must be maintained throughout the park, therefore, the tolerance threshold for pest activity, before action is taken is considered moderate.

Key Pests

The common park areas of active parks have fewer pests that would require treatment and for most of them the tolerance threshold is quite high. These include, but are not limited to:

- **Insects:** Fire Ants, Mole Crickets
- **Vertebrates:** Mice, Moles
- **Weeds:** Broadleaf Weeds, Signal Grass, Dollar Weed,

Non-Chemical Methods

Similar to the Athletic parks, maintaining healthy groundcover is key to preventing damage from insects, weeds, and disease. Understanding the biological needs and growth of St. Augustine groundcover is essential to reducing the use of chemical pest control methods. However, optimum health is not required, as pest tolerance thresholds are much higher. Therefore, in order to prevent pests, the following cultural and mechanical methods will be conducted as needed, as part of the selective maintenance of the City's active parks:

- **Maintain healthy soils.** Florida soils are very sandy and well-drained. Amending with organic material and microorganisms can increase water-holding capacity and reduce the need for fertilizers. Seasonal testing of pH and nutrient levels are integral to making the best decisions regarding soil management.
- **Irrigate uniformly and efficiently.** Maintain efficient **irrigation** equipment and schedule irrigation in correlation with weather conditions and temporal requirements of the groundcover. Water should be uniformly distributed. Conduct regular water audits to ensure systems are not leaking and the pressure, alignment, and distribution of the heads are correct.

- **Fertilize properly.** Annual testing of the soil should be conducted to ensure that the proper nutrients are being added. The addition of micro-nutrients at the appropriate time of the year will enhance the root system. Fertilization activities must be in compliance with City Ordinance Ch.50 Sec.50-5 (*Appendix C*)
- **Mow at correct height.** Mowing at the incorrect height for the groundcover species can thin out and starve the grass, or encourage the build-up of thatch. St. Augustine is to be mowed at 3-5" height, depending on the season. Mowing is conducted often enough so that no more than 1/3 of the leaf height is cut.
- **Always mow with sharp blades.** Dull mower blades cause uneven cutting and weaken the grass blades. The City owns its own blade sharpener and all mowing blades are sharpened as needed.
- **Tool Sanitation.** Pests can easily spread among sites by hitchhiking on un-sanitized lawn equipment. Cleaning the mower and all landscape tools between areas minimizes pest transport. In addition, separate mowers are used for Bermuda Turf than is used on St. Augustine.
- **Over-Seeding.** The appearance and/or removal of pests as well as extensive drought conditions often leave open patches of disturbed soil behind, which are favored habitat for many weeds. Broadcasting Rye Grass seeds over sparse groundcover areas in Riverview Park will fill in these areas and prevent weed infiltration, while enhancing the greenness and overall aesthetics of grassed areas.
- **Mulching.** To prevent weeds and reduce water requirements, **mulch** has been amended to areas surrounding some of the trees and shrubs bordering athletic parks. The mulched areas will be amended annually, as needed to maintain its effectiveness.



A girl and her dog enjoy the Bark Park

IV. PASSIVE PARKS

Overview

Passive Parks do not contain Bermuda turf, and receive least activity on a daily basis. Passive parks do not feature larger open grassed areas for play. Traffic is primarily on pathways and playgrounds. Predominantly, the groundcover in these parks is **St. Augustine**, and occasionally **Bahia grass**. Depending on the pest, passive parks may not require proactive treatments.

The City's passive parks include: Easy Street Park, Historical Park, Kildaire Park, Filbert Park, Bryant Park, George St. Park, Periwinkle Park, Blossom Street Park, Cheltenham Lake Park, Main Street Boat Ramp, Garden Club Park, Yacht Club, Community Center, Stormwater Park, and 5 miles of road medians (Schumann Drive, US1) and 512 intersections. Groundcover in these parks does not have to be maintained to as high a standard as on athletic fields or active parks, as playability is also not a factor. Safety of turf is not a concern beyond the immediate trail areas and playgrounds. Therefore, the tolerance threshold for pest activity, before action is required is considered high.

Key Pests

The common park areas of passive parks have fewer pests that would require treatment and for most of them the tolerance threshold is very high. These include, but are not limited to:

- **Insects:** Fire Ants,
- **Vertebrates:** Mice, Moles

Non-Chemical Methods

Similar to the athletic and active parks, maintaining healthy groundcover is the key to preventing damage from insects, weeds, and disease. Understanding the biological needs and growth of St. Augustine and Bahia groundcover is essential to reducing the use of chemical pest control methods. However, optimum health is not required, as pest tolerance thresholds are much higher. Therefore, in order to prevent pests, the following cultural and mechanical methods will be conducted occasionally, as part of the reactive maintenance of the City's passive parks:

- **Maintain healthy soils.** Florida soils are very sandy and well-drained. Amending with organic material and microorganisms can increase water-holding capacity and reduce the need for fertilizers. Seasonal testing of pH and nutrient levels are integral to making the best decisions regarding soil management.
- **Irrigate uniformly and efficiently.** Maintain efficient **irrigation** equipment and schedule irrigation in correlation with weather conditions and temporal requirements of the groundcover. Water should be uniformly distributed. Conduct regular water audits to ensure systems are not leaking and the pressure, alignment, and distribution of the heads are correct.
- **Fertilize properly.** Annual testing of the soil should be conducted to ensure that the proper nutrients are being added. The addition of micro-nutrients at the appropriate

time of the year will enhance the root system. Fertilization activities must be in compliance with City Ordinance Ch.50 Sec.50-5 (Appendix C)

- **Mow at correct height.** Mowing at the incorrect height for the groundcover species can thin out and starve the grass, or encourage the build-up of thatch. St. Augustine is to be mowed at 3-5" height, depending on the season. Mowing is conducted often enough so that no more than 1/3 of the leaf height is cut.
- **Always mow with sharp blades.** Dull mower blades cause uneven cutting and weaken the grass blades. The City owns its own blade sharpener and all mowing blades are sharpened as needed.
- **Tool Sanitation.** Pests can easily spread among sites by hitchhiking on un-sanitized lawn equipment. Cleaning the mower and all landscape tools between areas minimizes pest transport. In addition, separate mowers are used for Bermuda Turf than is used on St. Augustine.
- **Mulching.** To prevent weeds and reduce water requirements, **mulch** has been amended to areas surrounding some of the trees and shrubs bordering athletic parks. The mulched areas will be amended annually, as needed to maintain its effectiveness.



Gopher
Tortoise
munches
on grass at
Filbert
Street Park



White Ibis
Enjoy Easy
Street
Park

V. FURTHER NON-CHEMICAL RECOMMENDATIONS

Future Considerations

In addition to the cultural and mechanical pest control methods currently being implemented within the City's parks and properties, observations of the areas prompted the following recommendations for future consideration (*Figure 4*):

- **Updated Chemical Application Equipment.** In order to adhere to the label requirements for pesticide and fertilizer application equipment must be carefully calibrated and maintained. Over time and with continual use, chemicals can erode parts of the equipment. Nozzles can deteriorate and triggers can become loose. This can result in a drastic, unintended increase in application rates. Updated motorized equipment cleans more efficiently, calibrates and hold calibration more accurately, and deteriorated parts can be easily replaced.
- **Warning Track.** Replacing a wide strip of the turf that is closest to the back fence of the baseball/softball fields with rocks or other material will further decrease the amount of turf grass that needs to be maintained. Also of importance, the change in terrain serves as a "warning" for fielders trying to make a deep catch that they are running out of room, without having to take their eye off of the ball. For maintenance, it is simply dragged regularly, just like the baselines, to prevent turf grass or weed infiltration.
- **Concrete Platforms.** Weeds are a continual problem underneath sports bleachers, park benches, and trash cans. These areas cannot be mowed and it is difficult or even impossible to use a weed eater around. Chemical control becomes the only feasible option. Installing a concrete platform under these features will pay off through the reduction of staff hours and chemical use, as well as increase the parks' aesthetics.
- **Trees.** Trees enhance the shade and comfort for spectators, provide wildlife habitat, and shade groundcover, reducing water requirements. While no trees should be placed on or in proximity to athletic fields, still there are many spaces for the addition of trees within the general park areas. Trees will also enhance the safety of playgrounds as they shade the equipment from the Florida sun. The addition of trees will also enhance the aesthetic of the parks overall.
- **Extended Mulching.** Currently, the mulched areas in these parks are minimal. Enlarging the mulched areas, by grouping trees into large landscaped islands will reduce the amount groundcover that needs maintained.
- **Habitat for Beneficial Species.** Many Bermuda Turf pests have natural predators, which can be attracted to the athletic field by installing landscape beds of native flowering annuals and perennials along the edges of the general park areas. The addition of martin nests and owl or bat boxes around the perimeter of these parks will help to control moles, voles, and other rodents.

Figure 4: Table of Recommended Non-Chemical Control Methods

BIOLOGICAL, CULTURAL, AND MECHANICAL CONTROLS					
	Control Method	IPM Control Strategy	Pests Treated	Description	How to Implement
BIOLOGICAL	Brazilian Red-eyed Fly "Ormia depleta"	Biological	Mole Crickets	Established locally in Central and Southern Florida	Releases were done by UF/IFAS
	Insect Parasitic Nematode "Steinernema Scapterisci"	Biological	Mole Crickets	Presumably established, no longer available for purchase	Nematode is no longer produced commercially since 2010.
	Larra Wasp Parasitoid	Biological	Mole Crickets	Widely established in Florida	Introduce the wasps preferred plantings of shrubby false buttonweed, partridge pea, & white-flowered Pentas
CULTURAL	Always Mow with Sharp Blades	Cultural	Many Insect and Weed Pests Affected	Dull mower blades cause uneven cutting and weaken the grass blades allowing distressed areas to be infiltrated by pests.	Ensure that staff sharpens all mower blades on a consistent schedule and when necessary. The City has the tools and trained staff to accomplish this.
	Aerate Regularly	Cultural	Many Insect and Weed Pests	Aerating is a BMP that will promote healthy turf, reduce soil compaction, encourage deeper rooting, increase water infiltration, reduce thatch buildup and assist with the elimination of weeds.	Staff is converting a tractor to be used on turf and we have confirmed that we can rent aerating equipment.
	Clean Food Areas After Events	Cultural	Insect Pests	Following special events and athletic events in our City parks we are often left with lots of food, oily and greasy areas.	Ensure that City staff, athletic organizations, special event committees and rental groups take the time to clean all park areas in which food and oil or grease have been placed. These items often attract pests and we will ask that all these areas are thoroughly cleaned following activities. City staff will also continue to pressure clean these areas on an as needed basis.
	Florida Native Plantings	Cultural	Insect and Weed Pests	Florida native plantings will attract natural predators, reduce the need for irrigation, and reduce maintenance in some areas.	As the budget allows or in working with local non-profit groups begin to introduce plantings of florida natives to our parks.
	Increase Tree Plantings	Cultural	Weed and Insect Pests	Adding trees to general areas in active and passive parks will enhance the shade and comfort for park visitors, provide wildlife habitat and shade groundcover, reducing water requirements.	As the budget allows staff can identify parks and areas to plant florida native trees to promote shade and comfort.
	Irrigate Uniformly and Efficiently	Cultural	Insect and Weed Pests	Maintain efficient irrigation equipment and schedule irrigation in correlation to weather conditions.	Conduct regular water audits to ensure systems are not leaking and the pressure alignment, and distribution is correct for the park.
	Maintain Updated Chemical and Fertilizer Application Equipment	Cultural	Insect and Weed Pests	Maintaining updated chemical and fertilizer application equipment is necessary to adhere to the label requirements for applications to ensure equipment is calibrated. Updated motorized equipment cleans more efficiently, calibrates and hold calibration more accurately and deteriorated parts can be easily replaced.	Staff will stay up-to-date on the equipment and ensure that equipment is replaced as necessary to ensure the correct calibrations are applied per the label. Staff will also maintain servicing all parts necessary as recommended from the manufacturer.

Figure 4: Table of Recommended Non-Chemical Control Methods, continued

BIOLOGICAL, CULTURAL, AND MECHANICAL CONTROLS					
	Control Method	IPM Control Strategy	Pests Treated	Description	How to Implement
CULTURAL	Mow at Correct Height	Cultural	Insect and Weed Pests	Mowing at the correct height will ensure that we promote healthy grass and reduce the build-up of thatch.	Ensure that staff is mowing the various grasses at the correct heights dependent on the seasons and conditions.
	Over Seeding	Cultural	Insect and Weed Pests	Broadcasting rye grass seeds over turf will fill in open patches and prevent weed infiltration, while enhancing the greenness and aesthetics of the turf.	As budgeting allows staff plans to overseed healthy bermuda turf during the dormant months and also Riverview Park to help prevent weed infiltration.
	Take Soil Samples and Fertilize Properly	Cultural	Insect and Weed Pests	This is a Best Management Practice to take soil samples to ensure any fertilization provides necessary nutrients and we do not provide excess nutrients	Soil samples should be consistently done each year at the same time to identify any deficiencies or excesses in the soil. The addition of micro-nutrients at the appropriate time of the year will enhance the root system and help promote healthy turf.
	Tool Sanitation	Cultural	Insect and Weed Pests	Pests can easily spread among sites on unsanitized lawn equipment. Cleaning mowers and equipment between areas minimizes pest transport.	Staff is to use a specific mower on Bermuda grass and the zero turn mowers on all other grasses. As often as possible staff is to wash and clean equipment, especially when leaving areas with pest problems.
MECHANICAL	Develop Concrete or Milling Platforms	Mechanical	Weeds	Bleachers, benches and trash cans create areas which are hard to mow and weed eat. Installing a surface underneath these items would reduce staff hours, chemical use and increase the park aesthetics.	As the budget allows and in areas identified by staff we can work to implement surfaces under these items.
	Develop Warning Tracks	Mechanical	Weeds	Warning tracks serve a safety factor for baseball/softball participants. For the IPM it serves a purpose to reduce the infiltration of weeds along fence lines and reduce the amount of turf grass that has to be maintained.	Develop plans and as the budget allows begin to implement warning tracks along fence lines.
	Infield Grooming	Mechanical	Weeds	The grooming of infield clay is not only a safety process but it also assist with preventing the infiltration of groundcover and weeds.	Groom the baseball and softball infields on a daily basis and as often as possible.
	Manual Weed Eradication	Mechanical	Weeds	Where safe and applicable manual weed eradication will involve staff manually pulling weeds.	Areas deemed safe and applicable can have manual weed eradication.
	Mulching	Mechanical	Weeds	To prevent weeds and promote water retention. Mulch around trees and shrubs also helps eliminate damage from equipment. Enlarging mulching areas by grouping trees into large landscape areas will also reduce the amount of groundcover that needs to be maintained.	As budgeting allows staff should mulch around plants, shrubs, buildings and trees annually. Also look at areas to group trees into larger landscape areas.
	Steam or Hot Water Machine	Mechanical	Weeds and Fire Ants	Steam and Hot Water Machines to assist with weeds and fire ants.	Sub-Committee and staff have began research and will continue to explore this possibility and the costs associated with these methods.
	Verticutting	Mechanical	Insect and Weed Pests	Thatch buildup can impede air and water infiltration Verticutting will also cultivate the soil and permit the blades to stand up to groom the grass to be healthier.	Staff is converting a tractor to be used on turf and we have confirmed that we can rent equipment to verticut our athletic fields.

VI. PESTICIDE USE METHODOLOGY

Chemical Controls will be utilized after biological, mechanical, and cultural control methods, as listed on Figure 4, have been implemented and fail to reduce pest populations below tolerance thresholds. The approved products are most effective and pose the least risk, when used as part of an IPM program, following proper and frequent biological, mechanical, and cultural pest control methods.

Planning Pesticide Application

Inspection and Monitoring. Before chemical control methods are utilized, the certified applicator will properly identify the pest and record data on population estimates, weather, and location. All inspection and application data will be recorded in the field by the certified applicator on the "Chemical Control Log" Form (*Appendix D*).

Concentrations & Application Rates. Proper pesticide application entails applying the minimum amount of product to provide effective control. For this reason, the pesticide manufacturers spend millions of dollars to determine the rate, and therefore the amount, that the pesticide should be applied. These products rarely arrive from the manufacturer ready to use for commercial applications. It is up to the applicator to dilute or mix the product with water, oil and/or surfactant, according to the directions on the product label. The exact concentration of the active ingredient in the pesticide mixture is critical to its effectiveness. Too little product in the mixture may result in reduced efficacy, while too much may result in injury to the treated surface, illegal residues, impacts to the surrounding environment, or unnecessary expense. While the instructions for mixing the product involve simple calculations, it is important that all measurements be made accurately, carefully, and with the most precise measuring equipment available.

Directions for mixing and applying pesticides come in two general scenarios: rate per volume of water (pesticide concentration) or rate per area of land (lb. or qt. per acre). Mixing directions will vary. Pesticides that are mixed by concentration generally have specific directions for application. Some insecticide application directions may state to apply until spray runs off the target plant. Some herbicide application directions may state to apply only enough spray material to wet the leaves uniformly. Proper calibration of equipment and knowing how fast it is moving is crucial to controlling how much pesticide is being applied. The applicator must read the label to know how much product to apply. **THE LABEL IS THE LAW.**

Discouraged Procedures. Routinely scheduled pesticide applications and the broadcasting application method should be avoided whenever possible, unless such applications may be reasonably expected to result in an overall reduction in pesticide use when compared with all other practicable alternatives.

Buffer Zones. All Stormwater features (lakes, ponds, ditches, canals) within or bordering the City's parks and properties will not be treated under this IPM Plan, as they will be addressed in a separate IPM Plan for stormwater assets. However, as park landscapes are treated with pesticides near these areas a **buffer zone** must be observed in order to protect the shoreline integrity and water quality. Therefore, no application of pesticides may occur within a minimum of 10 feet from these features.

Safety Data Sheets. A binder of product labels and **safety data sheets (SDS)** for all approved pesticides will be provided to City staff and third party contractors whom apply, or may come in direct contact with the pesticides. In addition, this data will be available on the City's IPM website.

Treatment Notification

The City and contractors shall provide the public and its staff with notification of pesticide applications through the use of the Pesticide Notification Sign (*Appendix F*). Completed signs should be posted at all major public and employee points of entry to the treated area pursuant to state and/or federal law, the City's IPM Plan, and according to product label instructions. Notice is to be posted at least 24 hours in advance of application and remain in place for 24 hours following the application, unless the manufacturer's product label specifies a longer posting period. Signs shall be of standardized design, printed in color, laminated, and contain the name of the pesticide product, target pest, date and time applied, required re-entry interval and the name and contact number for the Leisure Services Director.

Conditional Exemptions. The Leisure Services Director and IPM Coordinator may grant authorization to apply a pesticide in regular park and property areas without providing a 24 hour notification. Authorization requires that there is a compelling need to use the pesticide, such as immediate threat to public health, safety, City property, or substantial economic detriment. These signs shall be posted as soon as possible prior to application, and remain posted following the application for 24 hours. All documentation of this exemption must be retained and included in the annual report. Signage shall not be required in right-of-way locations that the general public does not use for recreation, or pedestrian purposes, such as median strips.

Approved Pesticides

A comprehensive list of approved pesticides for use within the City's parks and properties has been compiled by the IPM Sub-Committee. These chemicals have either been previously utilized by City Staff, recommended through the University of Florida Institute of Food and Agricultural Sciences (IFAS) extension office publications, or discovered through extensive staff and committee member research. The "Approved Pesticide Table" includes pertinent chemical attributes such as: active ingredients and their percentages, EPA Registration #, targeted pest, a cost rating per 1000 ft², and the observed staff efficacy of the product

(Figure 5). Selection of pesticides for use should be based upon a combination of a low Environmental Impact Quotient (EIQ), low cost, and maximum efficacy.

Environmental Impact Quotient (EIQ). To best create a comparison among chemical methods, the Environmental Impact Quotient (EIQ) Method will be applied. Developed by Cornell University, the EIQ is a numerical model for pesticide selection. The formula takes into account factors such as: toxicity to humans, leachability to groundwater, runoff potential, soil persistence, and the effects on non-target terrestrial and aquatic species. (Appendix E) The risk of each chemical is the product of its overall toxicity and the potential for exposure. Cornell has a published table of commonly used chemicals and their calculated scores. (Kovatch, et.al, 1992)

Field Use EIQ. However, since the risk of a chemical's use increases with the amount that is applied, it is necessary to take into account the rate of application. In order to accomplish this, the EIQ is multiplied by the % of the active ingredient and the rate of application to create the Field Use EIQ Rating. The field use EIQs for all chemicals applied over a period of time can then be summed to create a field number that can then be compared to assess the reduction in environmental impacts among years or seasons. The Field Use EIQ can also be utilized to compare when multiple applications of a low EIQ chemical, such as a bio pesticide, are required versus when single applications are required of a higher EIQ chemical (Appendix F). (Kovatch, et.al, 1992)

Bio Pesticides. In the IPM Sub-Committee's quest to provide pest management options that are not only effective, but also have the least possible risk to human and environmental health, bio pesticide options were reviewed extensively. Bio pesticides, also called "natural" or "organic" pesticides, are non-synthetic and contain only naturally occurring substances. These products break down rapidly in sunlight or water, which means that they do not persist long in the environment and therefore pose the least risk to non-target organisms. Also, bio pesticides are typically fast-acting and can kill immediately on contact or cause the pest to instantly cease essential biological processes, such as feeding. For these reasons, bio pesticide options are generally preferred alternatives to the synthetic chemical pesticides.

However, there are also potential risks associated with the application of natural products that the IPM Sub-Committee must consider when selecting pesticides for the "Approved Pesticide Table". It is important to note that all pesticides, whether natural or synthetic, carry inherent risks and require safety precautions. The ability to break down fast can also mean that multiple applications are required to match the efficacy of the synthetic chemical option. Multiple applications can drastically increase the cost and the risks of the product. Because bio pesticides are made of natural substances, they often are exempt from the Environmental Protection Agency (EPA) review process. Therefore, there is little to no data on the long-term risks or efficacy. Of those that are registered by the EPA, many are not registered for sale in Florida, due to the lack of data. The City may not legally use a pesticide that is not state registered in this manner, per Florida Statutes: 482 and 487. Bio pesticides that are registered

may not be mass produced for commercial use and therefore may be priced too high for use over large areas, or simply not readily available. The lack of EPA review and state registration also means that they are produced by a variety of different sources, which often results in inconsistent potency and efficacy among producers and even within different batches from the same producer. For these reasons, while there are many natural pesticide options listed on the “Approved Pesticide Table”, it is not feasible to only approve bio pesticide options.

New or Restricted Pesticides

In the development of a thorough and reasonable IPM Plan, It is not advisable to prohibit the use of any IPM Method, which is legally approved and included in the UF IFAS local recommendations for pest management. Unforeseeable conditions may arise in which City staff is limited in what will be effective at reducing pest populations. In addition, the IPM Sub-Committee also recognizes that new pesticides are constantly being developed and approved, which may prove to be more environmentally and economically sustainable than current approved pesticides.

On the “Approved Pesticide List” (*Figure 5*), specific pesticides are labeled as “restricted use.” Use of these pesticides is to be avoided. These are only to be utilized to restore high and very high pest populations back down to a moderate tolerance threshold at which it can then be managed by preferred methods. Before purchase of a restricted pesticide or any new pesticide that is not included on this spreadsheet, a “Pesticide Exemption Form” (Appendix F) must be completed by applicator and submitted to the Leisure Services Director, IPM Coordinator, and City Manager for signed approval. This form is to be submitted 4 days prior to proposed application date. The form requires thorough justification for use of the chemical. However, should a new pesticide containing the same % active ingredient(s) be discovered which is preferred, an exemption form must be completed and submitted to the IPM Coordinator, but approval will not be required.



“Old Guys” Softball league plays at Barber Street Park

Figure 5: Approved Pesticide Table (IPM.APT.V1)

Cost/ 1,000 Ft ² Rating	\$= less than \$1.00	\$\$= \$1.00-\$1.99	\$\$\$= 2.00-\$2.99
	\$\$\$\$= \$3.00 to \$3.99	\$\$\$\$\$= More than \$4.00	

* "RESTRICTED" pesticide use requires submission of a "Pesticide Use Exemption Form" indicating that all other methods have been exhausted before purchase of this product for the specified area, and shall be approved and signed by: Leisure Services Director, IPM Coordinator, and City Manager.

TRADE NAME	ACTION	EPA REG. #	ACTIVE INGREDIENT(S)	LABELED HAZARD LEVEL	EIQ	APPLICATION RATE LBS PER ACRE	FIELD USE EIQ	TARGET PESTS	PERMITTED USE	COST (only includes cost of product)	COST RATING/ 1,000 ft ² (only includes cost of product)	CITY STAFF OBSERVED EFFICACY
Advion Fire Ant Bait (Granular)	Insecticide	100-1481	Indoxacarb .045%	Caution	31.19	1.5 LBS	0	Fire Ants	All Parks	\$341.60/ 25 LBS	\$	HIGH
Avenger (Liquid)	Herbicide	92967-1	d-Limonene 70%	Caution	N/A		N/A	Non-Selective	All Parks	\$105.00/ GAL	N/A	N/A
Conserve SC (Liquid)	Insecticide	62719-291	Spinosad 11.6%	N/A	14.38	0.68 LBS	1.1	Sod Webworms	All Parks	\$147.03/ 32 OZ	\$\$	N/A
Dimension 2EW Pre Emergent (Liquid)	Herbicide	62719-542	Dithiopyr 24%	Warning	15.73	2 LBS	7.6	Broadleaf Weeds	RESTRICTED*	\$116.75/ 64 OZ	\$\$	MODERATE
Dr. Kirchner Natural Weed Killer (Liquid)	Herbicide	Exempt	Sodium Chloride 4.00%	Caution	N/A	No data, stated to spray each weed to the point of wetness	N/A	Non-Selective	All Parks	\$99.99/ 5 GAL	N/A	LOW
Eco Might WOW (Liquid)	Herbicide	Exempt	Peppermint Oil 4.5% Potassium Sorbate 3.5% Sodium Chloride 3.5%	Caution	N/A	27.23 LBS	N/A	Non-Selective	All Parks	\$2,595.55/ GAL	\$\$\$\$	HIGH
Entrust SC (Liquid)	Insecticide	62719-621	Spinosad 22.5%	N/A	14.38	.05-.10 OUNCES PER ANT HILL	N/A	Fire Ants	All Parks	\$469.95/ QT	\$\$\$\$\$	N/A
Lesco Crosscheck 0.069% Plus Fertilizer (0-0-7 Mini Fertilizer) (Granular)	Insecticide & Mini Fertilizer	70506-123-10404	Bifenthrin .069 %	Caution	44.35	261.36 LBS	6.5	Fire Ants, Fleas, Ticks, Mole Crickets, Sod Webworms	Athletic, Riverview Park (Special Events), all Playgrounds	\$20.47/ 50 LBS	\$\$	HIGH
Lesco Crosscheck Plus (Liquid)	Insecticide	279-3206-10404	Bifenthrin 7.9%	Caution	44.35	2.72 LBS	7.3	Fire Ants, Fleas, Ticks, Mole Crickets, Sod Webworms, Termites	Athletic, Riverview Park (Special Events), all Playgrounds	\$59.70/ GAL	\$	HIGH
Mansion (Liquid)	Herbicide	228-373	Metsulfuron Methyl 60%	Caution	16.67	0.06 LBS	0.9	Broadleaf Weeds	Athletic	\$37.77/ 2 OZ	\$	HIGH
Monterey Bt (Liquid)	Insecticide	70051-106-54705	Bacillus Thuringiensis 98.35%	Caution	N/A		N/A	Bagworm, Webworm, Armyworm, Hornworm	All Parks	\$72.99/ GAL	\$\$\$	N/A
Orange Guard (Liquid)	Insecticide	61887-1	d-Limonene 5.8%	Caution	N/A	1 LB OR 4 LBS PER ANT HILL	N/A	Ants, Roaches, Fleas	All Parks	\$29.95/ GAL	\$\$\$\$	VERY LOW
Q4 Plus (Liquid)	Herbicide	2217-930	Quinclorac 8.43% Sulfentrazone .69% 2,4-D 11.81% Dicamba 1.49%	Caution	85.46	6.81 LBS	34	Signal Grass and Torpedo Grass	RESTRICTED*	\$301.44/ 2.5 GAL	\$\$	MODERATE
Revolver Post Emergent (Liquid)	Herbicide	432-1266	Foramsulfuron 2.34%	Caution	15.33	1.63 LBS	0.6	Goose Grass	Athletic	\$595.000/ 87 OZ	\$\$\$	HIGH
Round Up Pro Concentrate (Liquid)	Herbicide	524-529	Glyphosate 50.2%	Caution	15.33	3.2 LBS	24.6	Non-Selective	RESTRICTED*	\$699.95/ 30 GAL	\$	HIGH
Speedzone Southern Post Emergent (Liquid)	Herbicide	2217-835	2,4-D 10.49% Mecoprop-p 2.66% Dicamba .67% Carfentrazone .54%	Caution	77.17	5 LBS	11.4	Broadleaf Weeds, specifically Florida Pusley	Athletic & Surrounding Common Areas	\$168.38/ 2.5 GAL	\$\$	HIGH
TopChoice (Granular)	Insecticide	432-1217	Fipronil .0143%	Caution	88.25	87 LBS	1.1	Fire Ants, Fleas, Ticks, Mole Crickets	Athletic	\$139/ 50 LBS	\$\$\$\$	HIGH
Tribune (Liquid)	Herbicide	100-1390	Diquat 37.3%	Caution	39.2	1.5 LBS	21.9	Non-Selective	RESTRICTED*	\$240.04/ 2.5 GAL	\$	MODERATE

VII. DATA MANAGEMENT

Accurate records are essential for the success of an IPM program. They provide staff with historical, site-specific knowledge of pest activity and pesticide application. With this information, it can be predicted when certain pest problems are likely to occur. Effective record-keeping can also call attention to patterns of pest outbreaks and associations among pest populations, as well as provide valuable data for assessment of the IPM Program.

Data Recording & Collection

Field Data. All Non-Chemical pest control activities conducted within athletic parks will be recorded on the “Monthly IPM Log” (*Appendix H*). Because chemicals are applied very rarely to passive and active parks, daily records of non-chemical methods are not necessary. Before chemical control methods are utilized, the licensed applicator will properly identify the pest and record data on population estimates and efficacy of application. The date, time and location of pest will be recorded as well as the location and extent of turf damage or abnormalities. This data will be recorded on the Chemical Control Log Form (*Appendix D*) each time that pesticides are applied. These sheets will be completed manually in the field by the certified applicator and submitted to the IPM Coordinator monthly so that the data may be digitally compiled and stored.

Purchase Orders. All purchase orders for chemicals or IPM related equipment and materials will be submitted annually to the IPM Coordinator.

Contractors. All contractors who manage pests on City owned, leased, or managed property shall be required to adhere to the guidelines established in the City’s IPM Plan. Contractors must sign the “IPM Plan Contractor Agreement” (*Appendix B*) and maintain complete records of all chemical and non-chemical pest control activities. When applicable, a “Pesticide Exemption Form” must be submitted. “Pesticide Notification Signage” must also be posted per the IPM plan requirements. A summary of these activities must be submitted to the IPM Coordinator monthly, or upon completion of the job. These records must include treatment sheets and “Chemical Control Log” forms for all pesticide applications.

Program Transparency

All records and information regarding the IPM Program will be made available to employees and the public through the City’s IPM Program Website and upon request, in accordance with the Freedom of Information Act, Florida Statute: 119.

Annual Report & Evaluation

The IPM Coordinator will maintain all records relevant to the IPM Program, in order to prepare an annual report of the City’s IPM activities. The annual report will be reviewed, each March, by the IPM Sub-Committee and City staff in an effort to assess the effectiveness of pest control

methods, feasibility of new methods and technologies, and to decide whether revision of the IPM Plan is required. The annual report will include the following elements:

- A summary of all field inspection data and chemical application record sheets
- All non-chemical pest control methods implemented
- Summarized data presented in tables and graphs to depict trends in usage and Field use EIQ
- A discussion of all restricted chemical wavier forms submitted
- Purchase Orders for all Pesticides
- Pest management challenges reported by staff
- Determine if the results have met expectations, or if the IPM plan requires modification
- Summary of all public outreach activities conducted and their outcome
- Any proposed modifications to Approved Pesticide List
- Suggestions for amendments to the IPM Plan and policy
- Summary of all staff training activities

*Children
Grab for
Easter
Eggs at
Riverview
Park*



*Flowers in
bloom
outside
City Hall*

VII. FUTURE RECOMMENDATIONS

The IPM Sub-Committee acknowledges that this plan does not encompass every aspect of integrated pest management, nor could it address every possible scenario that may arise as this plan is incorporated into City policy. For this reason, the sub-committee members are in consensus that they shall reconvene six (6) months following adoption of this plan in order to closely review the data collected and address any inconsistencies, or amendments needed.

For future consideration the Sub-Committee Members make the following recommendations:

- A numeric quantification of pest populations is not being required, as this task may become tedious for applicator staff. Instead, it was decided to provide a more subjective scale ranging from "very low" to "very high". Should future review of data indicate the need, then a more quantitative approach may be needed.
- Records of non-chemical pest management activities through completion of the "Monthly IPM Log" are only being required from staff conducting work on the City's athletic parks. These activities occur constantly in all City properties, but recording each activity on parks and spaces in which chemicals are very rarely applied, did not seem necessary. Should future review indicate that there is a regular need for chemicals in these areas, and then this requirement may need to be broadened to include more of the City staff.
- The collection of data for purposes of monitoring impact to native plants, animals, and pollinators from the conduct of pest management activities is not being required. The field EIQ formula assumes that native plants, animals, and pollinators are all present and measures potential risks to them by using the score assigned to the chemical and incorporating the area covered and frequency of application. Should future review of data that are being collected indicate excessive or regular use of chemicals, a more quantitative approach may be needed.
- At the time that this IPM plan was drafted, there was no available data to assign an Environmental Impact Quotient (EIQ) for bio pesticides, as they are not subject to EPA review. There is a universal need and it is anticipated that future research will assign EIQs to these products. It is therefore recommended that the IPM Coordinator check peer-reviewed research regularly, so that these numbers may be incorporated into the "Approved Pesticides Table" and aid in pesticide application decisions and evaluation.

Appendix A: R-20-12

RESOLUTION NO.R-20-12

A RESOLUTION OF THE CITY OF SEBASTIAN, INDIAN RIVER COUNTY, FLORIDA, SUPPORTING THE “INTEGRATED PEST MANAGEMENT (IPM) PLAN FOR CITY PARKS AND PROPERTIES” TO BE IMPLEMENTED INTO CITY POLICY; PROVIDING FOR SCRIVENER’S ERRORS; PROVIDING FOR EFFECTIVE DATE.

WHEREAS, City Council believes that a commitment to the environment is integral to a thriving and livable community; are in support of the “Sustainable Sebastian” Initiative (R-19-30) and are committed to keeping sustainability in mind while supporting the ecological, economic, and social needs of our community, and

WHEREAS, the IPM Sub-Committee was created in February, 2020 by request of the City Council, to assist City staff in the development of an Integrated Pest Management Plan for the City’s parks and properties, and

WHEREAS, a *pest* may be any plant, vertebrate, invertebrate, or pathogen, which may cause disease, inflict damage, or out-compete the more desirable species for an area, be aesthetically undesired, or threaten to impact human/animal health, and

WHEREAS, to adopt an *integrated pest management* policy is to promote the most sustainable pest management methods, based on planning and prevention; which aim to minimize risks to human and environmental health through the limited use of chemicals, by first promoting biological, physical, mechanical, and cultural pest control methods, while also remaining economically feasible.

NOW, THEREFORE, BE IT RESOLVED BY THE CITY COUNCIL OF THE CITY OF SEBASTIAN, INDIAN RIVER COUNTY, FLORIDA, as follows:

SECTION 1. SUPPORT FOR THE “IPM PLAN FOR CITY PARKS AND PROPERTIES”. The City Council hereby is in support of the “IPM Plan for City Parks and Properties”, which shall be implemented into City policy and annually reviewed, by the Leisure Services Director, IPM Coordinator, IPM Sub-Committee, and City Council to ensure that the four following goals are being achieved to the maximum extent practicable:

- Protect environmental resources by reducing the amount of pollutants entering surface and ground water and minimizing effects on native plants, animals and habitats
- Ensure effective, economic pest management on City property, while minimizing health risks to the public, City staff, and the environment
- Promote the transparency of the City’s pest management activities
- Increase public awareness of IPM methods and benefits

SECTION 2. CONFLICT. All resolutions or parts of resolutions in conflict herewith are hereby repealed.

SECTION 3. SCRIVENER’S ERRORS. Sections of this resolution may be renumbered or re-lettered and corrections of typographical errors which do not affect the intent may be authorized by the City Manager, or the City Manager’s designee, without need of further action of the City Council by filing a corrected copy of same with the City Clerk.

SECTION 4. EFFECTIVE DATE. This resolution shall take effect immediately upon its adoption.

The foregoing Resolution was moved for adoption by Councilmember _____ . The motion was seconded by Councilmember _____ and, upon being put into a vote, the vote was as follows:

Mayor Ed Dodd
Vice Mayor Jim Hill
Councilmember Christopher Nunn
Councilmember Fred Jones
Councilmember Bob McPartlan

The Mayor thereupon declared this Resolution duly passed and adopted this ____ day of _____, 2020.

CITY OF SEBASTIAN, FLORIDA

By: _____
Ed Dodd, Mayor

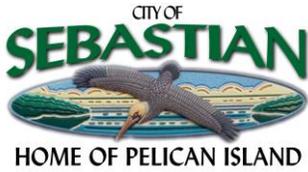
ATTEST:

Jeanette Williams, MMC
City Clerk

Approved as to Form and Content for
Reliance by the City of Sebastian Only:

Manny Anon, Jr., City Attorney

Appendix B: Contractor Agreement



Administrative Services Department
Procurement Division
1225 Main Street
Sebastian, FL 32958
(772) 388-8232

IPM PLAN CONTRACTOR AGREEMENT

The Contractor, _____, hereby agrees to all of the
(Company Name)
following:

- Review and follow the City’s IPM Plan completely
- Inform and train employees of the IPM Plan’s policies and procedures.
- Use only pesticides listed in the “Approved Pesticide Table”, and apply in accordance with rates/methods on the associating label.
- Complete the “Chemical Control Log” form completely with every pesticide application.
- Should there be a need to apply a pesticide classified as “restricted” on the “Approved Pesticide Table” or a pesticide not named on the table, a “Pesticide Exemption Form” must be completed and submitted to the Leisure Services Director at least four (4) days before proposed application date.
- Notify the Leisure Services Director at least three (3) business days before pesticide application. Provide the location, date and anticipated chemicals being used.
- Post the completed “Pesticide Notification Signage”, in accordance with the IPM Plan requirements
- Report monthly to the IPM Coordinator with all treatment sheets and completed “Chemical Control Logs”

I am a legal agent of the above named company and am fully authorized to sign and bind the above listed Company to this IPM Plan Contractor.

Print Name: _____ Title: _____

Signature: _____ Date: _____

Appendix C: City Fertilizer Ordinance

City of Sebastian

Code of Ordinances

CH.50 Sec. 50-5. - Florida-friendly fertilizer use on urban landscapes.

- (a) *Findings.* As a result of impairment to the City of Sebastian's surface waters caused by excessive nutrients, or, as a result of increasing levels of nitrogen in the surface and/or ground water within the aquifers or springs within the boundaries of the City of Sebastian, the city council has determined that the use of fertilizers on lands within the City of Sebastian creates a contributing risk that adversely effects surface and/or ground water.
- (b) *Purpose and intent.* This section regulates the proper use of fertilizers by any applicator; requires proper training of commercial and institutional fertilizer applicators; establishes training and licensing requirements; establishes a prohibition application period; specifies allowable fertilizer application rates and methods, fertilizer-free zones, low maintenance zones, and exemptions. The ordinance requires the use of Best Management Practices which provide specific management guidelines to minimize negative secondary and cumulative environmental effects associated with the misuse of fertilizers. These secondary and cumulative effects have been observed in and on the City of Sebastian's natural and constructed stormwater conveyances, rivers, creeks, canals, springs, lakes, estuaries and other water bodies. Collectively, these water bodies are an asset critical to the environmental, recreational, cultural and economic well-being of the City of Sebastian's residents and the health of the public. Overgrowth of algae and vegetation hinder the effectiveness of flood attenuation provided by natural and constructed stormwater conveyances. Regulation of nutrients, including both phosphorus and nitrogen contained in fertilizer, will help improve and maintain water and habitat quality.
- (c) *Definitions.* For this chapter, the following terms shall have the meanings set forth in this section unless the context clearly indicates otherwise.

"Administrator" means the city manager, or any other city official designated by the city manager.

"Application" or "apply" means the actual physical deposit of fertilizer to turf or landscape plants.

"Applicator" means any person who applies fertilizer on turf and/or landscape plants in the City of Sebastian.

"Board" or "governing board" means City Council of the City of Sebastian.

"Best Management Practices" means turf and landscape practices or combinations of practices based on research, field-testing, and expert review, determined to be the most effective and practicable on-location means, including economic and technological considerations, for improving water quality, conserving water supplies and protecting natural resources.

"Commercial fertilizer applicator" , except as provided in F.S. § 482.1562(9), means any person who applies fertilizer for payment or other consideration to property not owned by the person or firm applying the fertilizer or the employer of the applicator.

"Fertilize", "fertilizing", or "fertilization" means the act of applying fertilizer to turf, specialized turf, or landscape plants.

"Guaranteed analysis" means the percentage of plant nutrients or measures of neutralizing capability claimed to be present in a fertilizer.

"Institutional applicator" means any person, other than a private, non-commercial or a commercial applicator (unless such definitions also apply under the circumstances), that applies fertilizer for the purpose of maintaining turf and/or landscape plants. Institutional applicators shall include, but shall not

be limited to, owners, managers or employees of public lands, schools, parks, religious institutions, utilities, industrial or business sites and any residential properties maintained in condominium and/or common ownership.

"*Landscape plant*" means any native or exotic tree, shrub or groundcover (excluding turf).

"*Low maintenance zone*" means an area a minimum of ten feet wide adjacent to water courses which is planted and managed in order to minimize the need for fertilization, watering, mowing, etc.

"*Person*" means any natural person, business, corporation, limited liability company, partnership, limited partnership, association, club, organization, an/or any group of people acting as an organized entity.

"*Prohibited application period*" means June 1 through September 30 or the time period during which a flood watch or warning, or a tropical storm watch or warning, or a hurricane watch or warning is in effect for any portion of the City of Sebastian, issued by the National Weather Service, or if heavy rainfall is likely.

"*Sebastian Approved Management Practices Training Program*" means a training program approved per F.S. § 403.9338, or any more stringent requirements set forth in this Chapter that includes the most current version of the Florida Department of Environmental Protection's "Florida-Friendly Best Management Practices for Protection of water Resources by the Green Industries, 2008" as revised and approved by the administrator.

"*Saturated soil*" means a soil in which the voids are filled with water. Saturation does not require flow. For the purpose of this section, soils shall be considered saturated if standing water is present or the pressure of a person standing on the soil causes the release of free water.

"*Slow release*" , "*controlled release*" , "*timed release*" , "*slowly available*" or "*water insoluble nitrogen*" means nitrogen in a form which delays its availability for plant uptake and use after application, or which extends its availability to the plant longer than a reference rapid or quick release product.

"*Turf*" , "*sod*" , or "*lawn*" means a piece of grass-covered soil held together by the roots of the grass.

"*Urban landscape*" means pervious areas on residential, commercial, industrial, institutional, highway right-of-way, or other nonagricultural lands that are planted with turf or horticultural plants. For the purposes of this section, agriculture has the same meaning as in F.S. § 570.02.

- (d) *Applicability.* This section shall be applicable to and shall regulate all applicators of fertilizer and areas of application of fertilizer within the City of Sebastian unless such applicator is specifically exempted by the terms of this section from the regulatory provision of this section. This section shall be prospective only, and shall not impair any existing contracts.
- (e) *Timing of fertilizer application.* No applicator shall apply fertilizers containing nitrogen and/or phosphorus to turf and/or landscape plants during the prohibited application period, or to saturated soils.
- (f) *Fertilizer free zones.* Fertilizer shall not be applied within ten feet of any pond, stream, watercourse, lake, canal, or wetland as defined by the Florida Department of Environmental Protection (Chapter 62-340, Florida Administrative Code) or from the top of a seawall. If more stringent City of Sebastian Code regulations apply, this provision does not relieve the requirement to adhere to the more stringent regulations. Newly planted turf and/or landscape plants may be fertilized in this zone only for a 60-day period beginning 30 days after planting if need to allow the plants to become well established. Caution shall be used to prevent direct deposition of nutrients into the water.
- (g) *Low maintenance zones.* A voluntary ten-foot low maintenance zone is strongly recommended, but not mandated, from any pond, stream, water course, lake, wetland or from the top of a seawall. A swale/berm system is recommended for installation at the landward edge of this low maintenance zone to capture and filter runoff. If more stringent City of Sebastian Code regulations

apply, this provision does not relieve the requirement to adhere to the more stringent regulations. No mowed or cut vegetative material may be deposited or left remaining in this zone or deposited in the water. Care should be taken to prevent the over-spray of aquatic weed products in this zone.

(h) *Fertilizer content and application rates.*

- (1) No fertilizer containing phosphorous shall be applied to turf or landscape plants in the City of Sebastian unless a soil or plant tissue deficiency is verified by a University of Florida, Institute of Food and Agriculture Sciences, approved testing methodology. In the case that a deficiency has been verified, the application of a fertilizer containing phosphorous shall be in accordance with the rates and directions for the Central Region of Florida as provided by Rule 5E-1.003(2), Florida Administrative Code. Deficiency verification shall be no more than two years old. However, recent application of compost, manure, or top soil shall warrant more recent testing to verify current deficiencies.
- (2) The nitrogen content of fertilizer applied to turf or landscape plants within the City of Sebastian shall contain at least 50 percent slow release nitrogen per guaranteed analysis label.
- (3) Fertilizers applied to an urban lawn or turf within the City of Sebastian shall be applied in accordance with requirements and directions set forth on the label or tag for packaged fertilizer products, or in the printed information accompanying the delivery of bulk fertilizer products, as provided by Rule 5E-1.003(2), Florida Administrative Code, Labeling Requirements For Urban Turf Fertilizers. All packaged and bulk fertilizer products sold in the City of Sebastian shall be sold in packages with labels or tags, or, if sold in bulk, be accompanied by printed information, which complies with the requirements of Rule 5E-1.003(2), Florida Administrative Code.
- (4) Fertilizer containing nitrogen or phosphorus shall not be applied before seeding or sodding a site, and shall not be applied for the first 30 days after seeding or sodding, except when hydro-seeding for temporary or permanent erosion control in an emergency situation (wildfire, etc.), or in accordance with the Stormwater Pollution Prevention Plan for that site.

(i) *Application practices.*

- (1) Spreader deflector shields are required when fertilizing via rotary (broadcast) spreaders. Deflectors must be positioned such that fertilizer granules are deflected away from all impervious surfaces, fertilizer-free zones and water bodies, include wetlands.
- (2) Fertilizer shall not be applied, spilled or otherwise deposited on any impervious surfaces.
- (3) Any fertilizer applied, spilled, or deposited, either intentionally or accidentally, on any impervious surface shall be immediately and completely removed to the greatest extent practicable.
- (4) Fertilizer released on an impervious surface must be immediately contained and either legally applied to turf or any other legal site, or returned to the original or other appropriate container.
- (5) In no case shall fertilizer be washed, swept, or blown off impervious surfaces into stormwater drains, ditches, conveyances, or water bodies.

(j) *Management of grass clipping and vegetative matter.* In no case shall grass clippings, vegetative material, and/or vegetative debris be washed, swept, or blown off into stormwater drains, ditches, conveyances, water bodies, wetlands, or sidewalks or roadways. Any material that is accidentally so deposited shall be immediately removed to the maximum extent practicable.

(k) *Exemptions.* The provisions set forth in the chapter shall not apply to:

- (1) Bona fide farm operations as defined in the Florida Right to Farm Act, F.S. § 823.14;

- (2) Other properties not subject to or covered under the Florida Right to Farm Act that have pastures used for grazing livestock;
 - (3) Any lands used for bona fide scientific research, including, but not limited to, research on the effects of fertilizer use on urban stormwater, water quality, agronomics, or horticulture.
 - (4) Golf courses when landscaping is performed within the provisions of the Florida Department of Environmental Protection document, "Best Management Practices for the Enhancement of Environmental Quality on Florida Golf Courses", these provisions shall be followed when applying fertilizer to golf course practice and play areas;
 - (5) Athletic fields at public parks and school facilities that apply the concepts and principles embodied in the Florida Green BMPs, while maintaining the health and function of their specialized turf areas;
 - (6) Vegetable gardens owned by individual property owners or a community, and trees grown for their edible fruit.
- (l) *Training.*
- (1) All commercial and institutional applicators or fertilizer within the City of Sebastian, shall abide by and successfully complete the six-hour training program in the "Florida-Friendly Best Management Practices for Protection of Water Resources by the Green Industries" offered by the Florida Department of Environmental Protection through the University of Florida Extension "Florida-Friendly Landscapes" program, or an approved equivalent.
 - (2) Private, non-commercial applicators are encouraged to follow the recommendations of the University of Florida IFAS Florida Yards and Neighborhoods program when applying fertilizers.
- (m) *Licensing of commercial applicators.*
- (1) Prior to January 1, 2014, all commercial applicators of fertilizer with the City of Sebastian, shall abide by and successfully complete training and continuing education requirements in the "Florida-Friendly Best Management Practices for Protection of Water Resources by the Green Industries", offered by the Florida Department of Environmental Protection through the University of Florida IFAS "Florida-Friendly Landscapes" program, or an approved equivalent program, prior to obtaining a City of Sebastian Local Business Tax Receipt for any category of occupation which may apply any fertilizer to turf and/or landscape plants.
 - (2) After December 31, 2013, all commercial applicators of fertilizer within the City of Sebastian, shall have and carry in their possession at all times when applying fertilizer, evidence of certification by the Florida Department of Agriculture and Consumer Services as a Commercial Fertilizer Applicator per 5E-14.117(18) F.A.C.
 - (3) All businesses applying fertilizer to turf and/or landscape plants (including but not limited to residential lawns, golf courses, commercial properties, and multi-family and condominium properties) must ensure that at least one employee has a "Florida-Friendly Best Management Practices for Protection of Water Resources by the Green Industries" training certificate prior to the business owner obtaining a local business tax receipt. Owners for any category of occupation which may apply and fertilizer to turf and/or landscape plants shall provide proof of completion of the program to the City of Sebastian.
- (n) *Enforcement.* The provisions of this section may be enforced pursuant to any method provided for by the Code or Ordinances or general law.

(Ord. No. O-12-06, § 1, 5-9-12; Ord. No. O-14-02, § 1, 3-26-14)

Appendix D: Chemical Control Log

CHEMICAL CONTROL LOG

APPLICATOR NAME:

DATE OF APPLICATION:

TIME:

PRODUCT NAME	EPA REGISTRATION #	PARK	PEST(S) TARGETED	METHOD OF APPLICATION
		NAME: TYPE: Athletic Active Passive		
WEATHER CONDITIONS	TEMPERATURE	WIND SPEED (MPH)	EFFECTIVENESS	PEST POPULATION EST.
			Low Moderate High	Very Low Low
SIZE OF AREA TREATED	PRODUCT CONCENTRATION	APPLICATION RATE		Moderate High Very High
ADDITIONAL NOTES				

APPLICATOR NAME:

DATE OF APPLICATION:

TIME:

PRODUCT NAME	EPA REGISTRATION #	PARK	PEST(S) TARGETED	METHOD OF APPLICATION
		NAME: TYPE: Athletic Active Passive		
WEATHER CONDITIONS	TEMPERATURE	WIND SPEED (MPH)	EFFECTIVENESS	PEST POPULATION EST.
			Low Moderate High	Very Low Low
SIZE OF AREA TREATED	PRODUCT CONCENTRATION	APPLICATION RATE		Moderate High Very High
ADDITIONAL NOTES				

Appendix E: Pesticide Notification Sign

RESTORATION IN PROGRESS

CAUTION

As a part of Sebastian's work to restore and maintain healthy, active public areas, pests are being treated with approved pesticides by state-licensed applicators, in compliance with the City's Integrated Pest Management Policy.

Thank you for your cooperation.

TARGET PEST:

AREA TREATED:

PESTICIDE:

RE-ENTRY PERIOD:

APPLICATION DATE:

APPLICATION TIME:

For more information, contact the City's Leisure Services Director,
Brian Benton at (772) 228-7057



To learn more about Sebastian's IPM Program and other Sustainable Sebastian Programs visit:

<https://www.cityofsebastian.org/260/Natural-Resources-Board>

Appendix F: Environmental Impact Quotient Formula

Environmental Impact Quotient (EIQ) Formula:

$$EIQ = \frac{\{C[(DT*5)+(DT*P)] + [(C*((S+P)/2)*SY)+(L)] + [(F*R)+(D*((S+P)/2)*3)+(Z*P*3)+(B*P*5)]\}}{3}$$

- **DT = dermal toxicity** ability of a substance to cause local reaction and/or systemic poisoning in people or animals by contact with the skin
- **C = chronic toxicity** Harmful effects caused in repeated exposure situations
- **SY = systemicity** ability of the product to be translocated to other tissues which have not received the product directly
- **F = fish toxicity** risk to fish, the most sensitive aquatic vertebrate to toxicity
- **L = leaching potential** risk of moving through the soil profile, leaching, and getting into groundwater
- **R = surface loss potential** susceptible to loss through runoff and erosion during high-intensity rainfall events
- **D = bird toxicity** risk to birds, which are the vertebrates most sensitive to toxicity
- **S = soil half-life persistence**, or the "lasting-power" of a pesticide within the soil
- **Z = bee toxicity** risk to the essential pollinators
- **B = beneficial arthropod toxicity** risk to non-target organisms which are an important group of microorganisms that work to maintain ecosystem health
- **P = plant surface half-life**. Persistence, or the "lasting- power" of a pesticide on the surface of the leaves, stems, and fruit

Once an EIQ value has been established for the active ingredient of each pesticide, field use calculations can begin. To accurately compare pesticides and pest management strategies, the dose, the formulation or percent active ingredient of the product and the frequency of application of each pesticide needs to be determined. To account for different formulations of the same active ingredient and different use patterns, a simple equation called the EIQ Field Use Rating was developed. This rating is calculated by multiplying the EIQ value for the specific chemical obtained in the tables by the percent active ingredient in the formulation by the rate per acre used (usually in pints or pounds of formulated product).

$$EIQ \text{ FIELD USE RATING} = EIQ \times \% \text{ ACTIVE INGREDIENT} \times \text{RATE}$$

Source: Kovach, J., Petzoldt, C., Degni, J., and Tette, J. 1992. A method to measure the environmental impact of pesticides. New York's Food and Life Sciences Bulletin 139:1-8

Appendix G: Pesticide Exemption Form

PESTICIDE EXEMPTION FORM

This form is to be submitted for approval in order to request exemption for use of a product that is:
1) Classified on the "Approved Pesticide Table" as "Restricted" OR
2) Not named on the "Approved Pesticide Table"

Form to be submitted to the Leisure Services Director for approval at least 4 days before application

Name: _____
Department/Contractor: _____

Date: _____

PESTICIDE

Date(s) of Proposed Use: _____
Product Name: _____
Active Ingredient(s): _____
Concentration: _____
Application Rate: _____
EPA Registration #: _____
Target Pest(s): _____

LOCATION

Site Name: _____
General Area Description: _____

JUSTIFICATION

Reason for Use: _____

Explanation of any Previous Control Methods: _____

Strategy to Prevent Future Exemptions: _____

APPROVAL

Leisure Srvcs. Dir. Approval: _____ Date: _____

IPM Coordinator Approval: _____ Date: _____

City Manager Approval: _____ Date: _____

Appendix H: Monthly IPM Log

Appendix I: Glossary of Terms

IPM Glossary of Terms

Aeration	involves mechanically perforating the soil with small holes to allow air, water and nutrients to penetrate the grass roots. This helps the roots grow deeply and produce a stronger, more vigorous lawn. The main reason for aerating is to alleviate soil compaction
Bahiagrass	groundcover that is drought and heat tolerant, relatively durable, low-growing and low-maintenance turf.
Beneficial Species	preferred species which naturally feed on, out-compete or otherwise hinder the growth of pest populations. Ex. Ladybug, Air potato Beetle)
Bermuda Turf	preferred groundcover for athletic fields in the state. It is valued for its exceptional heat and drought tolerance and a capacity to withstand heavy use and recuperate quickly
Best Management Practice (BMP)	actions based on current science and technology that have been proven to be effective, with careful consideration given to protect public health, safety, wildlife and the environment
Bioaccumulation	gradual accumulation of substances, such as pesticides or other chemicals, in an organism; substance is absorbed at a rate faster than that at which the substance is lost by catabolism and excretion.
Biodiversity	naturally occurring variety of species that coexist in an area
Bio Pesticide	pesticides derived from such natural materials as animals, plants, bacteria, and certain minerals. For example, canola oil and baking soda have pesticidal applications and are considered bio pesticides.
Broadcast Application	general distribution of the pesticide over the entire ground surface of an area. In comparison to "spot application" in which the pesticide is applied directly to the pest location
Buffer Zone	predetermined distance surrounding a body of water where fertilizer and pesticide applications are prohibited
Chemical	any substance consisting of matter. This includes any liquid, solid, or gas. A chemical is any pure substance (an element) or any mixture (a solution, compound, or gas). They can either occur naturally or can be created artificially

Contract	A legal binding written agreement, including but not limited to a contract, lease, permit, license or easement, between a person, firm, corporation, or other entity, including governmental and a City department; which grants a right to use, lease, or occupy property of the City for a specified purpose or purposes
Contractor	person, firm, or corporation or other entity, including governmental that enters into a contract with the City for services
EIQ	a formula created to provide pesticide applicators with data regarding the environmental and health impacts of their pesticide options so they can make better informed decisions regarding their pesticide selection
Endangered Species	protected species that is very likely to become extinct in the near future, either worldwide or in a particular political jurisdiction. Highest level of conservation status
Exotic Species	often referred to as alien, nonnative, nonindigenous, or introduced species, are those that occur in areas outside of their natural geographic range
Field Use EIQ Rating	rating calculated by multiplying the EIQ value for the specific chemical obtained in the tables by the percent active ingredient in the formulation by the rate per acre used; the rating allows comparisons of environmental impact between pesticides and different pest management programs can be made
Fertilizer	chemical or natural substance added to soil or land to increase its fertility
Fungicide	substance (pesticide) that is intended to be used for the prevention, control and/ or eradication of fungal pests
Herbicide	substance (pesticide) that is intended to be used for the prevention, control and/ or eradication of plant pests
Insecticide	substance (pesticide) that is intended to be used for the prevention, control and/ or eradication of insect pests
Invasive	exotic species that causes ecological or economic harm in a new environment where it is not native
Irrigation	artificial application of water across a land to assist in the health and durability of plant species
Key Pests	often encountered at an unacceptable population level, at least once a year. They are unique to each park classification, based on how the area is used

Leachability	ability of a pesticide to travel downward through the soil profile due during rain events or irrigation where it can contribute to groundwater contamination, this trait is a product of the chemical and soil characteristics
Mulch	material (such as decaying leaves, bark, or compost) spread around or over a plant to enrich soil and prevent weed growth
Native Species	any species that normally lives and thrives in a particular ecosystem has developed with the surrounding habitat; they are easily affected by introduction of exotic species species and are preferred due to the lack of resources required to maintain and for the protection of the area's biodiversity
Nematode	any of a phylum (Nematoda or Nemata) of elongated cylindrical worms parasitic (harmful) in animals or plants or free-living in soil or water
Over-Seeding	process of planting new grass seed to fill in areas of thinning turf. It's a great way to improve the density of your lawn and enhance its color
Pathogen	any disease-producing agent, especially a virus, bacterium, or other microorganism
Pest	any plant (weed), vertebrate (bird, rodent, or other mammal), invertebrate (insect, tick, mite, or snail), nematode, or pathogen (bacteria, virus, or fungus), which may cause disease, inflict damage, or out-compete the more desirable species for an area. In addition, a pest may be aesthetically undesired, or threaten to impact human/animal health
Pesticide	any substance or combination of substances which is intended to be used for preventing, destroying, repelling, or mitigating any pest; this includes herbicides, insecticides, bio pesticides, fungicides, etc.
Phase II MS4 Permit	FDEP permit issued to the City every 5 years, which contains all of the approved BMPs which the stormwater department must implement in order to protect water quality
Pollinators	anything that helps carry pollen from the male part of the flower (stamen) to the female part of the same or another flower (stigma), are viewed as "beneficial species"
Protected Species	any species that is protected from harm by activities such as land development and hunting through government legislation

Safety Data Sheets	data sheets that are federally required for all hazardous chemicals. Sheets must contain all of the physical, health, and environmental health hazards; protective measures; and safety precautions for handling, storing, and transporting the chemical. Any entity creating, storing, distributing, or applying these chemicals must have these on-site and accessible to all staff.
Solubility	measure of the ability of a pesticide to dissolve in a solvent, which is usually water. Pesticides that are highly soluble in water dissolve easily. Such pesticides are more likely to move with water in surface runoff or to move through the soil in water
St. Augustine	a low, mat-forming groundcover that is commonly cultivated as a lawn grass, forms a dense turf when properly planted and maintained; grows tightly enough to permit average amounts of foot traffic, and also to compete well with weeds.
Sustainable (ecological)	quality of not being harmful to the environment or depleting natural resources, thereby supporting long-term ecological balance
Threatened Species	protected species that is vulnerable to endangerment in the near future, either worldwide or in a particular political jurisdiction. Moderate level of conservation status
Verticutting	also called vertical mowing, removes thatch buildup in the lawn so turf can breathe easy, better absorb nutrients, and soak in much-needed moisture. A verticutter machine has blades that cut down into the thatch without damaging the healthy grass. This breaks up that dead layer and brings it to the surface so it can easily be collected and removed