Integrated Pest Management Plan

2025 Update

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PREFACE

In 2011, the City of St. Albert developed an Integrated Pest Management (IPM) plan providing detailed information on how to prevent and manage pest problems in the city. The IPM promotes healthy vegetation and guides pest control activities on all public land and within civic structures and facilities. One of the goals of the IPM is to keep pests at an acceptable level through effective, economical and environmentally sound methods.

The City has updated the plan twice to act as a unified resource for current operational, planning and technical pest control activities. The plan provides information on current pest management programs and lists pests and their corresponding management procedures. The document will be updated as changes occur.

Factors required for a successful IPM program include:

- Adhering to and carrying out government mandates such as the *Weed Control Act* and the *Pest Act*.
- Integrating and using a diverse range of control products and methods while reducing the reliance on chemical pesticides.
- Monitoring pest activity before and after control procedures.
- Providing guidance and assistance to City staff and engaging external organizations and the community.

Regional collaboration and knowledge sharing is accomplished through biannual IPM meetings with surrounding municipalities. With a solid IPM framework in place, the community can participate in various pest control initiatives, including working with City staff to identify and monitor new pest problems and to help establish practical and effective pest control targets and workable solutions.

An IPM plan must inherently adapt to a dynamic pest environment and evolve with these changes. An IPM plan is only complete until the next major pest arrives, climate change drives sleeper species, pesticide or pest control legislation changes, new control methods become available or the public seeks a change in the way pests are dealt with because of shifting points of view.

ACKNOWLEDGEMENTS

The City of St. Albert would like to thank the Cities of Leduc, Calgary and Red Deer for allowing the use of portions of their IPM plans in the development of the original document. We appreciate the sharing of knowledge and expertise in these matters.

1. INTRODUCTION

The City of St. Albert (the City) manages over 502 hectares of public park space and natural areas, including sports fields, roadway green space, decorative parks and natural environment parks. Each year, the City also inspects and assumes responsibility for managing newly acquired property. In the past, the City used varied pest control techniques, and City Administration recognized the need for a formal policy and set of procedures for city wide use to control pests. In 2011, the City developed an Integrated Pest Management (IPM) plan with the objective of updating every five years. An IPM plan is a living document that acts as a foundation for current operational, planning and technical pest control activities, but it requires ongoing development and refinement. The 2025 updated IPM plan integrates new information on pests, legislation, City policies and controls.

This IPM plan has many purposes:

- Ensures public accountability for pesticide use.
- Complies with all pertinent laws, regulations, bylaws and policies regarding the use of pesticides on City owned lands.
- Considers community values in the development and implementation of pest management plans.
- Promotes ecologically sound pest management principles, concepts and techniques in the design and implementation of development projects on public lands.
- Develops and promotes opportunities for public education and information regarding environmentally sound methods of pest management.
- Trains staff who develop and implement the City's IPM plans.
- Promotes long-term, cost-effective management of pests.
- Preserves and enhances biodiversity through sound management practices.
- Recognizes and adapts to emerging threats due to climate change or other factors (i.e. expansion of raccoon range).

The IPM plan provides detailed information on how to prevent and manage pests (flora and fauna) on City owned lands. This document is split into numerous sections and supporting appendices for ease of use. Numerous supporting documents are presented as appendices to provide easy access to additional information.

2. INTEGRATED PEST MANAGEMENT

The goal of this IPM plan is to ensure operations involving pest management are implemented through a classical IPM plan that emphasizes an ecological approach, reduces the reliance on pesticides through preventive and alternative methods and considers long-term costs for evaluating the effectiveness and economic feasibility of pest management tactics.

2.1 What is a Pest?

A pest is defined in the federal *Pest Control Products Act* as “an animal, a plant or other organism that is injurious, noxious or troublesome, whether directly or indirectly, and an injurious, noxious or troublesome condition or organic function of an animal, a plant or other organism” (Government of Canada 2006). The definition of a pest can also relate to the situation or size of the pest population that adversely interferes with the aesthetic, health, environmental, functional or economic goals of humans.

There are provincial and federal legislation and regulations that provide a legal perspective to determine whether an organism is a pest and the requirements for control. The City has a legal responsibility to comply with these governing acts and regulations.

2.2 What is Integrated Pest Management (IPM)?

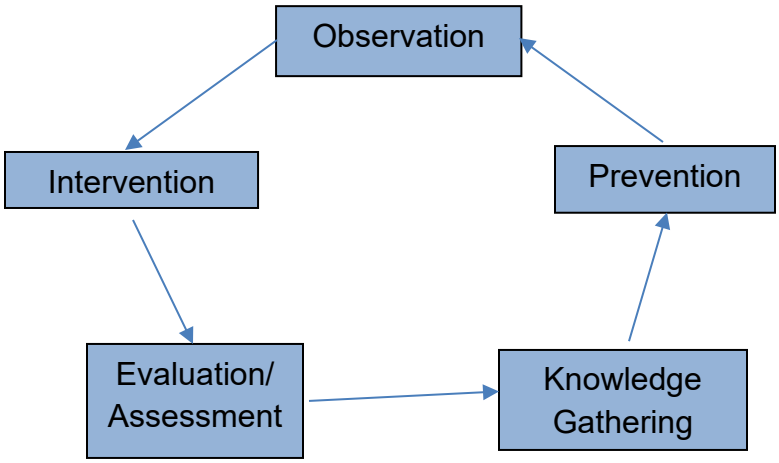
IPM is an ecosystem-based strategy that focuses on long-term prevention of pests or their damage through a combination of techniques, such as biological control, habitat manipulation, modification of cultural practices and use of resistant varieties. Pest control materials are selected and applied in a manner that minimizes risks to human health, beneficial and non-target organisms and the environment.

The IPM plan uses extensive technical knowledge of individual pests and their relationships to the environment and aims to maintain pests at acceptable levels through effective, economical and environmentally sound methods. The IPM plan is guided by federal and provincial legislation and municipal bylaws and is an overarching document that provides guidance on objectives and implementation of IPM. Within an IPM plan, programs are often developed for specific pests and may change from year to year as the pest is managed.

2.3 Why is there a need for Integrated Pest Management?

Controlling pests while promoting healthy growth of desirable species reduces health dangers caused by insect or disease infestations, maintains native vegetation and

wildlife habitat, supports biodiversity, public activities and interactions with land managed by the City, and is economically responsible. The City uses an adaptive management approach, following the cycle of:



The IPM plan does the following:

- Seeks to minimize the risk to human health and the environment.
- Considers cost effectiveness and operational feasibility.
- Considers community values.
- Protects vegetation communities by improving site conditions and fostering healthy conditions for optimal growth and plant health.
- Controls invasive pests while promoting healthy growth of desirable species.

Implementation of the City's IPM must consider the five pillars of sustainability: natural environment, social and culture, economic and built environment.

Natural Environment Concerns

- Increased plant and animal susceptibility to pests if an infestation is over a tolerable level.
    - Permanent pest damage considerations if infestations are annual.
    - Damage to plants due to competition for space, water, nutrients and sunlight.
    - Maintenance of a native species' balance and diversity.

Social and Cultural Concerns

- Public perception and complaints about aesthetics, health and safety concerns.
- Need for increased education and awareness about pests.

- Increased maintenance cost related to the provincial *Weed Control Act* and/or *Agricultural Pests Act.*
- Use of control methods that are safe for human health.
- Consideration of Indigenous harvesting of plants and animals for consumption, medicinal and ceremonial use.
- Cultural releases of invasive species such as goldfish, human health risks from introduced plants, parasites, viruses and economic concerns.
- Control species spread to and from private property.
- Control species spread from private property using enforcement.
- Increased need for vegetation replacement.
- Prevention of equipment/infrastructure damage
- Increased plant susceptibility to pests, which may lead to decreased landscape value.

Built Environment

- Degradation of landscape features.
- Damage to sidewalks, fences and utilities infrastructure, etc.Increased fire hazard due to declining ecosystem health and fallen trees.

2.4 Integrating Pest Management with Internal Policies and Management Plans

The City's IPM plan will apply to all City departments and contractors who directly or indirectly manage pests or plan, design, renovate or construct landscapes and facilities on City land. Developers are encouraged to reference the IPM for new developments or redeveloped sites. For IPM to work, effective communication and operational planning are required between all relevant service sections of the City's Public Operations department, and often between other City departments. The policy planning and developmental framework of the IPM is founded in the context of the following City plans and policies.

Environmental Sustainability Policy

The Environmental Sustainability Policy adopted by City Council establishes the overarching direction and sets the parameters of action required by the City, against which all decisions and actions are assessed.

https://stalbert.ca/city/environment/reports/environmental-policy/

Environmental Management Systems

The City's Environmental Management Systems (EMS) link environmental policy to procedures for organizations to bring environmental considerations into decision-making and day-to-day operations and provide a framework for evaluating and improving environmental performance. The EMS adhere to the International Organization for Standardization (ISO) 14001:2015 (ISO 2015) and is closely linked to the Environmental Master Plan (EMP).

https://stalbert.ca/city/environment/responsibility/ems/

Green Environment Strategy

This long-range plan will play an important role in guiding the City's operational activities and reinforcing its commitment to ecological sustainability over the next 10 years.

The foundation of the Green Environment Strategy is tied closely to the green environment goal of the City's Municipal Development Plan, *Flourish: Growing to 100K*, which includes principles related to natural features, biodiversity, water quality and the urban forest.

The following four strategic directions were identified to guide the City's environmental goals, conservation efforts and sustainable development practices:

- Watershed: Protect wetlands and riparian areas and improve stormwater quality to contribute to the health of the watershed.
- Biodiversity: Monitor, protect and enhance natural features, parks and open spaces to maintain, sustain and enrich biodiversity.
- Stewardship: Develop, maintain, and enhance community environmental programs to foster a sense of stewardship of natural features, parks and open spaces.
- Governance: Develop and follow regulatory documentation for the protection of the environment. This could include regulations, guidelines, standards, policies and processes.

Natural Areas Inventory, Conservation and Management Plan

The City's natural areas conservation and management plan is part of the City's ongoing efforts to strengthen their commitment to conserving and managing St. Albert's natural areas. This plan has several goals that directly align with those of the IPM:

- Maintain and enhance the native plant species composition or natural areas.

- Maintain capacity of natural area vegetation to develop and undergo natural succession, including experiencing natural disturbances (except fire).
- Reduce wildlife/property conflict near/in natural areas.
- Promote good water quality of natural bodies of water.

Urban Forest Management Policy and Plan

The City's urban forest management policy and plan provide a framework for the consistent protection, management and sustainability of the City's urban forest. The policy aims to preserve and enhance the City's tree canopy that consists of a beautiful, healthy and diverse tree population.

The Urban Forest Management Plan (2017) outlines the City's goals to sustainably manage and enhance the urban forest. The plan provides strategic direction for the entire urban forest area, including all trees within city limits. The vision of the plan is:

> *"Protect, ensure health, cherish and expand our urban forest for today and future generations".*

https://stalbert.ca/city/environment/natural/urban-tree-cover/

City of St. Albert Health and Safety Policy

The City employees are subject to the health and safety policies of the City Public Operations department. All employees will be familiar with and abide by the City of St Albert health and safety policies and safety procedures related to IPM.

Municipal Engineering Standards

Preventing pest problems through careful design and construction of facilities and landscapes is an essential component of IPM and cost-effective maintenance. Park and facility design circulations are discussed during the review phase with technical or operational staff involved with IPM. Implementing various IPM design and construction options will be taken into consideration when updating future landscape design standards.

The Standards should also be used to direct developers, contractors and citizens to use IPM principles when they develop and maintain facilities and landscapes on private land. All roads, park and facility design circulations should include the Parks Branch of Public Operations and the Environment Department to allow for comments or additional recommendations on landscape design.

2.5 Integrated Pest Management Considerations for the City of St. Albert

While insect and disease problems are present and create serious maintenance requirements for some of the City's landscape management operations, weeds are the major pest problem on the City's public lands. Infestations of weeds in park areas and the subsequent deterioration of turf quality are important challenges facing the City. The City sometimes may use more intensive strategies like pesticides to rehabilitate existing sites before moving to less intensive strategies such as mowing for maintenance. Many facilities and parks have not been designed to minimize pesticide use and require long-term maintenance, which can be a challenge for implementing IPM.

The City must consider a range of issues and responsibilities when implementing IPM in landscape and park environments, including the following:

- Natural Areas: St. Albert's natural areas provide valuable wildlife, pollinator and native plant habitats. The value of park environments to serve as habitats and corridors for wildlife and native plants will increase as areas of the city continue to be developed. Minimization of environmental degradation (especially from mechanical and chemical pest management) is important.

- Prohibited Noxious and Noxious Weeds: Prohibited Noxious, Noxious, and nuisance weeds create serious negative impacts on both natural landscapes and developed lands. Weeds are classified as Prohibited Noxious and Noxious under the provincial *Weed Control Act and Regulations*. The provincial act requires property owners to control prohibited noxious and noxious weeds to prevent their propagation and further spread. Nuisance weeds are not covered under the *Regulations* but can be a problem locally for maintaining healthy ecosystems.

- Agricultural Pests: Pests (animals, birds, insects, plants or diseases) can create serious negative impacts on the ecology of natural and developed lands. Property owners must control those organisms classified as either pests or nuisances under the provincial *Agricultural Pests Act*.

- Water Quality: Activities to manage pests in the City's landscape, park facilities and land could affect surface and groundwater quality.

- Safety: A primary management consideration is the safety of people using, maintaining and developing the City's Park facilities and other nonrecreational corridors (i.e. roadway green spaces). Pest management operations must be

developed and implemented in a manner that protects the health and safety of the public and the City staff.

- Education: Education of City staff and the public is a vital component of implementing the IPM plan. The City shall keep current with pest management strategies and incorporate them where applicable into the IPM programs.

- Aesthetics: Residents consistently rate trees and parks as highly valued assets to the community. Increasing density in new neighborhoods increases the demand for aesthetically pleasing green spaces. Weed and pest impacts can cause unsightly conditions that are unacceptable to some residents.

- Recreational Opportunities: St. Albert's Park system provides citizens with a wide variety of recreational opportunities. Pest management plans and operations must facilitate and enhance the opportunity to pursue and enjoy recreational activities.

- Heritage Features: St. Albert's Park environments include natural and introduced vegetation and features that are an important part of St. Albert's history. Pest management activities help to ensure the safety and sustainability of those historic sites.

- Indigenous Traditional Land Use: Traditional land use areas should be protected and enhanced for the benefit of local Indigenous populations.

- Design Criteria: Site design significantly influences landscape maintenance requirements, costs and environmental impacts. The City shall promote development and implementation of landscape designs that reduce the amount of human intervention required for their sustainability.

- Contracted Work: Private contractors hired by the City must carry out activities in accordance with the IPM plan and follow IPM principles in design and construction.

3. FEDERAL AND PROVINCIAL LEGISLATION AND MUNICIPAL BYLAWS

3.1 Federal

Pest Control Products Act

The *Pest Control Products Act* aims to protect human health and safety and the environment by regulating pest control products.

http://lawslois.justice.gc.ca/eng/acts/P9.01/

Canadian Food Inspection Agency

The Canadian Food Inspection Agency coordinates programs to prevent the introduction and movement of invasive species between borders and assists with education and monitoring within Canada.

https://inspection.canada.ca/plant-health/invasive-species/invasive-plants/invasive-plants/eng/1331614724083/1331614823132

Fisheries Act

The objective of the *Aquatic Invasive Species Regulations* is to provide a full suite of regulatory tools under the federal *Fisheries Act* to prevent the introduction of aquatic invasive species (AIS) into Canadian waters and to control and manage their establishment and spread, once introduced.

https://laws-lois.justice.gc.ca/eng/regulations/sor-2015-121/FullText.html

Migratory Birds Convention Act and Species at Risk Act

The *Migratory Birds Convention Act, 1994* and its supporting regulations aim to protect migratory birds, their eggs and nests. The *Species at Risk* Act and its supporting regulations aim to protect species of conservation concern in Canada. As part of the City's IPM plan, the federal government would be consulted before any pest control actions dealing with federally protected species.

http://lawslois.justice.gc.ca/eng/acts/M7.01/

http://lawslois.justice.gc.ca/eng/acts/S15.3/

3.2 Provincial

Environmental Protection and Enhancement Act

The *Environmental Protection and Enhancement Act* (EPEA), and its supporting regulations, govern the sale, use, application, handling, storage, transport and disposal of pesticides in Alberta. EPEA contains the following regulations specific to pesticides:

- *Pesticide (Ministerial) Regulation*
- *Pesticide Sales, Handling, Use and Application Regulation*
- *Environmental Code of Practice for Pesticides*

https://kings-printer.alberta.ca/1266.cfm?page=E12.cfm&leg_type=Acts&isbncln=9780779841660

Weed Control Act

The *Weed Control Act* categorizes a weed as either noxious or prohibited noxious. The list of weeds is not inclusive and should not be considered the final authority on problematic weeds but rather a guideline for municipal operations. The *Weed Control Act* protects citizens from economic and invasive losses caused by weeds.

The *Weed Control Act* defines municipal weed control actions, methods of serving notices, which notices should be served on, and the conditions necessary for appeal. The *Weed Control Act* also outlines municipal actions when managing weeds that are considered either noxious or prohibited noxious.

https://kings-printer.alberta.ca/1266.cfm?page=W05P1.cfm&leg_type=Acts&isbncln=9780779845521

Agricultural Pests Act

The *Agricultural Pests Act* and its supporting *Pest and Nuisance Control Regulation* declares as a pest or nuisance any animal, bird, insect, plant, or disease that is destroying or harming, or is likely to destroy or harm, any land, livestock, or property in the province of Alberta. The regulation allows municipalities to deal with native and introduced pests and nuisances that affect agricultural production.

https://kings-printer.alberta.ca/1266.cfm?page=a08.cfm&leg_type=Acts&isbncln=9780779845187

Local authorities are responsible for preventing the establishment of and controlling or destroying animals that have been designated as pests by Alberta Agriculture. Unlike

pests, local authorities are not mandated to prevent the establishment of, or destroy and control, species designated as nuisances under the *Agricultural Pests Act*. They are, however, permitted under the act to control these nuisances at their discretion using practices that comply with all applicable laws.

The City manages its obligations through a pest control unit in the Public Operations department that is educated in the recognition of pests on public property. The unit will take appropriate action to fulfill obligations as they relate to pests on public property. The City also appoints the municipal enforcement officers as inspectors pursuant to the *Agricultural Pests Act* to answer to public complaints and enforce pest control on private property when required.

Wildlife Act

The *Wildlife Act* and its supporting regulations protect provincial species of conservation concern in the province. The City has an exemption under the Wildlife Act to hunt or trap certain species (beaver, muskrat, red fox, coyote, red squirrel, badger). As part of the City's IPM plan, the City will consult the provincial government before any pest control actions dealing with provincially protected species. The City works closely with provincial fish and wildlife departments and uses their wildlife management expertise in preventing or managing any human-wildlife conflicts.

https://kings-printer.alberta.ca/1266.cfm?page=W10.cfm&leg_type=Acts&isbncln=9780779844401

Alberta Fisheries Act

Aquatic Invasive Species Regulations under the provincial *Fisheries Act* aim to prevent the introduction of aquatic invasive species into Alberta waters.

https://kings-printer.alberta.ca/1266.cfm?page=F16.cfm&leg_type=Acts&isbncln=9780779839353

3.3 Municipal Bylaws

- The City's Community Standards Bylaw 12/2010 outlines the actions permitted by City municipal enforcement officers to inspect and control weeds on private lands within the city. It regulates the conduct and activities of people on privately owned property and immediately adjacent areas to promote the safe, enjoyable and reasonable use of such property for the benefit of all citizens of the city.

- The City's Dutch Elm Disease Bylaw 5/98 that controls and prevents the spread of Dutch elm disease is managed by the City staff and municipal enforcement officers.

- The City's Animal Bylaw 11/2013 that prohibits residents to harbour any wild animal is managed by the City municipal enforcement officers.

- The City's Parks Bylaw 07/22 prohibits the feeding of wildlife, including bird feeders, and limits the use of pesticides in parks to City staff.

- The City's White Spruce Forest as a Municipal Historic Resource Bylaw 31/2011 prohibits the destruction, disturbance, alteration, restoration, or change of the Historic Resource other than in accordance with an approved management plan for the area.

https://stalbert.ca/cosa/bylaws/

4. CITY OF ST. ALBERT INTEGRATED PEST MANAGEMENT PROCESS

The sections below discuss the roles and responsibilities, and the resources required to implement the IPM plan.

4.1 Roles and Responsibilities

Chief Administrative Officer (CAO)

The CAO will have the overall authority for the IPM plan, strategies and prescriptions.

Environmental Advisory Committee (EAC)

The Environmental Advisory Committee will do the following:

- Review the IPM plan when it is updated and advise City Council, if required.
- Provide input into IPM plan public communication strategies to City Administration.

Environment Branch

The Environment Branch will do the following:

- Stay apprised of new and modified legislation and regulations that make it necessary to amend the IPM plan.
- Coordinate the research needed to implement IPM programs.

- Assist with IPM plan reviews.
- Evaluate the IPM plan and programs, as required.
- Assist with legislative updates and chemical storage and labelling requirements.
- Provide direction for pest wildlife management.
- Work with provincial regulatory authorities as required.
- Stay up to date with emerging threats and climate change considerations.

Public Operations – Operations Branch

Public Operations – Operations Branch will do the following:

- Stay apprised of new and modified legislation and regulations that make it necessary to amend the IPM plan.
- Monitor for new and existing invasive species, including sleeper species.
- Coordinate the development and implementation of the IPM plan with any pest management operations within the city.
- Help develop design and construction criteria for use in landscape and facility development projects that are consistent with the IPM plan.
- Manage park lands throughout St. Albert with standards consistent with the IPM plan.
- Evaluate, approve/disapprove, and rank all pesticide products that City departments use, following these criteria, and in line with the federal Health Canada Pesticide Management Regulatory Agency and the provincial Alberta Environment & Protected Areas:
    - Prescription evaluation:
        - application
        - methods
        - scale of application
        - exposure elements, and
        - buffer zones
    - Federal registration:
        - adverse human health effects
        - animal exposure data
        - mobility and persistence in the environment
        - potential impact on non-target organisms
        - inert ingredients
        - data gaps, and
        - pesticide classification information obtained from Health Canada and the Alberta government.
    - Federal designation of reduced risk pesticides.

- Coordinate the research needed to implement IPM programs.
- Ensure staff are trained appropriately to implement IPM.
- Specify criteria for pest management with City land lease/license holders (contained in lease agreements or Licence of Occupation Agreements).
- Maintain an education program that promotes awareness and understanding of the City's ecologically sound pest management practices, including all laws, regulations, bylaws, and policies that are directly or indirectly related to pest management operations.
- Evaluate the IPM plan and programs, as required.

Integrated Pest Management Supervisory Duties

The Tree and Pest Team Lead in consultation with the Senior Natural Areas Specialist and the Parks Operations Supervisor have IPM implementation and day-to-day supervisory duties for the program.

4.2 Resources

A successful IPM program requires IPM supervisors, staff training, greenspace design and development guidelines, greenspace inventory and site evaluation, monitoring and recording systems, increased level of cultural and physical practices, annual program evaluation and a public education program.

Personnel

Current staff levels provide adequate pest management to maintain existing standards. The IPM programs developed do not require additional staff time to monitor, evaluate and implement IPM prescriptions. However, as new programs are established because of municipal growth and changing climate, they will be evaluated to determine whether additional resources may be required in the future.

Equipment

Equipment relevant to IPM operations should be continuously assessed from an asset management perspective to incorporate the latest innovations in safety and techniques.

5. INTEGRATED PEST MANAGEMENT PROCEDURES AND IMPLEMENTATION

The IPM plan guides the management of public land and sites within and around structures. IPM will be implemented on parks, playgrounds, sports fields, cemeteries, pathways, paved areas, stormwater management facilities, trees in park areas and on

boulevards, park and non-park areas including roadway green spaces, agricultural roadways, and undeveloped municipally owned properties. The City will promote IPM strategies on major private land holdings, such as school board lands and industrial parks. This section provides information on the City's procedures and implementation. It outlines strategies and prescriptions for managing pest problems, monitoring, control, and evaluation of the IPM plan and program.

5.1 Strategies and Prescriptions

IPM strategies and prescriptions are necessary to manage pest problems. Strategies are a combination of short- and long-term approaches to managing a pest problem. Prescriptions describe the implementation plans for one or more practices.
IPM prescriptions may be a single strategy or a combination of different treatments within each strategy. It is important to review all treatment techniques to promote healthy vegetation and control pests then select the most appropriate technique(s). Selected techniques are called IPM prescriptions. Strategies for turf, urban forest, and vegetation management are shown on Figures 1, 2, and 3, respectively.

General prescriptions outline a full range of treatments that may be useful for preventing or managing a pest problem. They do not indicate the precise set of practices, techniques or materials that will be cost effective. The City will consider the following criteria when selecting IPM prescriptions and developing pest management strategies:

- Protecting/ensuring human health and safety.
- Being least disruptive of natural controls.
- Minimizing negative impacts to non-target organisms.
- Being least damaging to the general environment.
- Preserving natural or managed ecosystems.
- Producing long-term reductions in pest control requirements.
- Being operationally feasible and effective.
- Being cost effective in the short- and long-term.

Site-specific prescriptions require analysis and evaluation of the site conditions. This information is used to prioritize and review options outlined in general prescriptions, and determine the most appropriate treatment methods, tools, materials, and timing that, together, provide cost-effective and environmentally sound results. Daycares, playgrounds and schools, waterbodies, environmentally sensitive areas, and registered medical conditions are cases where site analysis and evaluation can have a major influence on the prescriptions chosen and notification requirements.

Residents with medical conditions can join the Pesticide Registry, which restricts application of herbicides or insecticides on City of St. Albert property within 30 metres of

a residence and/or pre-notifies registered residents of herbicide or insecticide applications within 100 metres of their residential property. Refer to the Pesticide Registry page on the City of St. Albert website:

https://stalbert.ca/city/public-works/pest-control/registry/

IPM prescriptions are continually subject to review and revision. Technology advancements, registration and availability of control products, and changes in site conditions impact the long-term success and viability of an IPM prescription. The maintenance of an accurate site inventory, routine monitoring and evaluation of IPM program provides baseline data for selecting prescriptions.

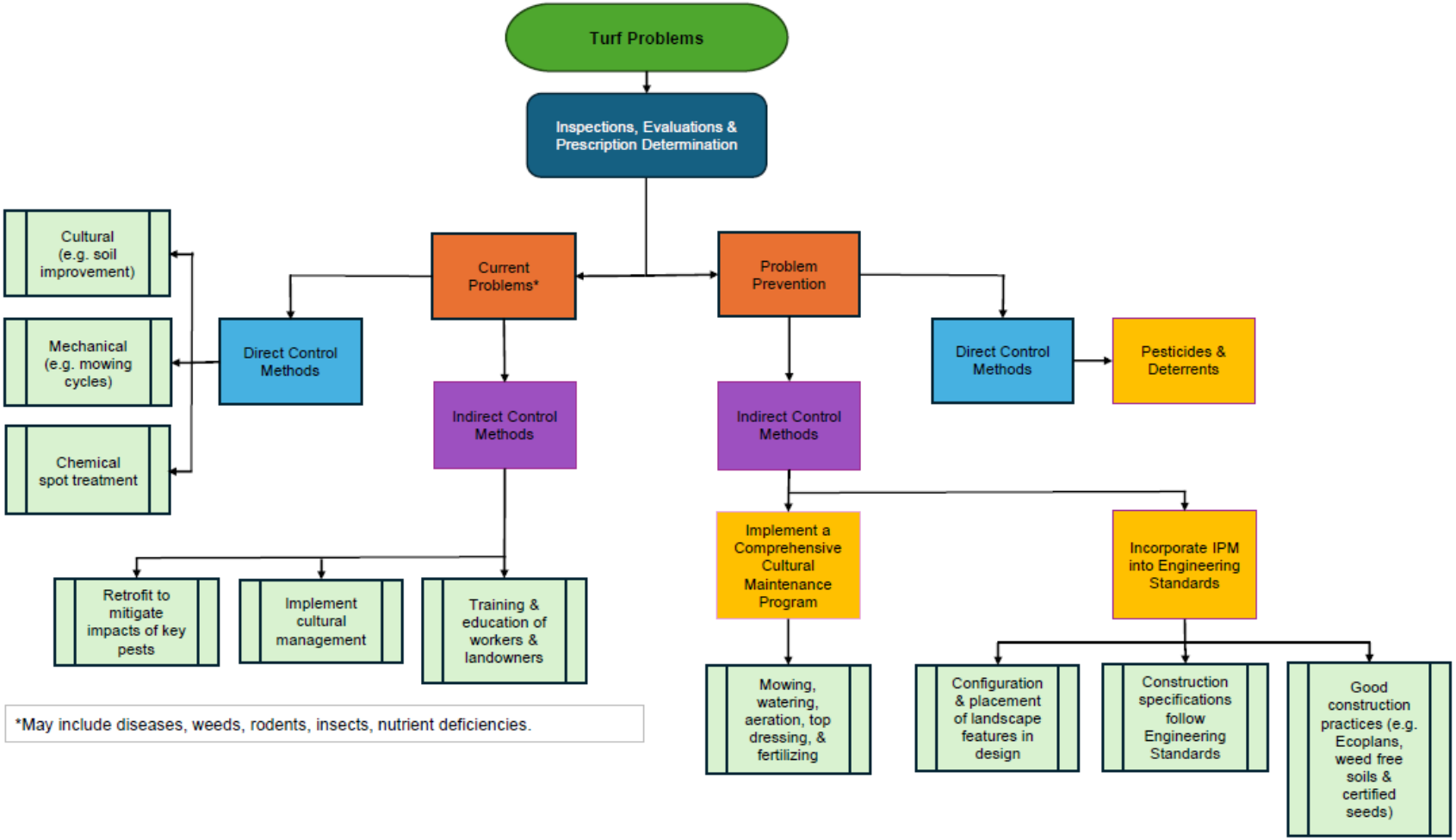


Figure 1. Turf Control Treatment Strategies

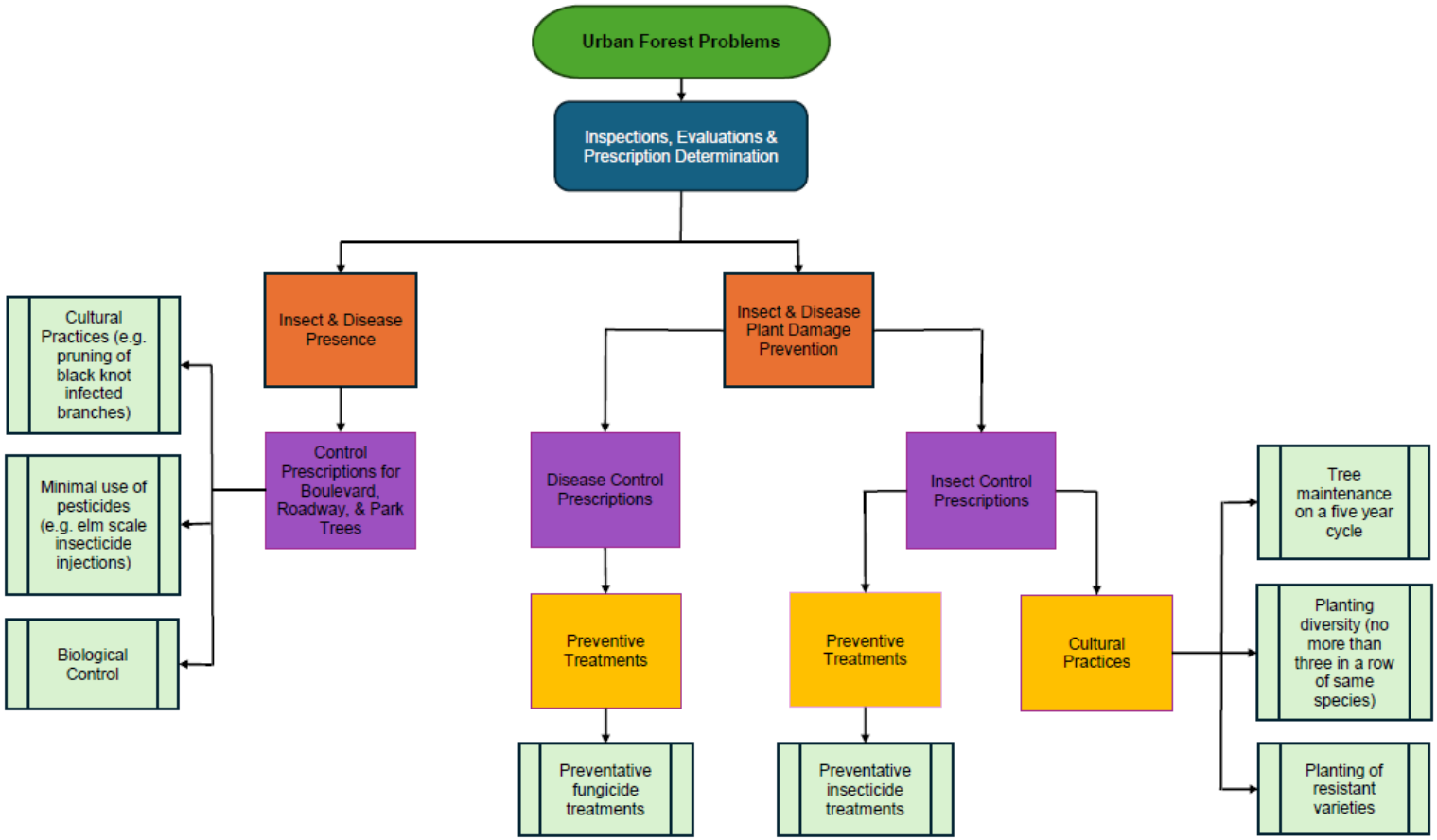


Figure 2. Urban Forest Control Treatment Strategies

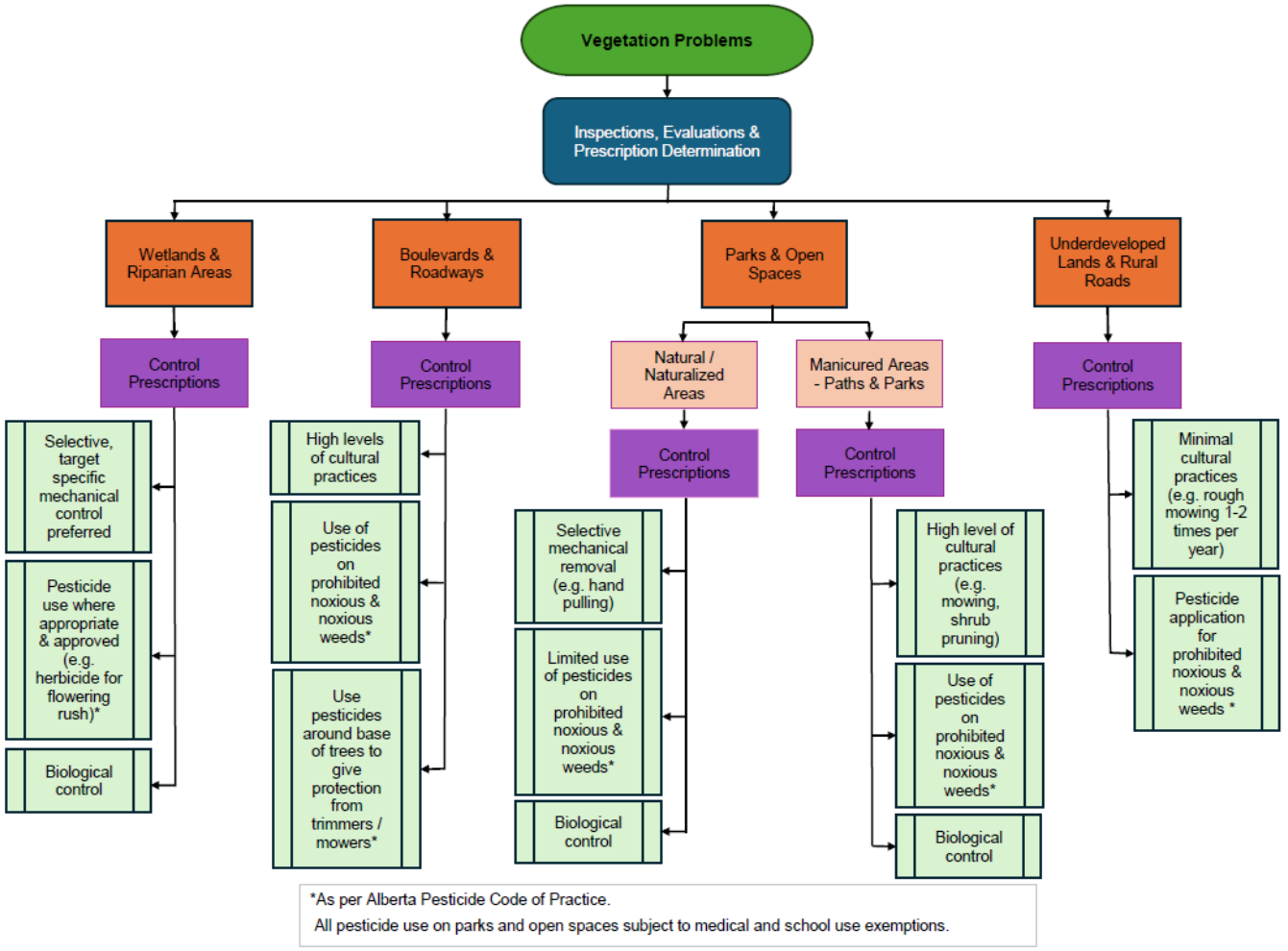


Figure 3. Vegetation Control Treatment Strategies

5.2 Monitoring

Monitoring helps staff decide if treatments are necessary, the best timing of treatments, and their efficacy. Successful management programs include regular inspections for unwanted pests throughout their life cycles. Life-cycle information can help determine when management strategies and preventative measures have the greatest effect.

Quantitative samples (e.g., weed counts, insect traps) are collected when the level of a specific pest infestation is at treatment threshold. If precise monitoring methods have not been developed, visual inspections may be the only viable alternative. Visual site inspections can assess and record conditions and document general areas for control methods.

The City participates in regional pest monitoring programs with partners such as the City of Edmonton Pest Lab and the Canadian Food Inspection Agency.

Site plans and evaluation forms for recording specific monitoring information should include the following:

- Location
- Type of pest (i.e. weed, insect, disease, vertebrate, sleeper species, etc.)
- Population density

The frequency of site inspections per growing season depends on several factors, including greenspace type, service priority ranking, action and injury thresholds and historical problems. Inspections may be required before treatments to ensure controls are applied at the optimum time. Variations in the target and non-target populations should be noted (e.g., recently germinated, seed head formations, population density of ladybird beetles in elm trees).

5.3 Control

Several factors should be evaluated when deciding specific prescriptions for a site. The action threshold (AT) defines when a particular treatment should be applied to deter pest levels from reaching the injury threshold. It is based on the type of treatment and the lifecycle and reproductive rate of the pest. Some insects or disease should be treated at first detection, while others may be able to remain at an endemic level before treatment is considered.

The AT can be determined by considering the following:

- Acceptable damage tolerance levels

- Current infestation level
- Options for treatment(s)
- The most effective timing for treatment(s)

The injury threshold (IT) is the point when the pest population reaches numbers that cause unacceptable injury or damage, sufficient to justify treatment. To help in determining IT, look for information from:

- Government and scientific papers
- Pest management experts
- Universities or colleges
- Grower organizations

Public complaints may contribute to the determination of either AT or IT.

A management program may include one or more treatments. If pesticides must be used, applicators should first review monitoring records and site plans to determine factors that could affect treatment and then use careful timing and precise equipment. Management techniques could include the following:

- **Preventative/Cultural Measures Design** – development and construction of landscape facilities to prevent or minimize pest problems. Cultural practices, such as routine irrigation, fertilizing, core aeration and top dressing provide similar benefits. Avoidance of monoculture tree planting (i.e., more than three in a row of the same species) can reduce the spread of pests. Sanitization of equipment between areas/trees and proper disposal of materials should be employed.

- **Physical and Mechanical Controls** – Involves the use of equipment, barriers or environmental manipulation to prevent the spread of pests or reduce pest populations. Examples include manual weeding, string trimming, and mowing around fence lines and site perimeters; chainsaws or heavy-duty mowers to control woody perennials; repetitive mowing; or cutting of top growth of bushy weed species.

- **Chemical Controls** - Control products are selected according to specific criteria, with preference given to least hazardous (based on Health Canada guidelines), least toxic/damaging to the environment, most likely to produce long-term improvements and most cost effective. Selected herbicides must be compatible with the IPM program and must be applied with target-specific techniques whenever practical. This can include using backpack or handheld sprayers, low-volume closed system applicators, wick applicators and covered boom or shrouded applicators. The

availability of reduced risk and low-risk pesticides should be continuously reviewed as they become available.

- **Behavioural Treatments** – This takes advantage of a pest's biology and natural behaviour to manage the population. This can include the use of pheromones, sterile males and light traps.

- **Biological Control** – This uses the living natural enemies of the pest, including:
    - Releasing predatory or parasitic insects
    - Protecting and encouraging natural predators and parasites
    - Using grazing animals
    - Using disease organisms

Specific prescriptions and strategies for vegetation, aquatic invasive species, mosquitoes and wildlife are provided in the IPM appendices.

5.4 Evaluation and Reporting

After treatments, it is necessary to determine the results through follow-up inspections. Frequency and timing of inspections vary according to the treatments and the site(s) priority. Reviewing monitoring records and site plans to determine factors that affected the treatment(s) can be useful for future management decisions.

Data Management

A historical database of previous monitoring and evaluation inspections can be used to determine effectiveness of treatment methods and the need for retreatment. The City uses a GIS-based app to monitor and track treatments. Summaries of customer service requests are compiled annually.

5.5 Education

The City will promote IPM principles through public education and will encourage private landowners, school boards and others to incorporate IPM principles in their operations. The City will take a leadership role by educating citizens and private landowners on environmentally sound, integrated approach to pest management. Here is a list of current public education outreach:

- Weed Warrior program
- Pest of the Week program
- Partnerships with non-profit organizations, such as the Alberta Invasive Species Council

- Public education events
- Social media campaigns
- Encouraging use of EDDMaps and iNaturalist for residents (on website and at events)

5.6 Training

Training is essential for all personnel involved with field implementation of plant health and pest management operations. This training must be specific and at regular intervals. The City will provide ongoing staff training to facilitate effective implementation of these guidelines, including internal training (tailgates, Standard Operating Procedure review and revisions) and external training (continuing education credits). Pesticide applicator training is legally required under the provincial *Environmental Protection and Enhancement Act* and associated *Code of Practice for Pesticides* for those applying chemical pesticides.

5.7 Maintenance Standards

Maintenance standards determine the intensity and type of management applied to sites and features. Where minimum maintenance standards are acceptable to the public and maintenance staff, pesticide use can usually be avoided by applying alternative management practices and tolerating less managed conditions (e.g., no mow zones).

However, where standards are high and tolerance for pest damage is low (e.g., areas with aesthetic importance, functional purpose, historical value or extensive public investment), it may be difficult to avoid chemical use. Applying alternative management strategies and practices may not work, or resources may inhibit physical or cultural methods. Pesticides may be used to meet expected levels of quality or protect the integrity of the site or feature.

When there are concerns about pesticide use, but non-chemical approaches are not feasible, the City must decide how to manage sites by answering the following questions:

- Should pesticides be applied but limited by some restrictions?
- Should the standard be amended to accept the presence of more pests (e.g., weeds in turf) or more pest damage?
- Can/should the feature be modified to minimize or prevent pest problems and pesticide use?

6. PESTS IN THE CITY OF ST. ALBERT

Primary pests pose a significant economic, physical, legal or health risk to parks land inventory, personnel or the public. Secondary pests, if left unattended, will over time create a significant economic, physical, legal or health risk to parks land inventory or personnel. All pest problems found within the City's public lands are common to this region of Alberta.

Pest problems are found throughout St. Albert in various locations, including parks, natural areas, the Sturgeon River and Carrot Creek riparian areas, annual and perennial gardens, cemeteries, sport fields, roadway green spaces and City facilities.

The City's goal is to minimize long-term costs and environmental impact through a focus on prevention first, moving into eradication and containment before a pest becomes established. When pests become prevalent within the City for long periods of time, they take the most resources to contain and/or control.

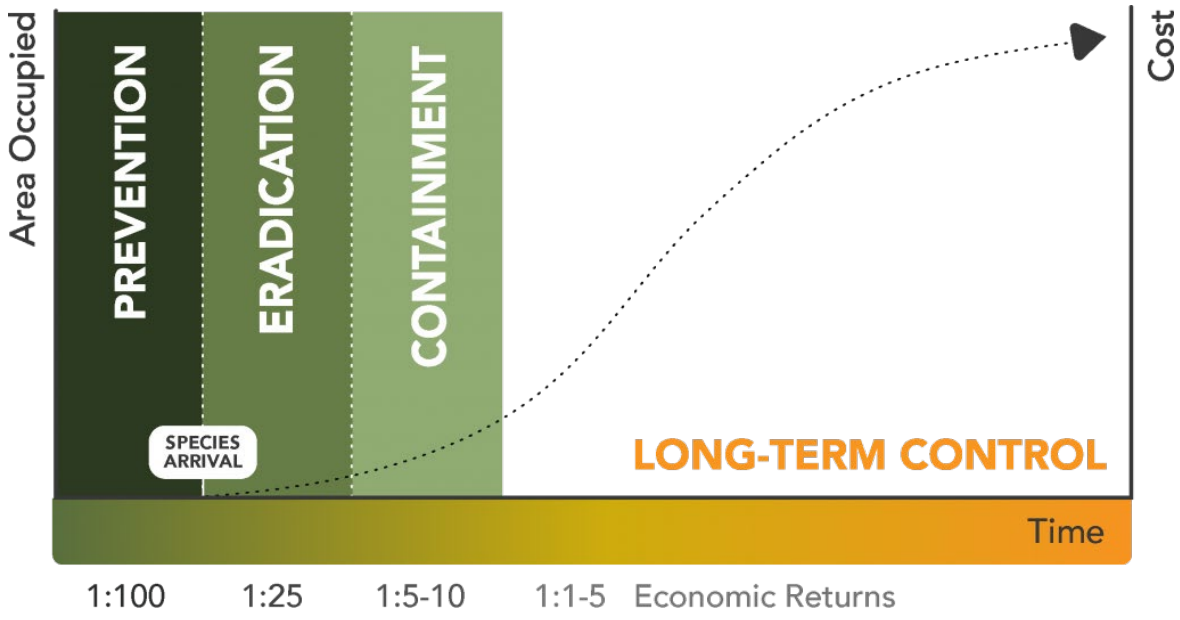


Figure 4. The Invasion Curve demonstrating the stages of invasive species management. (Invasive Species Center, accessed November 26, 2024, https://www.invasivespeciescentre.ca/learn/invasion-curve/)

6.1 Leading Causes of Pest Problems

Primary Causes of Pest Problems

Primary causes of pest problems are as follows:

- Readily available sources for infestation, such as seeds, eggs, adults, spores, host sites (open soil, mulch) or plants.
- Soils and weed infested seeds imported from outside of the city.
- Environmental conditions, such as fluctuations in temperature and rainfall.
- Climate change.
- Plants under stress due to poor maintenance or cultural practices, or unfavorable environmental conditions inappropriate site selection, vandalism, overuse of facilities/features and salt/mechanical damage from ice/snow removal.

Secondary Causes of Pest Problems

Secondary causes of pest problems are as follows:

- People are a common cause of landscape problems. Pedestrians and cyclists travel across shrub beds and turf areas, causing wear and tear on plants to the point where they cannot recover. Seeds can be carried on shoes and recreational equipment. Operation of maintenance equipment can damage turf or injure adjacent trees.
- Design and construction practices are a key factor in creating or aggravating pest problems in urban areas.
- Budget constraints in a growing community creates a situation where there is more to care for with less budget.
- Seasonal or localized site problems influence the presence and severity of pest problems. For example, snow removal practices (which can include salt and/or mechanical damage) impede a plant's ability to resist insects and diseases.
- Turf health is affected by mowing factors, such as height and frequency of cut, and condition of mowing equipment. Turf diseases can be spread from site to site on the turf maintenance machinery.
- Unattended properties adjacent to civic land, including annexed land and undeveloped land, provide an abundant source of windborne weed seeds. Seeds, spores, eggs or other sources of pest infestation impact pest problems in sports fields and peripheral areas.

6.2 Pests in St. Albert

Appendix A lists the pests found within the City's public lands that currently pose or could pose the greatest pest control challenge.

6.3 Pests and Urban Forestry

The urban forest program involves the promotion and care of trees on St. Albert's public lands, including boulevards, facilities and park areas. Collectively, St. Albert's trees represent an irreplaceable asset. Unlike grey infrastructure (hard structures such as sidewalks and roads), trees increase in value over time. The urban forest also makes a quantifiable contribution to the long-term livability of our city. The St. Albert urban forest is essential to community health and well-being, providing economic, environmental and ecological benefits.

As trees are a highly valued asset, managing to ensure longevity and tree health is a key goal of the City's urban forest program. There are unique management challenges within natural area, parks and along transportation corridors.

Environmental factors, such as wind, snow cover, drought, and soil conditions, can predispose the urban forest to dieback, sun scald, chlorosis, and damage to root systems. These conditions threaten the integrity of certain tree species within the city but can be minimized through proper site selection and planting techniques for new tree plantings. Early detection of forest pests is crucial to facilitating a quick response through control measures, allowing threats to be eliminated before they can cause significant loss to the forest canopy.

Primary and secondary insect pests that can vector tree diseases are monitored by placing insect traps. Monitoring is coordinated with outside agencies dedicated to the prevention of the spread of invasive pests and diseases. The Society to Prevent Dutch Elm Disease (STOPDED) and the Canadian Food Inspection Agency (CFIA) are two such agencies.

Preventative strategies are one of the primary methods to reduce or eliminate the potential pest sources pertaining to urban forestry. Plant Health Care (PHC) is both a preventative measure and a treatment, improving the viability of trees and minimizing pest problems. PHC practices include proper tree selection, planting and maintenance in the establishment phase of tree development. Efforts placed on PHC are an essential requirement in maintaining a healthy urban forest.

6.4 Urban Biodiversity and Climate Change

Climate change has the potential to impact urban biodiversity, with increasing temperatures in urban centres (known as “heat islands”) and changing precipitation regimes having negative impacts on vegetation and animal species. There may be a decline in native biodiversity, an increased growth of herbaceous species, an increased risk of invasive species and pathogens, and a change in vegetation types to species that can adapt to the new climate regimes. Our native species will gradually expand their range northward to follow suitable conditions, with pests following.

Vegetation management in the urban environment must consider the following factors (from *Urban Biodiversity and Design*, Chapter 5, 2010):

- Indirect anthropogenic effects, such as air pollution and altered hydrology, light and temperatures.
- Disturbance through trampling or equipment use.
- Direct vegetation management activities (plant introduction, planting, removals).

Existing native vegetation species will need to be monitored more closely for pathogens and insects, and replacement species may have to be chosen to reflect suitability under new climate regimes. This concept is known as “assisted migration.” This approach can minimize the large-scale loss of tree and shrub species that may occur by planting species from the warmer portions of their native range.

This process must be done with careful consideration. The introduction of exotic species can result in native species being outcompeted quickly, with many negative environmental consequences. Any new species must be able to withstand varying weather extremes and be resistant to diseases and pests.

Reduced periods of deeply cold weather over the winter will reduce the opportunity for pests to be impacted due to freezing. Increased temperatures over the year will encourage growth of herbaceous vegetation, and more weed density will be seen. Earlier spring conditions will result in changes to tree phenological phases, meaning earlier flowering. This will have an as-of-yet unknown impact to native pollinators.

Climate change may trigger the growth and spread of “sleeper species,” which are species that may be currently impeded due to climate or other factors but may emerge and become extremely successful under changed climate conditions. Vegetation monitoring on city owned lands will become critical for catching the emergence of sleeper species.

7. SUMMARY

The IPM plan must be treated as a living document that is intended to function as a basis for current planning, operational and technical pest control activities. The IPM program is reviewed twice per year with minor updates to the plan as required, and the entire plan updated a minimum of once every five years, with consideration for the impacts of climate change, emerging threats and human impacts.

8. GLOSSARY

Action Threshold Level
Action level is the level of development of a vegetation and pest population at a specific site at which treatment should take place to prevent the pest population from reaching the injury threshold level. The action threshold depends on the type of treatment and on the life cycle and reproductive rate of the pest.

Adaptive management
The curve of prevention, eradication, containment and asset protection.

Aesthetic weed
Non-regulated weeds: see “nuisance weed.”

Biodiversity
Consists of genetic (sum of genetic information contained in individuals and populations), species (number of biological organisms and their relative abundance) and ecosystem diversity (habitat variety, biotic communities, landscape and ecological processes).

Biological Control
The use of living organisms (parasites, predators, pathogens) to reduce or maintain pest populations to acceptable levels.

Chemical Control
The use of a control product such as a pesticide to suppress or control a pest.

Community
A group of populations of plants and animals in an area. Also relates to a group of individuals living within a legal or political boundary.

Control Product
Any product, device, organism, substance, or thing that is manufactured, represented, sold, or used as a means for directly or indirectly controlling, preventing, destroying, mitigating, attracting, or repelling any pest.

Cultural Practices
Management practices that focus on the prevention of pest by maintaining healthy hosts through proper planting, pruning, mulching, sanitation practices (also referred to as Plant Health Care (PHC)).

Diversity
The variety of species, vegetation communities, habitats, or landforms in an area.

Ecology
The study of relationships between living things, with each other and with environments.

Ecological Approach
A systems approach to prevention and management where control strategies are determined based on the relationship between the target's organism's life cycle and its environment.

Ecosystem
A community of organisms and their physical environment.

Environmental Advisory Committee (EAC)
An advisory committee of City Council that provides a vehicle for the flow of strategic advice and expert information between and among the public, City administration and Council, with an ongoing focus on best practices and the development and implementation of the City's environmental policies, strategies and initiatives.

Environmentally Sound Methods
IPM strategies and prescriptions that provide a desired result at reducing the impact of pest populations. These strategies are chosen based on the selection criteria to ensure minimal impact on the general environment and non-target organisms.

Evaluation
Involves analysis of treatment strategies and prescriptions to help determine the effectiveness of the control program. These records are useful in developing future pest management plans.

Fungicide
A chemical substance or cultured biological organism used to kill or suppress or prevent the development of fungi.

Herbicide
A chemical substance or cultured biological organism used to kill or suppress the growth of plants. Also defined as chemical compounds used to kill or inhibit undesirable plant growth.

Host Species
A species that acts as a host for a pest (e.g., a spruce tree is a host for the spruce budworm, an insect pest).

IPM Data Management and Documentation System
Involves maintenance of records of specific pest management factors observed during monitoring, information on labour and materials used in implementation of the urban IPM program, results of applied pest management strategies, and comprehensive data on pesticide applications.

IPM Prescriptions
Integrated pest control or eradication plans that are specific to a variety of pest management situations and/or pests and vegetation; these plans are based on the principles of IPM.

IPM Programs
Department, Division, and/or Operational Section level programs which are designed and developed to implement the Integrated Pest Management Plan. Individual programs are geared to the specific administrative and operational requirements and responsibilities of that specific working group.

Injury Threshold Level
When a pest population reaches numbers such that it causes unacceptable injury or damage to public safety, recreation, or health; natural and/or managed ecosystems; aesthetic values; economic injury to desirable plants; or the integrity, function, or service life of facilities.

Insecticide
A chemical substance or cultured biological organism used to kill or suppress the growth of insects.

Integrated Pest Management (IPM)
Integrated Pest Management is an ecological approach to suppressing pest populations (i.e., weeds, insects, diseases, etc.) in which all necessary techniques are consolidated in a unified program, so that pests are kept at acceptable levels in effective, economical, and environmentally sound methods. Since pest problems are often symptomatic of ecological imbalances, the goal is to attempt to plan and manage ecosystems to prevent organisms from becoming pests.

Invasive Species
An organism (plant, animal, insect, fungus, virus or bacterium) that is not native to the ecosystem, and poses potentially negative effects on a region's economy, environment or public health. Not all introduced species are considered invasive.

Inventory
A survey of selected natural resources not necessarily including a condition assessment.

Management Plan
A planning study and resulting document where the concern is to identify issues and create a management and implementation strategy.

Miticide
A chemical substance or cultured biological organism used to kill or suppress the growth of mites.

Monitoring
Involves the regular surveying of sites and/or features to understand and identify the location and extent of potential pest management problems.

Native
Species of animals or plants that have not been introduced by people or their direct activities.

Natural Area
Any land and/or water area that has existing characteristics of a natural/native plant or animal community; portions of a natural ecological system. It retains or has re-established a natural character although it need not be completely natural.

Noxious (weed)
Plants which have potential for rapid spreading and major economic impact. Weeds in this category are to be controlled to prevent their spread. They are well established in some areas of the province. Efforts must be undertaken to prevent spread to other locations within the province.

Non-target Organism
Any plant or animal other than the intended target of a pest management strategy.

Nuisance (organism)
Common animals which are widespread across the province. They are found on nearly all land and while they do cause economic losses their further spread is virtually impossible since they already occupy every area to which they are biologically suited.

Nuisance (weed)
The most common weeds which are widespread across the province. They are found on nearly all land and while they do cause economic losses their further spread is impossible since they already occupy every area to which they are biologically suited. Term is interchangeable with “aesthetic weed.”

Organism
Each individual living thing: animal, plant, insect, fungus, viruses, bacterium, or one of the single-celled creatures called protists.

Parasite
An organism (parasite) that lives in or on another (host), from which it obtains food, shelter or other requirements.

Park
Any land owned, controlled or maintained by the City that is intended to be used by the public for recreation or general enjoyment; and is:

- designated or districted as park under the Land Use Bylaw;
- dedicated as municipal reserve, environmental reserve, conservation reserve or a public utility lot; or,
- designated by the CAO as Park land under the Parks Bylaw.

Pathogen
A disease-causing organism.

Pathways
A route that provides designated access by a variety of compatible multiple or single travel modes (excluding automobiles). It is designed for the pursuit of outdoor recreational experience and activities. Pathways may be for bicycles, cross country skiing, pedestrian or equestrian use unless otherwise identified.

Pest
Any injurious, noxious, or troublesome insect, fungus, bacterial organism, virus, weed, rodent or other plant or animal pest, and includes any injurious, noxious, or troublesome organic function of a plant or animal. Whereby the situation or size of its population adversely interferes with the aesthetic, health, environmental, functional or economic goals of humans.

Pesticide

A substance that is intended, sold, or represented for use in preventing, destroying, repelling, or mitigating any insect, nematode, rodent, predatory animal, parasite, bacteria, fungus, weed or other form of plant or animal life or virus, except a virus, parasite, and bacteria in living people or animals. A substance that is a pest control product within the meaning of the *Pest Control Products Act* (Canada) and is granted federal registration by Pest Management Regulatory Agency, Health Canada. e.g., herbicides, insecticides, fungicides, rodenticides, and miticides.

Plant Health Care (PHC)

An integrated approach to plant (turf and tree) care that focuses on the health and growth of plants. Utilizes a comprehensive matrix of information to facilitate decision making.

Preventative Measures

Management practices that are directed towards preventing the establishment of pests (e.g., site design, genetic materials and optimal site selection for plant materials).

Primary Pest

A pest that poses a significant economic, physical, legal or health risk to the land inventory or personnel.

Reduced Risk Pesticide

Pesticide products which have a reduced risk to human health and the environment when compared to the existing pesticide alternatives.

Prohibited Noxious (weed)

These weeds must be eradicated. Weeds in this category possess highly competitive characteristics, inherent for rapid spread, and may pose difficulties for control. These weeds are known to be serious problems in other countries or provinces but are not well established in Alberta.

Rodenticide

A chemical substance or cultured biological organism used to kill or used to control or prevent the development of rodents.

Secondary Pest

A pest, if left unattended, will over time create a significant economic, physical, legal or health risk to the land inventory or personnel.

Sleeper Species
Non-native species already present in an ecosystem that have the potential to be invasive but are limited by factors such as climate change or other species.

Special-Use Approval
An approval issued by the Alberta Government for projects in specific locations. This includes pesticides that are excluded from the Environmental Code of Practices for Pesticides but used within 30 horizontal metres of open bodies of water.

Species
A genetically distinctive group of natural populations that share a common gene pool that are reproductively isolated from all other such groups.

Undeveloped Land
Corporately owned land that does not contain any permanent buildings, structures or facilities.

Weed
An herbaceous plant not valued for use or aesthetics and regarded as hindering the growth of desirable vegetation.

9. REFERENCES

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APPENDIX A

WEED, PEST AND INVASIVE SPECIES LIST

Table 1. City of St. Albert Pest List

Category	Pest	Reason for concern	Status in St. Albert (Emerging, Monitoring, Present, Eradicated, Controlling, Adapting)*
Tree Specific	Emerald ash borer (EAB)	Mass destruction of ash trees; CFIA listed species; declared pest under *Agricultural Pests Act* (new in 2025)	Monitoring
	Asian longhorned beetle	Mass destruction of deciduous trees; CFIA listed species	Provincially monitored
	Sirex wood wasp	Destruction of deciduous trees; CFIA listed species	Provincially monitored
	Mountain pine beetle (MPB)	Mass destruction of most pine tree species	Monitoring
	Spotted lantern fly	Exotic defoliator of deciduous trees; CFIA listed species	Provincially monitored
	Spongy moth	Mass destruction of most deciduous trees; CFIA listed species	Regionally monitored
	Dutch elm disease	Mass destruction of American elm trees; CFIA listed species; declared pest under *Agricultural Pests Act*	Monitored
	European elm scale	Reduced vigor of elm trees	Controlling
	Viburnum leaf beetle	Mass defoliation of high bush cranberry shrubs	Controlling

	Root weevil	Death of high bush cranberry shrubs	Controlling
	Fire blight	Branch death in fruit trees and some shrub species; Provincially listed species	Controlling
	Black knot	Reduced vigor or mortality of *Prunus* spp.	Controlling, but endemic
	Elm wilt (*Dothiorella* or *Plenodomus)*	Slow decline of elm trees, spreads vascularly	Controlling
	Tree wilt (*Verticillium* spp)	Reduced vigor or mortality of deciduous trees	Present
	Slime flux	Reduced vigor of elm and poplar trees	Present
	Cankers	Reduced vigor or mortality of mainly poplar and willow species	Present
	Oak gall wasp	Aesthetic impacts to oak trees	Present
	Spruce budworm	Loss of annual growth of spruce trees	Present
	Yellow-headed spruce sawfly	Defoliation of spruce trees	Present
	Banded elm bark beetle (BEBB)	Potential carrier of Dutch elm disease	Present & monitored
	European elm bark beetle (SEEBB)	Potential carrier of Dutch elm disease	Present & monitored
	Forest tent caterpillar	Mass defoliation of deciduous trees	Present (cyclical)

	Satin moth	Mass defoliation of deciduous trees, especially hybrid poplar	Present (cyclical)
	Ash cone leaf roller	Reduced vigor of ash trees	Present (cyclical)
	Ash bark beetle	Reduced vigor of ash trees	Present
	Dogwood sawfly	Mass defoliation of dogwood shrubs	Present
	Bronze leaf disease	Mortality of poplars, especially towering varieties	Present
	Tussock moth	Mass defoliation of deciduous trees/shrubs	Present
	Spiny elm caterpillar	Mass defoliation of elm trees	Present
	Ugly nest caterpillar	Reduced vigor and aesthetic impacts of deciduous trees	Present
	White pine terminal weevil	Loss of main leader in spruce and pine trees	Present
	Ash lilac moth	Aesthetic concern in deciduous trees (ash/lilac)	Present
	Sudden oak death	Mortality of elm trees; CFIA listed species	Emerging
	Oak blister rust	Aesthetic impacts to oak trees	Emerging
	Larch sawfly	Mass defoliation of larch trees	Unknown
	Poplar borer	Mortality and safety hazard concerns on aspen poplar and towering poplar trees	Monitoring

	Lecanium scale	Reduced vigor and aesthetic concerns on deciduous trees	Controlling
	Birch leaf miner	Aesthetic concerns on birch trees	Present
	Bronze birch borer	Reduced vigor on birch trees	Present
	Cooley's spruce gall adelgid	Aesthetic concerns on spruce trees	Present
	Ash plant bug	Nuisance	Present
	Fall webworm	Reduced vigor and aesthetic impacts of deciduous trees	Present
Weed	Himalayan balsam	Displaces native species; Prohibited Noxious	Controlling
	Flowering rush	Displaces native species, especially riparian/aquatic systems; Prohibited Noxious	Controlling
	Burdock	Displaces native species; Noxious	Controlling
	Creeping thistle	Displaces native species; Noxious	Controlling
	Garlic mustard	Displaces native species; Prohibited Noxious	Controlling
	Purple loosestrife	Displaces native species, especially riparian/aquatic systems; Prohibited Noxious	Controlling
	Common tansy	Displaces native species; Noxious	Controlling
	Leafy spurge	Displaces native species; Noxious	Controlling

	Toadflax	Displaces native species; Noxious	Controlling
	Scentless chamomile	Displaces native species; Noxious	Controlling
	Orange hawkweed	Displaces native species; Noxious	Controlling
	Oxeye daisy	Displaces native species; Noxious	Controlling
	Dame's rocket	Displaces native species; Noxious	Controlling
	Field scabious	Displaces native species; Noxious	Controlling
	Common mullein	Displaces native species; Noxious	Controlling
	Vetch	Displaces native species; Agronomic (not listed)	Controlling in select areas
	Birds' foot trefoil	Displaces native species; Agronomic (not listed)	Controlling in select areas
	White cockle	Displaces native species; Noxious	Present
	Kochia (tumbleweed)	Displaces native species; Agronomic (not listed)	Present
	Foxtail	Displaces native species; can cause animal health issues; Agronomic (not listed)	Present, some mechanical control
	Creeping bellflower	Displaces native species; Noxious	Present, relies on residential control
	Rat	Pest; *Alberta Agricultural Pest Act* listed	Monitoring
Vertebrates	Coyote	Nuisance; *Alberta Agricultural Pest Act* listed	Monitoring

	Fox	Not listed	Monitoring
	Feral pig/wild boar	Pest when at large; *Alberta Agricultural Pest Act* listed	Monitoring
	Deer/moose	Not listed	Monitoring
	Cougar	Safety concerns; Not listed	Monitoring
	Bats	Not listed; protected	Monitoring
	Deer & house mice	Nuisance; Alberta Agricultural Pest Act listed	Controlling
	Richardson ground squirrel	Nuisance; *Alberta Agricultural Pest Act* listed	Controlling
	Meadow vole	Nuisance*; Alberta Agricultural Pest Act* listed	Controlling
	Northern pocket gopher	Nuisance*; Alberta Agricultural Pest Act* listed	Controlling
	Magpie	Nuisance; *Alberta Agricultural Pest Act* listed	Controlling upon complaint
	Porcupine	Nuisance; Not listed	Controlling upon complaint
	Raccoon	Nuisance; Not listed	Controlling
	Skunk	Nuisance; *Alberta Agricultural Pest Act* listed	Controlling upon complaint
	Pigeons	Nuisance; *Alberta Agricultural Pest Act* listed	Controlling upon complaint

	Red squirrel	Nuisance; not listed	Present
	Crow	Nuisance; Not listed	Present
	Aphids	Nuisance	Monitoring
Insects	Mosquitos – *Culex pipiens*	Nuisance and health concerns	Monitoring
	Honey bees	Safety concerns	Monitoring
	Grasshoppers	Nuisance	Monitoring
	Ants	Nuisance	Controlling
	Wasps	Safety concerns	Controlling
Aquatics	Eurasian watermilfoil	Displaces native species in aquatic systems; Prohibited in *Fisheries (Alberta) Act*	Monitoring
	Curly leaf pondweed	Displaces native species in aquatic systems; Prohibited in *Fisheries (Alberta) Act*	Monitoring
	Goldfish and Koi	Displaces native species in aquatic systems; Of concern in *Fisheries (Alberta) Act*	Monitoring (last control in 2018)
	Prussian carp	Displaces native species in aquatic systems; prohibited in *Fisheries (Alberta) Act*	Monitoring
	Three-spine stickleback	Displaces native species in aquatic systems; listed in Federal *Fisheries Act*	Monitoring (last control prior to 2010)

	Quagga mussels	Displaces native species in aquatic systems; listed in Federal *Fisheries Act*	Monitoring
	Zebra mussels	Displaces native species in aquatic systems; listed in Federal *Fisheries Act*	Monitoring
	Spiny water flea	Displaces native species in aquatic systems; listed in Federal *Fisheries Act*	Monitoring
	Crayfish	Displaces native species in aquatic systems; Of concern in Fisheries (Alberta) Act (non-native to our region)	Present (in Lacombe Park Lake and Sturgeon River)
Fungi	Fairy ring	Reduced vigor of turf areas	Present
	Clubroot	Soil-borne pathogen affecting agricultural plants like canola, turnip, cabbage, broccoli and radish; listed in *Agricultural Pest Act* and Provincial Clubroot Management Plan.	Present

***Definitions:**

Monitoring: Active monitoring is taking place to ensure new appearances are found.

Present: Species already present in the community and is not subject to active control or monitoring unless specified.

Controlling: Species present, and under active control/management.

Emerging: A new species is emerging as a potential new invader.

Unknown: Not known if this species is present in the community.

APPENDIX B

CURRENT INTEGRATED PEST MANAGEMENT PROGRAMS

1. PLANT HEALTH CARE

1.1 General Vegetation Control Prescriptions and Strategies

This category includes all herbaceous monocot and dicot, annual, biennial and perennial species, as well as woody plants, in areas such as fence lines, parking lots, signs, lamp posts, hard surface areas and utility areas.

Levels of Vegetation Management

There are three levels of vegetation management:

- **Level 1:** Areas where no growth is desirable, such as paved surfaces and sidewalks.
- **Level 2:** Areas where low-growing or minimal vegetation is acceptable, such as along fence lines and lamp posts.
- **Level 3:** Planted areas where weeds occur among desirable plants, such as shrub beds and natural areas, parks and sports fields.

Facility Priority

There are three priority levels in the City of St. Albert:

- **High profile/premium level of service:** Includes areas such as entrance features, high profile/intensively managed facilities, high traffic areas such as City Hall, Servus Credit Union Place and downtown streets
- **Medium profile/high to moderate level of service:** (e.g., civic buildings, boulevards and medians, general park and playground areas/fence lines, parking lot perimeters, shrub beds)
- **Low profile/moderate to low level of service:** (e.g., utility areas, works yards, naturalized areas, trails and ditches)

Identification

Identification is essential because most treatments must be tailored to a particular species. Once a species causing a problem or potential problem is identified, information about its life cycle can be used to identify when suppressive measures will have the greatest effect, and what preventative measures would be most effective. Ensure weeds are correctly identified using reference materials or extension services.

Monitoring

Monitoring provides the information needed to decide whether treatments are necessary, the best timing of treatments, and if the treatments are working. Successful

management programs are based on regular inspection for the presence of unwanted plants.

Visual site inspections are necessary to assess and record conditions. The City Weed app records the following information:

- Date and location
- Type of vegetation
- Distribution and density of weeds present
- Reason for treatment, if required
- Presence of noxious/invasive weeds

Establishing Impact Assessment and Treatment Threshold Levels

How much infestation is tolerable depends on priority level and the consequences of leaving weeds untreated. Treatment action should be taken when weed levels exceed the predetermined threshold level.

When making decisions on management, various factors should be evaluated:

- **Safety and security**
  - Degree of trip/slip hazards presented by plants
  - Impairment of sight lines on roadways and parking lot exits
  - Concealment of signs, curbs, and light standards/luminaries by plants
  - Schools, daycares, playgrounds, proximity to residents on Pesticide Registry
  - **Aesthetics/site location**
  - Visibility and use patterns
  - Nature of area (rural, urban, or natural)
  - Adjacent areas that might be affected
  - Proximity to sensitive natural areas and open bodies of water
  - **Damage to structures**
  - Hard surfaces, such as sidewalks, tennis courts, or parking lots
  - Overgrown fence lines, signposts, or culverts
  - Building foundations
  - Fire hazards

Selection of Treatment Techniques

One or several treatments may be coordinated into a management program for a target pest or for the entire complex of weeds at a site. Substituting physical or cultural controls for chemicals is promoted wherever feasible to reduce impacts on the environment, if the nonchemical alternatives have lower potential environmental impacts. When pesticides are used, they should be applied as efficiently as possible, through careful timing and use of precise, accurate equipment. Pesticides should not be applied in riparian areas along the Sturgeon River without provincial approval.

Weeds should be removed or controlled before seed heads form. Preventative measures may include the following:

- Regular mowing and trimming of fence lines and site perimeters to help prevent perennial and brush weed species from becoming established
- Promotion of desirable plant material.
- Regular sweeping and cleaning of hard surface areas to prevent the buildup of organic material in cracks, which provides a growing medium for unwanted vegetation.
- Filling cleaned cracks and crevices with a sealant to remove potential germination sites on asphalt and concrete surfaces.
- Applying organic mulches in areas likely to be infested by persistent weed species (e.g., creeping thistle).
- Mass plantings to reduce the space, nutrients, and light available to weeds
- using landscape fabrics to prevent germination by blocking light from reaching the soil.
- Using root barriers to prevent encroachment from neighbouring areas.
- Using weed-free nursery stock and soil to prevent the importation of weed seeds to new planting areas.
- Identifying and mitigating potential problem areas during the design and landscape construction stages.

Physical and mechanical controls may include the following:

- Manual weeding.
- Trimming and mowing around fence lines and site perimeters (these operations should be timed to prevent seed head formation and maintain acceptable aesthetic levels).
- Pressure and steam washing and sweeping to remove organic material where weed seeds and/or moss may germinate.
- Cultivation and scraping of soils to reduce the ability of weeds to become established.

- Using chainsaws, brush saws, or heavy-duty mowers to control woody perennials (repetitive mowing or cutting of top growth of bushy weed species will deplete the energy reserves of the root).
- Complete removal, where feasible, of the roots or stump grinding for long-term control of plant species that sprout after cutting.
- Grazing by herd animals.

Chemical control measures may include the following:

- The least toxic effective herbicide should be used. Weeds should be spot treated in the active growing stage before seed head formation.
- Pre-emergent herbicides should be applied before weed seeds germinate, as these herbicides will not be effective on established plants.
- Post-emergent, selective herbicides can control annual, biennial, and perennial material while in an active growing stage before seed heads form.
- Post-emergent, non-selective herbicides may be appropriate for use as spot treatments on deep-rooted or rhizomatous perennial weeds on open ground, where there is no desirable vegetation present. Apply to actively growing weeds before seed heads form.
- Persistent chemicals can be used for long-term control.
- The most target specific application techniques available should be used where practical. This includes using backpack or handheld sprayers, low volume closed system applicators, and wipe on applicators. An alternative to spraying is to paint the stump of the plant with a systemic herbicide after cutting back stems.

Evaluation of Control Strategies

After treatments have been applied to vegetation, it is beneficial to determine the efficacy of the treatment. Records and site plans in the app should be used in addition to notes on the effectiveness of the treatment(s) employed. Examples of factors to evaluate include the rate of regrowth after mowing, and percentage of stems killed by herbicides, change in aerial extent, change in species composition, etc.

Frequency and timing of evaluation inspections will vary according to the different treatments employed and the priority of site(s) being managed. Maintain ongoing records of monitoring and evaluation inspections to determine the effectiveness of treatment methods and the need for retreatment.

1.2 Disease Control Prescriptions and Strategies

This category includes all horticultural beds, trees, shrubs, and turf areas, boulevards and medians, general park and playground areas, natural or naturalized areas, sidewalks and trails.

Level of Threat to Inventory

There are three levels of threat:

- **Serious**: City has zero tolerance to presence of pathogen (biotic) or environmental factors (abiotic) e.g., Dutch elm disease, sudden oak death. Notification to province required if listed.
- **Moderate**: City tolerates a small percentage of the inventory with the pathogen (biotic) or environmental factors (abiotic) e.g., black knot fungus, fire blight, *Cytospora*, sun scald.
- **Low**: City tolerates most of the inventory with the pathogen (biotic) or environmental factors (abiotic) e.g., *Nectria*, fairy rings

Each level is further subdivided into three priority areas:

- **Priority 1**: Highest level of service (e.g., horticultural gardens)
- **Priority 2**: High to moderate level of service (e.g., boulevards, medians, general park and playground areas; trees; annual and perennial borders)
- **Priority 3**: Moderate to low level of service (e.g., natural and naturalized areas, trails, native trees and other vegetation)

Identification

Identification of a disease-causing organism is essential because most treatments must be tailored to a particular species. In addition, alternate abiotic causes such as chemical or sun damage must be ruled out. Once a causative agent is identified, information about its life cycle can be used to identify when suppressive measures will have the greatest effect, and what preventative measures would be most effective. Categories of organisms or pathogens may include:

- fungi
- bacteria
- viruses and viroids
- mycoplasmas

Identification can be carried out by:

- Looking for signs of the disease, including spores, conks, fruiting bodies and others.
- Symptoms expressed by the plant including wilting, leaf spots and blights, root rot and cankers.
- Sending a sample to a diagnostic laboratory or by direct isolation and culturing for identification.

Given the turnaround time for diagnoses from professional laboratories, the recommended approach is to compare any diagnosis that has been done based on symptoms to the laboratory identification of the causal organism. Outside agencies (such as Plant Health Lab of the Alberta Government) and consultants may assist with identification when required.

Photographs and descriptions of disease symptoms that occur on various sites would assist in future identification.

Monitoring

Professionally trained arborists on staff perform regular and complaint driven inspections based on established best management practices from the International Society of Arboriculture or other recognized organizations (e.g. StopDED, Landscape Alberta, etc.).

Establishing Impact Assessment and Action Levels

How much damage is tolerable depends on what part of the plant is affected, the cost of treatment, the value of the plant, public safety or the aesthetic value that would be lost if not treated. Treatment action should be taken when disease levels exceed the predetermined threshold level.

Action levels should be developed, giving guidance on:

- Identify when no action needs to be taken.
- Define when preventative intervention is required.
- Define when suppressive action is required.

Selection of Treatment Techniques

One or several treatments should be coordinated into a management program for a target pest or for the entire complex of pests in a site. Substituting physical or cultural controls for chemicals is promoted wherever feasible to reduce impacts on the

environment. When pesticides are used, they should be applied as efficiently as possible, through use of best management practices.

Preventative/cultural measures may include the following:

- Ensure proper horticultural and arboricultural practices are adhered to.
- Prevent single species plantings, which are vulnerable to serious disease problems.
- Test new species that are adaptive to the local climate.
- Ensure planting follows guidelines set out in the City of St. Albert Engineering Standards.
- Use resistant or tolerant varieties; select native species that possess resistance factors to local disease and climate conditions.
- When selecting a plant site, select the right tree for the right place.
- Conduct species testing and variety selection. Internal inspection of our urban forest may yield unique healthy tree specimens that survive within our climatic and growing region.

Physical and mechanical controls include the following:

- Remove and destroy diseased tissue and overwintering stages of the disease organisms; isolate or remove diseased stock to avoid spreading diseases, such as *Pseudomonas, Verticillium, Armillaria*, etc.

Chemical controls may include the following:

- Use preferred fungicides and follow manufacturer's directions.
- Use spot treatments instead of general broadcast sprays whenever practical.

Evaluation of Control Strategies

Follow-up monitoring or inspections are necessary to find out how successful an IPM strategy has been. It is essential to review records to determine what worked, where improvements should be made and what preventative steps may be possible in future.

1.3 Trees and Ornamental - Insect Control Prescriptions and Strategies

Level of Threat to Inventory

There are three levels of threat:

- **Serious**: Zero tolerance to presence of insect (e.g., banded and European elm bark beetle, Asian longhorn beetle, emerald ash borer)
- **Moderate**: Will tolerate a small percentage of the inventory with the insect (e.g., western ash bark beetle, fruit lecanium scale, European elm scale, Viburnum beetle, forest tent caterpillar).
- **Low:** Will tolerate most of the inventory with the insect (e.g., aphid).

Each level is further subdivided into three additional service levels:

- **Trees**
  - **High priority trees -** Boulevard trees, medians, sign clearance, traffic clearance and any hazard trees
  - **Medium priority trees -** Buffer trees on roadways
  - **Low priority trees** – Trails and natural areas
- **Shrub Beds**
  - **Priority 1 –** Examples include: St. Albert Place, Downtown, Healing Garden
  - **Priority 2 –** Examples include: Fountain Park Recreation Centre, St. Albert Municipal Cemetery
  - **Priority 3 –** Examples include: neighborhood entrances and interiors, centre medians

Identification

Identification is essential because most treatments must be tailored to a particular species. Once a causative species is identified, information about its life cycle can be used to identify when suppressive measures will have the greatest effect, and what preventative measures would be most effective. Insects and other arthropods can be grouped into three general classes:

- Sucking arthropods - aphids, scale, mites, mealy bugs, etc.
- Root/crown feeding insects – weevils, etc.
- Leaf-chewing and mining insects - leaf miners, caterpillars, etc.

Monitoring

Monitoring provides the information needed to decide whether treatments are necessary, the best timing of treatments, and how the treatments are working. Most monitoring programs are based on regular inspection for pests, pest damage or signs of their presence.

Examples of specific monitoring methods may include the following:

- Visual inspections for small insects, mites and characteristic damage
- Pheromone traps for elm bark beetles and emerald ash borer
- Annual visual inspections of elm trees (July-August)

Establishing Impact Assessment and Action Levels

How much damage is tolerable depends on what part of the plant is affected, the cost of treatment, the value of the plant, public safety or the aesthetic value that would be lost if not treated. Treatment action should be taken when pest levels exceed the predetermined threshold level.

Action levels should be developed, giving guidance on:

- Identify when no action needs to be taken.
- Define when preventative intervention is required.
- Define when suppressive action is required.

Selection of Treatment Techniques

Single or multiple treatments may be coordinated into a management program for a target pest or for the entire complex of pests in a site. Substituting physical or cultural controls for chemicals is promoted wherever feasible to conserve native beneficial species and reduce impacts on the environment. When pesticides are used, they should be applied as efficiently as possible, through careful timing and accurate, precise equipment. Criteria for selection of treatment technique will also include choosing the least toxic yet effective product for the application.

Preventative/cultural measures may include the following:

- Ensure proper horticultural and arboricultural practices are adhered to.
- Prevent single species plantings, which are vulnerable to serious disease problems.
- Test new species that are adaptive to the local climate.
- Ensure planting follows guidelines set out in the City of St. Albert Engineering Standards.
- Use resistant or tolerant varieties; select native species that possess resistance factors to local disease and climate conditions.
- When selecting a plant site, select the right tree for the right place.

- Conduct species testing and variety selection. Internal inspection of our urban forest may yield unique healthy tree specimens that survive within our climatic and growing region.
- Elm trees may only be pruned from October to March, as per the Dutch Elm Disease Bylaw (Bylaw 5/98). Pruning during other times of the year increases the attractiveness of the elm to the elm bark beetle.
- Avoid using fast acting, high nitrogen fertilizers that promote succulent, insect susceptible plants.
- Investigate whether salinity damage may be a result of overfertilization instead of road salt.

Physical and mechanical controls include the following:

- Remove and destroy diseased tissue and overwintering stages of the disease organisms; isolate or remove diseased stock to avoid spreading diseases, such as *Pseudomonas, Verticillium, Armillaria*, etc.
- Remove infested, dead, and fallen twigs, leaves, and fruit from base of trees and shrubs, especially where soilborne or root/crown feeding insects have been a problem.
- Sticky barriers on tree trunks.
- Water sprays in appropriate situations.

Chemical controls may include the following:

- Use preferred fungicides and follow manufacturer's directions.
- Use spot treatments instead of general broadcast sprays whenever practical.
- Insecticide options include the following:

Insecticide	Target Species	Comments
Growth regulators	Aphids and whiteflies	
Insecticidal soaps	Chewing/sucking insects, wasps and mites	Good for spot treatment
Pyrethrins and pyrethroids	Wasps, hornets and ants	Low toxicity to mammals; may delay establishment of beneficial arthropods
Mineral Oils	Scales, mites, aphid eggs, moth eggs	For use on outside of growing season
Treeazin (botanicals)	Elm scale	Injection only

Other insecticides may be considered. Preferred application methods include spot treatments, injections and tree trunk implants rather than broadcast spraying.

Evaluation of Control Strategies

Follow-up monitoring or inspections are necessary to find out how successful an IPM strategy has been. It is essential to review records to determine what worked, where improvements should be made and what preventative steps may be possible in future.

1.4 Turf Weed Control Prescriptions and Strategies

This category includes all sports fields, City building turf areas, general park areas, boulevards, picnic areas and rough grass areas (no mow zones).

Turf Priorities and Maintenance Schedule

Mowing priority is given to areas such as City Hall, entrances to the city, St. Albert Trail, river valley (Kingswood to BLESS platform), Maloney Place, and the St. Albert Muncipal Cemetery. These areas are usually cut once every week. Additional areas are mowed and other maintenance activities performed on the following schedule:

Area or activity	**Cycle**
Sports fields mowing (Priority 1)	Five working day cycle
Boulevard mowing	Ten working day cycle
Other parks - mowing	Ten day working cycle
Rural roads mowing	Minimum twice per year
Fertilization	If required, once per year
Aeration	Passive and non-passive spaces up to twice per year
Trimming	Up to three times per year

Identification

Identification is essential because most treatments must be tailored to a particular species. Once a causative species is identified, information about its life cycle can be used to identify when suppressive measures will have the greatest effect and what preventative measures would be most effective.

Monitoring

Monitoring provides the information needed to decide whether treatments are necessary, the best timing of treatments and how the treatments are working. Successful turf management programs are based on regular inspections and counts to determine the proportion of weed cover in the turf.

Presence of prohibited noxious or invasive weeds present should be noted for legislative compliance. Safety issues due to invasive weeds in sport fields shall be noted for treatment.

Compaction tests are done on an as-needed basis, depending on sport field use and potential risk of injury to athletes. Visual inspections for soil moisture are also completed.

Establishing Impact Assessment and Action Levels

Compliance with the *Weed Act* drives action levels; prohibited noxious weeds must be eradicated, noxious weeds must be controlled. On sports fields, safety considerations may influence the action levels.

Selection of Treatment Techniques

One or several treatments may be coordinated into a management program for a target weed or for the entire complex of weeds in a site or facility. Substituting physical or cultural controls for chemicals are promoted wherever feasible to reduce impacts on the environment. When pesticides are used, they should be applied as efficiently as possible, through careful timing and appropriate equipment.

For annual weeds, control should focus on preventing seed spread and germination of dormant seeds already in the soil or migrating in from adjacent areas.

For perennial weeds, top growth of established stands of perennials should be controlled before blossoming, when root nutrient reserves are at their lowest and the plant is least capable of regenerating new top growth. Roots must also be destroyed to achieve effective control if eradication is desired.

Preventative/cultural measures are as follows:

- When weed populations exceed tolerance levels, it is usually because competing turf grasses have been thinned out by stress, leaving openings to be colonized by weeds. Prevention is the cornerstone of a successful IPM plan and includes ensuring proper turf management practices are adhered to, such as proper soil management, nutrient, over seeding, and watering programs. When weed populations become consistently too high and require routine control, re-evaluate the management program for the site to determine how to improve turf health and prevent the problem in the future.
- Ensure that seed type selected is suitable for local climatic conditions. Select the best seed available that is appropriate to functional use. Examples include shade tolerant fescue species for general park use in shady areas.
- Keep thatch to a minimum through periodic removal by sweeping if growth is heavy.
- Provide for regular aeration to reduce soil compaction; frequency depends on the type of turf and usage. Use deep tine aerating to a depth of 8 to10 inches.
- Avoid compaction from overuse. Rotate fields for compaction rehabilitation.
- Promptly repair worn or damaged areas by overseeding, reseeding or resodding.
- Select and apply fertilizers appropriate to turf grass nutritional requirements.
- Avoid overuse of sports field surfaces through implementation of a field closure policy during inclement weather. Limit play on sensitive or stressed sports field surfaces whenever possible.
- Sports field grass cultivars should have the following desirable characteristics: disease resistant, ability to withstand cutting heights of 2.5 inches, high wear tolerance, rapid healing abilities from aggressive rhizomes, drought resistance, and good colour.
- Avoid planting a single grass cultivar since a monoculture lacks the genetic variation required for successful disease resistance.
- Clean equipment that has been contaminated by weeds and pests before moving to the next site if in natural areas or areas infested with fairy rings.

Physical and mechanical controls include the following:

- Keep mowing height as high as possible for turf species and usage. Most turf grass species in recreational and athletic areas can be mowed at a height of 6 cm (2.5 inches) without sacrificing vigour or usability.
- Mowing height and frequency should be adjusted to seasonal variations and grass growth or use patterns (e.g., baseball infields often require more frequent

cutting and shorter turf than outfields). Time mowing to remove seed heads of weeds to prevent spreading.
- Hand-pull small populations of weeds before seed production.

Chemical controls include the following:

- Select chemicals that are registered for turf and rated for the weed to be controlled.
    - Follow label directions.
- Be cautious of ornamental trees that are within the turf areas so as not to adversely affect them.
    - Keep herbicides away from fences bordering private property.
    - Use appropriate signage before applying herbicides and notify the turf maintenance Team Lead for the area. Sports fields may require booking timeslots for maintenance.
    - Select proper time of application to maximize effects to target species and minimize effects of spray on other species.

Evaluation of Control Strategies

Follow-up monitoring and inspection is necessary to find out how successful an IPM strategy has been. It is essential to review records to determine what worked, where improvements should be made, and what preventative steps may be possible in future. Frequency of evaluations should be determined by facility priority.

Evaluation of weed control effectiveness should be continuous. Ongoing weed mapping followed by suitable treatment strategies is the most effective method.

APPENDIX C

AQUATIC INVASIVE SPECIES

1. AQUATIC INVASIVE SPECIES (AIS)

1.1 Aquatic Vegetation

This category includes the Sturgeon River, Carrot Creek and stormwater management facilities.

Aquatic vegetation can be grouped into four types:

- submerged aquatic vegetation
- emergent aquatic vegetation
- floating aquatic vegetation
- algae

Identification and Monitoring

Identification or monitoring will be carried out for aquatic plants in stormwater management facilities, and the Sturgeon River and Carrot Creek within City boundaries. Non-toxic algae, natural aquatic vegetation and aesthetic factors will not be considered as part of the IPM plan.

Comprehensive vegetation surveys should be completed on a three to five-year basis.

Establishing Impact Assessment and Action Levels

In stormwater management facilities, vegetation must be kept from restricting water flow at the inflow and outflow structures.

Aquatic vegetation and leaf litter should be managed in Lacombe Park Lake to prevent the increase of nutrient levels and subsequent growth of blue green algae (cyanobacteria).

Invasive plants, such as Eurasian milfoil, must be sampled for verified identification by provincial AIS specialists. Genetic testing may be required, and removal will be guided by provincial advice and permitting.

Selection of Treatment Techniques

Treatments may be co-ordinated into a management program for a target invasive species or for the entire complex of species in a site or facility. The environmental impacts of all methods used in aquatic environments must be evaluated. Proper special use approvals must be in place with the provincial and federal governments for any aquatic application.

Preventative/cultural measures include the following:

- Numerous methods can minimize nutrient inputs and reduce pesticide requirements:

- **Minimizing nutrient inputs** - education programs to inform homeowners how to reduce nutrients, pesticides, sediment and seeds released into the stormwater system and Sturgeon River. Removal of excessive leaf litter and submerged vegetation growth (in built facilities only and in the absence of fish) can be used in stormwater management facilities to reduce nutrient inputs.
- **Filtration** - design and maintain stormwater management facilities to include native riparian and emergent vegetation to trap sediments and remove organic contaminants.

Physical and mechanical controls include mechanical removal of aquatic vegetation in stormwater management facilities only. Removal in the Sturgeon River or Carrot Creek requires licences/approvals from the Government of Alberta and the federal government and is generally not allowed due to potential negative impacts to fish populations and habitat.

Chemical controls selected must be effective and registered for the specific plant type. Ensure the use of that product is registered for aquatic habitats and approved for use by the Alberta and federal Governments.

Evaluation of Control Strategies

Follow-up monitoring and inspection is necessary to find out how successful an IPM strategy has been. Continual communications with Aquatic Invasive Species Specialists with the Government of Alberta is crucial to the success of any aquatic invasive control strategies.

1.2 Mussels and Invasive Fish

This category includes the Sturgeon River, Carrot Creek and stormwater management facilities.

Invasive goldfish species have been present in St. Albert stormwater management facilities and were subject to chemical control measures.

The two AIS of greatest economic concern are currently:

- quagga mussel
- zebra mussel

Identification and Monitoring

Monitoring in the Sturgeon River, Carrot Creek and City facilities is done on an annual basis using visual inspections. Comprehensive surveys in stormwater management facilities should be done on a three-to-five-year basis.

The Alberta Invasive Species Early Detection Rapid Response Plan should be used as a reference when considering monitoring, identification, risk assessment, management and reassessment of invasive species infestations.

Establishing Impact Assessment and Action Levels

Any aquatic invasive species found in City bodies of water and watercourses will be immediately reported to provincial authorities (1-855-336-BOAT).

Selection of Treatment Techniques

Prevention is the cornerstone of a successful IPM plan and will prevent aquatic invasive species from establishing in water bodies and watercourses. Public education and using the clean, drain, dry principles will be critical for prevention of AIS establishment.

Invasive Fish Removal Procedure

Purpose

The purpose of this fish removal procedure is to assist with the planning and implementation of rotenone treatments for the eradication of invasive fish species. This document references the Alberta Government Rotenone Standard Operating Procedures (SOP) Manual, Federal and Provincial Legislation, and previous Alberta Government and municipal experience in planning and implementation of a fish toxicant treatment.

Implementation

Public Notification

As most bodies of water (including stormwater management facilities) are in areas where there is public access, public notification is a part of the planning when conducting an invasive fish eradication.

Water Quality Sampling and Rotenone Efficiency

Certain water quality conditions can inhibit uptake and therefore efficacy of the rotenone treatment. Prior to rotenone application, baseline surface water quality grab samples should be taken at least a week in advance from the area(s) to be treated and analyzed in an accredited lab.

Drawdown of water levels should be considered in stormwater management facilities to improve success rates.

Signage/Fencing
As with any pesticide used by the City, it is prudent to keep all non-authorized persons and pets away from the mixing site. This is usually accomplished through installing a fence surrounding the water, although depending on the location, other methods (e.g., blocking vehicle access and putting a barrier on the pedestrian traffic) may suffice to limit access to the water body.

Disposal of Fish Carcasses
Carcasses should be removed as soon as possible and handled with gloved hands. Typically, rotenone effects start within 1 hour of application but may take up to 1 week to affect larger fish, so removal efforts will have to take place for up to 10 days. Wading into stormwater management facilities should be avoided due to the presence of very deep, sticky sediments. Netting can be done from the boat in deeper areas of the facility. Carcasses should be disposed of at an approved facility.

Application Concentration Calculations
Apply this product only as specified on this label. Calculations of water volume in pond must be verified to current existing water levels on application day.

Application Procedure
Application is to be made by boat wherever possible. Application of product by backpack should be limited to areas along the shoreline not treatable by other methods. When applying by boat, product must be released below the water's surface. Avoid contamination downstream of the treatment area, through release of rotenone-treated water, during or after treatment.

Drip Cans
Drip cans should be placed in the stormwater management facility inflow and outflow pipes to prevent upstream or downstream travel of fish. Product must be released below the water's surface.

Retention Times

Warm Weather

In warm weather (June-September), rotenone will have a half life[1] of three to five days, depending on climate conditions. How long the water will need to be retained depends on the application concentration of the rotenone; at minimum, it should be held for 2 weeks. For effective goldfish kill, an application concentration of 4 per cent rotenone is recommended. For the water to be safely released, the rotenone concentration must be between 0.05 and 0.025 ppm.

Before release, it is recommended to have the water tested at an accredited laboratory.

Cold Weather

Application past mid-October is not recommended due to the increase in half life; later in the year, the rotenone will have a half life of five to seven days. At minimum, the water should be held for four to five weeks before release in fall. Application under ice is not approved.

Post Treatment Monitoring

After treatment is completed, follow up monitoring should be done to ensure successful eradication. This can be accomplished through seine netting of the facility (recommended) or setting minnow traps (this has limited success). Both methods require a Fish Research Licence from the Alberta government.

Alternatively, an underwater camera or fish finder could be used. While monitoring stormwater facilities, it would be prudent to send a camera into the stormwater underground pipe system to confirm presence or absence in the catch basins.

[1] *Half Life – The time required for the concentration of rotenone to decrease by half.*

APPENDIX D

HUMAN WILDLIFE CONFLICT MANAGEMENT

HUMAN-WILDLIFE CONFLICT MANAGEMENT

Urban wildlife is part of life in St. Albert, with over 500 hectares of parks and natural areas within our city boundaries, Lois Hole Centennial Provincial Park on the west and Riverlot 56 Natural Area on the east. The City recognizes that wildlife provide many ecological and social benefits, but we also need to understand and be prepared for potential human-wildlife conflicts that may occur in our urban environment. For this plan, urban wildlife does not include domesticated animals.

The guidelines are meant to outline measures to prevent and manage human-wildlife conflicts while ensuring the conservation of biodiversity in the natural environment. While the guidelines do not encompass all the wildlife species that may be encountered within St. Albert, it focuses on the more common human-wildlife conflicts. The guiding principles of the wildlife management include the following:

- recognize that wildlife has intrinsic ecological, economic, social and cultural value
- response to human-wildlife conflicts must be ecologically sound and based on scientific and technical knowledge
- outreach and education are important tools for minimizing human wildlife conflicts

Wildlife Monitoring

Residents reporting small mammal or bird concerns should call Public Operations.

Residents reporting no-contact coyote sightings/interactions should call Municipal Enforcement.

Residents reporting moose, deer, bear, cougar, wolverine, badger or coyote-human interactions resulting in injury should call Municipal Enforcement, RCMP or Fish and Wildlife.

Wildlife sightings can be reported on the City's website using the wildlife reporting interactive map *(expected early 2026)*.

Management Guidelines

All wildlife fall under the ownership of the Crown. However, under the Provincial Wildlife Regulation, a Damage Control License (DCL) is not required in the following circumstances:

- *A person employed by a municipality under contract of services and whose duties include the control of animals that cause problems may hunt beaver, coyote, red fox, badger, red squirrel and muskrat within the boundaries of a*

city, town, village or summer village if the hunting is performed in the course and falls within the scope of that employment (Wildlife Regulation 143/97 Schedule 1(13)). This authorization includes the use of traps.

- *If the animal causing the damage is classified as a non-licence animal, you do not need a licence to remove it from your property; however, you should contact a Fish and Wildlife officer for advice on the legal methods that can be used.*

The City will perform management of problem wildlife on public lands only. Any problem wildlife on private property remains the responsibility of the property owner and a pest control specialist.

Birds

Crows, starlings, pigeons, magpies and Canada geese may create problems in various situations, both on city lands and private property. Magpies and pigeons are the only species that are currently subject to possible control methods on a complaint basis in the City.

Magpies

Magpies can create problems and can be trapped if they become a nuisance, making them slightly easier to manage than crows. They feed on food scraps, carrion, pet food and young songbirds.

If a magpie problem exists on public property, trained Public Operations staff will assess the degree of the problem and take appropriate steps to manage the situation. These actions may include the following:

- Trapping the birds using a government approved trap and euthanizing them.
- Contracting the services of professional wildlife specialists to safely employ management techniques, with appropriate provincial permits if required.

When magpies are a problem on private property, it is the homeowner's responsibility to address the problem through personal actions or through the services of a professional pest control specialist. Trapping the birds using a government approved trap and euthanizing them is one option available to residents.

Mammals

Small Mammals

Small mammals, including skunks, rabbits, hares, Richardson's ground squirrels, mice, voles, red squirrels, northern pocket gophers and porcupines can be an urban problem, particularly those seeking den sites under concrete stairs and garden sheds in residential areas. The City will provide advice on discouraging habitation around residential property.

The City will trap on public land if necessary. Ground squirrels and gophers will be controlled on public lands by trained Public Operations staff using various methods appropriate to the circumstances. Control methods may vary from simply filling in surface holes, to trapping or eradicating the animals if there is no risk to the public or pets. Sulfur bombs may also be used for control.

Porcupines may occasionally be a problem in the City's parks, natural areas, and private properties. Damage to trees and shrubs may occur, as porcupines feed on young branches and shoots, or remove the bark from older vegetation. Porcupines may be live-trapped and relocated away by trained Public Operations staff when they are found in public parks or green spaces.

Upon receiving a report of a sick or aggressive small mammal on public land, trained Public Operations staff will attempt to observe the affected animal. If it is confirmed that the animal poses a health threat to the public, the City may retain the services of a professional wildlife management specialist. It will be up to the specialist to determine the most effective method of removing the affected animal from the situation.

When small mammals are a problem on private property, it is the homeowner's responsibility to address the problem through personal actions or through the services of a professional pest control specialist. Trapping the mammals using a government approved trap and euthanizing them is one option available to residents.

Fox, Badgers and Wolverines

These native animals can be found in the St. Albert area but are not frequently sighted. They play a natural and beneficial role in the food chain by feeding on small mammals.

The City will not trap, hunt, or interfere with these animals unless they are sick (i.e., rabid) or come into direct contact with humans. The City of St Albert tracks the sightings and calls as part of our Integrated Pest Management Response.

Upon receiving a report of a sick, injured, or aggressive animal, trained municipal enforcement officers will attempt to observe the affected animal. If it is confirmed that the animal poses a safety hazard to the public, the City will retain the services of a professional wildlife management specialist and/or provincial wildlife officers. It will be up to the specialist to determine the most effective method of removing the affected animal from the threatening situation.

The City will maintain records of the encounters and evaluate management options as needed.

If an animal is not found to be sick, injured, or has not injured a human, the City will not take any action that would interfere with the animal or its habitat (including den sites).

Cougars, Wolves and Bears

Cougars, wolves and bears are occasionally seen moving through the City, usually in the river valley or other natural areas. They are typically reclusive and avoid human contact. City staff are not authorized to control or relocate these animals. Sightings should be reported directly to Alberta Fish and Wildlife using the report-a-poacher hotline, 1-800-642-3800.

Deer and Moose

Periodic visitations by deer and moose within the City limits will be monitored by trained Municipal Enforcement officers/Public Operations staff. Actions to manage the behaviour of these animals will be undertaken only if the animals are sick, injured, represent a danger to public safety, or pose a hazard to traffic.

City staff may advise Municipal Enforcement, Alberta Fish and Wildlife and/or the RCMP when a large wildlife animal complaint is received. Depending on the circumstances and the risk to the safety of the public, appropriate co-ordination and action may take place. The City will assist law enforcement officials as necessary in dealing with this type of concern. This includes attempting to guide the animal out of the City and back into a rural area. Decisions to tranquilize and transport wildlife or euthanize injured wildlife will remain with the RCMP and Fish and Wildlife officers.

Wild Boar

Wild boar are a more recent invasive threat to Alberta. As of December 1, 2025, they are now considered a pest in all circumstances, not just when at large, and are a threat due to their destructive behaviour on agricultural crops, pastures, and the natural environment. They can also carry a variety of diseases that can be transmitted to wildlife, domestic animals and people. Sightings should be reported directly to Alberta

Agriculture and Irrigation through their Report a Sighting form, as well as the City for further investigation.

Raccoon

Raccoon have not traditionally been found as part of the native ecosystem but have been steadily moving northward and are now present in the City in small numbers. They are very adaptable to the urban environment and can impact native small mammals as well as cause destruction through the spreading of garbage, getting into structures and potentially carrying disease. Sightings should be reported directly to the City for management.

APPENDIX E

COYOTE MANAGEMENT AND COEXISTENCE GUIDELINES

Coyote Management and Coexistence Plan

Coyotes are native wildlife within our ecosystem. The Coyote Management and Coexistence Plan provides a program for reducing human-coyote conflicts while prioritizing human safety. It is based on successful management programs in North American municipalities and is guided by the following basic principles:

- Human safety is a priority in managing human-coyote interactions.
- Coyotes serve an important role in ecosystems by helping to control the population of rodents, rabbits and other urban mammals.
- Solutions for coyote conflicts must address both problematic coyote behaviors (such as aggression towards people and attacks on pets) and the problematic human behaviors (intentionally or unintentionally feeding coyotes and letting pets outside unattended) that contribute to conflicts.
- Non-selective coyote removal programs are ineffective for reducing coyote population sizes or preventing human-coyote conflicts.
- A community-wide education program necessary for achieving coexistence among people, coyotes and pets.

Human-Coyote Conflict Definitions

The following definitions will be used for the process of categorizing human-coyote conflicts:

COEXISTENCE: Humans and coyotes exist together. Humans take an active role in helping coyotes in their community stay wild by removing attractants, taking responsibility for pet safety, hazing coyotes in their neighborhood and learning about coyote ecology and behavior.

OBSERVATION: The act of noticing signs of a coyote, such as tracks, scat or vocalizations, but without visual observation of the coyote.

SIGHTING: A visual observation of a coyote. A sighting may occur at any time of the day or night.

ENCOUNTER: A direct meeting that is between human and coyote with no physical contact and that is without incident.

INCIDENT: A conflict between a human and a coyote where the coyote exhibits any of the following behaviors: growling, baring teeth, lunging or making physical contact with the person. A human is not bitten.

HUMAN ATTACK: A human is bitten by a coyote.

Provoked: An attack where the involved human encourages the coyote to engage. Examples include a human hand-feeding a coyote, approaching a coyote with pups or intervening in a coyote attack on a pet.

Unprovoked: An attack where the involved human does not encourage the coyote to engage.

The following definitions will also be used for the process of categorizing conflicts among coyotes, pets and livestock:

PET ATTACK: Coyote kills or injures a domestic pet.

Attended: Pet is on a leash less than six feet in length or is in the presence of a person less than six feet away.

Unattended: Pet is free-roaming, walking off-leash more than six feet from a person, or on a leash longer than six feet.

BACKYARD BEES AND HENS OR LIVESTOCK LOSS/DEPREDATION: Coyote kills or injures livestock.

Management Considerations

The City will not trap, hunt or interfere with coyotes unless they are sick (i.e. rabid) or come into direct contact with humans. The City of St Albert tracks the sightings and calls as part of our Integrated Pest Management Response.

Upon receiving a report of a sick, injured or aggressive coyote, trained municipal enforcement officers will attempt to observe the affected animal. If it is confirmed that the animal poses a safety hazard to the public, the City will retain the services of a professional wildlife management specialist and/or provincial wildlife officers. It will be up to the specialist to determine the most effective method of removing the affected animal from the threatening situation.

The City will maintain records of the encounters and evaluate management options as needed.

If a coyote is not found to be sick, injured, or has not injured a human, the City will not take any action that would interfere with the animal or its habitat (including den sites).

Signage Use and Thresholds

The City may deploy signage under limited circumstances. Warning signs may be placed if the following conditions occur:

1. City staff have visually observed heightened aggressive behaviour
    - Significant number of calls/reports in one area balanced with the severity of interactions
2. Conditions at time of interaction – daytime interactions are more problematic
    - Type of behaviour seen – snarling, stalking, lunging, or other protective behaviours indicates more aggressive behaviour

Other Tools

Education tools will be the primary mode of minimizing negative interactions with coyotes. This may include social media posts, targeting advertising in local newspapers, public service announcements in denning season, wildlife tracking app and MES issue reporting app.

Hazing: An Intervention Technique

Generally, coyotes are reclusive animals who avoid human contact. Coyotes in urban and suburban environments, however, may learn that neighborhoods provide easy sources of human-associated food while presenting few real threats. These coyotes, having lost their fear of humans, may visit yards and public areas even when people are present, and may cause conflicts with people and pets. Humans have contributed to this habituation of coyotes by not reacting when they see a coyote. To coexist safely, it is important to modify this behavior and attitude in resident coyote populations.

The City may consider a hazing program as a tool to help coyote management.

Hazing is an activity or series of activities that is conducted to change behaviors of habituated coyotes and/or to instill a healthy fear of people in the local coyote population. Hazing techniques include generating loud noises, spraying water, shining bright lights, throwing objects, shouting, etc. Hazing, if done consistently, can help maintain a coyote's fear of humans and deter them from neighborhood spaces such as backyards, greenbelts and play spaces.

A hazing program encourages the use of harassing actions without employing weapons or causing bodily harm to the coyote. The more often an individual animal is hazed, the more effective hazing is in changing coyote behavior. Being highly intelligent animals, coyotes who are hazed quickly learn to avoid neighborhoods, people and pets.

The goals of hazing are to:

- Reverse the habituation of coyotes to people, teaching them to fear and avoid humans.
- Discourage coyotes from entering public areas such as parks, playgrounds and yards when people are present.

- Discourage coyotes from approaching people and pets.
- Empower residents by giving them tools to use when they encounter a coyote, thereby reducing their fear of coyotes.
- Increase awareness about coyote behavior among residents and involve the community in coyote management efforts.

Lethal Control

Removal programs are not effective in reducing coyote populations in the long term or addressing the root causes of conflicts. Coyote removal programs are costly and controversial among the public.

Research has shown that when lethally controlled, coyotes exhibit a “rebound effect” (a surge in their reproductive rates), allowing for quick regeneration of their population numbers. The disruption of their family group structure leads to an increase in the number of females breeding in the population, and the increase in available resources leads to larger litter sizes, earlier breeding ages among females and higher survival rates among pups. For these reasons, lethal programs are not effective at reducing coyote populations, and non-selective coyote trapping programs are not effective at solving conflicts.

Coyotes removed from an area will be quickly replaced by transient coyotes looking for a vacant home range. If the root causes of human-coyote conflicts have not been addressed, incoming coyotes may quickly become nuisance coyotes.

Lethal responses (coyote removal) would be considered only in the event of an unprovoked, confirmed attack on a human, or if the animal is injured or diseased. This decision would be made in conjunction with Fish and Wildlife or through use of a private contractor. If implemented, lethal control efforts should focus on the offending coyote(s) only, rather than the coyote population at large. The City would consider lethal control as only one of a suite of management interventions (e.g., removal of attractants, hazing, etc.) that involve an array of humane and non-lethal measures.

APPENDIX F

BEAVER MANAGEMENT AND COEXISTENCE GUIDELINES

Beaver Management and Coexistence

Beaver are native wildlife within our ecosystem. The City originally developed Beaver Management Guidelines in 2006 with the input of residents and the City's Environmental Advisory Committee. The guidelines outlined the City's approach to dealing with beavers, using both preventative and active management techniques. The beaver management guidelines are in line with the City's environmental policy that reflects a balanced approach to coexist with beavers while addressing flooding control, infrastructure integrity, native tree and shrub assets, and public safety on City owned lands.

Since 2006, further research into beaver coexistence has been completed by organizations such as Cows and Fish (Riparian Lake Management Society) and the Miistakis Institute, so the City is now moving to adopt the *Working With Beavers Best Management Practices Guide*. In addition, *Mitigating Human-Beaver Conflicts through Adaptive Management*, developed in 2015 for Beaver County by Dr. Glynnis Hood and the University of Alberta, may also be considered when exploring beaver management options.

The original 2006 Beaver Management Guidelines were developed specifically for the reach of the Sturgeon River that runs through St. Albert. This reach is predominantly surrounded by the Red Willow Park trail system and residential and industrial developments. The areas of Carrot Creek acquired by the City since 2007 are surrounded predominantly by agricultural development, rural residents, and some oil and gas activities. Access along Carrot Creek is also very restricted, except where there are road crossings, and the issues with beavers are more related to flooding of buildings, roads, and agricultural lands. The City will follow the same management processes on Carrot Creek as are followed along the Sturgeon River, with the knowledge that concerns from rural residents may differ from those received from urban residents.

The City's management considerations are outlined in the *Managing Beavers at the Urban and Rural Interface in the City of St. Albert* case study document, as well as below.

Management Considerations

Trained Public Operations staff will record any beaver activity during the open water period of the year as part of their regular inspection procedures (minimally in June and late August/early September). The following information may be collected:

- population estimate based on number of lodges and/or visual sightings

- dam locations and sizes
- effect of impounded water (if any)
- bank stability (in the case of bank beavers)
- immediate areas of feeding
- types and numbers of trees being removed

City staff will assess any potential impact to public property using the collection of data as outlined above. Unacceptable beaver activity will be reported and determination of action will be decided upon by relevant City departments.

Unacceptable beaver activity *may* include the following:

- Cutting trees managed by the City that are 6 cm or greater in diameter at breast height (DBH), have special value or may cause a safety concern.
- Tunnelling under walking trails.
- Destabilizing slope or any activity that undermines the riverbank.
- Tunnelling under areas in which mower operators drive in groomed park areas.
- Interfering with culverts or infrastructure that could cause flooding of private or public buildings or agricultural lands.
- Flooding issues that may occur in the event of a large runoff.
- Activity in high use public areas that may put the beaver or public at risk.

If active management is deemed necessary, the management of beavers will initially be carried out through a non-invasive approach, following all applicable provincial and federal guidelines, such as the following:

- Protecting trees with ecological or aesthetic value in areas of feeding through wire skirts, enclosures, or river edge beaver fencing. Other trees and shrubs, where there are large quantities with advanced regenerative capability, should be left unprotected for the use of beaver.
- Dismantling of beaver structures through methods least destructive to the environment.
- Removing debris.
- Other non-invasive deterrents that do not harm the beaver, such as pond levelers and Beaver Deceivers.

If non-invasive management techniques are not possible or are ineffective, the City may consider retaining a licensed professional to live-trap and relocate the beaver following all provincial and federal regulations. Some considerations when relocating beaver are:

- Relocation should occur when beavers will have adequate time to recolonize (typically between May and August).
- Attempt to move beavers within the watershed and/or a minimum distance of 10 to 15 km.
- The relocation destination should be predetermined, and proper permission obtained.
- Move beavers only to areas where there is a high probability of beaver survival once relocated, and where no other resident beaver populations are present.
- Once beavers have been relocated, prevention and exclusion techniques should be implemented at the site to prevent the area from being recolonized by another beaver.
- If applicable, those same prevention and exclusion techniques can be recommended to residents to help prevent the area from being recolonized by another beaver (e.g., wire skirts, exclosures or creek-edge beaver fencing to protect trees with special value).

Destroying beavers will be considered after all other management tools have been exhausted or when an emergency has arisen. Once the beavers are euthanized, prevention and exclusion techniques will be implemented to help prevent the area from being recolonized by another beaver.

Unacceptable beaver activity will lead directly to livetrapping and/or destroying in the following artificial water bodies: Lacombe Park Lake, Garden Pond and any stormwater management facilities.

Beaver Management Guidelines – Decision Tree