

2021

LANDSCAPE AND LAWN CARE SERVICE LICENSEE COMPLIANCE AUDIT

INTEGRATED PEST MANAGEMENT ACT



Ministry of
Environment and
Climate Change Strategy

Executive Summary

Beginning in March 2021, the Ministry of Environment and Climate Change Strategy's Compliance Team conducted an audit of landscape and lawn care service licensees to verify compliance under the *Integrated Pest Management Act* (IPMA or Act) and Integrated Pest Management Act Regulation (IPMR, or Regulation). The main purpose of this audit was to obtain a compliance snapshot of landscape licensees that use pesticides, and to identify areas of non-compliance that need to be addressed. The compliance criteria assessed included requirements for pesticide storage, pesticide use, public notification, and the use of integrated pest management.

The regulated parties inspected in this audit include private sector pesticide applicators who are licenced to use pesticides as a service on landscapes to manage pests such as weeds, insects, and fungal diseases. The safe and appropriate use of pesticides on these locations is important, as private sector landscapers typically apply pesticides in residential areas including home lawns and gardens, apartment and strata grounds, and may include applications as a service on public properties such as parks, sports fields, golf courses, sidewalks, recreational areas, and schools. Landscape license holders that are public agencies, backyard tree fruit applicators, golf courses or are primarily engaged in other license holder sectors were not included in this report.

A total of 39 inspections were conducted in this audit, representing about 20% of approximately 200 landscape and lawncare licensees. The results of the audit found:

- The overall rate of compliance was 8% for all inspections conducted.
- The inspections conducted led to 3 notices of compliance, 32 advisories of non-compliance, and 4 warnings of non-compliance.
- Inspected parties had relatively high compliance rates (>85%) for requirements covering pesticide storage, applicator certification, appropriate containers and labels, and for the prevention, identification, and use of alternatives to pesticides in their IPM programs. Low levels of compliance (10-38%) were assessed for requirements governing recordkeeping, treatment notifications, and IPM components involving monitoring and injury thresholds.
- Recordkeeping, particularly with respect to monitoring and injury thresholds related to required IPM practices, as well as notifications related to pesticide use are the areas in which regulated parties experience most frequent challenges in attaining compliance.

The majority of non-compliant parties received an advisory, the lowest level of enforcement response. This demonstrates that most non-compliances were relatively minor in nature, and most non-compliant parties demonstrated willingness to come into compliance. Despite the low levels of overall compliance, all 39 inspected parties were compliant with the requirements to implement appropriate pest prevention options that reduce the need to use pesticides. Overall, these audit findings provide confidence that landscape and lawncare pesticide users represent a relatively low risk to human health and the environment.

The results of this audit indicate that specific direction to licensees, through promotional activities, on specific methods to assess conditions and summarize observations triggering pesticide use could greatly assist licensees in achieving higher levels of compliance with the requirements related to pest monitoring and the use of treatment thresholds. Ministry staff will continue to work with regulated parties in the landscape industry to promote compliance, IPM, and good pesticide use practices.

List of Abbreviations Used

Acronym/abbreviation	Definition
the audit	2021 Landscape and Lawn care Service Licensees Compliance Audit
ENV	<i>Ministry of Environment and Climate Change Strategy</i>
CRISP	Comprehensive Records and Inspections System for Pesticides
IPMA	<i>Integrated Pest Management Act</i>
IPMR	Integrated Pest Management Regulation (the Regulation)
PCPA	<i>Pest Control Products Act</i>
PPE	Personal Protective Equipment

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Introduction

Purpose of this Report

The Ministry of Environment and Climate Change Strategy conducts sector-wide audits as a method to obtain a snapshot of the compliance rate within a specific sector. Audits can be conducted through a combination of on-site inspections and reviews of submitted data and reports. The primary objectives of audits are to evaluate the rate of compliance in a specific sector, determine if risks to human health or the environment are present, identify compliance promotion opportunities, and to provide recommendations to improve legislation or policy guidance.

Ministry policies and procedures for compliance verification recognize that:

- audits represent a point-in-time assessment of the compliance rate within a particular sector, with individual inspections representing a point-in-time assessment of the requirements of each authorized party inspected.
- many non-compliances may be administrative in nature or have minor impacts to the environment and human health. When a single problem is found during an inspection, the whole inspection is marked out of compliance, regardless of how minor the non-compliance was.

For more information on how ministry inspectors assess and respond to non-compliances, please review the [Compliance and Enforcement Policy and Procedure](#). Inspection results from previous audits and compliance reports can also be found via the [Government of B.C.'s website](#).

Overview of the Industry Sector

Selection

At the outset of the audit, there were approximately 200 landscape and lawn care companies licensed to provide pesticide services in B.C. As pesticide service licensees must submit an annual summary of the quantity of pesticides they applied, IPM Compliance staff focused inspections on the companies using the largest quantities of pesticides, based on prior years' reporting. Inspectors also prioritized inspections based on past compliance history, logistics, and other relevant factors. Landscape license holders that are public agencies, backyard tree fruit applicators, golf courses or are primarily engaged in other license holder sectors were considered out of scope for this audit.

The audit was similar to one recently completed by IPM Compliance staff focusing on the public agency landscape licensee sector in 2019, and a golf course sector audit in 2020; the procedures followed were also similar to those for audits under the *Environmental Management Act*.

Description

The landscape sector in B.C. includes private sector pesticide applicators who are licenced to use pesticides as a service on landscapes to manage pests such as weeds, insects, and fungal diseases. The safe and appropriate use of pesticides in these locations is important since private sector landscapers typically apply pesticides in residential areas including home lawns and gardens, apartment and strata grounds. These may also include applications as a service on public properties such as parks, sports fields, golf courses, sidewalks, recreational areas, and schools (Figure 1). Non-compliance or improper use of IPM in these areas may impact human health and the environment and reduce public confidence in how pesticide use is regulated.

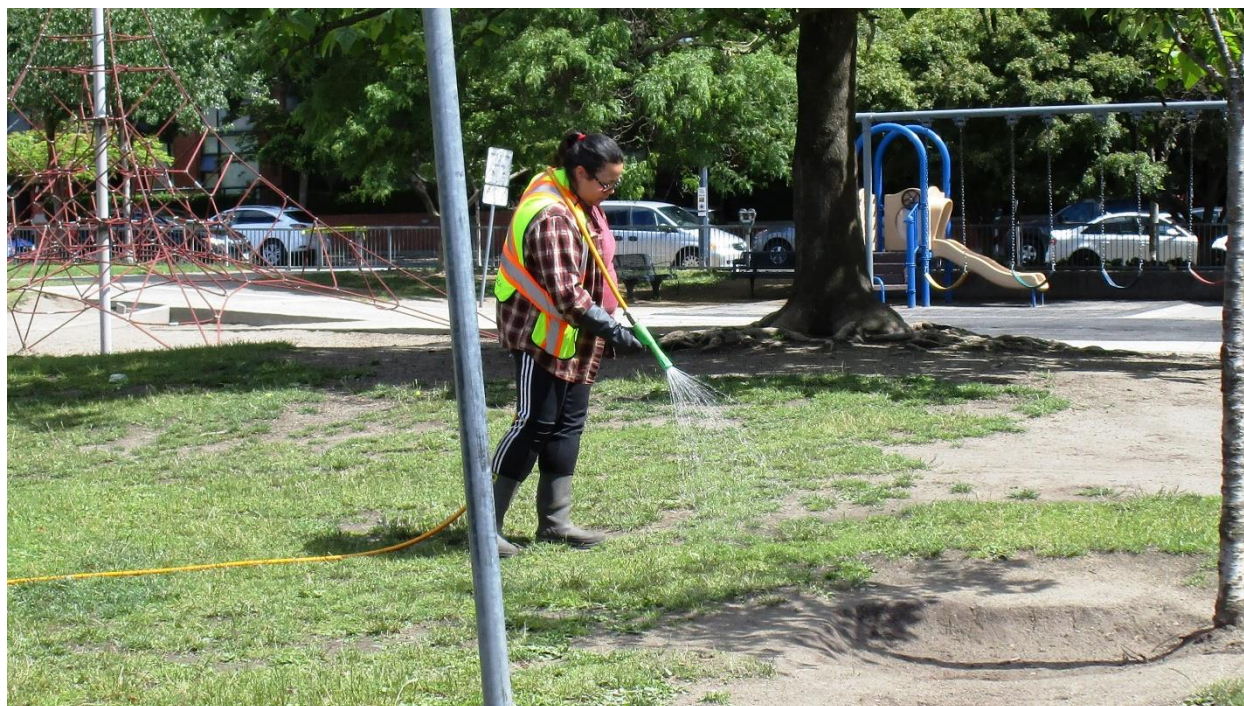


Figure 1: Lawncare landscape licensees conduct applications in areas where people and their pets play.

Regulatory Oversight

Audit and inspection activities help ensure that the lawncare/landscape sector is following the environmental & human health protection requirements outlined in the federal [Pest Control Products Act \(PCPA\)](#), administered by Health Canada, and, in British Columbia, the [Integrated Pest Management Act \(IPMA\)](#) & [Integrated Pest Management Regulation \(IPMR\)](#). More specifically, the audit helps ensure that pesticides are stored, transported and used in a manner that safeguards human health and the environment. In addition, the audit determined if private landscapers are implementing an appropriate IPM program that meets the requirements set out in the IPMA. IPM programs must consider environmental protection, human health, and good pest management practices that reduce the reliance on conventional spray programs.

The following requirements under the IPMR were the primary criteria inspected during this audit:

storage 33 (1)	Pesticides must be contained, labelled and stored to minimize hazards to people and the environment.
records 35 (1)	Licensees must keep records of each pesticide use that include client name and address, the name and certificate number of the applicator, date and time of application, target pest, pesticide trade name and registration number, method, rate, and total quantity applied, weather conditions for outdoor applications, pest injury threshold and related pest monitoring observations, and precautionary advice provided to their client regarding restrictions for re-entry of treated areas.
certification 50 (4)	Applicators must hold a valid certificate in the Landscape IPM category.
notice 63 (1)	Applicable pesticide treatment notices must include a description of the treatment area, targeted pest, pesticide registration number and its active ingredient, dates and times of the pesticide use, name of licensee and license number, phone number for more information about the application, and precautionary advice regarding restrictions for re-entry of treated areas.
containers 65 (1):	Pesticide must be kept as originally contained and labelled or equivalently.
prevention 68 (1)(a):	Before using a pesticide, licensees must take reasonable measures to prevent pests or outline recommendations of such to clients.
identification 68 (1)(b):	Before using a pesticide, licensees must properly identify target pest(s).
monitoring 68 (1)(c):	Before using a pesticide, licensees must monitor target pest populations.
injury threshold 68 (1)(d):	Before using a pesticide, licensees must ensure that an objective injury threshold triggering pesticide application has been established and exceeded.
alternative controls 68 (1)(e):	To protect people and the environment, before using a pesticide, licensees must, when practical, use alternatives to pesticides.

Key Environmental and Human Health Considerations

Pesticides are a key component of IPM programs, which aim to keep pests at levels below those causing significant economic or ecological impact. However, pesticides themselves can have negative impacts on human health or the environment because of toxicity or disruptions to ecosystems. “Commercial pesticides”, of the type generally used by landscaper service licensees, are those that are required to bear a label designation, under the PCPA, of "commercial", "industrial", "agricultural" or another commercial category. Such pesticides are generally more toxic or are packaged in larger volumes than pesticides labeled in the "domestic" class, which are generally available to homeowners.

Methods

Inspections

Office Review

For each licensee that was inspected in the audit, ENV reviewed required records. The office review included authorization information within ENV's Comprehensive Records and Inspections System for Pesticides (CRISP) database and related submissions including:

- Annual Use Summary data from 2018 to 2020,
- compliance history,
- current licence status,
- certification data for pesticide applicators,
- daily pesticide use records for treatments conducted during the previous year

The office review also may have included direct communication with the authorization holder to ask questions as needed to gather additional information necessary to complete the inspection.

On-site Inspection

ENV conducted on-site inspections with all licensees inspected in the audit. During each on-site inspection, ENV conducted an inspection of service vehicles and/or permanent pesticide storage areas to assess facility and operational details, and to review pesticide application records. Site personnel were questioned on pesticide use history and operation details as necessary in order to verify compliance. Photographs of required records, equipment, Personal Protective Equipment (PPE) and treatment locations were taken as necessary.

Sites Inspected

Inspections were conducted in all regions of the province, with the numbers of inspections in each region being related to the concentration of licenced lawn landscapers in each region and inspection capacity. See Appendices for a complete list of inspected licensees and Figure 2 for a map of inspection locations.

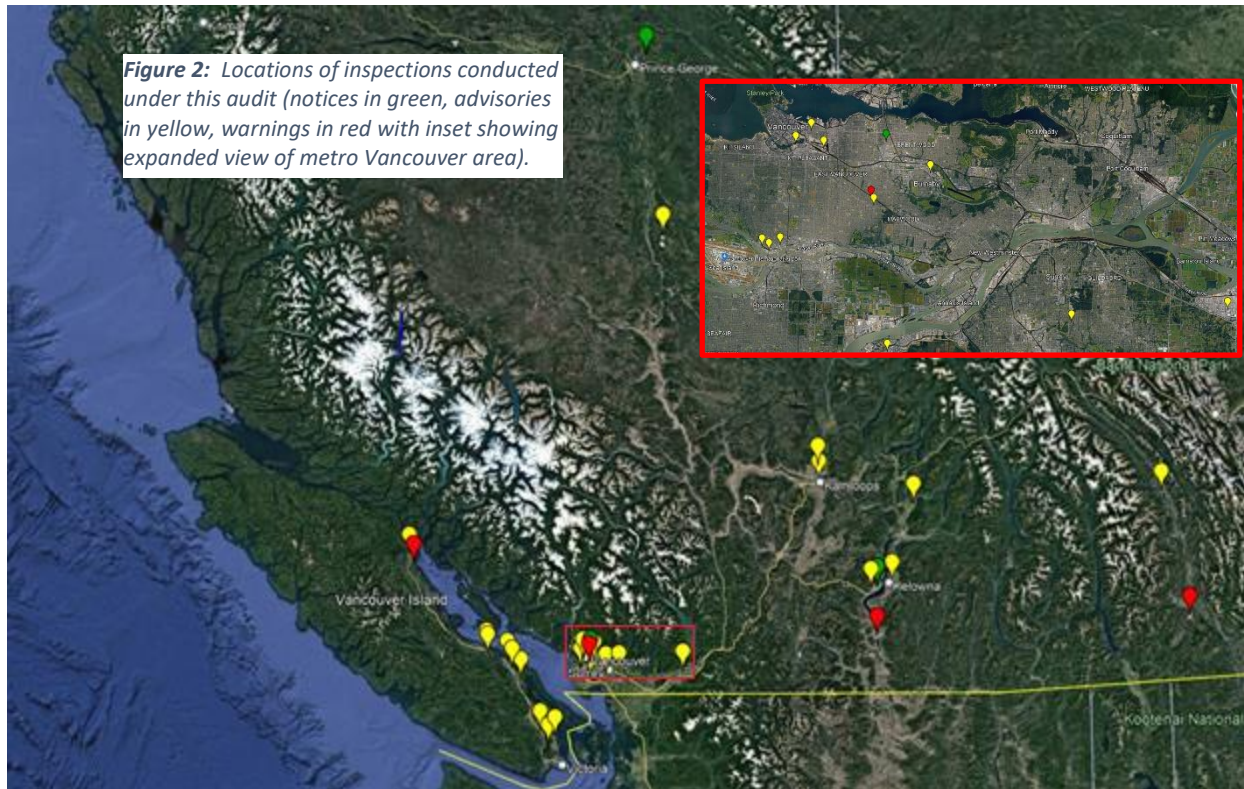


Figure 2: Locations of inspections conducted under this audit (notices in green, advisories in yellow, warnings in red with inset showing expanded view of metro Vancouver area).

Compliance Determinations and Responses

Inspections consisted of evaluating whether the authorization holder was compliant with IPMA and IPMR requirements. Compliance findings for each section were one of four outcomes:

In	ENV determined that the authorization holder is in compliance with the regulatory requirement at the time of the inspection
Out	ENV determined that the authorization holder is out of compliance with the regulatory requirement at the time of the inspection
Not determined	There was not enough information for ENV to determine whether the authorization holder is in compliance with the regulatory requirement at the time of the inspection
Not applicable	Compliance with the regulatory requirement did not apply to the authorization holder at the time of the inspection

ENV determined the appropriate administrative response based on the compliance verification findings of the inspection using the non-compliance decision matrix contained in ENV’s [Compliance and Enforcement Policy and Procedure](#). A detailed description of common administrative responses is included below:

Notice	A notice of compliance is a written confirmation that ENV determined that the authorization holder is in compliance with all of the regulatory requirements evaluated at the time of the inspection
Advisory	An advisory notifies the non-compliant party in writing that they are not in compliance with a specific regulatory requirement and often recommends a course of action that is expected to achieve compliance. An advisory is often the first enforcement response taken in cases of minor to moderate non-compliance when there is a high likelihood of achieving compliance.
Warning	Similar to an advisory, a warning notifies the non-compliant party in writing that they are not in compliance with a specific regulatory requirement; however, the warning differs from an advisory in that it warns of the possibility of an escalating response should non-compliance continue. Warnings are generally used when it is determined that an exchange of information alone would not be sufficient in achieving compliance.

The response of a notice of compliance is only issued if none of the assessed sections are found to be out of compliance. If a single non-compliance was found during an inspection, the minimum compliance response is an advisory, regardless of how many sections were in compliance or how minor the non-compliance was. Individual inspection reports completed under this audit are available from the [Natural Resource Compliance and Enforcement Database](#).

Data Analysis

To maintain quality and consistency, an inspection template form was created, and individual inspectors provided guidance on assessing each section of the IPMR. There were no outlying inspections that were excluded from this audit roll-up. However, given the variety of licensee circumstances, apart from a core of requirements common across all inspections, inspectors included, in their reports, only those sections relevant to the operation in question. For example, if inspectors were not onsite during a pesticide treatment, they may not have included an assessment for the presence of required notification signage.

Results

Inspectors completed a total of 39 inspections of service licensees in the landscape and lawn care category between April 27 and November 18, 2021

Inspections by region

Inspections of service licensees were conducted throughout the province in the following regions: Vancouver Island, Lower Mainland, Southern Interior, Kootenays, and Cariboo, and Omineca (Figure 2).

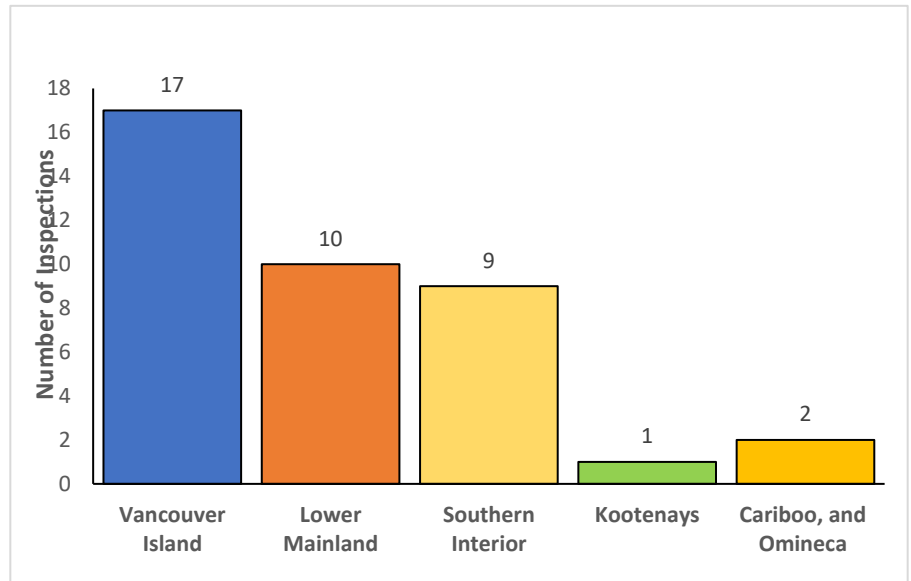


Figure 2: Number of landscape licensees inspected by region in 2021

Compliance outcomes

Overall compliance rate and resulting compliance response

Of the 39 licensees inspected, three (8%) were fully in compliance, while the remaining 36 (92%) were out of compliance with at least one aspect of the Regulation (Figure 3). A list of all of the inspected licensees and the compliance determinations made under the Regulation can be found in Appendix A.

Licensees found to be in compliance were issued a notice of compliance; non-compliant licensees were issued either an advisory or a warning (Figure 4), in accordance with the [Ministry's Compliance and Enforcement Non-Compliance Decision Matrix](#).

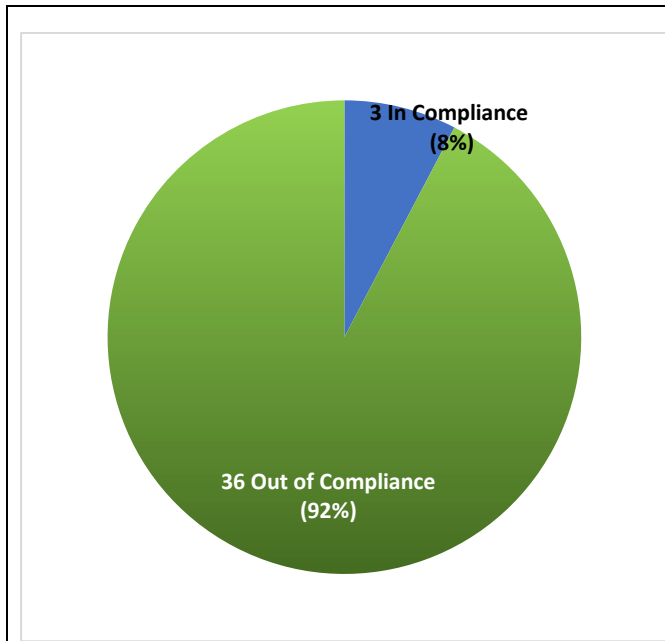


Figure 3: Overall compliance rate of landscape licensees inspected in 2021

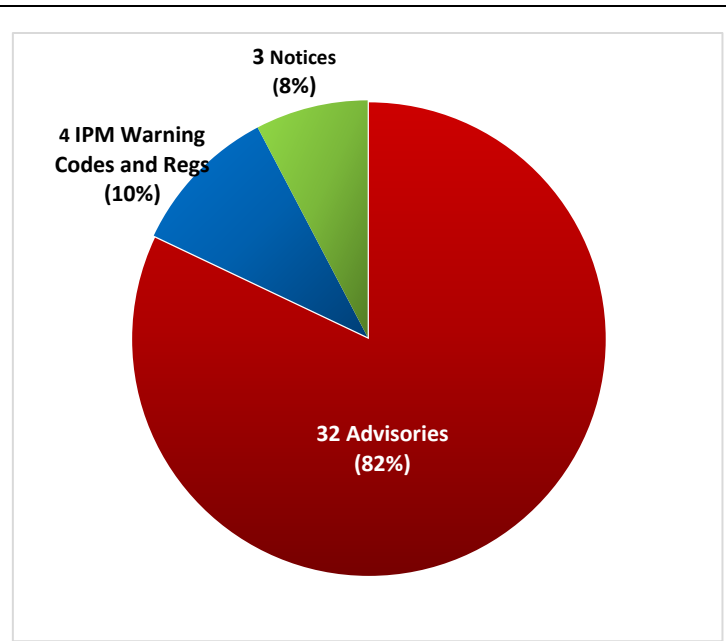


Figure 4: Compliance responses for inspections of landscape pesticide users in 2021

Compliance results for specific requirements under the Regulation

Inspectors conducted compliance inspections to assess the following requirements for all 39 licensees: pesticide storage, record keeping, certification of pesticide applicators, treatment notification and implementation of IPM elements.

The pesticide storage requirements assessed under IPMR Section 31(1) included specifications for appropriate facilities, labels, and cautionary signage. Of the licensees inspected, 92% complied with the storage requirements assessed. The most common non-compliances issued under the storage requirements were due to lack of signage posted on the pesticide storage facility (which was immediately corrected with storage signs provided by inspectors).

The record keeping requirements assessed under IPMR Section 35(1) included prescriptions for information that must be recorded for each pesticide use. Of the licensees inspected, only 10% were fully in compliance with these requirements. The most common recording non-compliances were due to failure to record the monitoring methods and injury thresholds.

11-Aug-21 10:38 AM	Kelowna, BC V1P 1K9	Broad leaf weeds and Grasses	Finalsan	15.00 milliliter	Liquid	0km/h	25
Technician/Cert #:	/ #	Monitoring method:	30012	7.50 milliliter		N	
Precaution: Your hand surfaces have just been treated with a non-selective weed control. This product will control only the weeds that are present at the time of application. Re-growth will occur. Rain may not necessarily affect this application. Please allow 5 - 10 days for results to start to show. Wait for Advice Given: treated surfaces to be dry before reentering area and leave signs in place for min of 48 hrs							
Tech notes: [Posted@8-11-2021 10:38 AM]: Applied to non Turf Areas, spot application, bind weed, black medic, clear- no rain, injury threshold 25-50%.							

Figure 5: An example of a compliant Pesticide Use Record entry (some required content intentionally blurred in reproduction).

Pesticide treatments must be conducted by applicators holding valid certification in the appropriate category under IPMR Section 50(4). Ninety two percent of inspected licensees were in compliance with certification requirements, with the remainder having at least one instance of treatments conducted by applicators with an expired certification.

Treatment notification requirements under IPMR Section 63(1) include notification content and timing components. Of the licensees inspected, 31% complied with the treatment notification requirements assessed (e.g. Figure 6). Non-compliances issued under the notification requirements were mainly due to licensees failing to record required information such as service licence number, pesticide registration number, contact phone number or precautionary information.



Figure 6: Pesticide Use Notice compliant with the Regulation.

Containers for pesticides must be suitably robust and properly labelled under IPMR Section 65(1). 92% of licensees were fully compliant with this section, with the only non-compliances related to incomplete labelling of pesticides.

Before using pesticides, licensees must implement all specified components of an IPM program. All 39 licensees complied with the requirements for undertaking preventative actions to reduce pesticide use (such as maintaining healthy turf through appropriate fertilization, irrigation and mowing regimes) and alternatives to pesticide use (such as hand pulling of weeds or cultural methods). Some licensees did not identify target pests sufficiently to meet regulatory requirements. Because many licensees did not

properly record the monitoring observations and the linked injury thresholds required before using pesticides, they did not meet the associated requirements for implementing these components of IPM.

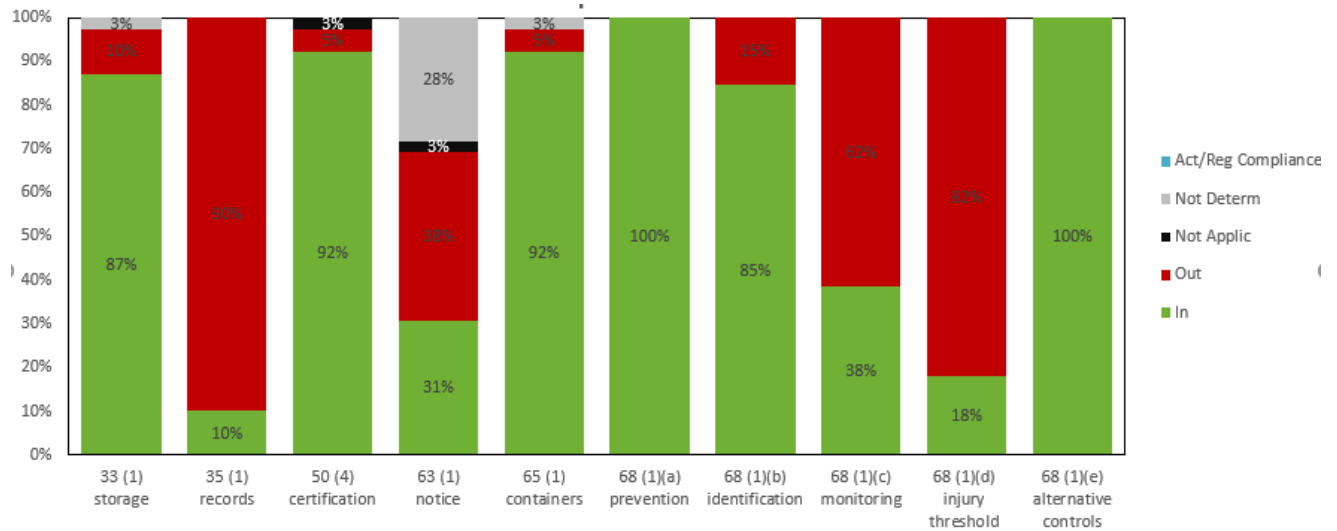


Figure 7: Compliance rates for individual sections of IPMR for licenced lawn landscape pesticide user inspections 2021

Discussion and Recommendations

Compliance results

The overall compliance rate for lawn care and landscape licensees was relatively low, with only 8% of inspected parties being fully in compliance with the IPMR. This result was not unexpected, given that a single non-compliance, regardless of how minor, results in an “out of compliance” determination. Therefore, an analysis of the compliance rate for each regulatory requirement inspected was used to determine specific areas of non-compliance and identify areas that require improvement.



Figure 8: Licensee rep adding new pesticide storage facility signage in compliance with the Regulation.

Inspected licensees received high compliance rates (85-100%) for requirements related to pesticide storage, certification, containers and under three of five required IPM elements including pest prevention, pest identification, and use of alternatives to pesticides. High compliance rates in these areas show that licensees are well informed of the storage and IPM requirements under the Regulation. Inspectors provide new storage facility signs if non-compliant signage is found, which improves compliance rates with storage requirements (Figure 8). Inspectors that found unmarked pesticides informed licensees to either replace the label or take products with unknown contents to proper disposal facilities.

Low compliance rates (10-38% compliance) were found for inspected parties for requirements for notification, record keeping, and the monitoring and injury threshold components of the IPM requirements. Inspectors found that many licensees are failing to record their onsite observations that trigger pesticide use. This indicates that licensees require additional guidance on setting objective levels of pest infestation requiring treatment, and in recording related observations for monitoring methods and injury thresholds in a concise manner. The use of appropriate monitoring and thresholds prior to any pesticide application is key to ensuring that the use of the pesticide is necessary and justified.

On landscape injury thresholds:

Few quantitative thresholds have been established as guidance on what abundance of pests or their damage warrants control action in landscapes, in part because of the lack of research and variation in people's tolerance for pests.

Dreistadt, S. H. (2016). *Pests of landscape trees and shrubs: an integrated pest management guide* (Vol. 3359). UCANR Publications. p. 126

Setting an Injury Level for Weeds in a Lawn

When you ask someone how many weeds they would tolerate in their front lawn, their first reaction is often “None!”. But does “none” really equal “zero”? One study conducted in California, found that people did not notice that there were weeds in a lawn until weed counts exceeded 5-10%*. Sounds unlikely?

Try this...

First, find some areas of turf that look “fine” to you, then count the weeds in 10 transects or grids (as described above) and average the counts. Do the same for turf that you consider looks “marginal” and again for turf areas that look “poor”. The whole exercise can be done fairly quickly. It should give you a better idea of acceptable and unacceptable weed counts, which can be used to set realistic injury and action levels.

Olkowski, W., Daar, S. C., & Olowski, H. C. (1991). *Common-Sense Pest Control: Least-toxic solutions for your home, garden, pets and community* (No. Pq1944). TAUNTON PRESS. pg. 55

Injury and Treatment Thresholds

If honeydew is the main problem caused by aphids, an injury threshold can be based on the number of honeydew drops falling on monitoring cards per hour. If the honeydew is falling on plants and sidewalks, the threshold number of drops can be higher than when honeydew is falling on parked cars.

Governments of Newfoundland & Labrador, Nova Scotia, New Brunswick, and Prince Edward Island. (2006). *Atlantic Canada Pesticide Applicator Training Manual Series Vol 1*. Pg 161

Overall, audit findings indicate that current landscape and lawn care pesticide use by service licensees represents a relatively low risk to human health and the environment. The results of this audit suggest that specific direction to licensees, through promotional activities, on concise means to assess conditions and summarize observations triggering pesticide use could greatly assist licensees in attaining and maintaining high levels of compliance with related regulations. Ministry staff will continue to work with regulated parties in the landscape industry to promote compliance, IPM, and good pesticide use practices through outreach such as sector meetings, webinars, and digital resources.

Appendices

Appendix A—Inspected licensees, inspection locations and compliance response.

Lic #	name	Inspection			
		#	Latitude	Longitude	Response
24837	Xcelcor Services Ltd.	148835	48.69477	-123.592	Advisory
3398	508764 B. C. Ltd. Doing Business As Weed Man - Abbotsford	166214	49.19937	-121.917	Advisory
14642	Blue Holdings Inc. Doing Business As Nutri-Lawn (Victoria)	166218	48.58995	-123.489	Advisory
11985	The F.A. Bartlett Tree Expert Company Canada Ltd.	166219	49.25614	-122.977	Advisory
3802	W.M. Lawn Care Surrey Ltd. Doing Business As Weed Man	166224	49.13935	-123.014	Advisory
1988	Davey Tree Expert Co. Of Canada, Limited	166227	49.20477	-123.142	Advisory
3569	Valley Green Lawn Services Ltd. Doing Business As Weed Man - Chilliwack	166230	49.19937	-121.917	Advisory
19723	Cordeiro Maintenance Contractors Ltd	166231	49.23827	-123.035	IPM Warning Codes and Regs
7561	Timbervalley Supply Inc. Doing Business As Nutri-Lawn Parksville	166237	49.3074	-124.267	Advisory
24257	Clayton J. Norris Doing Business As Clay-Nor Lawn Care	166239	49.95022	-125.203	IPM Warning Codes and Regs
26297	Kevin Telosky Doing Business As Kevin'S Lawn Care	167897	50.01848	-125.265	Advisory
3802	W.M. Lawn Care Surrey Ltd. Doing Business As Weed Man Lawn Care	168535	48.65242	-123.413	Advisory
17586	Cutting Edge Vancouver Landscape Services Inc.	169224	49.20595	-123.124	Advisory
1570	Silva Landscaping & Grounds Maintenance Ltd. Doing Business As Silva Landscaping Ltd	169225	49.23351	-123.032	Advisory
1838	Western Weed Control (1980) Ltd.	169226	49.26963	-123.084	Advisory
730	Olson'S Pest Control Ltd	169335	49.89572	-119.407	Advisory
26458	Sun Rivers Property Managment Ltd. Doing Business As Sun Rivers Landscaping	169392	50.68874	-120.291	Advisory
1259	Grassroots Choice Lawn Care Ltd Doing Business As Grassroots Lawn Care	169404	50.80695	-120.303	Advisory
667	Sun Valley Tree & Lawn Care (Kelowna) Ltd.	169594	49.84571	-119.664	Advisory

16822	Yun Feng Holdings Ltd.	169668	49.28083	-123.097	Advisory
22227	Neighbourhood Lawncare Ltd.	169679	49.20193	-123.135	Advisory
15662	Dale Arthur Graham Doing Business As Outdoor Empire Yard And Tree Care	172539	50.50152	-119.13	Advisory
18924	Mid Island Landscape Consulting Inc.	172759	49.0976	-123.846	Advisory
7181	Brian Roy Reid Twinn Doing Business As Undercutters Lawn And Property Maintenance	172761	49.17735	-123.955	Advisory
14802	Woelke, Doreen Doing Business As Mystical Images Landscaping	172764	49.27812	-124.253	Advisory
3682	Strain Landscapes Ltd.	172819	49.234	-124.015	Advisory
23373	G.W. Property Services Ltd.	173095	49.272	-123.112	Advisory
19903	1171479 B.C. Ltd Doing Business As Richbar Landscape Maintenance	173331	52.59211	-122.27	Advisory
23781	Total Turf Care Ltd.	173706	54.00292	-122.552	Notice
370	T C L Maintenance Ltd. Doing Business As Tcl Maintenance Ltd.	174038	49.16231	-122.832	Advisory
1172	Premier Landscaping Inc	174039	49.16231	-122.832	Advisory
1086	Para Space Landscaping Inc.	174040	49.27522	-123.022	Notice
23311	Scott James Halford Doing Business As Timber Wolf Maintenance And Security	174877	50.5181	-116.041	Advisory
2180	Kootenay Lawn Doctor Inc.	174902	49.52383	-115.767	IPM Warning Codes and Regs
3657	Lawnpro Landscapes Ltd.	175428	49.19937	-121.917	Advisory
26998	One Five Root Builders Inc. Doing Business As Nutri-Lawn Vancouver	175430	49.17353	-122.677	Advisory
23191	Cleare Choice Holdings Ltd. Doing Business As Weed Man West Kootenay	178774	49.47885	-119.595	IPM Warning Codes and Regs
3319	Gold Medal Ventures Ltd Doing Business As Nutri-Lawn Ecology Friendly Lawncare	179396	49.86586	-119.578	Advisory
2815	B & N Turf Management Inc. Doing Business As Weed Man (Kelowna)	179397	49.86186	-119.59	Notice

Appendix B— Resources for Landscape IPM

BC Ministry of Agriculture. *Home & Garden Pest Management Guide For British Columbia* (Chapter 4) BC Ministry of Agriculture. 2019

http://www.llbc.leg.bc.ca/public/pubdocs/bcdocs2021/720906/720906_HomeGardenPestManagementGuideBC.pdf

Daar, S., Drlik, T., Olkowski, H. and Olkowski, W. *IPM for Schools: A How-to Manual* (Chapter 3). Environmental Protection Agency (EPA). 1997. <http://www.birc.org/SchoolManual.pdf>

Dreistadt, S. H. *Pests of Landscape Trees and Shrubs: An Integrated Pest Management Guide*. University of California, Agriculture and Natural Resources. (2016). https://www.google.ca/books/edition/Pests_of_Landscape_Trees_and_Shrubs_Thir/_zqoCwAAQBAJ?hl=en&gbpv=0

Governments of Newfoundland & Labrador, Nova Scotia, New Brunswick, and Prince Edward Island. *Atlantic Canada Pesticide Applicator Training Manual Series Vol 1*. Atlantic Provinces of Canada. 2006. https://novascotia.ca/nse/pests/docs/ApplicatorTraining_Landscape.pdf

Lanthier, M. and Edwards, L. *A Manual of Integrated Pest Management for Urban Landscapes for British Columbia* BC Ministry of Environment, Land and Parks. 1993 (as "Chapter 3, Trees of Parks and Boulevards: the Application of Integrated Pest Management" at: <http://crophealth.com/wp/wp-content/uploads/2012/04/CropHealthcom-IPM-book-1993-ch3-trees.pdf>