Canadian Council of Forest Ministers

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Forest Pest Knowledge Collection and Exchange

Pest Strategy Information System

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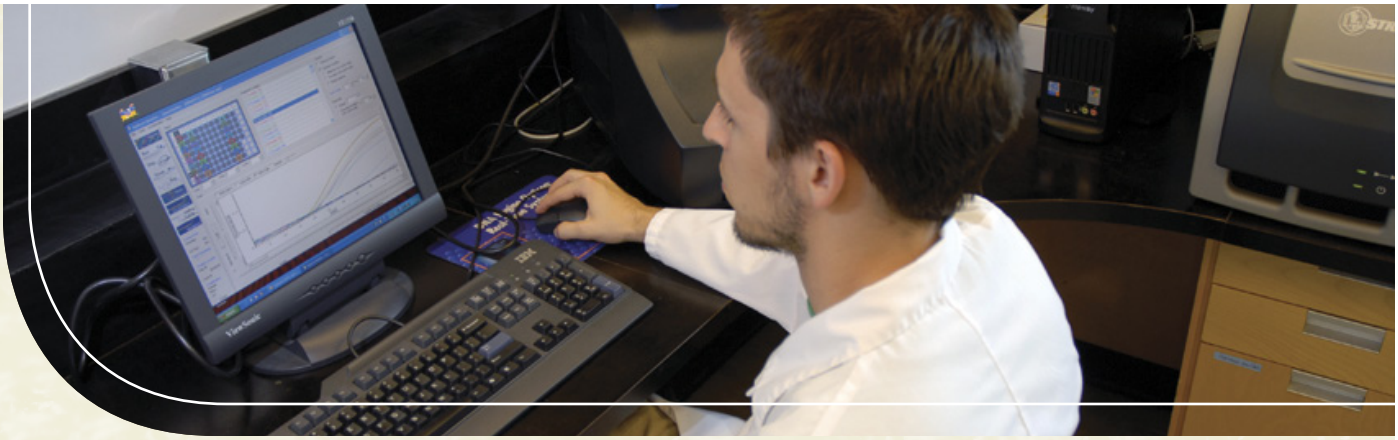


Executive Summary

The National Forest Pest Strategy (NFPS) identified the need for a common framework for the compilation, sharing and synthesis of forest pest data and information. In response, work has been underway developing a national forest pest data system.

Among the key benefits such a national forest pest data system will offer:

- Authoritative forest pest data and information that is readily accessible and actively used by NFPS partners, increasing the ability to analyze and report on forest pest situations in a dynamic, interactive and timely environment and resulting in better informed decision-making
- Availability of information to serve the needs of those conducting risk analyses, threat response and national reporting while protecting and creating access to important historical information
- Decreased costs to individual provinces and territories through greater collaboration across all jurisdictions; increased sharing of existing capacity and information is more efficient; and potential for reduced response-related costs
- Ease of use with minimal time requirements from NFPS partners to upload forest pest data.

This report summarizes information collected from NFPS partners to guide the development of a national Pest Strategy Information System (PSIS). It also describes the prototype PSIS developed from this information, the current status of the system's development, and the next steps required to complete the PSIS.

OVERVIEW OF THE PEST STRATEGY INFORMATION SYSTEM

The PSIS is implemented as a web-based centralized system that is managed by a single group on behalf of the NFPS partners.

The fully developed PSIS will

- have a uniform data model;
- include spatial data and mapping and charting functionality;
- impact data providers minimally; and
- contain updated pest status information.

End-users will include NFPS partners as well as individuals and agencies seeking to view or use forest pest data. Access to information contained within the PSIS will be controlled by the Distributed Access Control System (DACS), using data-sharing conditions and privileges defined by the provinces and territories.

The PSIS will be managed and supported by Canadian Forest Service (CFS), Atlantic Forestry Centre.

MEETING NFPS PARTNER NEEDS

NFPS partners are most interested in content that pertains to: risk analysis, historical and current pest information, control measures, and pest risk assessments. The majority of NFPS partners seek to use a web-mapping application in order to visualize and query forest pest data interactively rather than to download and manipulate the data or produce hard copy maps.

PARTICIPATION BY PROVINCES AND TERRITORIES

All the provinces[1] and territories, plan on submitting their annual pest survey data, from both ground and aerial surveys, to the PSIS. Although differences do exist, there are commonalities in the data collected from each jurisdiction.

The provinces and territories have identified varying levels of end-user privileges based on the end-user agency. Access requests by potential users will be handled through an access management system that provides the data owner full control of granting or denying individual's permission.

A standardization workshop held with provincial and territorial representatives acknowledged that there were similarities in the types of pest survey information being collected. At the same time, however, it was also recognized that pest survey methodologies and pest thresholds do, and will continue to, vary between jurisdictions as a result of local conditions or needs.

[1] Quebec will submit data once it has assessed the Pest Strategy Information System.

NEXT STEPS

A web portal housing authoritative forest pest data and information is near completion. At present, the system has been populated with content from New Brunswick, British Columbia and the CFS (including from the Forest Insect and Disease Survey [FIDS] Infobase).

The following tasks are required to complete full development of the PSIS:

1. Develop data-sharing agreements with jurisdictions.
2. Load survey content from remaining jurisdictions (including metadata and data dictionaries).
3. Improve mapping performance.
4. Identify a means to ensure that metadata is acknowledged and read by end-users.
5. Build charting and reporting functionality.

Ideally, other sources of pest survey information should also be incorporated into the PSIS, including that from the CFIA and municipal governments. A means to upload and distribute pest news to PSIS members would also be beneficial.

Background

In 2006, the Canadian Council of Forest Ministers (CCFM)[2] endorsed the vision, principles and approach for a National Forest Pest Strategy (NFPS). The NFPS promotes a proactive, integrated response to the threat of forest pests through a national risk-analysis framework to guide decision-making by the many jurisdictions involved in pest management in Canada.

In 2008, the CCFM's Task Force—consisting of representatives from the Canadian Forest Service (CFS) of Natural Resources Canada (NRCan), Canadian Food Inspections Agency (CFIA), and all provinces and territories except Nunavut—released an NFPS implementation plan. The plan identified five broad components of the strategy:

1. Risk Analysis
2. Monitoring and Diagnostics
3. Information and Information Management
4. Science and Technology Priority-Setting
5. Reporting, Communication and Outreach.

Recommendations for the implementation of each component were developed by Technical Advisory Groups made up of federal, provincial and territorial officials and reporting to the CCFM's Forest Pest Working Group. This report addresses the third component of the plan, Information and Information Management (IIM).

Introduction

The NFPS identified the need for a common framework for the compilation, sharing and synthesis of data and information, and the provision of standards for data compilation, assessment and reporting. In response, work has been underway developing a national forest pest data system.

The information content for the framework will include both spatial and non-spatial data from various pest surveys—such as those used for population monitoring (e.g., pheromone trapping, forecast surveys) and damage and risk assessments—as well as information on pest management techniques and practices, diagnostic and taxonomic tools and resources, and other sources of information that should be shared in the national interest and for the benefit of all NFPS partners.

Among the benefits such a national forest pest data system will offer:

- Authoritative forest pest data and information that is readily accessible and actively used by NFPS partners, increasing the ability to analyze and report on forest pest situations in a dynamic, interactive and timely environment and resulting in better informed decision-making
- Availability of information to serve the needs of those conducting risk analyses, threat response and national reporting while protecting and creating access to important historical information
- Decreased costs to individual provinces and territories through greater collaboration across all jurisdictions; increased sharing of existing capacity and information is more efficient; and potential for reduced response-related costs
- Ease of use with minimal time requirements from NFPS partners to upload forest pest data.

Overall, this work contributes to the CCFM Forest Pest Working Group's objective of disseminating best practices to facilitate forecasting, preparedness and coordination of pest management activities in Canada, and to facilitate reporting at the national level of the status of forest pests and risk assessments.

Development of the Pest Strategy Information System Framework

The NFPS implementation plan developed in 2008 identified a number of key gaps essential to the development of the PSIS framework. Among those gaps:

- suitable system architecture;
- information needs of NFPS partners;
- detailed knowledge of provincial and territorial data holdings and status; and

[2] Abbreviations used in this report are listed in Appendix 1.

- data-sharing agreements among jurisdictions relating to forest pests.

A number of surveys targeting NFPS partners were undertaken to address these gaps. Survey respondents included personnel from the CFS and CFIA and provincial forest health managers and specialists. The results of the surveys related to each of the gaps are summarized below. The importance of standardizing pest survey data is also discussed.

SYSTEM ARCHITECTURE

Using information gathered from NFPS partner surveys and from consultation with the other NFPS components, the CCFM and the CFS, the IIM Technical Advisory Group identified the following system requirements:

- single point of access
- jurisdictional control over access
- uniform data model
- spatial data/mapping functionality
- minimal impact on data providers
- up-to-date pest status information.

INFORMATION NEEDS OF NFPS PARTNERS

CONTENT

Survey respondents were most interested in content that pertains to: risk analysis, historical and current information on pest populations and damage levels, control measures, and pest risk assessments (Table 1). Historical data include both provincial and territorial data holdings and data from the CFS Forest Insect and Disease Surveys (FIDS) Infobase.

Table 1. Pest Strategy Information System content priorities by topic/theme.

Topic/ theme	Overall importance	Item	Ranking (scale 1–5)
Risk Analysis	1	Annual pest reports	4.45
	1	Pest risk assessment	4.45
	2	Historical pest survey documents from other jurisdictions	3.79
	2	Current pest control reports	4.00
	2	Spatial pest survey data from neighbouring jurisdictions	4.08
	3	Data and detailed analyses used in pest risk assessments	3.96
	4	Historical pest control reports	3.79
	5	Within-season pest survey data from neighbouring jurisdictions	3.69
Average			**4.03**
Management	2	Integrated pest management approaches and tools and associated efficacy	4.07
	2	Data relating to damage and impact	4.04
	3	Threshold/decision criteria used by pest management agencies; pest damage ratings; criteria for using particular survey or control methods	3.92
Average			**4.01**
Information	2	Information on current research projects in Canada	4.00
	4	Listing of taxonomist and diagnostician contacts and area of expertise	3.79
	4	Summarized pest survey data from neighbouring jurisdictions	3.88
	6	Spatial/location data on control programs carried out	3.50
	7	Documents describing structure of other agencies' databases, and/or data dictionaries	3.41
Average			**3.72**
Other	8	Other spatial data	3.04
Average			**3.04**

Of almost equal importance was information concerning pest management such as integrated pest management (IPM) tools, pest damage rating and impacts, and thresholds or decision criteria used for particular surveys or control methods.

The majority of survey respondents were also interested in timely access to news items pertaining to detection of forest invasive alien species (FIAS), as well as to native species bordering their jurisdiction.

FUNCTIONALITY

In terms of web-mapping applications, respondents said they were more likely to use the PSIS to visualize infestation locations and discover trends and relationships interactively, rather than downloading and manipulating the data or producing hard copy maps (Table 2).

The availability of other spatial themes, such as ecozones and plant hardiness zones, were also seen as useful tools to further explore and visualize pest relationships.

Table 2. Potential web-mapping applications and survey respondent interest in such functionality.

Use	**% Survey respondents interested**
Display infestation locations	84.6
Discover trends and relationships interactively	76.9
Generate hard copy maps	57.7
Download provincial and territorial spatial data	53.8
Download national spatial datasets	34.6

PROVINCIAL AND TERRITORIAL DATA HOLDINGS AND STATUS

All provinces and territories[3] plan on submitting data to the PSIS—from both ground and aerial surveys. Although differences exist in jurisdictional survey methods and damage thresholds, there are commonalties in the type of data collected from each jurisdiction. For the most part the data from each jurisdiction is compatible from year to year and available in digital format.

Additional work is required in some jurisdictions to compile multiple years of data with different formats into compatible multi-year datasets. For the remaining jurisdictions, the majority of the data is ready to be uploaded once the metadata for each pest survey has been defined and data-sharing agreements are in place.

AERIAL SURVEYS

Ten out of 11 provinces and territories (PEI does not conduct aerial surveys) that conduct aerial surveys will be submitting data. The majority of aerial surveys currently being conducted across Canada capture biotic disturbances of the major defoliators and bark beetles, as well as some abiotic events.

For more information on pests currently being monitored, see the report *Forest Pest Monitoring in Canada: Current Situation, Compatibilities, Gaps and Proposed Enhanced Monitoring Program* [cfs.nrcan.gc.ca/publications].

The spatial aerial survey data of a majority of provinces and territories are in a standardized digital format and ready for inclusion in the PSIS. The data from a few provinces and territories will require conversion before being uploaded to the PSIS. As well, a few provinces and territories have hard copy maps that will require digitizing.

GROUND SURVEYS

All jurisdictions that conduct ground surveys plan on submitting data. At this time, Yukon Territory does not conduct formal ground surveys. Ground surveys, like aerial surveys, consist mostly of monitoring and assessing major defoliator populations.

Eastern spruce budworm survey data will be provided by 9 out of the 10 of the provinces that conduct ground surveys for this defoliator. Jack pine budworm data will be provided in five out of six provinces that conduct ground surveys for this defoliator (Table 3).

Fourteen different types of forest invasive alien surveys will be submitted, along with 14 miscellaneous surveys, several of which are permanent sample plots (Table 4).

[3] Quebec will submit data once it has assessed the Pest Strategy Information System.

Table 3. Types of defoliator ground surveys to be submitted to the Pest Strategy Information System, by province and territory. E = egg, L= larva, P = pupa, A = adult

Type of ground survey	BC	NT	AB	SK	MB	ON	QC	NB	NS	NL	PE
Three-tree beatings	L										
Balsam fir sawfly								E, L, P	E	E	
Douglas-fir tussock moth	E, L, A										
Eastern blackheaded budworm								E	E	E	
Eastern hemlock looper							E, A	E, A	E, A	E, A	
Eastern spruce budworm		A	E, L, A	L, A	E, A	L, A	L,A	E, L, A	L, A	E, A	A
European pine shoot moth										A	
Forest tent caterpillar				A		E	E	A			E
Gypsy moth	A							E, A	A		E
Jack pine budworm				A	E	L, A	L, A	L, A	L, A		
Rusty tussock moth								A			
Yellow-headed spruce budworm											
Western hemlock looper	L, A										
Western spruce budworm	L										
Whitemarked tussock moth								A	E, A		

Table 4. Forest invasive alien species and miscellaneous forest pest surveys to be submitted to the Pest Strategy Information System, by province and territory.

	BC	YT	NT	AB	SK	MB	ON	QC	NB	NS	NL	PE
Forest Invasive Alien Species												
Balsam woolly adelgid									•	•	•	
Banded elm bark beetle					•	•						
Beech bark disease							•					
Butternut canker							•					
Brown spruce longhorn beetle										•		
Emerald ash borer							•					
European elm bark beetle						•						
European larch canker												•
Sirex wood wasp							•	•				
Gypsy moth	•											
Hemlock woolly adelgid									•			
Japanese beetle												•
Native elm bark beetle					•	•						
Pine shoot beetle							•			•		
Miscellaneous												
Balsam gall midge									•	•		
Balsam twig aphid									•	•		
Mountain pine beetle			•	•	•							
Bark beetles											•	
Eastern larch beetle						•						
Spruce beetle										•		
Armillaria root disease						•						
Pine dwarf mistletoe						•						
Pine stem canker PSP [a]						•						
Western gall rust PSP						•						
Aspen decline plots				•			•					
Red pine decline plots							•					
Jack pine PSP							•					
Spruce and fir PSP							•					

[a] PSP = permanent sample plots

The provinces and territories use a variety of programs to store ground survey data. None of the programs should pose difficulties for translation and upload into the PSIS database. Of the two provinces that still have data in hard copy format, one indicated that it might require assistance to input the data. The majority of provincial and territorial data are ready to be uploaded into the PSIS database. Only three provinces have data that are either in hard copy format or not standardized from one year to the next.

GENERAL INFORMATION

Respondents were asked five questions about the type of information they plan on submitting to the PSIS. Of the 12 who responded, the majority said they were most likely to provide historical pest surveys and least likely to provide costs for Integrated Pest Management programs (Table 5).

DIAGNOSTIC TOOLS AND RESOURCES

All provinces and territories provided information about submission of diagnostic tools and resources, the majority of which pertain to insect survey methodologies (Table 6). Some of these resources exist in digital format; others are provided as web links to specific web sites.

The creation of a diagnostic tools and resources database will benefit all jurisdictions by providing quick and easy access to a variety of diagnostic tools, pest management materials, methodologies, survey forms, pest brochures and other resources. This will facilitate greater dialogue between jurisdictions, particularly about survey methodologies and pest management criteria and thresholds. Such a database may eventually lead to standardized reporting and harmonization of pest survey methods, although pest damage thresholds will still vary because of regional conditions and needs.

This database is by no means meant to be an exhaustive or static list of what is available, but rather a dynamic interactive list that will continue to grow as provinces and territories contribute additional information.

Table 5. Potential information to be submitted to the Pest Strategy Information System, by province and territory.

Type of information or data	**Response (from 12 respondents total)**		
	Yes	**No**	**Maybe**
Internal reports	7	0	5
Historical pest surveys	9	2	1
Within-season pest survey data	7	2	3
Data relating pest damage to tree and stand growth and mortality	6	2	4
Cost data for Integrated Pest Management programs	3	3	6

Table 6. Summary of diagnostic tools and resources to be included in Pest Strategy Information System, by category and pest type.

	Pest type					
Category of diagnostic tool/resource	**All pests**	**Insects**	**Diseases**	**FIAS[a]**	**Host-specific**	**Nursery pests**
Annual reports, pest alerts, fact sheets, brochures	5	1	1			1
Diagnostics (including online)	10	12	1	5		
General	9	4	5	3		
Impact		1				
Management	3	2	6		1	
Survey methodology	13	59	2			
Training	1					
Textbooks		67	8			
Total	41	146	23	8	1	1

[a] FIAS = forest invasive alien species

DATA-SHARING PROTOCOL

Data providers were asked to identify data-sharing permissions (i.e., required or not required) and privileges (i.e., view or download) by end-user group such as universities, other provinces and territories, and the CFS. Several jurisdictions indicated that their permission will be required, while others have already granted full permission to all agencies (Table 7).

The former group will revisit these privileges once those jurisdictions have a better understanding of the PSIS, the profile of the end-users, and the use of their data by those end-users.

Privileges are defined as view (which allows querying and visualizing of the data within the web-based application—PSIS) and *download* (which allows viewing, querying and manipulating of the data offline using end-user software).

Access requests by potential users will be handled through an access management system that provides the data owner full control of granting or denying permission. This system will also allow the data owner to enter into discussions with the end-users to determine how they intend on using the data. The system will also assure data owners that their data are not being misinterpreted or misused.

Given the differences in some pest survey methodologies across Canada, it is imperative that the end-user be familiar with the survey protocol and forecast or severity thresholds of each jurisdiction conducting similar surveys.

If granted access, individuals or organizations can query the PSIS using database applications, but they will only be able to view or download the content for which they have been granted access. Once granted or denied, permission and privilege levels for a particular pest survey in a particular jurisdiction will remain the same in perpetuity for that end-user unless the owner of the data informs the PSIS manager otherwise.

As previously stated, all provinces and territories plan on submitting data to the PSIS from both ground and aerial surveys. For the most part, the data from each jurisdiction is compatible from year to year, and available digitally in spreadsheet or relational database format. Therefore, the majority of the data is ready to be uploaded once the metadata for each pest survey has been defined and data-sharing agreements are in place.

STANDARDIZATION

Ideally, pest survey data should be compatible across jurisdictions, facilitating standardization of data within the PSIS.

A standardization workshop held with provincial and territorial representatives, however, acknowledged that pest survey methodologies and pest thresholds do, and will continue to, vary between jurisdictions as a result of local conditions or needs. The lack of standardized pest survey methods and reporting thresholds could create potential compatibility issues, given that pest thresholds and associated damage differ between some jurisdictions.

A potential solution for dealing with these compatibility issues is to ensure that in addition to counts (i.e., trap counts, number of larvae, etc.), jurisdictions also provide predicted damage levels, and that end-users are aware of the underlying survey methodologies, protocols and damage thresholds. This will also alleviate potential interpretation errors.

Over time there may be opportunities for survey methodologies and protocols to become more compatible as provinces and territories may review methodologies employed by other jurisdictions.

Table 7. Permissions and privileges for various end-users of the Pest Strategy Information System, as indicated by provincial or territorial representatives.

Permission required	User privileges	BC[a]	YT[b]	NT	AB	SK	MB	ON	QC	NB	NS	NL	PE[c]
Yes	View	Some GROUND SURVEYS					ALL users GROUND SURVEYS	Academia, NGOs[d]	All users	ALL users	NGOs	CFS, CFIA, AAFC, PMRA, all other provinces and territories, municipalities, academia, industry, NGOs	
No	View			CFIA, AAFC, PMRA, all other provinces and territories, municipalities, academia, industry, NGOs			ALL users AERIAL SURVEYS	CFS, CFIA, AAFC, PMRA, all other provinces and territories, municipalities, industry					
Yes	Download			CFS, NT government	CFIA, AAFC, PMRA, municipalities, academia, industry, NGOs	ALL users					Academia, industry	NL government	
No	Download	All other ground and aerial data -ALL users	ALL users		CFS, all other provinces and territories						CFS, CFIA, AAFC, PMRA, all other provinces and territories, municipalities		ALL users

[a] Ground monitoring is coordinated by a number of entomologists in British Columbia; therefore, their responses reflected a variety of permission levels for ground surveys. Aerial surveys are available for download without permission to all end-users.

[b] No ground surveys at this time.

[c] No aerial surveys at this time.

[d] See Appendix 1 for abbreviations.

Meeting NFPS Partner Needs: The Pest Strategy Information System

Development of the PSIS was based on information gathered from NFPS partners, as described in the previous section. This information has guided the selection of the appropriate system architecture and framework and the development of interactive tools (functionality) within the PSIS. It will also assist with the development of data-sharing agreements and protocols with the provinces and territories.

PSIS ARCHITECTURE

The system's design is relatively simple (Figure 1). A centralized PostgreSQL database houses the PSIS database and will be accessed via a web portal. The system is updated using client and server-side applications as changes are made to the data at the client organizations. The data will be extracted, compressed and sent to the NFPS server via a web-based upload tool.

Once on the NFPS server, the data will be uncompressed, reformatted and then loaded into the database.

The CFS will host a web portal that will contain database query, web mapping, charting and reporting capabilities, as well as other forms of information products.

Open Geospatial Consortium (OGC) web services can be served to GIS analysts in the participating organizations so that the analysts can interact with national datasets in their GIS applications.

DATA ACCESS

Data providers can assign specific access levels to individuals who request to use their content. For example, the Province of British Columbia plans to allow users to view and download all of their data with the exception of a few sensitive ground surveys. In the case of the latter, rights to view and download the data will be provided on an individual basis using the Distributed Access Control System (DACS). Access rights can also be assigned to an entire organization, such as the CFS and CFIA. Those who use the database applications will see only the content for which they have been granted access.

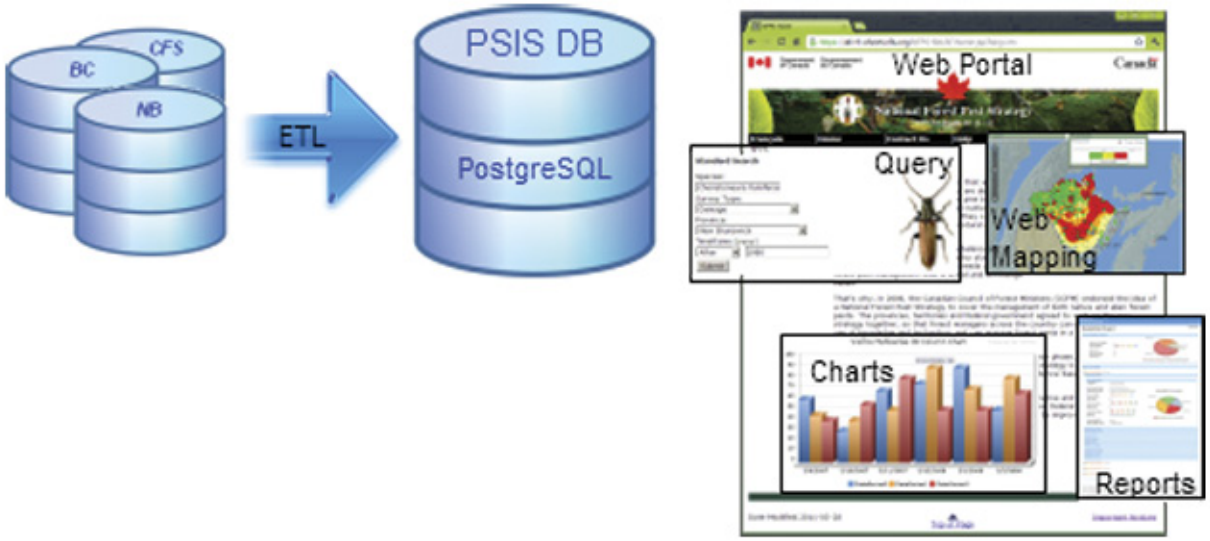


Figure 1. Architecture of the Pest Strategy Information System. ETL = extract, transform, load; DB = database

PSIS FEATURES AND TOOLS

The PSIS main menu is composed of five main features:

1. Pest data
2. Diagnostics
3. Reference materials
4. Data upload
5. Links to other web sites.

PEST DATA

Query – Pest data can be queried using either a simple form ("standard"; Figure 2) or a more advanced form (Figure 3). The standard query allows the user to filter a data request based on some high-level attributes such as pest, survey type, province and date. This query assumes that the user wants to include synonyms and that only positive records are being requested.

Figure 2. Example of a standard pest data query of the Pest Strategy Information System.

The advanced query page allows the user to build a custom query based on any database attributes related to the survey type chosen. Figure 3 shows a textbox for the species in question, followed by a dropdown list of the type of survey the user wants. (A user can choose "Any" if he or she doesn't want to filter based on a specific survey type.) Next is a dynamic panel titled "Query Filters" where the user can identify specific values of fields to return, and can add as many additional filters as deemed necessary. Additional filters can be added by clicking the "Add Filter" link or removed by clicking the associated delete button.

Query results – The results of a query are displayed in a table (Figure 4). Columns can be sorted by clicking on the column headers. The end-user can visualize the query results in a web-mapping application by clicking on the "View Map" link found below the table.

Additional capabilities such as charting will be integrated in the future and will work with the current query results in the same way as the mapping capabilities.

Figure 3. Example of an advanced pest data query of the Pest Strategy Information System.

Figure 4. Example of paged query results of the Pest Strategy Information System.

Web mapping—The web-mapping application provides spatial context to the query results, allowing the user to interactively navigate (pan/zoom) to an area of interest and query the resulting features (Figure 5).

Managing data layers—Clicking on the "layers" tab shows the list of spatial datasets that can be turned on or off based on end-user needs. These layers can help the user relate pest occurrence to other base data such as host range, plant hardiness, mean minimum temperatures, political and ecological boundaries, and transportation networks.

Defining count thresholds—Point location data from each survey type can be rendered as present or absent, or classified into either two or three classes to describe thresholds relevant to each particular pest. For example, a user could map aerial defoliation polygons with the previous year's pheromone or larval counts to better understand the relationship between counts and subsequent defoliation.

Using the time control—If a query encompasses multiple years, the user can step through the data on a year-by-year basis to visualize the spatial characteristics of a pest outbreak over time. This feature could be useful in visualizing, for example, the spread of a forest invasive alien species.

Charts and reports—Charting and reporting capabilities will be integrated into the database application in much the same manner as the mapping. Specific charts or reports will be created based on user needs. Some specific charting examples by jurisdiction or ecological unit include:

- Area defoliated by severity
- Percent positive traps
- Population trends.

DIAGNOSTICS

This portion of the database contains information pertaining to diagnostic and taxonomic resources. It includes a list of national diagnostic and taxonomic expertise, diagnostic software and diagnostic material. Users are able to query each of these databases and access results. A national sample submission form and protocol is also available for jurisdictions submitting samples to agencies that do not have a standard form.

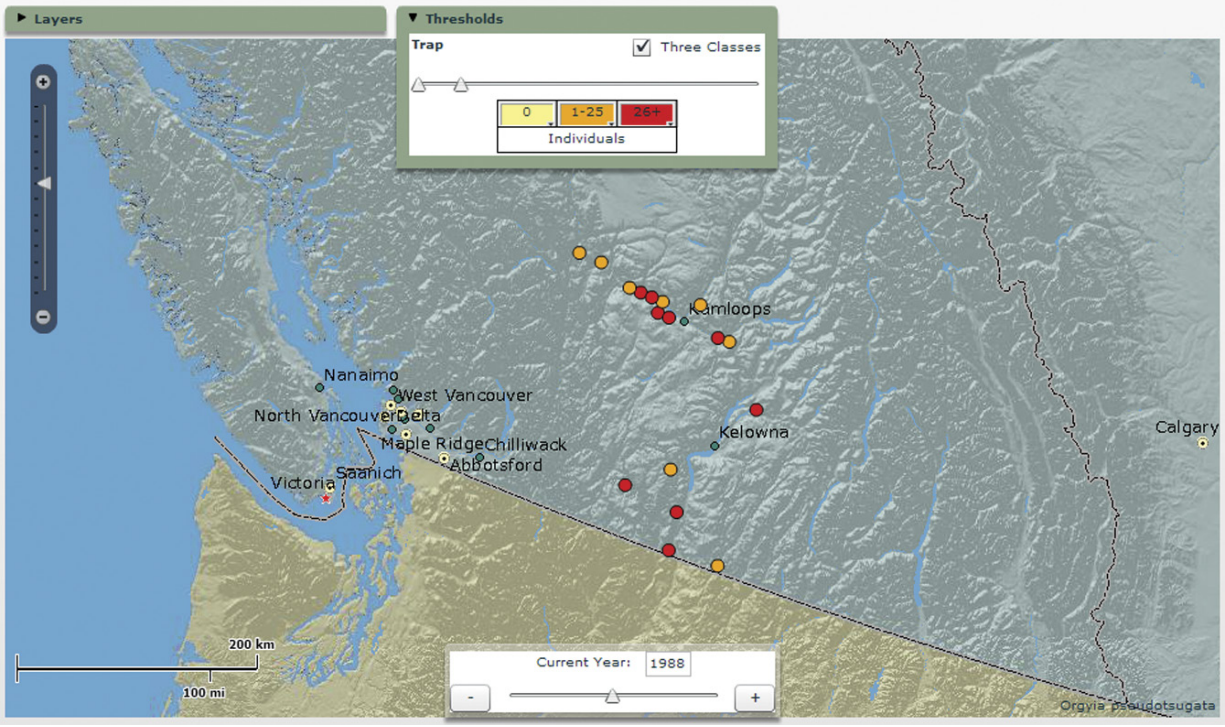


Figure 5. Example of query results displaying web-mapping features, available in the Pest Strategy Information System.

REFERENCE MATERIALS

This portion of the database contains information pertaining to management, survey methodologies, forest health training resources, textbooks and general information. Much of the information will be accessible within the PSIS. However, some materials, particularly textbooks, will not be available online.

DATA UPLOAD

The data upload web application gives the data providers an easy means of securely putting their pest data (in its native format) onto the PSIS server. The data remains formatted in its native form, so there is minimal effort required on the part of the data owners.

Once the update is detected on the server, an application will be executed to standardize the content and publish it to the PSIS portal.

It is expected that most organizations will update their data once or twice a year, but the system could accommodate daily updates if that approach is preferred by the data provider.

LINKS TO OTHER WEB SITES

Links to government and other related forest pest sites will be maintained on the PSIS web portal.

Current Status of the PSIS

A web portal housing authoritative forest pest data and information will be completed by mid-2012. The system includes tools to query, visualize and export current and historic forest pest survey data, forest pest diagnostic resources (online diagnostic tools, resource materials, pest brochures, etc.), a resource list providing diagnostic and taxonomy services, and a national sampling submission form and sample submission protocol.

At present, the system has been populated with pest survey content from New Brunswick, British Columbia, and the CFS (including from the Forest Insect and Disease Survey [FIDS] Infobase).

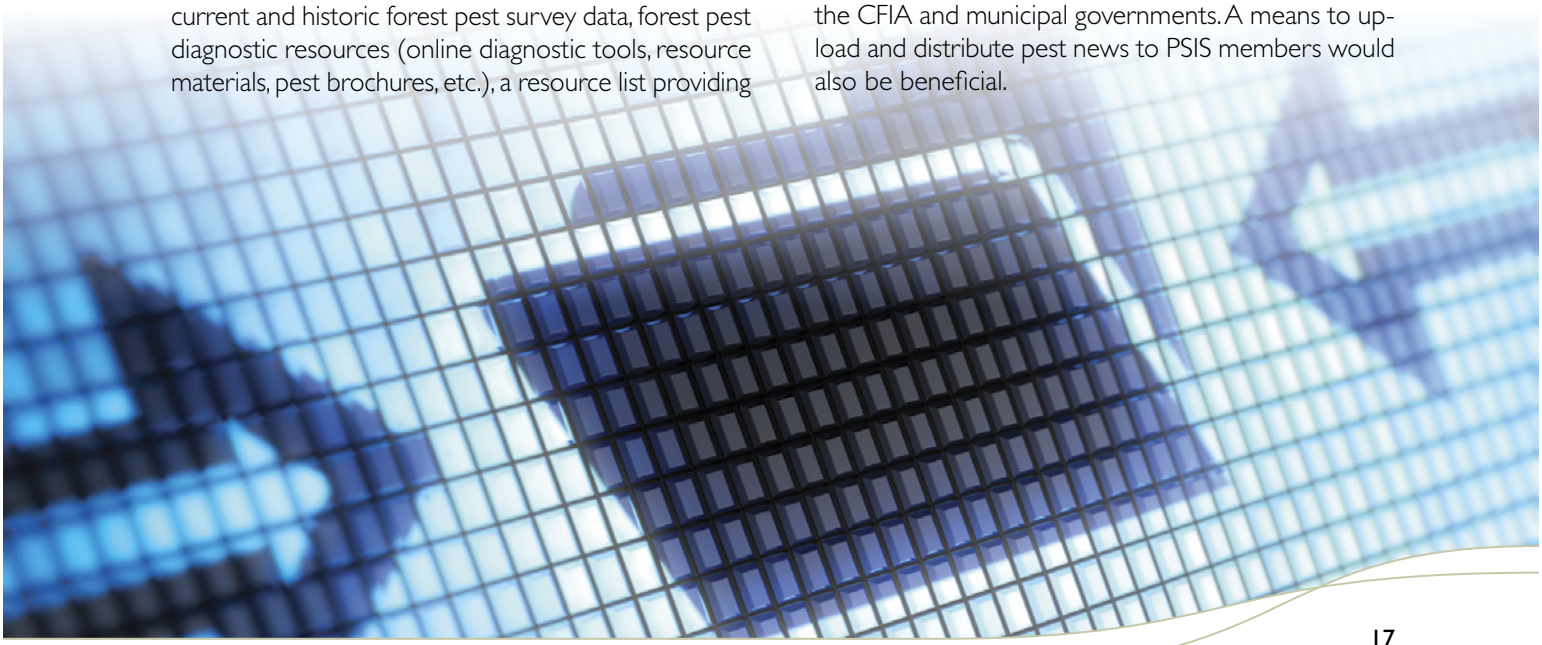
A commitment has been made by the CFS (Atlantic Forestry Centre) to maintain and support the PSIS, as long as the provinces and territories are willing to contribute their data. Some provinces and territories have indicated a preference for a long-term commitment or memorandums of understanding to ensure that their efforts have a long-lasting legacy available to forest pest managers throughout Canada.

Next Steps

The following tasks are required to complete full development of the PSIS:

1. Develop data-sharing agreements with jurisdictions.
2. Load survey content from remaining jurisdictions (including metadata and data dictionaries).
3. Improve mapping performance.
4. Identify a means to ensure that metadata is acknowledged and read by end-users in order to eliminate pest data interpretation errors.
5. Build charting and reporting functionality.

Ideally, other sources of pest survey information should also be incorporated into the PSIS, including that from the CFIA and municipal governments. A means to upload and distribute pest news to PSIS members would also be beneficial.



APPENDIX 1. ABBREVIATIONS

AAFC	Agriculture and Agri-Food Canada
CCFM	Canadian Council of Forest Ministers
CFIA	Canadian Food Inspection Agency
CFS	Canadian Forest Service
DACS	Distributed Access Control System
FIAS	forest invasive alien species
FIDS	Forest Insect and Disease Survey
IPM	integrated pest management
NFPS	National Forest Pest Strategy
NGO	non-governmental organization
NRCan	Natural Resources Canada
PMRA	Pest Management Regulatory Agency
PSIS	Pest Strategy Information System