Using Free and Open Source Software to deploy a Spatial Data Infrastructure: Canada's National Forest Information System (NFIS Canada)

Brian Low and Dr. Robin Quenet

September 2006

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II. Architecture
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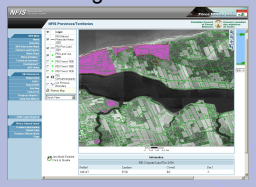
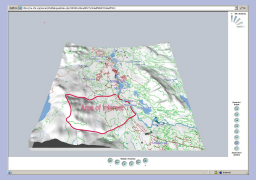
Vision

"The National Forest Information System vision is to acquire and disseminate authoritative information from jurisdictional sources in support of reporting on sustainable forest management." CCFM Iqaluit, August 2000

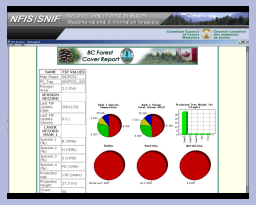
Publishing



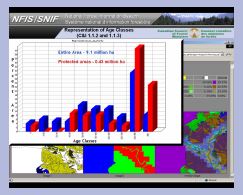
Area of Interest



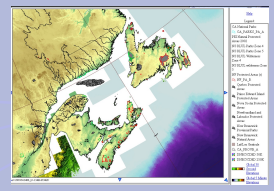
Data Analysis



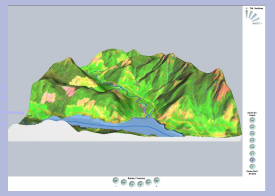
Spatial Analysis



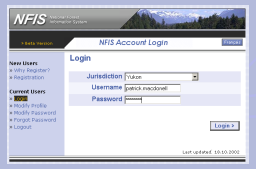
Data Integration



Terrain Server



Security



Goal

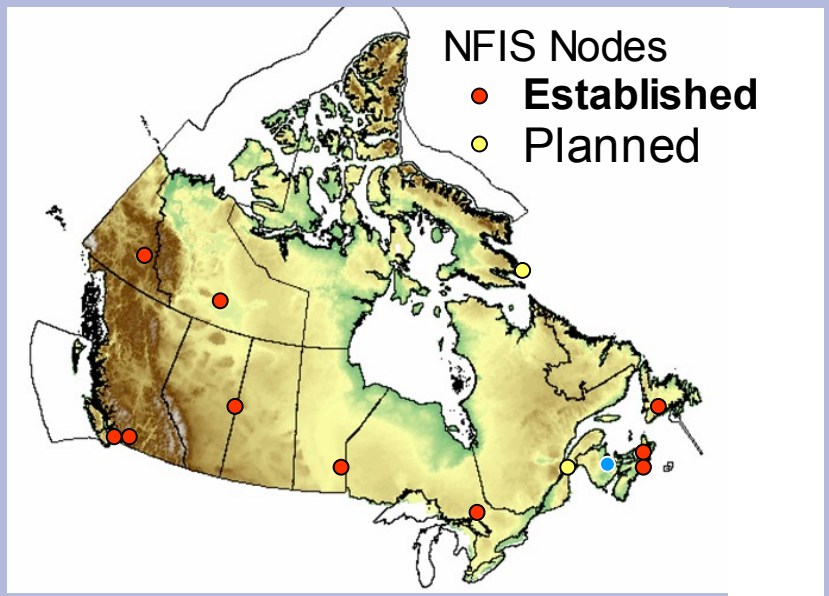
NFIS Canada will be the authoritative source for all forestry information for Canada

Users can discover, integrate, analyze, and display current authoritative information on Canada's Forests and on sustainable forest management.

The NFIS Canada Federation

- Federal, Provincial and Territorial Governments cooperating in the delivery of national forest information on the Web
- Authoritative information accessed from distributed custodial data holdings according to the Canadian Geospatial Data Infrastructure (CGDI) (http://www.cgdi.gc.ca) and Open Geospatial Consortium (OGC) specifications

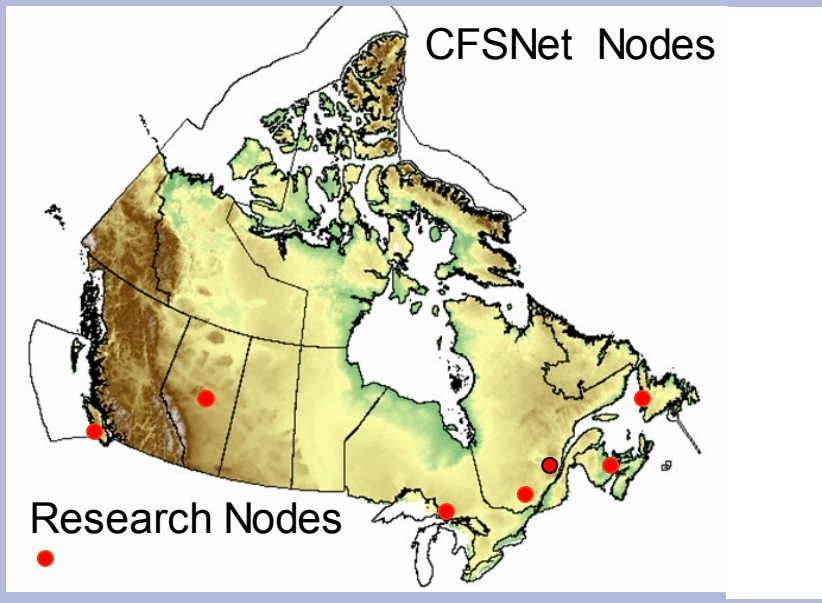
Member agencies retain autonomy of business practice & technology
Low participation overhead
Shared development



CFSNet

- CFS Centres and Ottawa HQ and Corner Brook
- Authoritative information accessed directly from researchers and operational teams

CFS Development teams working with researchers, scientists, communications and IT staff across the country at CFS centres.



Current Status:

Provincial/Territorial Jurisdictions Connected

Alberta
British Columbia
Manitoba
New Brunswick
Nfld. & Labrador
NWT
Nova Scotia
Nunavut
Ontario
PEI
Quebec*
Saskatchewan
Yukon
(*Continuing discussion)

Federal Jurisdictions Connected

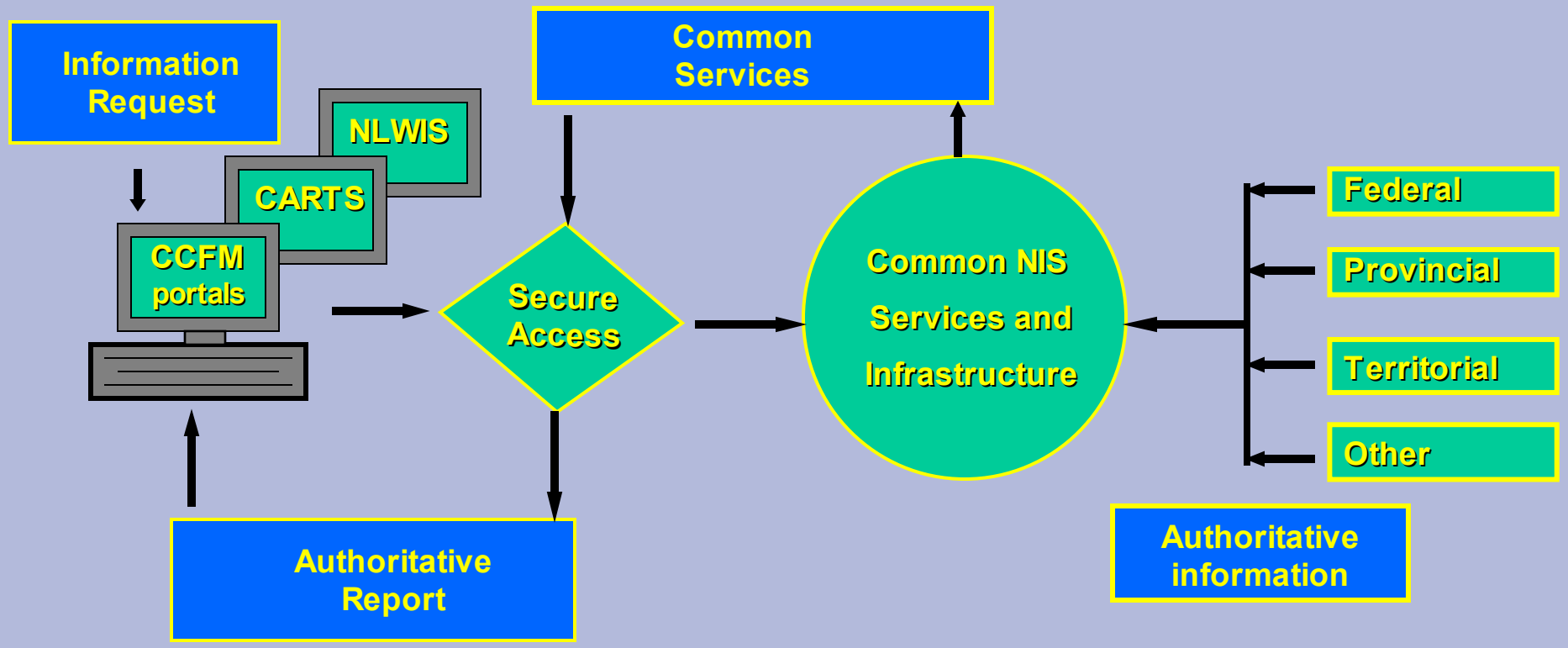
CFS Centres and HQ (7 nodes)
Agriculture and Agri-Foods Canada
Canadian Geoscience Knowledge Network
Canada Centre for Remote Sensing
Centre for Topographic Information
Fisheries and Oceans Canada
Environment Canada
GeoConnections

Others

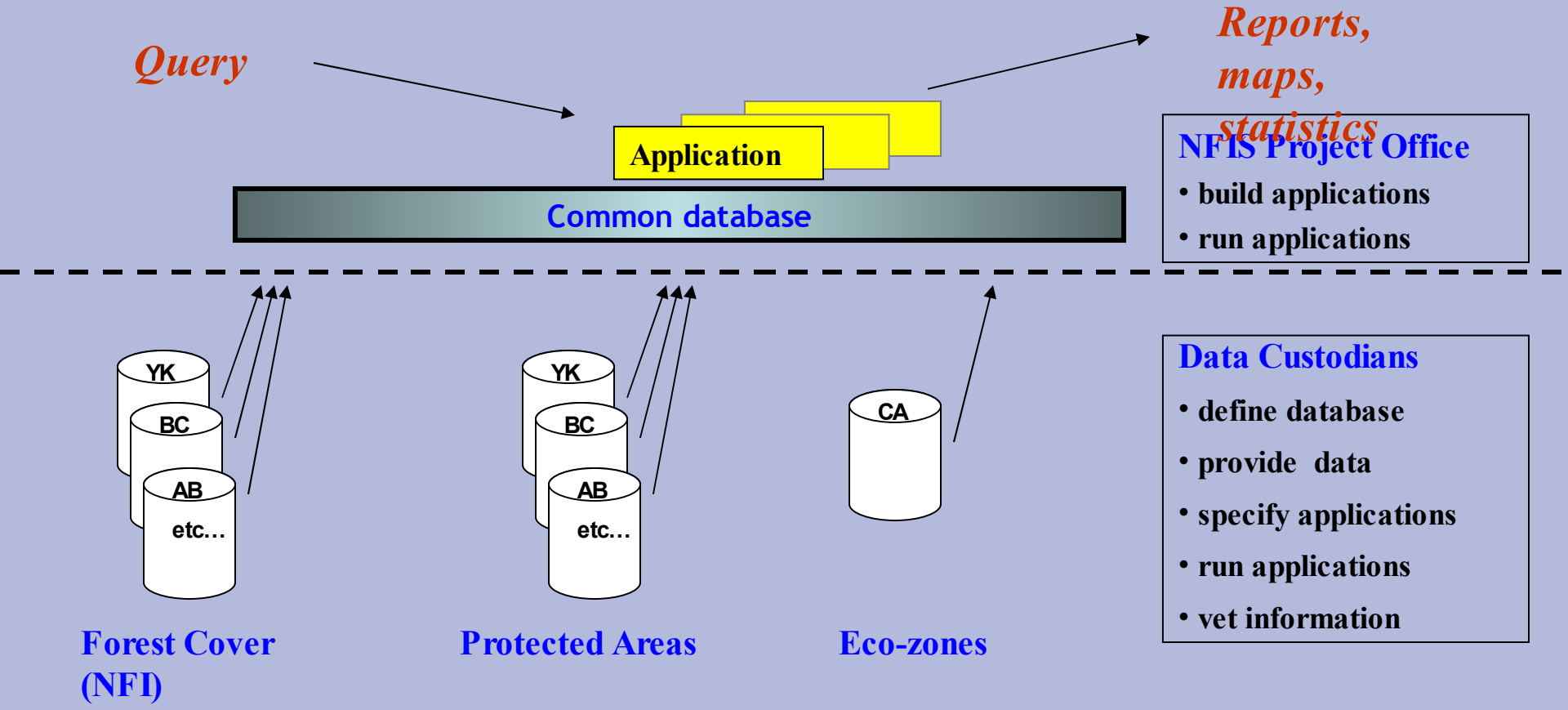
NOAA
CubeWerx

- Architecture

Sharing a Common Architecture



Common Applications operating against Common Databases



NFIS Project Office
- build applications
- run applications

Data Custodians
- define database
- provide data
- specify applications
- run applications
- vet information

Common Applications operating against Different Databases

Query

Reports, maps, statistics

Application

Common Database

Attribute Translations

NFIS Project Office

- build applications
- run & manage applications

Vegetation
Ownership
Disturbance
etc…

British Columbia

Vegetation
Ownership
Disturbance
etc…

Alberta

Vegetation
Ownership
Disturbance
etc…

Nova Scotia

Data Custodians

- corporate database definitions
- provide data
- specify applications
- vet information
- control access of data

NFIS services

NFIS and CFSNet are based on CGDI endorsed services and OGC standards and use the following services:

- Map publication service (WMS)
- Feature service (WFS)
- Terrain and Grid service (WCS)
- Rules for web mapping, visualization and analysis (SLD)
- Data and attribute publication service (GDAS)
- Catalogue, metadata registry services (WRS)
- Services for schema translation/mapping (WPS)

Open Source Solution

Over 80% of the NFIS / CFSNet infrastructure use Open Source Software solutions for both Hardware and Software replacements to COTS.

Software solutions:

Open Source Solution

NFIS and CFSNet nodes use the following Open Source products (aka SDI-in-a-Box) :

- Linux Fermi LTS
- Apache Web Server - ModSSL
- Apache Tomcat – Java Web Container
- DACS – Distributed Access Control System
- Mapserver – curl, gd, gdal/ogr, jpeg, libgeotiff, libpng, php, proj, xerces, zlib
- Chameleon
- KaMap
- GDAS – GeoLinking Data Access Services

Infrastructure level solutions:

- MySQL
- Nagios – Monitoring and Heart Beat Services
- PostgreSQL
- PostGIS
- Sequoia – High Availability, Load Balanced JDBC layer for Postgres and other RDMS
- Wiki – collaborations
- WebCalc (WikiCalc) – scientific collaborations

Hardware solutions:

Open Source Solution

NFIS Project Office deployed several CISCO Content Service Switches ~ $30 K each.

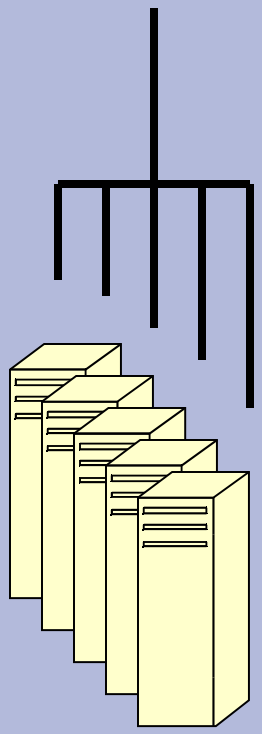
Currently end of life products with no support

Open Source Solution

CISCO CSS

Switch

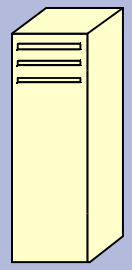
Backend Servers



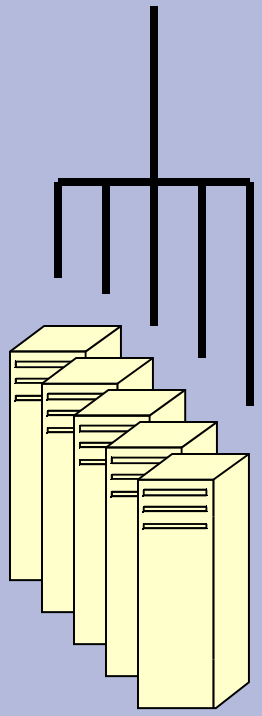
Linux

LVS

Ldirectord



Backend Servers



Open Source Solution

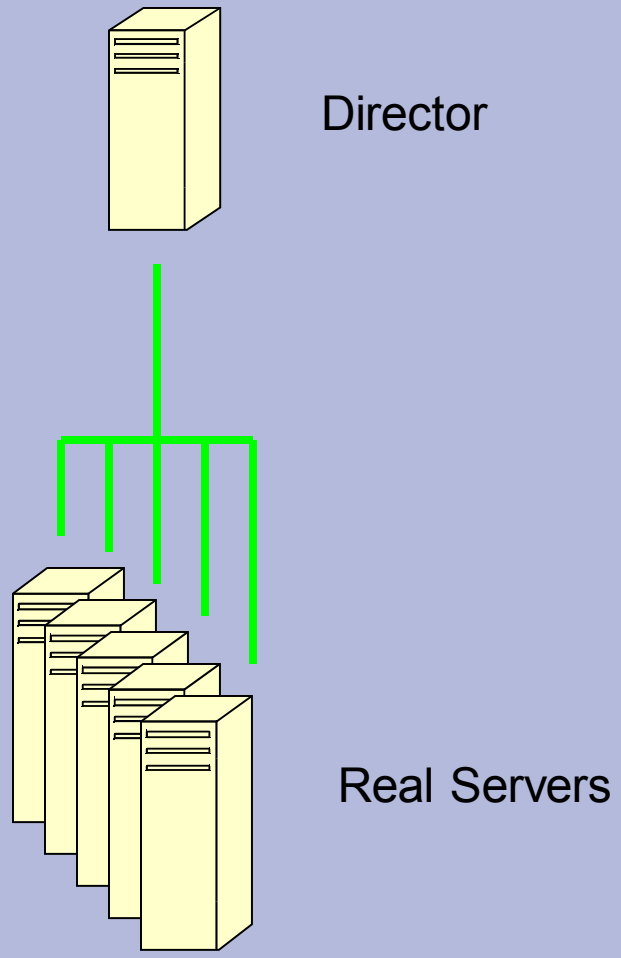
Load Balancers are based on:

- Fedora Core 5
- Compact Flash 1GB
- CF – IDE interface
- HP Compaq computer
- LVS
- Ldirectord

The Linux Virtual Server

The LVS Project allows for the load balancing of Web services from a set of real servers by a director server.

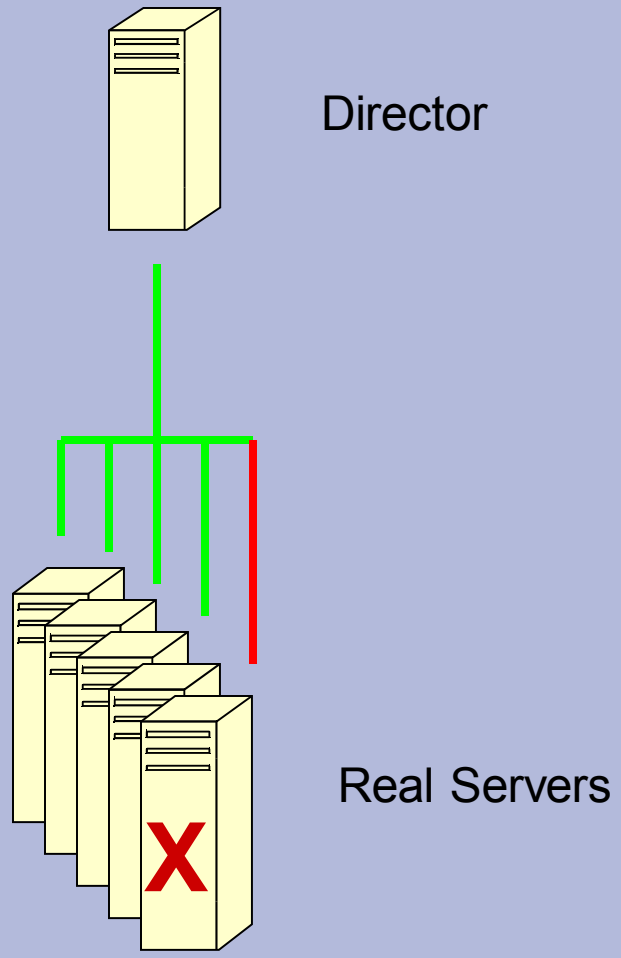
Several servers will act like a single server from the users perspective



Open Source Solution

High Availability achieved by monitoring / checking for heartbeat of real servers.

Ldirectord monitors the health of the Real Servers and will adjust the Director LVS tables to accommodate for changes.



- Initiatives & Applications that rely on Open Source Solutions

Example Deployed Applications

- NFDP Web Form Capture
- NFI Metadata Tool
- NFI Spatial Analysis
- NAI National Afforestation Inventory
- Forest Invasives (CFIA)
- CBM Carbon Budget Model Download tool
- Boreal Initiative
- Biodiversity Initiatives
- Parks and Protected Areas reporting

CFSNet Applications

1 Canadian Biomass Innovation Network Biomass Inventory Portal: Purpose-Grown and Opportunity Sources of Woody Biomass for Bioenergy
2 Canadian Photovoltaic Potential Maps
3 Canadian Wildland Fire Information System
4 Climate maps on the web
5 Control of Scleroderris Canker in Red Pine
6 Defining critical loads of N and S for the Georgia Basin, BC
7 Earth Observation for Sustainable Development of Forests (EOSD)
8 Fire Regimes of Eastern Canada from 1961 to 1990
9 Forest Ecosystem Mapping in Canada (FEMIC) data supply
10 Forest Ecosystem Mapping in Canada - FEMiC V1.0W
11 Historical Database FluxNet - Chibougameau (1928-2003)
12 Insect and Disease Risk Mapping
13 LFC Knowledge transfer
14 Mountain Pine Beetle Internet Tool
15 National Afforestation Inventory
16 Ontario Ministry of Natural Resources climate/climate change portal
17 Petawawa Research Forest (PRF) Internet Mapping Tools
18 PlantHardiness Mapping –(Climate and climate change effects on plant species in North America)
19 SEEDWHERE V3.1W
20 Tree species of concern KMS
21 Turkey lakes
22 WebCalc
23 SDI Infrastructure Footprint - SDI-in-a-Box (a.k.a. NFIS-in-a-Box)

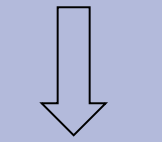
Security

- Security - Access Control

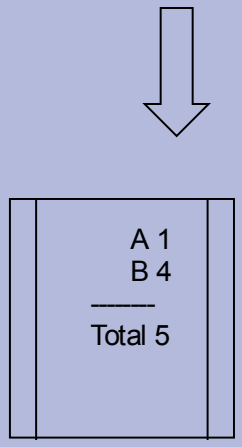
Security

Access Control:

We want report A



We want report B



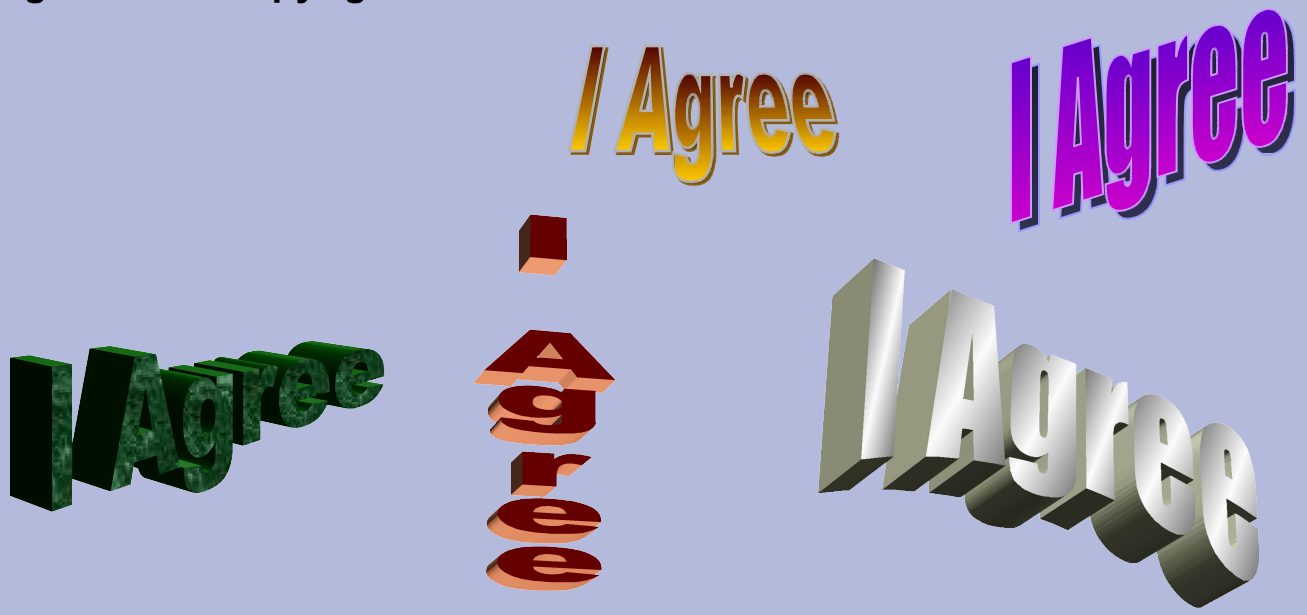
Security

We need to be able limit access:

- Who sees the information?
- Who can add information?
- Who can edit information?
- How they see it?
- When they see it?
- Where they see it?

Digital Rights Management:

End user licensing, data custodian recognition… Right of Canada…. Provincial/Territorial.. Partner Recognition… Copyright ©

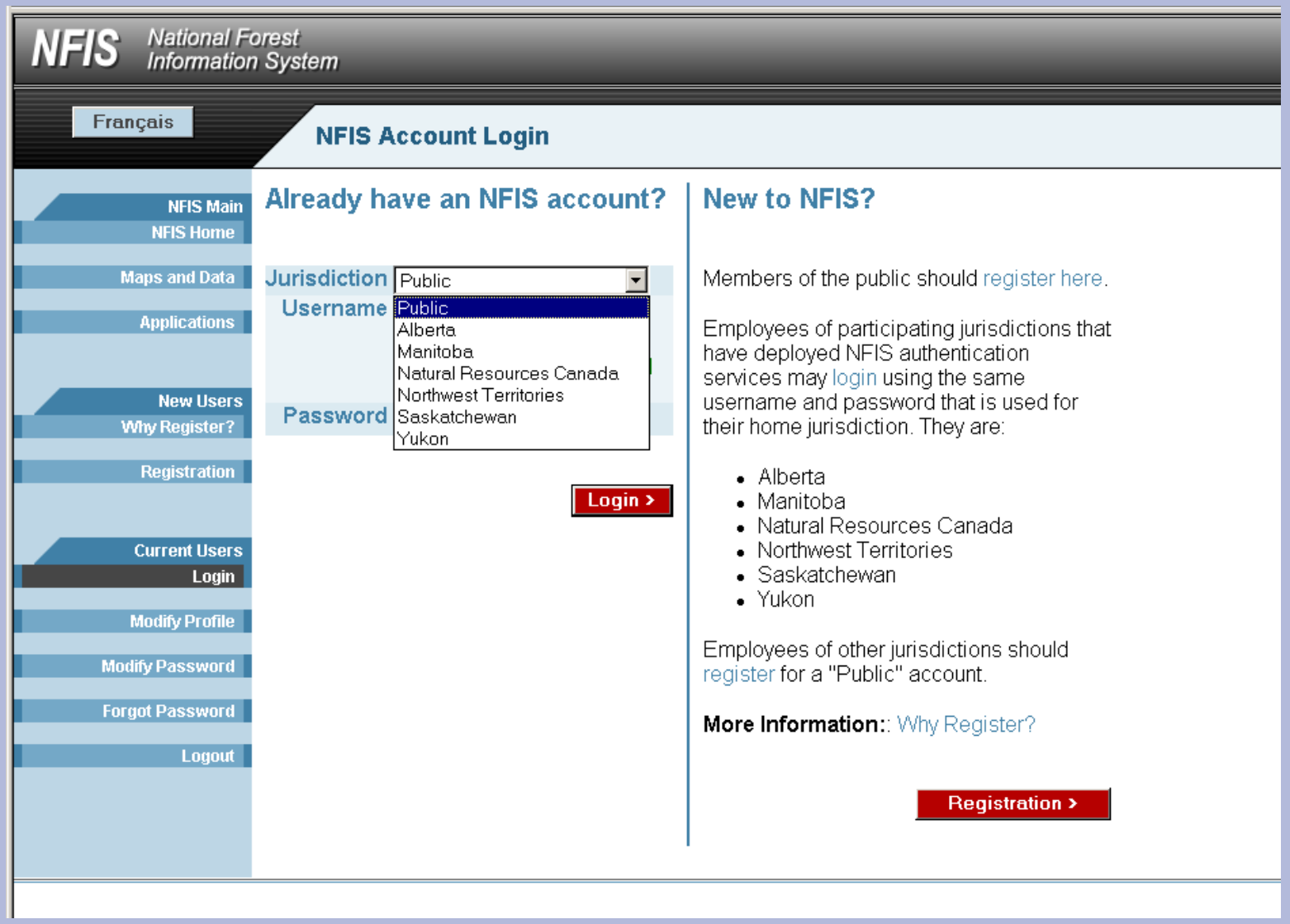


DACS – Distributed Access Control system

Is a open source identity management system based on single sign-on within a federation. It allows access from role-based access control methods and access control lists. It allows for multiple authentication methods to co-exist within a federation.

http://dacs.dss.ca

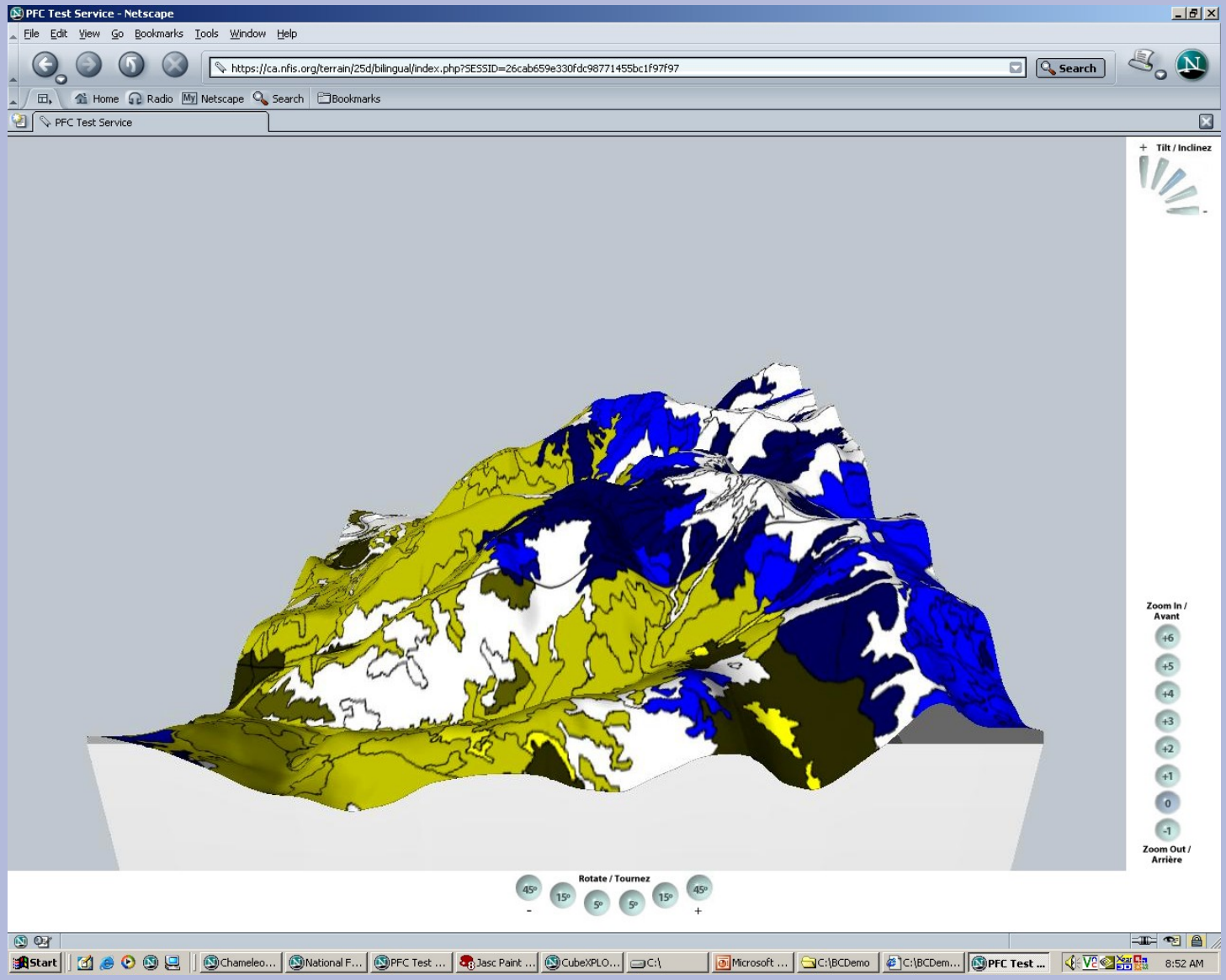
Access Control



Typical uses NFIS Services

- Spatial Operations / Integrations

Forest Cover on DEM

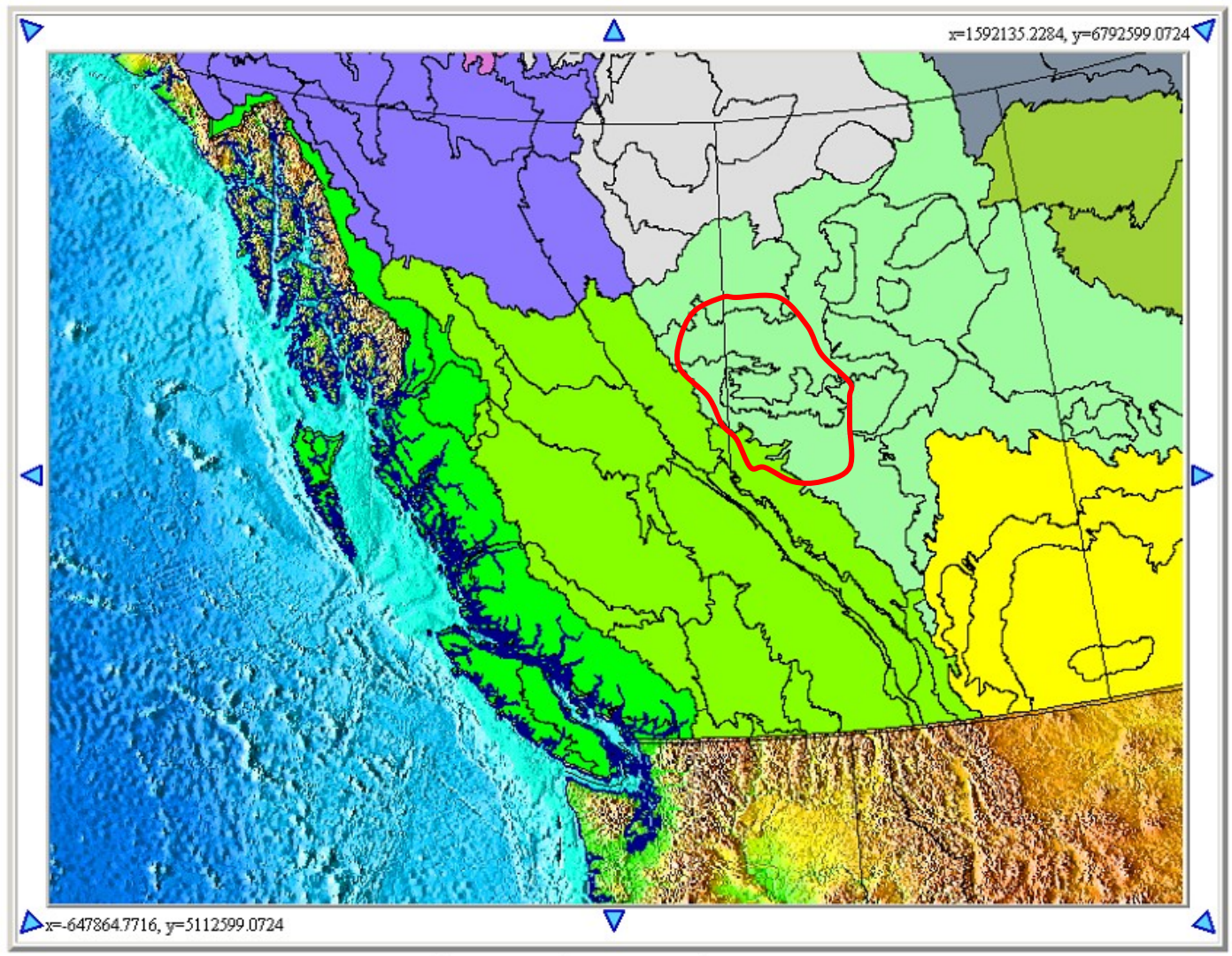


PostgreSQL - PostGIS

- Elevation models loaded into PostGIS – PostgreSQL
- Service is invoked by using a URL encoded OGC GetMap call

- PostGIS and Terrain Server by: (http://www.refractions.net)

Area of Interest



Area of Interest

Existing Geometry (GML) or User Digitized Area (AOI)

- Attribute and data discovery tool
- Min, Max, Arithmetic Mean, Median, Mode, Standard Deviation and Frequency Distribution for a given attribute

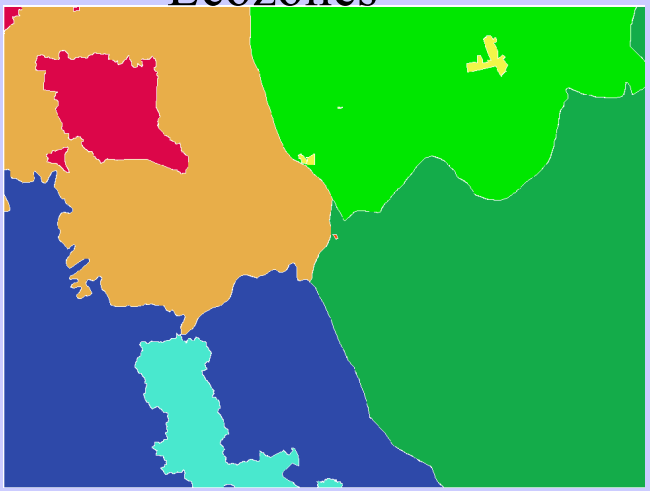
Existing Geometry or User Digitized Area (AOI)

- Implementation based on Chameleon with Mapserver: WFS, WMS and GDAS (http://chameleon.maptools.org)
- Implementation of R Statistical package (http://www.r-project.org)

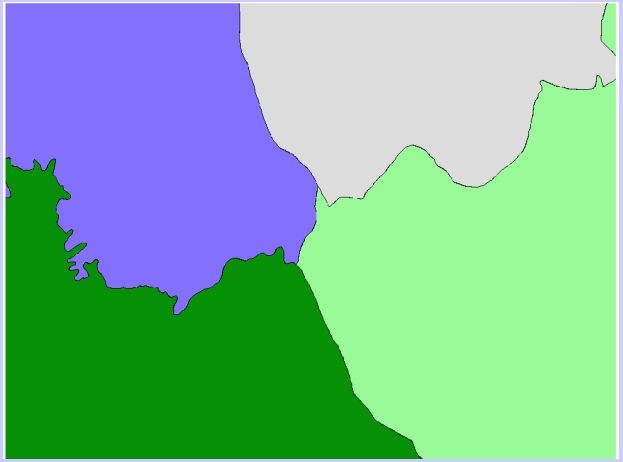
Distributed Spatial Analysis Architecture

- Based on Web enabled WMS Getmap requests that is used as inputs into Raster style GIS operations

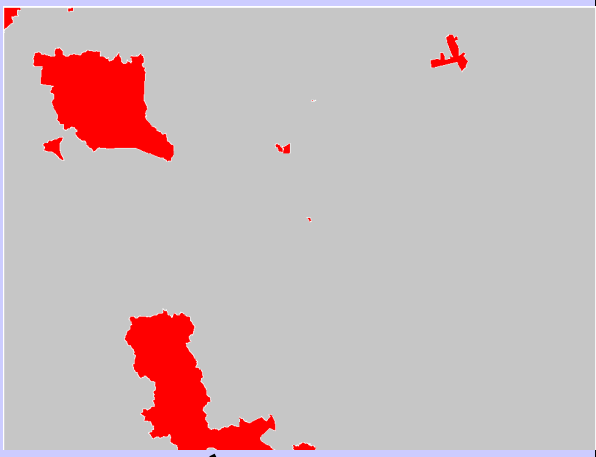
Protected Areas by Ecozones



Ecozones



Protected Areas



Resultant				Image 1		Image 2	
Name	Colour	Area (ha)	Pixel Count	Name	Colour	Name	Colour
Protected Boreal Plains		64.414	22	Boreal Plains		Protected Area	
Protected Taiga Plains		4854.460	1658	Taiga Plains		Protected Area	
Protected Montane Cordillera		81070.658	27689	Montane Cordillera		Protected Area	
Protected Boreal Cordillera		82856.678	28299	Boreal Cordillera		Protected Area	
Non-Protected Taiga Plains		430287.298	146961	Taiga Plains		Non-Protected Area	
Non-Protected Boreal Cordillera		473418.212	161692	Boreal Cordillera		Non-Protected Area	
Non-Protected Montane Cordillera		490628.415	167570	Montane Cordillera		Non-Protected Area	
Non-Protected Boreal Plains		720749.744	246166	Boreal Plains		Non-Protected Area	

Distributed Spatial Analysis Architecture

- Operations include:
  - Overlays
  - Point Buffers
  - Line Buffers
  - Masks
  - Remaps - Reclassifications
  - Pixel Area calculations
  - Interpolations: Mode, Mean, Medium, Nearest Neighbours
  - Maximums, Minimums

- Publishing – Thematic Portals

Thematic maps are generated using technologies from

Mapserver:

WMS, WFS

and clients:

- **Chameleon**
- **GMAP 75**
- **Ka Map**

Portals

NFIS National Forest Information System

Themed Portals

Canadian Council of Forest Ministers | Conseil canadien des ministres des forêts

- Operational Services
  - Maps and Data *
  - Featured Applications *
- Knowledge Base
  - About NFIS
  - Current Development
  - Documentation
- Site Resources
  - Home
  - Login
  - Search
  - Site Map
  - Contact Us
  - Important Notices

* = You will be prompted to login

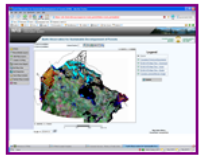
Public | Provinces & Territories | Topic Areas | Scientific | CFSNet

These portals provide a view of Canada's protected areas, land cover, the boreal, and others.

To view, please click an image:

NFIS Protected Areas Portal

Contains data related to Canada's protected area's.



EOSD Portal

The Earth Observation for Sustainable Development of Forests (EOSD) initiative is developing a land cover map of the forested area of Canada. The EOSD Portal contains the following data:

1. Canada Landsat Mosaic
2. EOSD NTS Map Tiles (Vector and Raster)
3. Ability to download EOSD Map Tiles.

Georgia Basin Nitrogen Deposition Study

The Georgia Basin Nitrogen Deposition Study is analyzing the nitrogen build up in the Georgia Basin Ecosystem. This portal contains a collection of data that is being used in the analysis which includes:
BCSIS Soil data, BioGeoclimatic / ecozone data, Forest Cover data, Temperature / climatic data, Malcolm Knapp Research Forest data, Other various data
Access to this data portal may be restricted.

Boreal Forest Portal

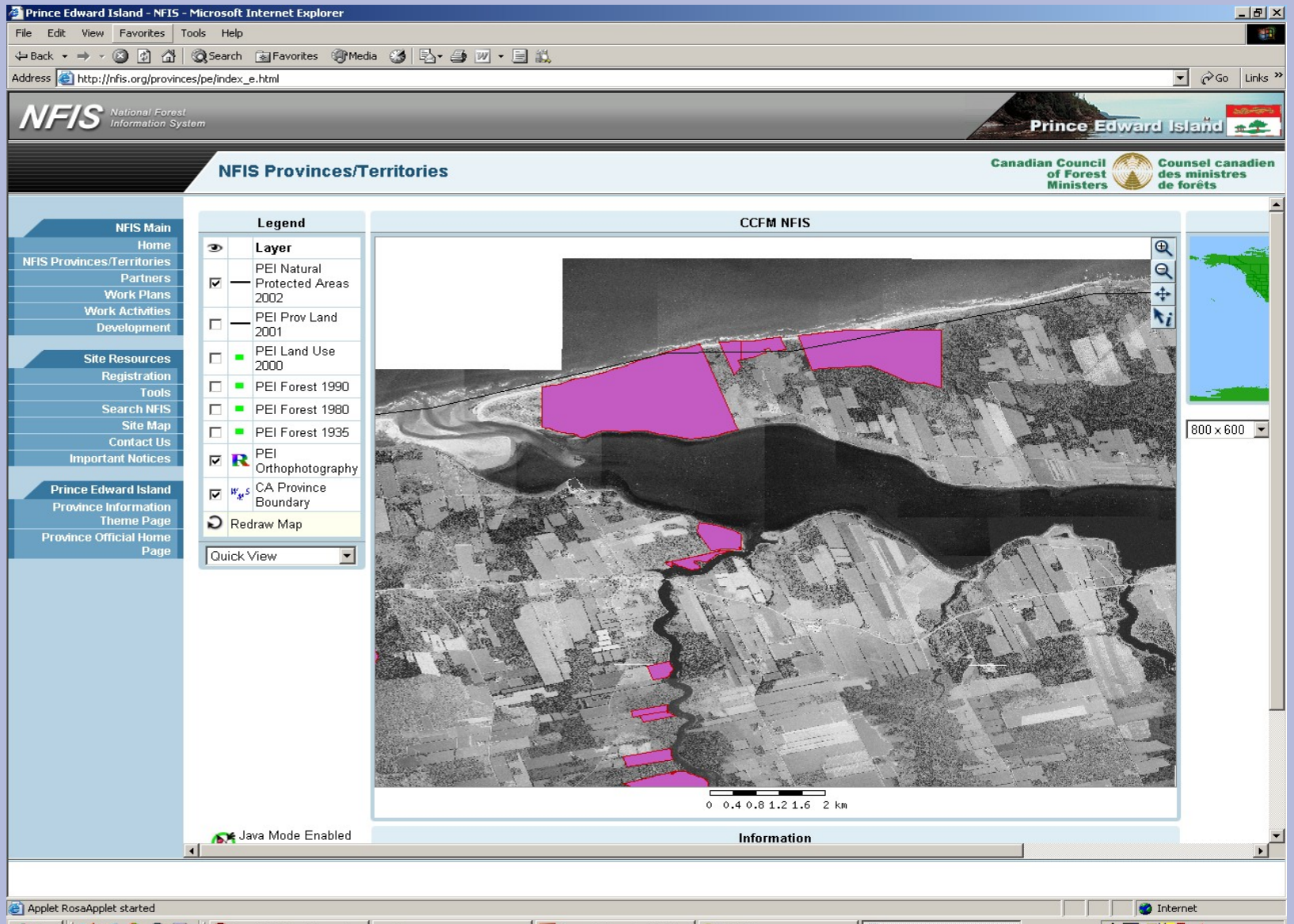
The Boreal Forest Portal contains spatial data about the Boreal region of Canada.
Access to this data portal may be restricted.

NFIS/SNIF

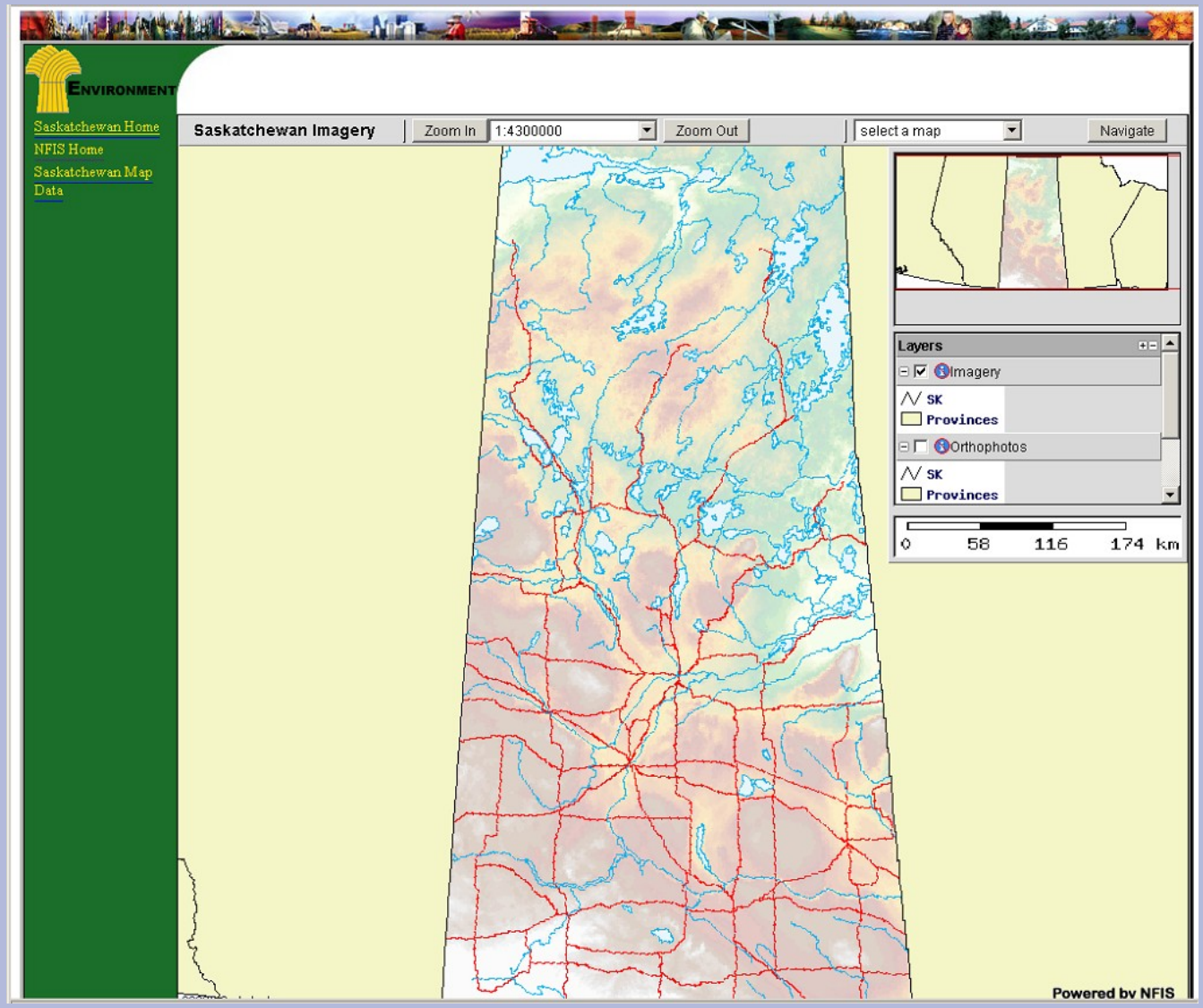
National Forest Information System
Système national d'information forestière

PEI Public Portal

Canadian Council of Forest Ministers
Counsel canadien des ministres de forêts



Saskatchewan Public Portal



CFSNet

Forest Ecosystem Mapping in Canada

PFC

Français

Errors

Move/Delete Layers

Add Map Layers

Create 3-D Map

Set Map Size

Set Projection

Help

More Info

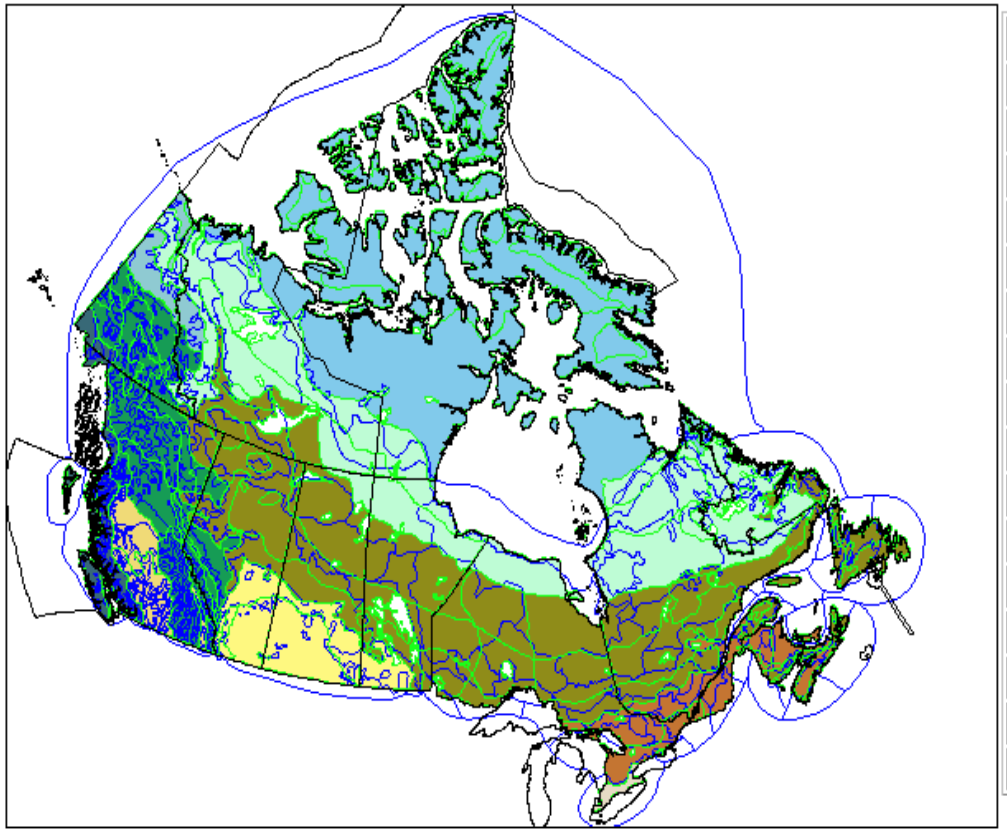
Reports

Zoom Factor: 2

Map Units: Metre
Projection: =epsg:42304

X Cursor position: 2352670
Y Cursor position: -633778

X: 3560755 , Y: 3906950



X: -2687955 , Y: -779581

0 900 1800 2700 km

Scale 1: 29521477 go

Themes

	Name
☑	Provincial boundaries
☐	Roads 7.5M
☑	Ecoclimatic Regions (1989) - Lines
☑	Rowe's Forest Sections - Lines
☐	BC Biogeoclimatic Zones/Subzones - Lines
☐	Ag Canada / Env Canada - Ecodistricts (1999) - Lines
☐	Ag Canada / Env Canada - Ecoregions (1999) - Lines
☐	Ag Canada / Env Canada - Ecoprovinces (1999) - Lines
☐	Water areas
☐	NS Ecological Land Class
☐	Ontario ELC
☑	Ecoclimatic Provinces (1989) - Area
☐	Rowe's Forest Regions - Area
☐	Ag Canada / Env Canada - Ecozones (1999) - Area
☐	Canada Landsat Mosaic Image (1990)- Area
☐	DNEC 250K DEM - Area

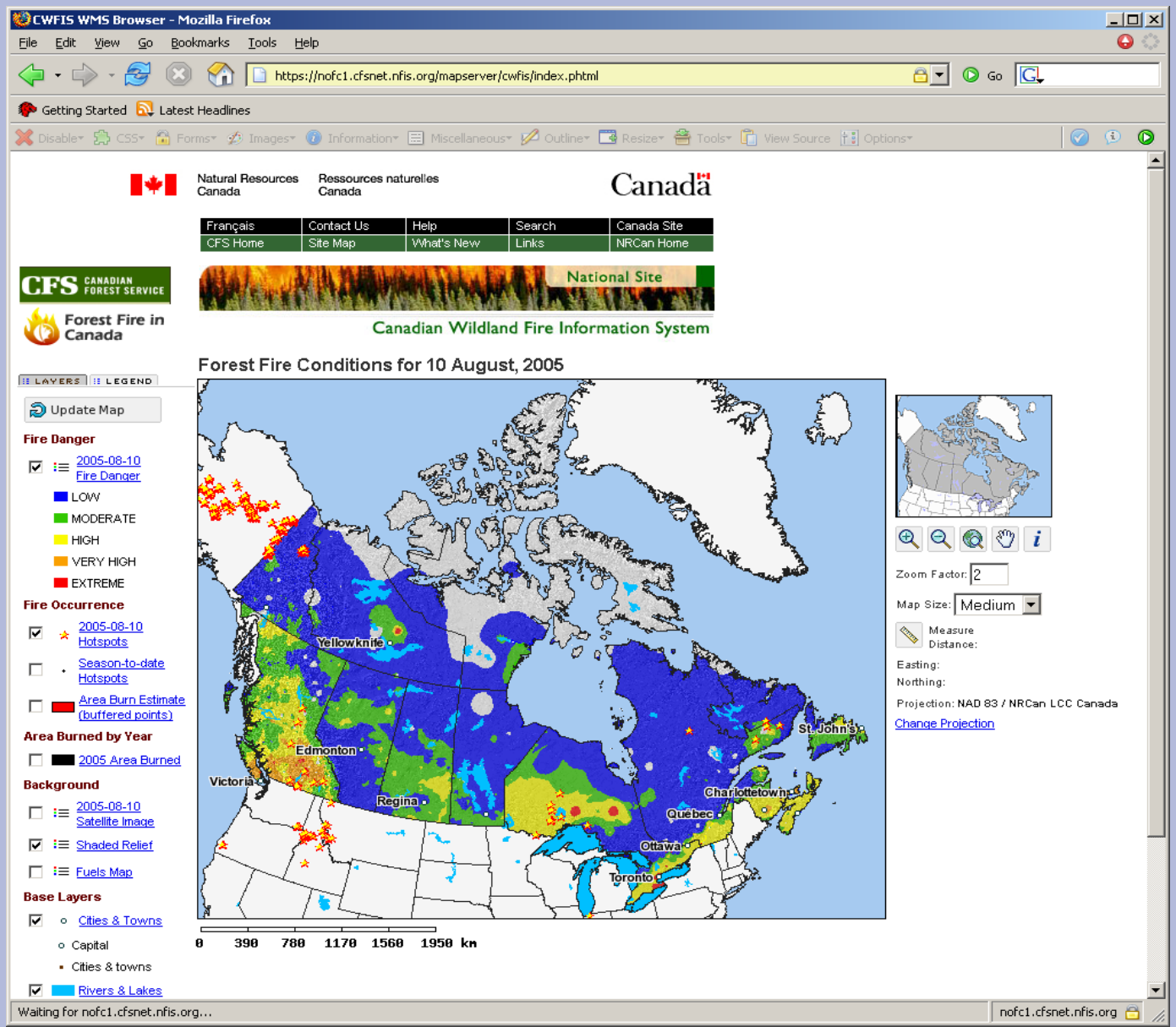
Update

NFIS/SNIF

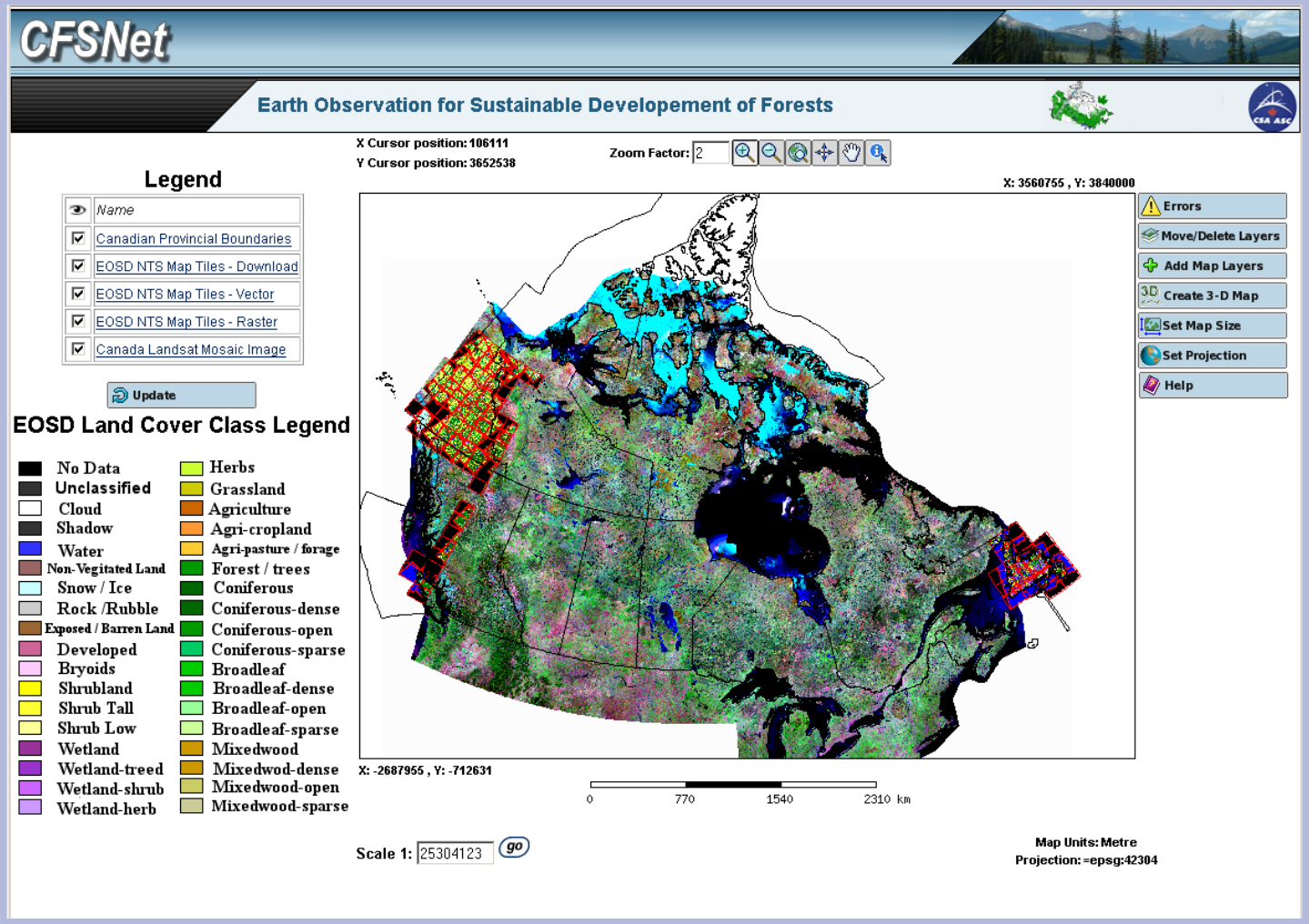
National Forest Information System
Système national d'information forestière

Canadian Wildland Fire Information System

Canadian Council of Forest Ministers
Counsel canadien des ministres de forêts



EOSD


CFSNet
Earth Observation for Sustainable Developement of Forests
X Cursor position: 106111
Y Cursor position: 3652538
Zoom Factor: 2
X: 3560755 , Y: 3840000
Legend
Name
Canadian Provincial Boundaries
EOSD NTS Map Tiles - Download
EOSD NTS Map Tiles - Vector
EOSD NTS Map Tiles - Raster
Canada Landsat Mosaic Image
Update
EOSD Land Cover Class Legend
No Data
Unclassified
Cloud
Shadow
Water
Non-Vegitated Land
Snow / Ice
Rock /Rubble
Exposed / Barren Land
Developed
Bryoids
Shrubland
Shrub Tall
Shrub Low
Wetland
Wetland-treed
Wetland-shrub
Wetland-herb
Herbs
Grassland
Agriculture
Agri-cropland
Agri-pasture / forage
Forest / trees
Coniferous
Coniferous-dense
Coniferous-open
Coniferous-sparse
Broadleaf
Broadleaf-dense
Broadleaf-open
Broadleaf-sparse
Mixedwood
Mixedwod-dense
Mixedwood-open
Mixedwood-sparse
Errors
Move/Delete Layers
Add Map Layers
Create 3-D Map
Set Map Size
Set Projection
Help
X: -2687955 , Y: -712631
0
770
1540
2310 km
Scale 1: 25304123
go
Map Units: Metre
Projection: =epsg:42304

CFSNet

Georgia Basin Nitrogen Deposition Study

Powered by NFIS

X Cursor position: 1022151
Y Cursor position: 537442

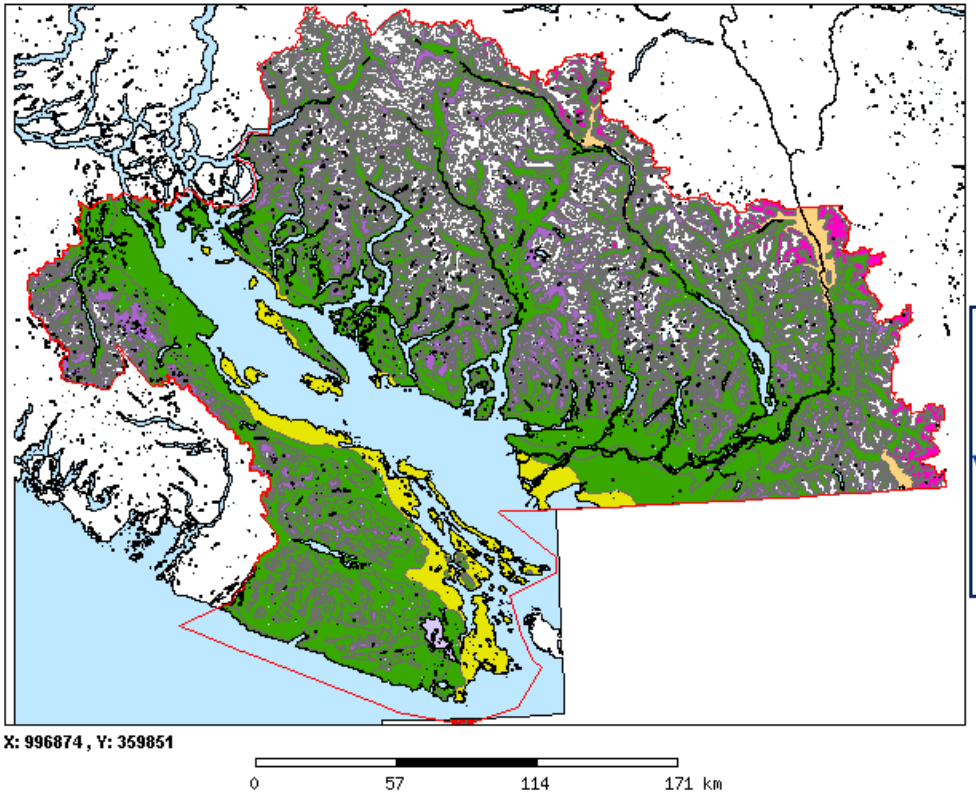
Zoom Factor: 2

X: 1385760 , Y: 651516

Legend

	Symbol	Name
☑		Georgia_Basin_Boundary
☑		Lakes
☑		Ocean
☐		Rivers
☑		River_Polygons
☑		MASS_Study_Area
☐		Malcolm_Knapp_Research_Forest_Study_Area
☑		Shawnigan_Lake_Study_Area
☑		Sooke_Lake_Watershed_Study_Area
☑		BioGeoclimatic_Zones
☐		Bedrock_Geology
☐		Ecoregions
☐		Forest_Cover_Inventory:_All_Layers
☐		PRISM_Minimum_Temperature_Data
☐		PRISM_Maximum_Temperature_Data
☑		PRISM_Precipitation_Data
☐		Soil_Landscapes
☐		Surficial_Geology

Update



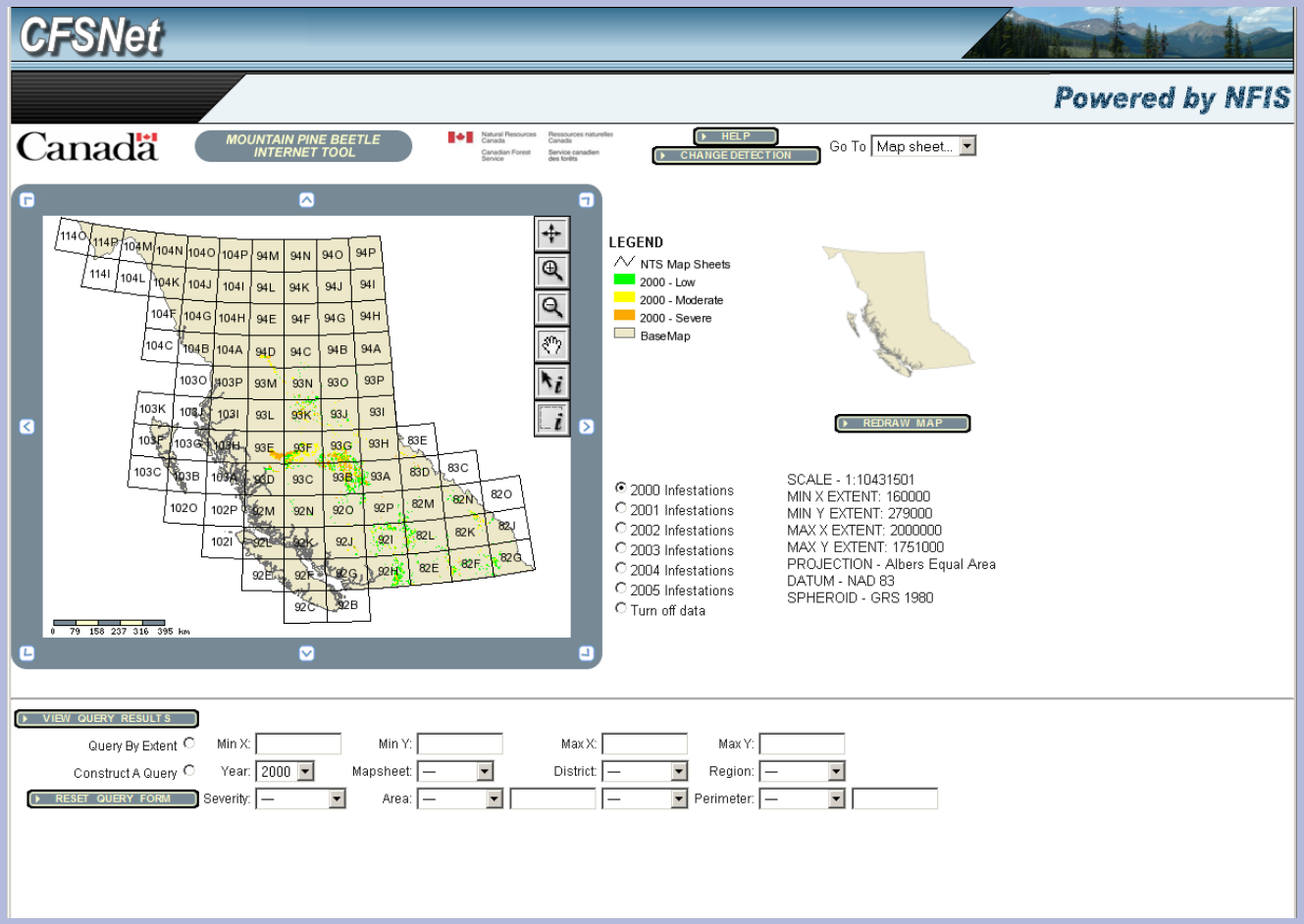
Errors
Move/Delete Layers
Add Map Layers
Create 3-D Map
Set Map Size
Set Projection
Help

WORKING TOGETHER FOR THE GEORGIA BASIN
AU TRAVAIL POUR LE BASSIN DE GEORGIA

Scale 1: 1837260 go

Map Units: Metre
Projection: =epsg:42102

Mountain Pine Beetle



CFSNet

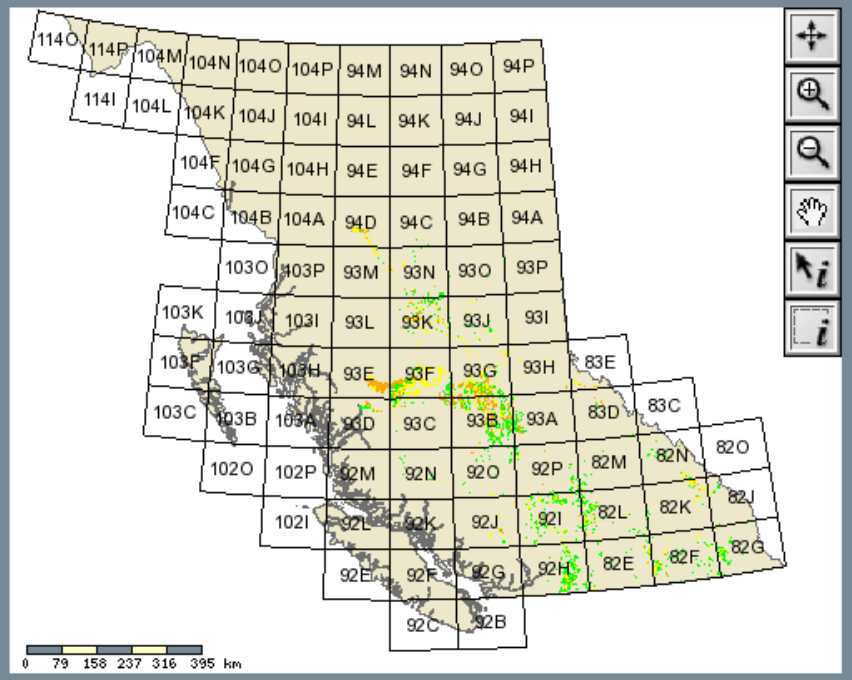
Powered by

Canada

MOUNTAIN PINE BEETLE INTERNET TOOL

Natural Resources Canada / Ressources naturelles Canada
Canadian Forest Service / Service canadien des forêts

HELP | CHANGE DETECTION | Go To: Map sheet...



LEGEND

- NTS Map Sheets
- 2000 - Low
- 2000 - Moderate
- 2000 - Severe
- BaseMap

REDRAW MAP

- (•) 2000 Infestations
- ( ) 2001 Infestations
- ( ) 2002 Infestations
- ( ) 2003 Infestations
- ( ) 2004 Infestations
- ( ) 2005 Infestations
- ( ) Turn off data

SCALE - 1:10431501
MIN X EXTENT: 160000
MIN Y EXTENT: 279000
MAX X EXTENT: 2000000
MAX Y EXTENT: 1751000
PROJECTION - Albers Equal Area
DATUM - NAD 83
SPHEROID - GRS 1980

VIEW QUERY RESULTS

Query By Extent ( ) Min X: Min Y: Max X: Max Y:

Construct A Query ( ) Year: 2000 Mapsheet: — District: — Region: —

RESET QUERY FORM Severity: — Area: — — Perimeter: —

CFSNet

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Canada

MOUNTAIN PINE BEETLE INTERNET TOOL

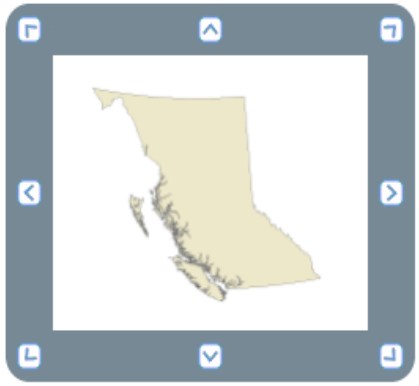
Natural Resources Canada | Ressources naturelles Canada
Canadian Forest Service | Service canadien des forêts

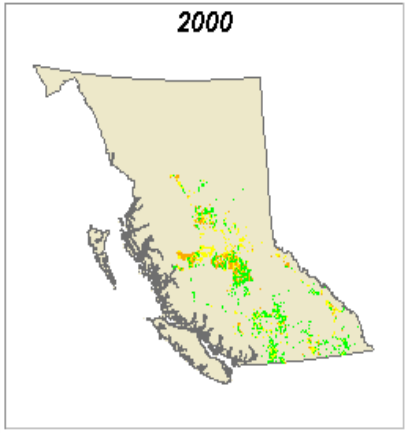
HELP

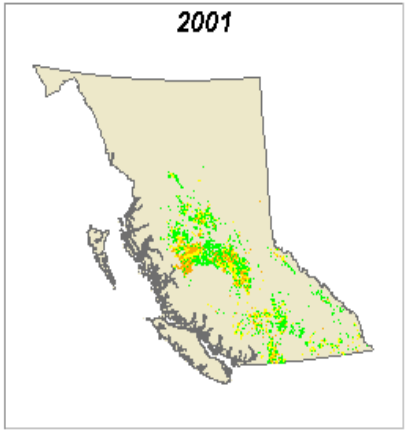
BACK TO MAP

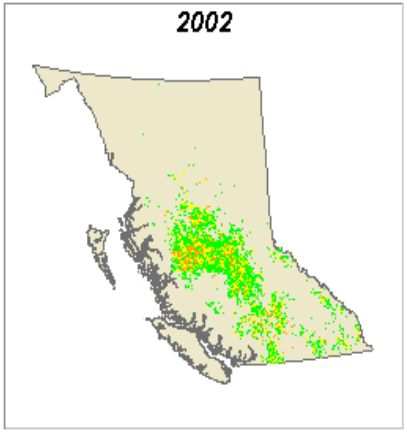
CHANGE DETECTION TOOL

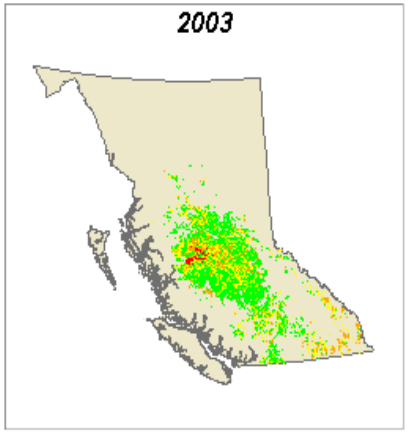
Jump To: Mapsheet...

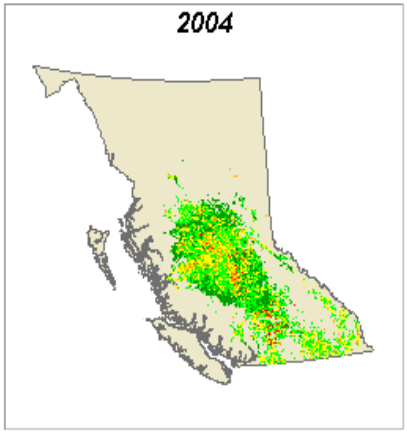


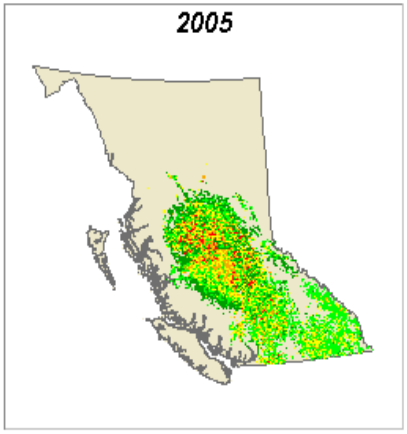












- Dynamic Reports

Dynamic reports are generated using technologies from Mapserver, GDAS, OWT

GDAS – many implementations available:

http://nfis.org

http://maptools.org

OWT Chart Engine – produces dynamic charts based on set of input parameters

http://maptools.org

Canadian Council of Ecological Areas
CCEA CCAE
Conseil canadien sur les aires ecologiques

Conservation Areas Reporting and Tracking System Portal (BETA)

English | Français

X Cursor position: 3444707
Y Cursor position: 2670598

Zoom Factor: 2

X: 3560755 , Y: 3840000

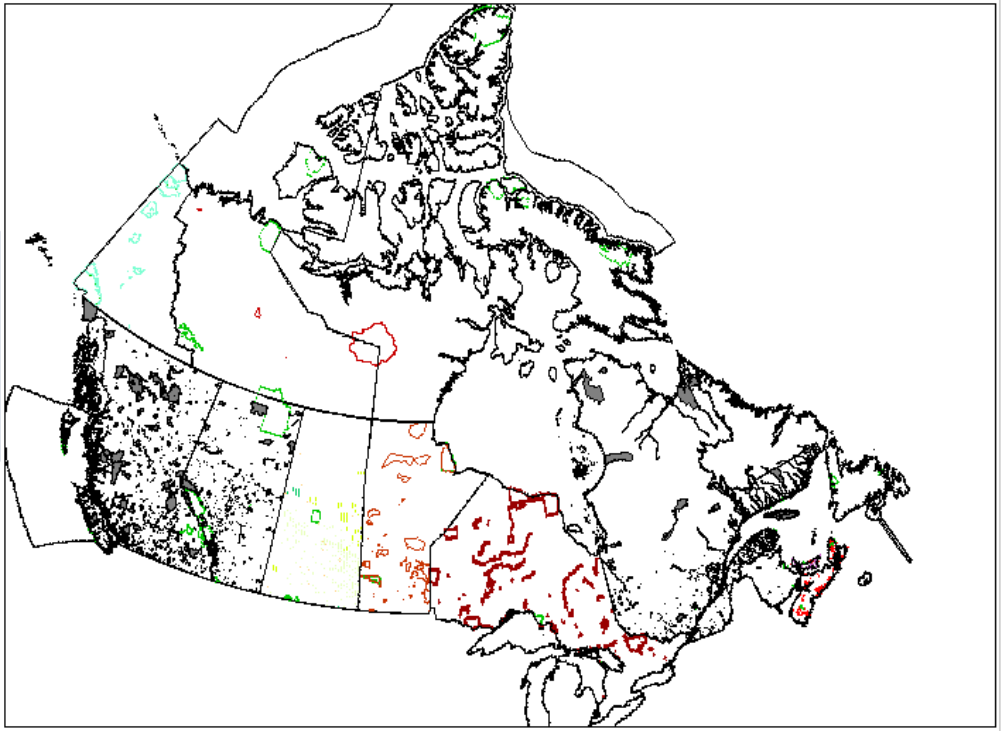
Generate Reports

- Move/Delete Layers
- Add Map Layers
- Create 3-D Map
- Set Map Size
- Set Projection
- Help

Canadian Council of Forest Ministers | Conseil canadien des ministres de forets

WORKING TOGETHER WITH CCEA

AU TRAVAI AVEC CCAE



X: -2687955 , Y: -712631

0 770 1540 2310 km

Powered by NFIS

Scale 1: 25304123 go

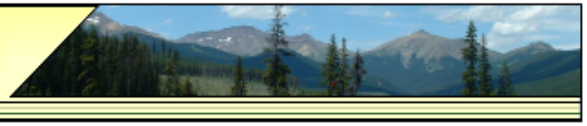
Map Units: Metre

Legend

	Name
☑	Provincial_boundaries
☑	AB Protected Layers
☑	BC Protected Areas
☑	MB Park Outlines
☑	NB Protected Layers
☑	NWT Protected Areas
☑	NS Protected Areas
☑	NU Protected Layers
☑	ON Protected Areas
☑	PEI Protected Areas
☑	QC Protected Areas
☑	SK Protected Areas
☑	YK Protected Areas
☑	National_Parks
☐	Ecodistricts
☐	Ecoregions
☐	DNEC 250K DEM
☐	Landsat 7 Orthorectified Imagery over Canada - band 743
☐	EOSD Canada Landsat Mosaic Image
☐	Ecozones

Update

Canadian Council of Ecological Areas
CCEA CCAE
Conseil canadien sur les aires ecologiques



Data Summary Tool > ***Protected/Designated Areas Listing***

Start Over

Select Report Fields

- [ ] National Schema Unique Identification Number
- [ ] Parental Identification Number
- [ ] Jurisdictional Unique Identification Number
- [ ] Protected Area Ownership
- [ ] FR: Protected Area Ownership
- [ ] Management - English
- [ ] Management - French
- [ ] Location - English
- [ ] Location - French
- [x] Protected Area Name - English
- [ ] Protected Area Name - French
- [ ] Type Designation - English
- [ ] Type Designation - French
- [ ] Legislation
- [ ] Legislation Jurisdiction
- [x] Official Area in Hectares
- [ ] Marine Area in Hectares
- [ ] Status Description - English
- [ ] Status Description - French
- [x] Protection Date
- [x] IUCN Category
- [ ] General Comments
- [ ] URL to Additional Information

View Report >

Data Summary Tool > *Protected/Designated Areas Listing*

Start Over

	Protected Area Name - English	Official Area in Hectares	Protection Date	IUCN Category
Saskatchewan	HORSESHOE LAKE	56.8086784684195	1949-09-09	IA
Saskatchewan	HIDDEN VALLEY	129.614804490956	1953-08-28	IA
Saskatchewan	FRENCHMAN RIVER	64.6487113944416	1965-07-19	IA
Saskatchewan	REDBERRY	3.3443180415714	1970-09-02	IA
Saskatchewan	REDBERRY	4.93226620077889	1970-09-02	IA
Saskatchewan	REDBERRY	39.5854604680748	1970-09-02	IA
Saskatchewan	REDBERRY	42.976456764389	1970-09-02	IA
Saskatchewan	ISLE OF BAYS	53.4468370122571	1970-09-02	IA
Saskatchewan	HEGLUND ISLAND	93.8169831095033	1970-09-02	IA
Saskatchewan	SCHEELHAASE ISLAND	1.64221234982908	1971-07-19	IA
Saskatchewan	ROCK ISLAND	2.56159446943694	1971-07-19	IA
Saskatchewan	SCHEELHAASE ISLAND	3.03620291831359	1971-07-19	IA
Saskatchewan	BACKES ISLAND	4.91005337017726	1971-07-19	IA
Saskatchewan	INGVALD OPSETH	64.1118823519203	1973-02-02	IA
Saskatchewan	FISHING LAKE	136.592226718566	1974-04-17	IA
Saskatchewan	OSAGE	36.7360503546708	1976-12-15	IA
Manitoba	Brokenhead River Ecological Reserve	64	1978-07-19	IA
Manitoba	Red Rock Ecological Reserve	502	1979-02-28	IA
Saskatchewan	LENORE LAKE	0.066676804465136	1982-03-16	IA
Saskatchewan	LENORE LAKE	0.103909180607907	1982-03-16	IA
Saskatchewan	LENORE LAKE	0.30606454040159	1982-03-16	IA
Saskatchewan	MUD LAKE	0.413852989584992	1982-03-16	IA

Manitoba, Saskatchewan
Protected/Designated Areas 0 or more Hectares

		IUCN Category							
		IA	IB	II	III	IV	V	VI	Protected Total
MB	Count	14	8	42	12	49	9	0	134
	Area	5,207	1,335,860	1,635,226.5	825	0	119.1	0	2,977,237.8
	Avg	371.9	166,982.5	38,934	68.8	0	13.2	0	22,218.2
SK	Count	410	0	0	0	1,867	0	0	2,277
	Area	656,450.6	0	0	0	78,459.3	0	0	734,909.9
	Avg	1,601.1	0	0	0	42	0	0	322.8
Summary	Count	424	8	42	12	1,916	9	0	2,411
	Area	661,657.6	1,335,860	1,635,226.5	825	78,459.3	119.1	0	3,712,147.5
	Avg	1,560.5	166,982.5	38,934	68.8	40.9	13.2	0	1,539.7

Count = Protected Area Count, Area = Total Area in Hectares, Avg = Average Area

NFIS / SNIF National Forest Information System / Système national d'information forestière

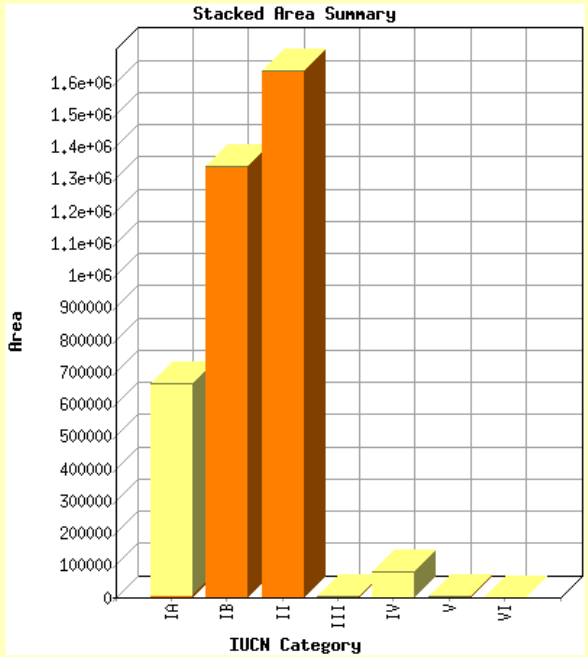
Data Summary Tool > Reports > *Protected/Designated Areas 0 or more Hectares*

Go | Data | Graph | Help

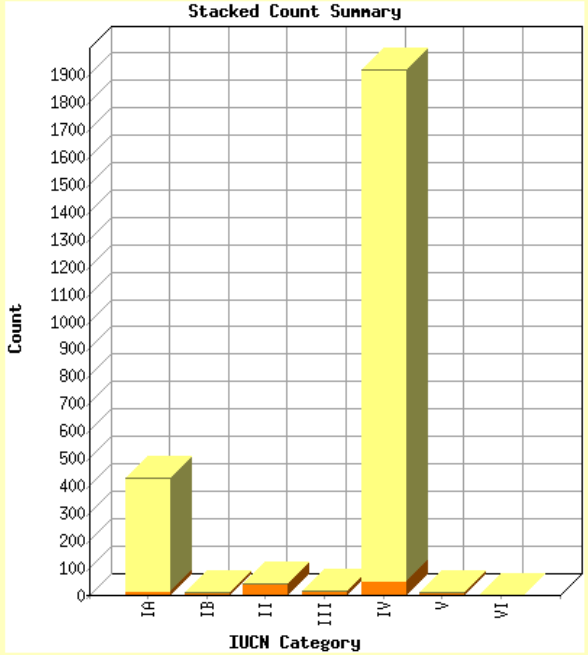
Manitoba, Saskatchewan
Protected/Designated Areas 0 or more Hectares

		IUCN Category							
		IA	IB	II	III	IV	V	VI	Protected Total
MB	Count	14	8	42	12	49	9	0	134
	Area	5,207	1,335,860	1,635,226.5					

Protected/Designated Areas 0 or more Hectares



Protected/Designated Areas 0 or more Hectares



Typical uses of NFIS Services

- Data capture, access, analysis, download and reporting

NFI Canada's National Forest Inventory

Welcome to NFI

Canadian Council of Forest Ministers | Conseil canadien des ministres de forêts

en Français

Introduction
- About NFI
- Collaborators
- Frequently Asked Questions
- What's New

Implementation
- Current Status
- Documentation
- Downloads
- Utilities
- Reporting

Site Resources
- Home
- Contact Us
- Links
- Login
- Site Map
- Important Notices

"Monitoring the sustainability of Canada's forests."

About NFI

Current Status

Documentation

Utilities

Reporting

Français >

This page was last updated on 29-Sep-2005.

Welcome / Bienvenue

National Forestry Database Program
Programme national de données sur les forêts

Canadian Council of Forest Ministers
Conseil canadien des ministres des forêts

National Forestry Database Program / Programme national de données sur les forêts

The National Forestry Database (NFD) is the central database used to compile the national forestry statistics from provincial or territorial resource management organizations.

La Base nationale de données forestières est la base de données centrale qui est utilisé pour la compilation des données forestières des organisations de gestion des ressources par chaque province et territoire.

JavaScript must be enabled in the web browser in order that the NFDP questionnaire can be accessed properly.

Le langage JavaScript doit être activé dans le navigateur web pour accéder le questionnaire PNDF correctement.

You may access the NFDP Questionnaire as: /
Vous pouvez accéder au questionnaire PNDF car:

Robin Quenet (rquenet) from/de
Natural Resources Canada / Ressources naturelles Canada

(•) Read Only / Guest - Afficher seulement / client

English Français

National Afforestation Inventory

Canada

Robin Quenet | Logout

Français | Home | Help | Contact Us

- Search
- Map >
- Reports
- Reporting Entities

Home > Map

Map

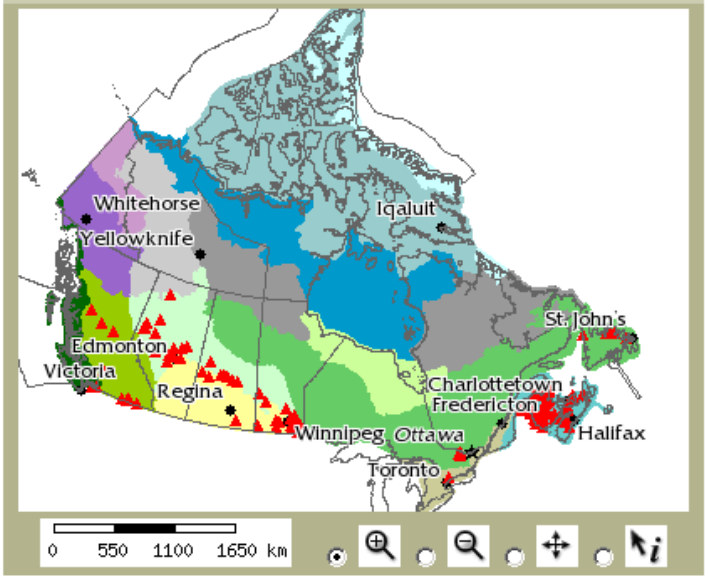
The Map module of the National Afforestation Inventory allows users to view afforestation activity in a map layer.

Layers

- [x] Forest 2020 Sites — Info
- [x] Provincial Boundaries
- [x] Capital Cities
- [ ] Waterbodies — Info
- [x] Ecozones — Info
- [ ] Relief — Info
- Redraw Map

Quick View

Forest 2020 Sites



Legend

- Provincial Boundaries
- Forest 2020 Sites
- National Capital
- Provincial Capitals

Ecozones

- Arctic Cordillera
- Northern Arctic
- Southern Arctic
- Taiga Cordillera
- Taiga Plains
- Taiga Shield
- Boreal Cordillera
- Boreal Plains
- Boreal Shield
- Pacific Maritime
- Montane Cordillera
- Prairies
- Hudson Plains
- Mixed Wood Plains
- Atlantic Maritime

National Afforestation Inventory

Search

Map

Reports >

Reporting Entities

Home > Reports > Report: area planted (hectares)

Report: area planted (hectares)

Province	Genus	Total
ALL	birch	1
	larch	72.4
	pine	347.1
	Populus	1,211.1
	Pseudotsuga	80.3
	spruce	778.5
	Total	2,490.4
Total		2,490.4

<< Back

WikiCalc (NFIS WebCalc) created by Dan Bricklin

- Web Authoring tool
- Multi person editing and spreadsheet like formatting and data organizing
- Editing like a Wiki
- Server based

http://www.softwaregarden.com

WebCalc/WikiCalc

ser: nfis-nrcan-apeekevo

Page | Preview | Cells | Format | Tools

More cell commands *[Esc to return to cell editing]*

A1 Keyboard shortcuts: **Range**, **Paste**, **Global**, **Insert** row/column, **Delete** row/column, **Format**

:Range | Paste All | Paste Contents | Paste Formats | Recalc Manual

Insert Row | Insert Column | Delete Row | Delete Column | Cancel | Help

	A	B	C	D	E	F	G	H	I	J	K	L	
1	Day Name	Date	Arrival Time	Depart for Lunch	Back from Lunch	Lunch Break	Departure Time	Daily Hours (actual)	Daily Hours (decimal)	Required	+ / -	Cumulative + / -	Comi
2	Friday	2/11/2005	8:40 AM	12:18 PM	12:54 PM	0:36:00	5:07 PM	7:51:00	7.85	7.5	0.35	21	Time
3	Monday	2/14/2005	9:00 AM	2:15 PM	2:30 PM	0:15:00	4:00 PM	6:45:00	6.75	7.5	-0.75	20.25	Work Hom
4	Tuesday	2/15/2005	6:49 AM	12:30 PM	1:00 PM	0:30:00	5:29 PM	11:00:00	11	7.5	3.5	23.75	Vanc GeoT Conf
5	Wednesday	2/16/2005	8:50 AM	12:30 PM	1:00 PM	0:30:00	5:22 PM	8:02:00	8.03	7.5	0.53	24.28	Work powe helpe for C conf
6	Thursday	2/17/2005	8:42 AM	12:00 PM	12:15 PM	0:15:00	5:10 PM	8:13:00	8.22	7.5	0.72	25	CGDI Conf

Canada's National Forest Information System Project Office will be releasing several Open Source packages :

- GeoLinking Data Access Service (OGC GDAS 0.9.1) – Java Implementation
- Data Summary Tool (DST) – Generic client for OGC GDAS 0.9.* (attribute viewer)
- File Storage System (FSS) – saving files as blobs in a RDMS
- Database replicator (DBReplicate) – replicates database schemas over JDBC
- Packaging of Open Source "SDI in a Box"

We are working in co-operation with others on:

- Non spatial Analysis Tools
- Geospatial Analysis Tools
- Web Registry Service
  (Metadata and service registry)
- Digital Rights Management
- Schema Translations
- “SDI in a Box”

Visit us at

http://nfis.org

https://cfsnet.nfis.org

Questions?