A Catalogue of Databases Related to Ontario Agro-Ecosystems

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Published by Authority of the
Minister of Environment
Canadian Wildlife Service

Catalogue No. CW69-5/195E
ISBN 0-662-21473-0
ISSN 0831-6481

This publication may be cited as:

> Snell, E., A. Baril, N. Patterson, and P. Cureton. 1994. A catalogue of databases related to Ontario agro-ecosystems. Technical Report Series No. 195. Canadian Wildlife Service, Environment Canada, Ottawa, Ontario.

Copy may be obtained from:

Wildlife Toxicology Division
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Foreword

This catalogue is the product of a joint collaboration by three groups within Environment Canada: the National Wildlife Research Centre, the Evaluation and Interpretation Branch of the Ecosystem Conservation Directorate and the Great Lakes Office of the Environmental Conservation Branch, Ontario Region. This project started in December 1992, with most of the information collected in the following four months. Any database created after April 1993 is probably not included in this catalogue. The funding for this project was provided by all three groups.

Abstract

To improve the basis for federal environmental assessments and management decisions regarding agricultural land use in Southern Ontario, an inventory was taken of regional and provincial databases related to land use, farming operations and practices, and wildlife and wildlife habitat distributions. Eleven areas of interest were defined and researched. Contacts were made with many federal, provincial and non-governmental organizations involved with land use and conservation efforts in Ontario. Information was gathered via correspondence, telephone or personal interviews. Emphasis was put on databases which are referenced geographically and thereby amenable to spatial analysis. Ninety-eight databases were inventoried. A brief description of the contents, spatial extent and resolution, volume, structure and availability is provided for each database.

Résumé

Afin d'améliorer les évaluations environnementales fédérales et les décisions d'aménagement du territoire dans le sud de l'Ontario nous présentons un inventaire des bases de données régionales et provinciales traitant de l'utilisation des terres, des pratiques agricoles ainsi que de la distribution de la faune et des habitats fauniques. Onze domaines d'intérêt ont été définis pour cette recherche. Les agences fédérales, provinciales et non-gouvernementales impliquées dans la gestion du territoire et dans les efforts de conservation en Ontario furent contactées. L'information concernant ces bases de données fut recueillie par correspondance et par entrevues téléphoniques ou en personne. L'emphase fut placée sur les bases de données à références géographiques qui peuvent être soumises à des analyses spatiales. Quatre-vingt-dix-huit bases de données furent ainsi inventoriées. Pour chacune la description du contenu, l'échelle et la résolution spatiale, le volume, la structure et la disponibilité sont fournis.

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Introduction

Southern Ontario is one of the most productive agricultural regions of Canada. Agriculture is the dominant landscape feature of a large area of the province, particularly in southwestern Ontario, where over 3 million of the 5.5 million hectares of Ontario farmland are located (Statistics Canada 1992). This land use is not only extensive but also intensive, with important inputs of energy, fertilizers, and pesticides. Over time, agriculture involved felling large areas of forested land and draining a significant proportion of Ontario wetlands. In southern Ontario, 70% of pre-settlement wetlands have been converted to other uses (Environment Canada 1986), predominantly to agriculture (Snell, 1987; Bardecki, 1984).

This activity has contributed enormously to the economic well-being of the province and to the survival and welfare of small rural communities in this region. The impact on environmental quality, however, is substantial. Not only is the amount of habitat available for wildlife substantially reduced, the quality of the remaining areas, particularly woodlots and wetlands, is suspect. This is due to non-wildlife oriented management of many habitat remnants and to incidental inputs of fertilizers, manures, and pesticides. Furthermore, the small size and fragmentation of the habitats alone have substantial negative effects on wildlife populations such as increased nest predation and parasitism. The impacts have also moved downstream to influence river and Great Lakes ecosystems with consequences for wildlife, fisheries, and urban populations.

Environment Canada is responsible for the risk assessment of pollutants, the establishment of environmental quality criteria and guidelines, and the protection and restoration of habitats. In order to carry out these activities effectively, a regional approach is required, where landscapes are well characterized and land use issues are put into their proper context. In an attempt to develop a more focused and realistic approach to the problems of environmental quality in southern Ontario, it is necessary to establish the state of our knowledge about the agricultural landscape. Three groups within Environment Canada, the National Wildlife Research Centre, the Great Lakes Office of the Environmental Conservation Branch and the Evaluation and Interpretation Branch of the Ecosystem Conservation Directorate, set out to survey regional and provincial databases related to agricultural land use, operations, and practices, and to wildlife and wildlife habitat distribution. The survey, while as comprehensive as possible within the confines of this project, focuses on databases covering most or all of agricultural Ontario. Numerous local databases valuable for site-specific research or local decision makers were not included. For those databases included, entries are brief summaries and interested readers should refer to contact people or the published database outputs for more detail. Environment Canada would welcome suggestions of suitable databases not included in this catalogue. It is hoped that this survey will be a useful resource for researchers and decision makers involved in the southern Ontario rural landscape.

Methods

The search for information on agro-ecosystems was broken down into 11 areas of interest (see Table 1). These areas of interest reflect a bias towards information essential for environmental risk assessment and especially those data that are referenced geographically and thereby amenable to spatial analysis. Preferences was also made for databases covering most or all of agricultural Ontario.

Initial contacts were made for each area of interest and their advice sought for other data sources. When a possible database source was located, a telephone or personal interview was conducted to complete a standard form. Often the contact was able to send or refer to written information, sample data, or sometimes the database itself, which provided much of the required background and minimized interview time. Existing database catalogues were reviewed for appropriate databases and information about each. This applied particularly for federal government databases (Cameron et al. 1992; McRae 1990; Keddy and McRae 1989).

The Great Lakes Office of the Environmental Conservation Branch had initiated a separate project to collect information on wetland databases, especially those related to coastal Great Lakes wetlands. For each database known to ECB, background information and telephone interviews were also used to complete a standard form. To gather information on more local or regional databases, survey forms were distributed to the 48 Ontario Ministry of Natural Resources (OMNR) District and Area offices and to the 38 Conservation Authorities throughout Ontario. The wetlands database information thus collected was incorporated into this catalogue under the **Agricultural Landscapes** section (Section 8).

Under **Methods/Data Quality**, the **Data Quality** discussion was made in light of Environment Canada uses and data needs as described in Table 1. The discussion was based both on information provided by contact persons and on the authors' judgement. Issues such as "resolution", spatial consistency and date were considered. While general, the comments may not be universally applicable to specific alternative uses with needs different from those of Environment Canada.

Draft catalogue entries were sent to each contact person for their review. The comments of those who replied were incorporated.

Catalogue Organization

The databases are listed in the order of topics presented in Table 1. Many databases were relevant to more than one topic of interest. The appropriate numbers beside each area of interest in Table 1 (i.e., 1–11) were assigned to each database. They appear at the top left-hand corner of each catalogue entry. The topic judged as dominant for each database is in bold print, and the order of the entries is based on that number. The first page of each section lists all databases in that subject area.

Table 1
Subject areas chosen for search

Subject area	Description
1. Crop Distribution	Area and distribution of different crops and crop rotations
2. Farm Practices	Timing of activities for major crops by region (e.g., average seeding or planting dates, soil cultivation practices, average harvest dates)
3. Livestock Operations	Distribution and density of livestock: beef, dairy cattle, sheep, pigs, poultry, horses, and aquaculture
4. Animal Husbandry	Typical practices, particularly as they relate to pathways of pesticide intake (i.e., feeding and pasturing practices, source of feed)
5. Pesticide Use	- quantities used or sold by region/county - specific products used or recommended by crop - frequency of pesticide applications for each crop - rates of application by crop - integrated pest management (IPM)
6. Application Methods	The most important types of machinery used to apply pesticides and their relative importance (particularly aerial versus ground application)
7. Pest Infestation Timing	Timing of infestations and control measures such as pesticide applications, delayed seeding, or cultivation for each major crop as they relate to pest and weed behaviour, cycles, response to climate or other factors
8. Agricultural Landscapes	- habitat fragmentation - woodlots/ha of cultivated lands - wetlands/ha of cultivated lands - amounts of shelterbelts, bushy fencerows, riparian or riverside habitats, aquatic habitat, idle land, other forms of habitat
9. Protected Areas	Surveys of natural areas and wildlife refuges such as national and provincial parks, wildlife refuges, conservation areas
10. Wildlife Populations	Surveys of wildlife distribution and abundance as found in atlases and regional wildlife inventories
11. Policies, Bylaws, Acts	Federal, provincial, and municipal policies, bylaws, acts, and guidelines affecting land use, farming practices, and farm economics

Catalogue Summary

The catalogue is considered relatively complete for province-wide databases. This judgement is based on the occurrence of repeat suggestions. The catalogue is not, however, likely to be fully comprehensive, as the scope of topics, the number of agencies, and the size of the province combined with the short assembly time precluded an exhaustive survey of all possible sources. This would apply particularly to regional, non-province-wide databases.

A brief summary of databases under each topic follows.

Crop Distribution

The standard data sources of the *Census of Agriculture* and the *Agricultural Statistics for Ontario* provide crop areas for variously sized units over time. Distribution of rotations is harder to quantify. The *Agricultural Resource Inventory: Agricultural Land Use* (1983) provides a valuable farm operation classification that includes rotational factors and is comprehensively mapped. The *Ontario Farm Groundwater Quality Survey* may offer a chance to check how up to date it remains. This agricultural land use has been combined with wildlife data under the Eastern Habitat Joint Venture programs. The Soil and Water Environmental Enhancement Program (SWEEP) survey of *Cropping, Tillage and Land Management Practices* includes crop rotation data for southwestern Ontario sample sets.

Farm Practices

Information on agricultural practices and timing is largely in the form of recommendations (Ontario Ministry of Agriculture and Food [OMAF] — *Crop Recommendations*) or agro-meteorology analysis rather than actual surveys. The only survey found was by SWEEP in southwestern Ontario (*Changes in Cropping, Tillage and Land Management Practices*, 1986 and 1991), although the *Census of Agriculture* for 1991 has a few data on practices, which also appear in the *Environmental Information System* (EIS). One method to estimate timing differences across the province might involve contacting each county OMAF office to ask the local representatives about timing for practices of interest (Ted Taylor, OMAF, pers. comm.).

Livestock Operations

Many of the databases listed under **Crop Distribution** also include data on livestock numbers. Aquaculture data were not included in these references but were added because of possible susceptibility to other agricultural contaminants.

Animal Husbandry

Very few data could be found on feeding practices relating to pathways of pesticide intake. Again, county OMAF offices might be able to give summaries of local feeding and pasturing practices and sources of feed. *Ontario Farm Management Analysis Project* (OFMAP) data might be interpretable for on- and off-farm feed for different farm types but are not necessarily representative. The *Census of Agriculture* also had data on feed costs, which possibly could be interpreted for some trends of on- and off-farm feed. The *Livestock Feeds*

Contaminants Database flags some of the general concerns but gives no regional breakdown. No attempt was made to locate databases on direct application of pesticides to livestock and associated uptake.

Pesticide Use

The most comprehensive database found is the *Survey of Pesticide Use in Ontario*, conducted every five years. OMAF *Crop Recommendations* give "worst case" recommendations; *Integrated Pest Management* (IPM) suggests methods for minimum use (for selected commodities); actual use probably lies between the two (Wayne Roberts, OMAF, pers. comm.). The limited indicators of pesticide use in the *Census of Agriculture* and the *Environmental Information System*, associated with cost, have the advantage of comprehensive collection and high resolution, down to the enumeration area.

Application Methods

The conventional and IPM recommendations sometimes include reference to suggested methods. The only database found, however, that quantifies an application method, *Aerial Agricultural Pesticide Use Database*, is limited to broad spatial analysis by confidentiality and may overestimate amounts if the approved spraying did not occur.

Pest Infestation Timing

Recommendations for timing rather than actual surveys of timing are given in OMAF *Crop Recommendations* and IPM recommendations. The *Pest Management Research Information System* (PRIS) and the product labels in *Regulatory Information on Pesticide Products* (RIPP) also include timing recommendations.

Agricultural Landscapes

Probably the biggest source of data on habitats in agricultural Ontario is OMNR. Currently, its data are scattered over the province, with access confused by changing administrative areas and regional differences in collection. OMNR has recognized the problem and is forming the *Natural Heritage Information Centre*. It will collect wildlife and habitat databases initially from itself and its partners in the centre (Ontario Natural Heritage League, Nature Conservancy of Canada and of the United States) and standardize them for easy access. Because of this initiative, the effort for this catalogue was for databases other than those in OMNR, Natural Heritage League, and Nature Conservancy or for large comprehensive OMNR databases for which there is ready access.

Agricultural landscape databases include topographic maps, soil- and physiography-related databases, and artificial drainage maps as the abiotic basis of the agro-ecosystems of Ontario, the basis that determines the nature of the agricultural and biotic components. Forest databases use either the *Forest Resources Inventory* (FRI) or remote sensing, with an interesting pre-settlement map set from surveyors' notes. *Ontario Basic Mapping* (OBM) scales can locate larger hedgerows and shelterbelts. *Flood Risk Mapping* might help locate some riparian habitat. Idle land was mapped in the *Agricultural Resource Inventory*.

A large, and somewhat dispersed, wetland database that covers agricultural Ontario includes OMNR data records and detailed maps for wetlands evaluated using the *Ontario Wetland Evaluation System*. A broader-scale mapped database is the *Ontario Wetland Map Series* and associated analysis of *Wetland Distribution and Conversion in Southern Ontario*, including data on conversion to agriculture. Other wetland databases beyond more local collections tend to be combined with other features, often for Great Lakes shoreline inventories, and are associated with shoreline processes and development issues more than agricultural ones.

Conservation Authorities collect landscape information. Because of the number of Authorities, no attempt to conduct a comprehensive survey was made. Two interesting agro-ecosystem projects being conducted by the Maitland Valley Conservation Authority are included as examples of some of the more innovative Authority projects.

Several databases have collected more than one type of data together to broaden the potential for agro-ecosystem analyses. These include *Ontario Hydro's Environmental Assessment* databases, the *Lake Erie Non-Point Source and Wetland GIS Database*, OMAF's *Drainage and MNR Evaluated Wetlands*, and the *Eastern Habitat Joint Venture* database. Others, like Statistics Canada's *Environmental Information System* and OMNR's *Cambridge District Geographical Information System (GIS)*, are not project specific but include many types of data available for a variety of applications.

Protected Areas

The most comprehensive database that is readily available is the *National Conservation Areas Database*. Ultimately, the *Natural Heritage Information Centre* will also provide similar data, probably with more information on each protected area. The entry for an example of a Conservation Authority database (Grand River) is included to help illustrate the strengths and limitations of various contributing databases to the *National Conservation Areas Database*.

Wildlife Populations

The wildlife databases chosen were those that were fairly comprehensive in scope in the province and not limited to just one species. This omits many locally useful inventories.

Policies, Bylaws, Acts

This topic proved difficult to locate in a database form and was given lower priority. While not comprehensive for all policies, bylaws, acts, and guidelines affecting land use and farm practices and economics, a number of lists were compiled that flag many at the provincial level and some at the federal. The *Summary of Wildlife-Related Statutes* is the most comprehensive. Many policies and acts not targeted at land use and agro-ecosystems can greatly affect them, such as international trade legislation or taxation and agricultural productivity policies. Because of constraints on the focus of this survey, no attempt was made to list these individually.

Miscellaneous

Several databases were found that, while linked to Ontario agro-ecosystems, did not readily fit the above categories. These included ones related to wildlife depredation, advice about wildlife to landowners, a literature review of avian use of agro-habitats, toxic chemical residues, an agricultural information manager (AIM) system, and a directory of provincial records.

Other databases in their planning stages or of possible interest are listed together with a contact person in Appendix I.

1. Crop Distribution

Note: Databases relevant to this subject area may also be found within other sections of this catalogue. The reader may want to consult the entries on pages 102, 118, 129 and 223.

1,8 *Agricultural Resource Inventory: Agricultural Land Use*

Responsible Organization(s)

Resources Management Branch
Ontario Ministry of Agriculture and Food
Guelph Agricultural Centre
P.O. Box 1030
52 Royal Road
Guelph, Ontario N1H 6N1

Contact Person(s)

David Rouleau
same address
Tel. 519-767-3587

Ian Gillespie (GIS)
same address
Tel. 519-767-3588

Nature of Information

Maps, township area summaries, GIS

Content

a) Purpose

- to provide an inventory of agricultural land use that remains valid over a long period of time

b) Attributes

- for agricultural uses, land system classes were developed that reflect farm operation type
- for field crops:
  - continuous row crop
  - corn system
  - mixed system
  - grain system
  - hay system
  - pasture system
  - grazing system
- for fruit and grapes:
  - peaches
  - cherries
  - peaches–cherries
  - orchard (hardy fruit)
  - vineyard
  - orchard–vineyard

  - vineyard–orchard
  - berries
- for specialty agriculture:
  - extensive field vegetables
  - market garden/truck farms
  - tobacco system
  - nursery
- nonagricultural system land uses:
  - idle land — 5–10 years idle
  - idle land — >10 years idle
  - woodland
  - pastured woodland
  - reforestation
  - built up
  - swamp, marsh, or bog
  - extraction: sand, gravel, or quarries
  - extraction: topsoil
  - sod farms
  - recreation (outside urban areas)
  - water
- a few very slight variations exist, depending on the part of the province
- for southern Ontario, one paper set of land system maps includes an overlay of OMNR-evaluated wetland boundaries and classes

c) Spatial extent

- covers agricultural Ontario: this is mainly southern Ontario south of the Precambrian Shield; also included are agricultural areas in central and northern Ontario, i.e., portions of Algoma, Cochrane, Kenora, Manitoulin, Nipissing, Parry Sound, Rainy River, Renfrew, Sudbury, Thunder Bay, Timiskaming

d) Scale, resolution, or geographical units of measurement

- 1:50 000

e) Volume

- 591 township maps

Structure

The maps are black and white, on a base map derived from National Topographic Series (NTS) maps. Land systems are outlined and coded with a letter code. The maps are by township. The originals are on a reproducible chronoflex master.

The GIS system is ARC/INFO.

Output Format

Maps, tables

Date

1982 and 1983, with a few areas between 1975 and 1982

Frequency of Update or Release

None planned

Methods/Data Quality

The data were derived using air photos and a field survey from the nearest roads. Crops in each field were noted. The ownership pattern was overlaid to derive management units, and system types were assigned based on the proportion of crops in that unit. The map unit, farm operation, while not showing the precise crop location for the study year, provides a functional component to the mapping as well as the longer-term validity required. Experience shows good consistency between mappers and high accuracy of system designation. The 1% of total acreage not visible did not significantly affect the system assignments.

The mapping involved several studies, with the legend becoming slightly more refined with time. Changes maintained consistency among all legends; a few counties just have a few more subcategories. While designed to be of long-term validity, some areas have been changing operation types since the mapping, notably the tobacco areas. In general, however, the farm systems remain useful for regional analyses. The database was the best, most recent comprehensive coverage of land use in agricultural Ontario that was found.

Several map categories were distinct from crop and operation types and have some limitations. Since mapping, idle land mapped using definitions based on 5–10 years and >10 years would shift with time, and new idle land would be missing. Small woodlots (<2.5 ha) were omitted because of the scale. Precise woodlot location is better from NTS maps. Pastured woodland may not be as distinguishable from woodland far from roads.

The wetland category was generally marsh; swamps, while in the legend, tended to be lumped in with the woodland class. (On one set of land system maps for southern Ontario, OMAF had OMNR-evaluated wetland boundaries sketched from the OMNR District wetland summary maps. Because these summary maps were at various scales, the boundary accuracy at 1:50 000 varies. The map set, however, indicates where land system mapping did not correspond with OMNR's wetland, and conflicts were noted. Because many wetlands have not been evaluated, the comparison is not complete.)

Estimates of average crop areas can be derived using the percentage criteria for each system. For most townships, the area of each map category has been summarized by township, providing a useful broad-scale data set.

Availability

Paper maps are available from the responsible organization (see address above). Township and county should be specified.

Maps for Ottawa-Carleton and Niagara are available from Land Resource Research Centre, Research Branch, Agriculture and Agri-Food Canada, Ottawa, Ontario K1A 0C6.

The summary statistics have not been published. Information on them and on the GIS database is available from Bob van den Broek at the above address, Tel. 519-767-3572.

The map set with overlaid OMNR-evaluated wetlands can be viewed at the responsible organization office.

Costs

None for small requests; copying costs for large requests

1,3,5,8

Census of Agriculture

Responsible Organization(s)

Agriculture Division
Statistics Canada
12th Floor, Jean Talon Building
Tunney's Pasture
Ottawa, Ontario K1A 0T6

Contact Person(s)

Linda Kemp
same address
Tel. 613-951-8711

Nature of Information

Data depository

Content

a) Purpose

- the Census of Agriculture is the major source of agricultural data in Canada and serves a wide range of social and economic research, planning, and policy formulation requirements

b) Attributes (broad categories, each with many sub-attributes)

- livestock and poultry
- dairy products and eggs
- field crops
- fruits and vegetables
- mushrooms
- greenhouse nursery products and sod
- fur-bearing animals
- honey and beeswax
- maple products
- value of products sold
- business expenses

c) Spatial extent

- Canada

d) Scale, resolution, or geographical units of measurement

- data are collected by farm operation but are available no more detailed than enumeration areas

e) Volume
- extremely large

Structure

Information not provided

Output Format

Standard tabulation or data file. For a detailed list of products offered, refer to *Census of Agriculture — User's Guide* (Catalogue No. 96-101). Methods of dissemination: a) Hard copy/printout, b) Diskette, c) Tape, d) Other, microfiche; customized analytical studies; other customized products. Many Statistics Canada publications.

A set of standard maps is issued from each census. They include Census Divisions, Subdivisions, Agricultural Regions/Census Consolidated Subdivisions, Tracts, Rural Enumeration Areas — each at scales appropriate for the size of units. Thematic maps are also produced at 1:25 000 000 by Census Division, including:

- A Profile of Canadian Agriculture publication with 51 maps
- individual sheets (also at 1:12 000 000 and 1:7 000 000)
  - Canadian Cropland
  - Change in Cropland Since the Last Census
  - Canadian Agricultural Land
  - Canadian Agricultural Sales
  - Flaxseed Area
  - Grain Corn Area
  - Wheat Area
  - Canola Area
  - Barley Area
  - Summerfallow Area
  - Total Pigs
  - Total Cattle

Date

Since 1871

Frequency of Update or Release

Every five years

Methods/Data Quality

A survey is sent directly to all census farms. Collection is 94% self-completion, drop off/pick up; 5% self-completion, drop off/mail back; 1% face-to-face interview. The collection period is from mid-May to the end of June.

The census data are very comprehensive, long term, and available at relatively detailed scales. Recently, some land management practice attributes have been added.

The published thematic maps present national overviews. While not suitable for even regional analysis, comparisons between censuses could show general trends that might suggest issues to pursue through the statistical databases. The census unit maps would be necessary to define study areas for use of the statistical databases.

Availability

Individual responses are confidential. Aggregated statistics are available from the responsible organization — see *User's Guide* cited under **Output Format.**

Statistics Canada's *Environmental Information System* (see catalogue entry) may provide useful access for recent statistics.

Costs

Charges depend on request

1,2,3

National Farm Survey (NFS)

Responsible Organization(s)

Agriculture Division
Statistics Canada
12th Floor, Jean Talon Building
Tunney's Pasture
Ottawa, Ontario K1A 0T6

Contact Person(s)

Phillip Stevens
same address
Tel. 613-951-2435

Nature of Information

Data depository

Content

a) Purpose

- to provide information on agriculture between census years

b) Attributes

- operating arrangements
- land use, particularly areas seeded
- cattle and calves
- pigs
- sheep and wool
- other livestock or poultry
- farm business expenses
- agricultural receipts
- capital values
- percentage of spring seeding completed by June 1

c) Spatial extent

- all provinces

d) Scale, resolution, or geographical units of measurement

- data collected by operator, but available by county

e) Volume

- 12 000 to 13 000 farms in Ontario

Structure

On a mainframe computer

Output Format

Standard tabulation or data file. Method of dissemination: a) Hard copy/printout, b) Diskette, c) Tape. Also customized tabulation or data file. The database is the basis for the annual *Agricultural Statistics for Ontario* (see catalogue entry).

Date

Since 1972

Frequency of Update or Release

Annual

Methods/Data Quality

Sample farms are chosen using census results to represent different types of farms and areas of the province. Data collection methods include 70.9% telephone interview; 19.8% face-to-face personal interview; 6.4% self-completion, mail out/mail back; 2.9% self-completion, mail out/pick up. The collection period is from May 23 to July 7. The sampling design means the data are not considered representative of any unit smaller than a county.

While no questions are specific to rotations, since about 75% of the respondents overlap each year, some estimates could be made by looking at more than one year's responses from the same operator. This, however, would be a customized request and likely costly. Some estimates might also be possible from questionnaires before 1992, which asked both area seeded or to be seeded in current year as well as area seeded in the previous year.

Seeding dates are requested for spring wheat in the Prairies and British Columbia, but in Ontario farmers respond only to the percentage of all spring-sown crops seeded by June 1. This provides no data for crop-specific average seeding dates but would offer an indication of the effect of spring weather conditions throughout the province each year.

Availability

See above contact. Confidentiality on individual responses. *Agricultural Statistics for Ontario* are available annually from OMAF.

Costs

Charge depends on request

1,3 *Agricultural Statistics for Ontario*

Responsible Organization(s)

Statistical Services Unit
Policy Analysis Branch
Ontario Ministry of Agriculture and Food
801 Bay Street, 4th Floor
Toronto, Ontario M7A 1B6

Contact Person(s)

Bill McGee
same address
Tel. 416-326-3219

Nature of Information

Annual publication

Content

a) Purpose

- to create a source of agricultural statistics for Ontario

b) Attributes

- weather conditions
- financial data and population (22 tables of various attributes)
- food industry: manufacturing statistics, employees, stores, sales, prices (6 tables)
- selected census data: farms of different classes (10 tables)
- international trade: various imports and exports by group (23 tables)
- field crops: area, yield, production, value by county by crop (16 tables)
- fruit, vegetable, and specialty crops: area, production, and value by crop (13 tables)
- livestock and poultry: numbers by type and by county, average prices, numbers slaughtered, consumption (23 tables)
- dairy: production, sales, shipments, consumption (10 tables)
- Census of Agriculture Profiles by county for census years (including pesticide expenses)

c) Spatial extent

- Ontario

d) Scale, resolution, or geographical units of measurement

- either county and districts or province

e) Volume

- 156 pages (1991)

Structure

Consists of compilation of databases from *Census of Agriculture*; *National Farm Survey*; commodity groups re import, export, and marketing

Output Format

Annual published report of tables

Date

Since 1881

Frequency of Update or Release

Annually

Methods/Data Quality

The data are from the *Census of Agriculture* and *National Farm Survey* which use questionnaires. The latter is designed to provide county estimates for Ontario (see catalogue entry). Pesticide expense estimates are available for the province only, except in census years.

This database is the main reference for an annual overview of agricultural statistics in Ontario. For more detailed (township or enumeration area) data, reference to the *Census of Agriculture*, available every five years, should be made. The *Agricultural Statistics for Ontario*, however, is the most detailed comprehensive crop and livestock data collection that was found that is readily available on an annual basis.

Availability

From Consumer Information Centre, Ontario Ministry of Agriculture and Food, 801 Bay Street, Main Floor, Toronto, Ontario M7A 2B2

Costs

None

1,3,5,7 *Ontario Farm Groundwater Quality Survey*

Responsible Organization(s)

Centre for Land and Water Stewardship
Richards Building
University of Guelph
Guelph, Ontario N1G 2W1

Waterloo Centre for Groundwater Research, University of Waterloo
Ontario Ministry of Agriculture and Food
Ontario Soil and Crop Improvement Association
Ontario Ministry of Environment and Energy
Ontario Ministry of Health

Contact Person(s)

Dean Barry or Mike Goss
same address (Centre for Land and Water Stewardship)
Tel. 519-824-4120
Ext. 4263 (D. Barry)
Ext. 2491 (M. Goss)

Nature of Information

Electronic database, reports, GIS link

Content

a) Purpose

- to evaluate through water samples from farm drinking water wells and multilevel wells the rural Ontario groundwater conditions on a provincial scale

b) Attributes

- for each well:
  - county
  - OMAF Land System classification
  - well data: year constructed, type, capped, condition of well seal, depth, static water depth, water uses
  - distance to well of feedlot and manure system, use of sludge, age and distance of septic tank and weeping bed
  - laboratory results for various bacteria types, nitrate, alachlor, metolachlor, atrazine, D-ethyl atrazine, metribuzin, cyanazine, petroleum-based chemicals, and whether Ontario drinking water objectives were exceeded
  - soil series, surface texture, drainage, hydrological soil group
- for multilevel wells:
  - data on soil type at each sampling depth, groundwater table and flow
  - farm type: crops and livestock

  - similar laboratory analyses as listed above for farm wells
- the questionnaire included data on livestock types and numbers, water sources, pesticides used, including when and why, crop residue after planting, and other practices and facilities not included in the computer database

c) Spatial extent
- agricultural areas of Ontario

d) Scale, resolution, or geographical units of measurement
- a sample of individual farms, designed to represent the province

e) Volume
- 40 attributes for each of approximately 1300 farms and 18 attributes for each of 144 multilevel well analyses

Structure

Data from questionnaire on QUEST data file; laboratory results in LABOR; data linked to well locations with OMAF GIS are in GIS data file; and multilevel well analyses in MULTL. Some agricultural practices data have not yet been included in the computer database.

Output Format

Quattro Pro or Lotus spreadsheets; two reports with the database title: one produced in September 1992, the other in April 1993

Date

The first report is based on data collected in winter of 1991–92; the second report includes data collected in summer 1992.

Frequency of Update or Release

None planned

Methods/Data Quality

Farmers (approx. 1300 wells) were randomly selected within criteria to represent Ontario conditions. The farmers filled out a questionnaire on farm facilities and practices. The wells were sampled and analyzed for nitrate–N, total and fecal coliform bacteria, and several common herbicides. Multilevel monitoring wells (144) were installed in fields with several control wells in woodlots and samples analyzed for various contaminants.

The samples were designed to represent the province rather than any smaller units.

Availability

From Mike Hicknell, Agri-Food Development Branch, Agriculture and Agri-Food Canada, 174 Stone Road West, Guelph, Ontario N1G 4S9.

The data were intended to be averaged for Ontario; locations of individual farms are confidential.

Costs

For reports, none

1,3,8,10 *A Spatial Planning Study of Southern Ontario Using Wetland, Agricultural Land Use and Waterfowl Data to Assist Development of the North American Waterfowl Management Plan – Eastern Habitat Joint Venture*

Responsible Organization(s)

Ducks Unlimited Canada
566 Welham Road
Barrie, Ontario L4M 6E7

Contact Person(s)

Ted Gadawski or Ron Maher
same address
Tel. 705-721-4444

Nature of Information

Electronic database, GIS, maps, expert system

Content

a) Purpose

- to provide a spatial planning framework for the Eastern Habitat Joint Venture in southern Ontario

b) Attributes

- OMAF Land Systems (Farm Operation Types) for the following systems: Row Crop and Tobacco; Corn; Mixed Traditional; Grain; Hay; Pasture and Grazing; Vegetable, Berry, Nursery, and Sod
- a summary township land system type derived from Land Systems data
- agricultural occurrence (proportion in agriculture)
- idle land occurrence
- cattle density (from 1986 Census of Agriculture)
- wetland, marsh, and swamp occurrence
- wetland loss trends
- recent marsh loss (in hardcopy map only)
- an estimate of resident dabbler duck density, from CWS harvest data up to October 15
- rural, low-density year-round non-farm residents (in hardcopy map only)
- waterfowl breeding habitat map based on Ducks Unlimited's combination of wetland and duck harvest data

c) Spatial extent

- agricultural townships in southern Ontario, generally south of the Precambrian Shield

d) Scale, resolution, or geographical units of measurement

- all electronic and GIS data are by township units

e) Volume
- 382 townships, about 7000 records

Structure
- dBase
- OMAF GIS (ARC/INFO) — links township dBase information to a township map base
- Ducks Unlimited GIS, Winnipeg
- combination of a number of original databases adapted to a township format and put into one database

Output Format

Maps, included in an unpublished report with the database title; tables

Date

1992, although original individual databases included data from 1983, 1986 Census of Agriculture, and 20-year average of duck harvest

Frequency of Update or Release

None planned

Methods/Data Quality

Farm Operation Types and agricultural occurrence are from *Agricultural Resource Inventory: Agricultural Land Use* database. Wetland, marsh, and swamp occurrence and losses are from *Ontario Wetland Map Series* database. Waterfowl data are interpreted from the *National Harvest Survey*. See the relevant catalogue entry for each of these databases. Rural non-farm residents data were estimated from Ontario Hydro customer service data. In combination, all data (except non-farm rural residents) were reduced or translated into township format for a consistent base. This meant the most assumptions for the waterfowl data (originally on a 10-minute base). The cattle density had a few assumptions because of census methods. All other databases were consistent with township units. The dates varied slightly and are up to a decade old. The combined database is felt to be good quality for regional- to provincial-scale planning.

Availability

Not published, possible arrangements through Ducks Unlimited

Costs

See above contacts

1,2,3,4,5,8 *The Environmental Information System (EIS)*

Responsible Organization(s)

National Accounts and Environmental Division
Statistics Canada
21st Floor, R.H. Coats Building
Tunney's Pasture
Ottawa, Ontario K1A 0T6

Contact Person(s)

Philip Fong
same address
Tel. 613-951-5638

Nature of Information

Electronic database, maps, publications, GIS

Content

a) Purpose

- contains a core set of statistics relevant to the analysis and assessment of the national state of the environment and regional environmental concerns, to offer services of analysis and report preparation on environmental issues that overlay and aggregate Statistics Canada micro-data series, including combination with external data sets and geographical boundaries

b) Attributes

- in summary:
  - biophysical conditions
  - crop type trends
  - use of pesticides, fertilizers, irrigation
  - cultivation practices
  - conservation practices, soil erosion control measures
  - socioeconomic agriculture data
  - population
  - dwelling types
  - labour force
  - industrial establishments
  - industrial activity
- more specifically, over 1200 attributes:
  - 88 attributes from the 1971 Census of Agriculture
  - 59 attributes from the 1976 Census of Agriculture
  - 103 attributes from the 1981 Census of Agriculture
  - 139 attributes from the 1986 Census of Agriculture
  - 122 attributes from the 1991 Census of Agriculture

- all years include areas in each crop, numbers of different kinds of livestock, area sprayed for weeds, areas sprayed for insects
- a set of attributes on agricultural practices, including:
  - 80 attributes from 1971
  - 50 attributes from 1976
  - 85 attributes from 1981
  - 85 attributes from 1986
  - 75 attributes from 1991
- all years include a breakdown of crop areas, areas sprayed, chemicals purchased, etc. by type of farm: wide-row mono, close-row mono, non-cropping, rotational, specialty
- 46 attributes on agricultural conservation practices, all from 1991
- 50 attributes on conservation data
- 125 attributes of Land Potential, including attributes on soils, landform, land use, and 89 climate attributes
- 2 wetland attributes: percentage cover, and wetland regions
- many other socioeconomic attributes, including attributes on airports, labour force, manufacturing statistics, private dwellings, population, and electric power generating plants

c) Spatial extent
- Canada, some U.S. data for adjacent river basins

d) Scale, resolution, or geographical units of measurement
- variety of scales, depending on the original database
- census data are at the census enumeration area resolution, whereas wetlands data were originally at 1:7 500 000
- others include drainage basins, ecological units, climate zones, pollution impact areas, etc.

e) Volume
- very large

Structure

Many databases have been combined. These can be further combined with any geographic units. Core data are in both PC- and UNIX-based ARC/INFO GIS. Analytical results can be provided in: Spreadsheets, ASCII files, micro-computer databases, ARCVIEW products, ARC/INFO export files.

Output Format

Customized tables; maps on paper, image, or postscript files; any of the results formats listed under **Structure**; discussion papers, e.g., Trant, D. 1992. *The Changing Rural Environment: A Look at Eastern Ontario's Jock River Basin*. National Accounts and Environment Division, Statistics Canada, Ottawa; reports: *Human Activity and the Environment*, Statistics Canada, Catalogue No. 11-509E.

Date

Building database since 1985, but available data back to 1971

Frequency of Update or Release

Ongoing as appropriate data received

Methods/Data Quality

Existing databases are acquired and combined in one system. The quality is that of the original databases, which were often based on surveys.

While containing many agricultural attributes, the environmental databases are less complete, stressing climate factors. The system is set up, however, to be combined with external databases. This allows the users to provide their own database for combined analysis with agricultural and/or climate attributes. Another feature is the ability to provide your own geographical units for analysis. Watersheds or other biogeographical units would be examples. Caution is required in the scale/resolution issue. Different databases have different geographical units. Straight overlay creates inaccuracies, especially if they are of greatly varying scale (e.g., wetlands data and Census of Agriculture). Even at similar scales, overlay of different units can create site-specific anomalies, and analysis should be kept at a regional level.

An example of the potential of watershed overlays on a broad regional scale is presented in Statistics Canada's *Human Activity and the Environment* (1991). Pesticide costs (both total and per hectare cultivated land) are compared between 1970 and 1985 for each of Ontario's 17 major watersheds, of which 5 cover the major agricultural areas. This type of analysis could also be done at a much finer resolution using the enumeration area data.

Availability

Intended for client use. See above contact. Use of the *Land Potential Database* requires approval from Agriculture and Agri-Food Canada's Centre for Land and Biological Resources Research.

Costs

Depend on the request. Inquire from above contact.

2. Farm Practices

Note: Databases relevant to this subject area may also be found within other sections of this catalogue. The reader may want to consult the entries on pages 17, 26, 72 and 102.

2 *Changes in Cropping, Tillage and Land Management Practices in Southwestern Ontario, 1986 and 1991*

Responsible Organization(s)

Agri-Food Development Branch
Agriculture and Agri-Food Canada
174 Stone Road West
Guelph, Ontario N1G 4S9

Ontario Ministry of Agriculture and Food
Guelph Agricultural Centre
P.O. Box 1030
Guelph, Ontario N1H 6N1

Contact Person(s)

Gary Nelson
same address (Agri-Food Development Branch)
Tel. 519-837-9400 Ext. 2158

Peter Roberts
same address (Guelph Agricultural Centre)
Tel. 519-767-3578

Nature of Information

Electronic database, publication

Content

a) Purpose

- to document the adoption of conservation farming practices that contribute to the reduction of phosphorus loading to Lake Erie; this will help monitor compliance with Great Lakes Water Quality Agreement targets

b) Attributes

- general information characterizing the farm
- source of conservation information
- for each of 1986 and 1991:
  - crops
  - crop rotation
  - strip cropping
  - field borders
  - tillage machinery
  - tillage times, depths, slope direction, reasons for change
  - planting machinery and slope direction
  - other practices — e.g., vegetated buffer strips, tree windbreaks, reforestation, drainage

- fertilizer — amounts, storage, application methods, timing for each of manure, nitrogen, and phosphorus

c) Spatial extent

- 14 Soil and Water Environmental Enhancement Program (SWEEP) counties in southwestern Ontario: Essex, Kent, Elgin, Lambton, Middlesex, Huron, Perth, Oxford, Brant, Haldimand-Norfolk, Hamilton-Wentworth, Waterloo, Wellington, and Dufferin

d) Scale, resolution, or geographical units of measurement

- the farms sampled were randomly selected but also stratified on the basis of their soil erosion rating (High or Low) to approximately match the township proportion of erosion rating

e) Volume

- for most townships, 10 farms were sampled for a total of about 1200 farms; 1164 remained in 1991
- on average, 3–5 fields per farm were sampled

Structure

Two sets of data exist for each farm — 1986 and 1991; most data are recorded as one of a set of multiple-choice options.

Output Format

To be published by SWEEP in April 1993. A report was written under SWEEP on the 1986 results alone, entitled *Cropping, Tillage and Land Management Practices in Southwestern Ontario* (D. Coleman and P. Roberts, 1987).

The electronic database creates tabular output.

Date

The survey was done in 1986 and repeated in 1991.

Frequency of Update or Release

No future plans

Methods/Data Quality

The data were collected by personal interview by trained students, assuring understanding of the questions and consistent filling out of the questionnaire. The only attributes where results have suggested some uncertainty of the consistency between 1986 and 1991 or of the understanding of the question are No. 26 (Manure Amounts) and Nos. 5 and 6 (Lengths of Rotations) (Peter Roberts, pers. comm.).

While the coverage is limited in extent, it provides spatial and time trends for agricultural practices and activities for the most intensively farmed portion of southern Ontario. It was the most detailed database on agricultural practices related to the environment that was found.

Availability

From Gary Nelson (see above)

Costs

Reports are free.

2 *Freeze Risk During Spring and Autumn in Ontario*

Responsible Organization(s)

Ontario Ministry of Agriculture and Food
Richards Building
University of Guelph
Guelph, Ontario N1G 2W1

Contact Person(s)

D. Murray Brown
same address
Tel. 519-824-4120 Ext. 2206

Nature of Information

Publication and maps

Content

a) Purpose

- to present methods for determining the risk of freezing temperatures late in the spring and early in the fall in Ontario

b) Attributes

- average date of last spring frost
- average date of first autumn frost
- average length of the frost-free period
- spatial variability of autumn frost dates for the region from London to Niagara
- rules-of-thumb for estimating frost dates at 25% and 10% risk from the average (50% risk) date
- rules-of-thumb for estimating freeze dates for critical temperatures to −4.4°C for any risk level between 10% and 50%

c) Spatial extent

- Ontario

d) Scale, resolution, or geographical units of measurement

- 1:4 000 000

e) Volume

- four maps in a four-page factsheet

Structure

Non-computerized summary compiled from meteorological databases

Output Format

Maps and tables in a factsheet: D.M. Brown and A. Bootsma. 1991. *Freeze Risk During Spring and Autumn in Ontario.* Factsheet. AGDEX 072, Order No. 91-006, Ontario Ministry of Agriculture and Food.

Date

1991

Frequency of Update or Release

None planned

Methods/Data Quality

Maps were based on climatological records for the period from 1951 to 1980 at over 300 sites. Rules-of-thumb for risk levels were calculated from frost occurrences at a number of Ontario sites with a long series of temperature records. The authors state that the regional picture is not likely to change by including records to 1990. Local differences (e.g., within cities, at various elevations, or near large water bodies) can occur beyond the resolution of the maps.

This factsheet would help predict regional differences in average timing of farm practices dependent on frost. This could include transplanting of tender plants in the spring and planting and harvesting of full-season crops. Knowledge of characteristics of different crops would also be required. The dates are average, and timing of practices could also depend on other factors, e.g., in 1992, many areas were not harvested because the cold growing season slowed development to maturity and the wet weather prevented field access.

Other factsheets, such as *Critical Temperatures for Fruit Blossoms* by B.J.E. Teskey, 1972, Order No. 72-101; and *Predicting Blossom Time in the Niagara Peninsula* by Sharon Stevenson, 1983, Order No. 83-067, provide some data on fruit bloom dates and critical temperatures that could be used in conjunction with the freeze risk data to provide some estimates of farm timing for fruit crops.

Availability

From Consumer Information Centre, Ontario Ministry of Agriculture and Food, 801 Bay Street, Toronto, Ontario M7A 2B2, or from each county OMAF office

Costs

None

3. Livestock Operations

(see also under **1. Crop Distribution**)

Note: Databases relevant to this subject area may also be found within other sections of this catalogue. The reader may want to consult the entries on pages 14, 17, 19, 21, 24 and 26.

3 *OMNR Aquaculture Licence Holders — 1990* and *Ontario Ministry of Natural Resources Fish Culture Stations*

Responsible Organization(s)

Fisheries Policy Branch
Ontario Ministry of Natural Resources
90 Sheppard Avenue East, 5th Floor
North York, Ontario M2N 3A1

Contact Person(s)

Julian Hynes
same address
Tel. 416-314-1165

Nature of Information

Electronic database

Content

a) Purpose

- to document aquaculture licence holders in Ontario

b) Attributes

- operator's name
- company or fish culture station name
- address
- telephone number (plus fax number for the OMNR Fish Culture Stations)
- licence type (to propagate and sell, or for a fishing preserve)

c) Spatial extent

- Ontario

d) Scale, resolution, or geographical units of measurement

- operation specific, although most addresses are to Rural Route number only

e) Volume

- 175 private farms licensed
- 11 OMNR Fish Culture Stations

Structure

The two databases are separate; dBase

Output Format

Tables

Date
1990

Frequency of Update or Release
Annual

Methods/Data Quality
Licence information is collected and input. An annual production survey is conducted by the Aquaculture Extension Centre at the University of Guelph. As there are fewer than 300 operations, the statistics are summarized for the whole province (see annual publication, *Aquastats*, a factsheet available from OMAF).

Availability
From above contact

Costs
Internal/OMNR

3 *Ontario Aquaculture Association Corporate Members*

Responsible Organization(s)

Ontario Aquaculture Association
P.O. Box 324
Elmira, Ontario N3B 2Z6

Contact Person(s)

Laurie Taylor
same address
Tel. 519-669-3400

Nature of Information

Published pamphlet

Content

a) Purpose

- to list association members and operation types

b) Attributes

- company name, address, and telephone number
- contact person
- species of fish propagated
- sizes of fish
- fish preparation available: fresh or smoked
- fishing access: public, club, or none

c) Spatial extent

- Ontario

d) Scale, resolution, or geographical units of measurement

- operation specific, although most addresses are to Rural Route number only

e) Volume

- 65 members

Structure

Not applicable

Output Format

Table in a pamphlet

Date

1990-91

Frequency of Update or Release
Annual

Methods/Data Quality
Data are obtained from member application forms. While this list appears to be a subset (approximately one-third) of the *OMNR Aquaculture Licence Holders* list, it provides extra information on each operation.

Availability
From above contact

Costs
None

4. Animal Husbandry

Note: Databases relevant to this subject area may also be found within other sections of this catalogue. The reader may want to consult the entries on page 26.

4,5 *Ontario Farm Management Analysis Project (OFMAP)*

Responsible Organization(s)

Agricultural Representatives Branch
Ontario Ministry of Agriculture and Food
P.O. Box 1030
Guelph, Ontario N1H 6N1

Contact Person(s)

Al de Jong
same address
Tel. 519-767-3227

Nature of Information

Electronic database with expert system, annual summary publication

Content

a) Purpose

- to provide management information to farmers to help them improve their farm business profitability

b) Attributes

- all participating farmers submit records similar to those required in their income tax form:
  - revenue types and amounts — e.g., product (e.g., milk) sales, livestock sales, crop sales
  - expenditure types and amounts — e.g., purchased livestock, purchased feed (concentrates and grain, forage), crop inputs (including categories for fertilizer and lime, for pesticides and other chemicals), machinery costs, labour costs, overhead costs
  - current assets by type and amount
  - capital assets by type and amount
  - liabilities
  - tillable acres and land use
  - livestock numbers
- OFMAP calculates:
  - revenue and expenditures per animal, per tillable acre
  - measures of financial strength, e.g., percent equity, debt-to-equity ratio
  - measures of performance efficiency
  - measures of profitability
  - debt servicing capacity analysis
  - enterprise summary
- all the above data are confidential but are summarized for Ontario by farm operation type (i.e., each of dairy, beef feedlot, beef cow-calf, swine sow-farrowing, swine farrow-finish, swine hog-finish, cash crop, sheep, meat goats)

- for each of the above attributes, a breakdown of the low third, top third, and average of participating farms according to net farm income

c) Spatial extent
- Ontario

d) Scale, resolution, or geographical units of measurement
- individual operations, but available only in provincial summary of participating farmers

e) Volume
- in 1991, 566 dairy farms; 115 feedlot farms; 240 beef cow farms; 28 swine-farrow farms; 82 farrow-finish farms; 23 swine finish farms; 53 cash crop farms; 87 sheep farms; 19 meat goat farms
- 1991 summary report is 84 pages
- 3200 farms in 1992

Structure

Information not provided

Output Format

Ontario Farm Management Analysis Project Annual Summary, OMAF Publication No. 69

Date

Since 1946

Frequency of Update or Release

Annual summary

Methods/Data Quality

Farmers submit their financial information. The OFMAP system produces a farm business analysis, including statements of income and cash flow, change in financial position, several measures of profitability, liquidity, and solvency, production information, and trend analysis. Each year, the data from the individual reports are used to create the provincial comparative farm business summary.

OFMAP provides some indication of range of data with a breakdown of the top and bottom one-third of farms for all attributes. No spatial distribution is available.

Availability

The individual analyses are confidential. The annual summary report is available from Consumer Information Centre, Ontario Ministry of Agriculture and Food, 801 Bay Street, Main Floor, Toronto, Ontario M7A 1A3, or from county OMAF offices.

Costs

None

4 *Livestock Feeds Contaminants Database*

Responsible Organization(s)

Plant Products Division
Plant Industry Directorate
Agriculture and Agri-Food Canada
Neatby Building
960 Carling Avenue
Ottawa, Ontario K1A 0C6

Contact Person(s)

Daintry Gordon or Ms. F. Dauphin
same address
Tel. 613-995-7900

Nature of Information

Electronic database

Content

a) Purpose

- to monitor residues in livestock feeds and assess compliance under the Feeds Act and Regulations

b) Attributes

- product tested
- feed registrants
- on-farm manufacturers
- feed mills
- antibiotics/drug residues
- heavy metals
- pesticides (50 screened)
- insects
- biological contaminants (e.g., salmonella, mycotoxins)
- bacterial viability
- location (province)

c) Spatial extent

- Canada

d) Scale, resolution, or geographical units of measurement

- individual sample sources and by province

e) Volume

- varies from year to year

Structure
Micro-computer with dBase III + software, INGRES (VAX)

Output Format
Tables, text; report: *Year End Summary of Feed Inspection Program*

Date
Data from late 1970s to present; database set up in 1985

Frequency of Update or Release
Monthly

Methods/Data Quality
Data are obtained from national random sampling surveys and specific directed investigations.

Availability
See above contact. Some individual data are confidential, but summary information is not. With the confidentiality restrictions, it may be difficult to obtain data at a resolution less than Ontario (inquire from above contact).

Costs
None

5. Pesticide Use

Note: Databases relevant to this subject area may also be found within other sections of this catalogue. The reader may want to consult the entries on pages 14, 21, 26, 42, 82, 86 and 88.

5 *Survey of Pesticide Use in Ontario*

Responsible Organization(s)

Statistical Services
Policy and Programs Division
Ontario Ministry of Agriculture and Food
801 Bay Street, 4th Floor
Toronto, Ontario M7A 2B2

Contact Person(s)

William McGee
same address
Tel. 416-326-3219

Nature of Information

Electronic database, publications, GIS

Content

a) Purpose

- to identify and quantify pesticides used in the Great Lakes watershed to monitor pursuance to the Great Lakes Water Quality Agreement, detect crop and regional trends in pesticide use in Ontario, and gauge effectiveness of OMAF extension work in pest and weed control

b) Attributes

- area treated
- area grown
- chemical product, active ingredients
- crop treated, some years include roadside weed control
- amount used
- concentration
- date of applications

c) Spatial extent

- Ontario

d) Scale, resolution, or geographical units of measurement

- samples are of individual operations, estimates made by county and by 12 watershed areas for the lower Great Lakes

e) Volume

- in 1988, about 2600 field crop producers and 525 fruit and vegetable producers

Structure

1988 field crop data and fruit/vegetable data have different structures — one on the mainframe computer, one on a PC; other years are not electronic databases

Output Format

Tables in:

Moxley, J. 1989. *Survey of Pesticide Use in Ontario, 1988.* Economics Information Report No. 89-08, Economics and Policy Coordination Branch, Ontario Ministry of Agriculture and Food, Toronto.

McGee, W.G. 1984. *Survey of Pesticide Use in Ontario, 1983.* Economics Information, Economics and Policy Coordination Branch, Ontario Ministry of Agriculture and Food, Toronto.

Roller, N.F. 1979. *Survey of Pesticide Use in Ontario, 1978.* Economics Information, Economics Branch, Ontario Ministry of Agriculture and Food, Toronto.

Roller, N.F. 1975. *Survey of Pesticide Use in Ontario, 1973.* Economics Information, Economics Branch, Ontario Ministry of Agriculture and Food, Toronto.

Date

Data for 1973, 1978, 1983, 1988

Frequency of Update or Release

Every five years (OMAF is hoping to establish an annual reporting summary to help assess Food Systems 2002, a program to reduce pesticide use by 50% from 1987 levels [Wayne Roberts, OMAF, pers. comm.])

Methods/Data Quality

Field crops (1988):

Statistics Canada's Farm Register of 1986 census farms was used to generate 10 000 farms. The number in each county depended on the distribution of pesticide use in the 1983 survey and on the distribution of field crops in the province. Random sampling occurred within each county. Each selected farmer received Pesticide Use Record Forms in April 1988 to be completed throughout the growing season. A summary questionnaire was then mailed to each selected farmer in September. About 2600 were returned. Each was checked for consistency and completeness. Quantities of active ingredients were calculated from the proportion in each product used. A geographic code was used to link the data with the 1986 Census of Agriculture to expand the data for each major field crop to the county level. The code also identified the township. Watershed boundaries were allocated by the nearest township boundary. Depending on the crop and county, the expansion factors described previously could be applied and summed for watershed estimates. (The 1978 survey differed slightly in that it derived the proportion of each township in each basin for its estimates.)

Various tests supported the representativeness of the selected farms and of the respondents.

Possible underestimates of no use for some pesticides in some counties occur when areas involved were too small for estimates or for sample detection.

Fruit and vegetables (1988):

A similar selection procedure was followed, selecting 3200 growers. Additional forms were added from field crop survey records. Because of the smaller sample compared with the field crops, the expansion method first estimated provincial use based on the 1988 areas of each crop. County and watershed estimates used proportional area breakdowns of the provincial estimates for each active ingredient for each commodity. This method assumes fruit and vegetable crops are treated in a similar fashion regardless of location.

Roadside spraying:

OMAF weed specialists contacted authorities responsible for roadside spraying and collected data on herbicide applications. These data were not collected in 1988.

These surveys are the main source of comprehensive data on pesticide use in Ontario. The data have been expanded by statistics experts to fit both administrative and natural geographical units — counties and watersheds. Both are regional scale, providing an overview of distribution throughout the province. The 47 counties include all agricultural areas; the watersheds cover southern Ontario agricultural areas west of Kingston. This covers the major pesticide use areas but it is possible that similar data processing could extend the coverage to the Ottawa and St. Lawrence basins.

The four surveys, while having some minor differences, are largely consistently applied and provide a basis to determine use trends since 1973. Care should be taken to consider possible reasons: for example, 1988's reduced use was at least partly attributable to its extreme drought conditions. In 1988, the data were presented in 18 tables and 8 maps. The extensive presentation in various formats likely reduces the need for electronic databases, which exist only for 1988.

Confidentiality and sample design restrict the scale to regional levels and to comparison with other regional-level databases or suitably located river water quality databases. More local data are comprehensively available only through the Census of Agriculture at the enumeration-area level, and its attributes are confined to area in herbicides, area in insecticides and fungicides, and amount spent on pesticides — without the reference to active ingredients.

The 1993 survey now under way and available in January 1994 will be the most detailed yet and will likely include estimates of forestry use. Urban use data, however, are not widely collected in Ontario (Wayne Roberts, pers. comm.).

Availability

The 1988 survey publication is available from the Consumer Information Centre, Ontario Ministry of Agriculture and Food, 801 Bay Street, Main Floor, Toronto, Ontario M7A 2B2.

For information on the 1988 survey electronic databases and on earlier surveys, see the above contact.

Costs

None for survey publications

5 *Grower Pesticide Certification Database*

Responsible Organization(s)

Ridgetown College of Agricultural Technology
Ontario Ministry of Agriculture and Food
Ridgetown, Ontario N0P 2C0

Contact Person(s)

Larry Litschko
same address
Tel: 519-674-5456

Nature of Information

Electronic database

Content

a) Purpose

- to document growers certified under the Grower Pesticide Safety Course in Ontario

b) Attributes

- grower
- address and telephone number
- county
- farm type
- crops (for some registration years)
- grade in course
- course date
- course location
- certificate number

c) Spatial extent

- Ontario

d) Scale, resolution, or geographical units of measurement

- individual growers; most detailed available unit — county

e) Volume

- approx. 40 000 growers

Structure

dBase III+; PC accessible

Output Format

Tables

Date

Started in 1988; will be comprehensive in 1996

Frequency of Update or Release

As each grower recertifies, which is every five years from the original certification

Methods/Data Quality

The data are based on questionnaires that each certified grower must fill out. As of 1991, all growers using Schedule 1, 2, or 5 products had to be certified. As of March 1996, users of Schedule 3 products (including some widely used products, such as Roundup) will be added, as well as anyone handling the products. In 1988, 1400 growers were certified; 10 000 in 1989; 10 000 in 1990; 17 000 in 1991; 2500 in 1992. In 1993, the original 1400 from 1988 must recertify, plus any new applicants, for an estimated total of 3000 (all numbers are rounded). The required data changed each year, so the attributes are not completely consistent. The data apply to the year of certification or recertification. Use of the *Grower Pesticide Certification Database* may also be complicated by the five-year staggered nature of the data, depending on grower certification dates.

Volumes and products used are not included; only very general estimates would be possible on the basis of the crops (not available for all applicants) and recommended rates.

Availability

The data are submitted confidentially and are not readily accessible to the public. Only requests that amalgamate data to avoid any breach of confidentiality will be considered. Requests must be submitted through the Freedom of Information and Privacy office of OMAF at 801 Bay Street, 3rd Floor, Toronto, Ontario M7A 2B2; contact Alma Beard, Tel. 416-326-3137. Requests are reviewed on a case-by-case basis.

Costs

Depend on request

5 *Levels of Pesticide Contaminants in Fertilizers*

Responsible Organization(s)

Feed Section, Plant Products Division
Animal and Plant Health Directorate
Agriculture and Agri-Food Canada
Neatby Building
960 Carling Avenue
Ottawa, Ontario K1A 0C6

Contact Person(s)

Margaret Kenny
same address
Tel. 613-995-7900

Nature of Information

Data depository

Content

a) Purpose

- to monitor fertilizer contamination by pesticide residues to prevent crop damage

b) Attributes

- location (producer, town)
- fertilizer composition
- pesticides (butylate, atrazine, trifluralin, triallate, metolachlor)

c) Spatial extent

- Canada

d) Scale, resolution, or geographical units of measurement

- individual producers, nearest town

e) Volume

- information not provided

Structure

Paper file

Output Format

Internal annual reports

Date

Records: late 1970s to present; reports: since 1988

Frequency of Update or Release

Annually

Methods/Data Quality

Data are collected from random surveys and specific case studies.

This database could offer an indication of the scale of application of pesticides through fertilizers. It would need to be linked with fertilizer use to estimate total volumes. As the data are by producer and producer information is restricted, and as there are very likely similar restrictions on the fertilizer data (contact Fertilizer Institute of Ontario, Cambridge), it is likely that only general estimates of pesticide levels applied through fertilizer contamination are possible.

Availability

See above contact. Data on individual producers are limited.

Costs

None

5 *Potential for Soils to Transfer Pesticides to Water Systems in Southern Ontario*

Responsible Organization(s)

Agriculture and Agri-Food Canada
70 Fountain Street East
Guelph, Ontario N1H 3N6

Contact Person(s)

Greg Wall
same address
Tel. 519-766-9180

Nature of Information

Unpublished report, maps, and tables

Content

a) Purpose

- to amalgamate some existing pesticide and pesticide-relevant data in the southern Ontario Great Lakes basin into a comprehensive summary useful for prioritizing areas for severity of pesticide pollutant transfer through soil

b) Attributes

- for each township, from the 1981 Census of Agriculture:
  - total area
  - area of farmland
  - area of cropland, and percentage of township and county
  - area of field crops, and percentage of township
  - area of horticultural crops
- for each county, and for each of a) field crops and b) horticultural crops, from *Survey of Pesticide Use in Ontario, 1983*, by W.G. McGee, Economics Information, Economics and Policy Coordination Branch, Ontario Ministry of Agriculture and Food, Toronto (1984):
  - kg triazine
  - kg phenoxy herbicides
  - kg other herbicides
  - kg insecticides
  - kg nematocides
  - kg fungicides (for horticultural crops only)
  - kg total pesticides
  - average application rate, kg/ha
  - average application rate for all cropland
- assuming the average county application rate applied to each township, combined township crop areas and county pesticide use to estimate for each township:
  - kg pesticide used on field crops

  - kg pesticide used on horticultural crops
  - total kg pesticide used
- derived High, Moderate, and Low rankings per township for:
  - soil potential for pollutant transfer to surface water systems
  - soil potential for pollutant transfer to groundwater systems

  from existing interpreted soil maps (Coote and MacDonald 1974, cited in Switzer-Howse, K.D. 1982. Agricultural management practices for improved water quality in the Canadian Great Lakes Basin. Land Resource Research Institute Contribution No. 82-10. Research Branch, Agriculture Canada, Ottawa)
- combined township pollutant transfer potential rankings and estimates of pesticide use to rate each township for:
  - potential problems of pesticide transfer to surface water
  - potential problems of pesticide transfer to groundwater

c) Spatial extent
- southern Ontario west of and including Frontenac County; northern boundary approx. Precambrian Shield boundary

d) Scale, resolution, or geographical units of measurement
- the highest-resolution data are by township.

e) Volume
- 263 townships

Structure

The data are all tabular; the report is on WordPerfect. Maps summarize some of the data into classes.

Output Format

Unpublished report with the database title, by I.J. Shelton, G.J. Wall, and W.T. Dickinson; includes maps and tables

Date

1987

Frequency of Update or Release

No plans to update

Methods/Data Quality

Approach is summarized under **Content** *b) Attributes* above. Assumptions required in the estimates of the data likely introduce some inaccuracies, but they would retain regional planning value. The two databases — soil pollutant transfer data, which were area weighted, and pesticide use, which was not area weighted — were combined for the final potential pesticide problem ranking maps. This means large townships with moderate rates per hectare could score worse than a small township with high rates per hectare. For data on pesticide use per township, the sum of the township totals for some counties

does not always match the county total even for counties completely within the study area.

The land use and pesticide data are now out of date but provide a baseline for trends. Use of the approach with recent data and with consistent area weighting would update the analysis. If the same approach of estimating township pesticide use from county statistics is to be considered, it might be valuable to check the assumption of constant rates per hectare within a county.

Availability

Unpublished report copies available from above contact

Costs

None

5 *An Assessment of Fertilizer and Insecticide Use in Watersheds and Ecoregions of Ontario*

Responsible Organization(s)

National Water Research Institute
Environment Canada
Canada Centre for Inland Waters
P.O. Box 5050
867 Lakeshore Road
Burlington, Ontario L7R 4A6

Contact Person(s)

Scott Painter
same address
Tel. 905-336-4641

Nature of Information

GIS

Content

a) Purpose

- to transform spatial data on fertilizer and insecticide use from an administrative basis to a watershed and ecoregion basis to help assess the representativeness of the water quality sample network

b) Attributes

- counties (60) and area
- major watersheds (29) and area
- ecoregions (20) and area
- for each of counties, watersheds, and ecoregions:
  - total fertilizer applied per hectare
  - pesticide applied per hectare
  - triazine applied per hectare
  - insecticide applied per hectare
  - nematocide applied per hectare
  - fungicide applied per hectare
  - other pesticides applied per hectare

c) Spatial extent

- Ontario

d) Scale, resolution, or geographical units of measurement

- counties (60 units), major watersheds (29 units), and ecoregions (20 units)
- scale 1:2 000 000

e) Volume

- with 7 chemical attributes and 109 geographical units, each with area and percent area entries, over 2000 values

Structure

Information was synthesized using Tydac SPANS GIS. The SPANS universe encompassed the province of Ontario. The Lambert Conformal Projection was used. County boundaries were provided by Statistics Canada in ARC/INFO format; ecoregions and watersheds were from Environment Canada's Environmental Information Systems Division. Several databases were compiled.

Output Format

Maps, tables, report: Geomatics International Inc. *An Assessment of Fertilizer and Insecticide Use in Watersheds and Ecoregions of Ontario.* No date. Burlington, Ontario.

Date

None shown, but circa 1990

Frequency of Update or Release

Water Quality Branch planning to analyze 1993 pesticide use survey data

Methods/Data Quality

Existing databases were collected — fertilizer use from the Fertilizer Institute of Ontario, insecticide and pesticide data from OMAF's *Survey of Pesticide Use in Ontario*. The county, watershed, and ecoregion databases were compiled and generalized to 1:2 000 000 scale. By assuming even distribution of fertilizer and pesticides across each county, the data were allocated by watershed and ecoregion using the GIS. This assumption is recognized as introducing error but was considered appropriate for the scale of the study.

For watershed analyses in southern Ontario, OMAF's *Survey of Pesticide Use in Ontario* has much better resolution. *Assessment of Fertilizer and Insecticide Use*, however, extends the watershed coverage beyond OMAF's to the whole province and has added ecoregions and fertilizers. Some anomalies occur, including pesticide applications occurring in non-agricultural parts of extreme northern Ontario. This may be attributable to the averaging over counties, which in northern Ontario are extremely large and include very small agricultural areas. Similar errors will arise in counties along the Precambrian Shield, where agriculture forms just a small portion of the county. While looking at chemical use on an ecosystem basis is a valuable concept, with only three ecoregions in agricultural southern Ontario the resolution is relatively low.

Availability

See above contact

Costs

Report is free

5 *A Profile of 2,4-D Use and Exposure in Ontario*

Responsible Organization(s)

Ontario Pesticides Advisory Committee
Ontario Ministry of Environment and Energy
135 St. Clair Avenue West, Suite 100
Toronto, Ontario M4V 1P5

Contact Person(s)

Doug Mewett
same address
Tel. 416-314-9235

Nature of Information

Report

Content

a) Purpose

- to gather quantitative information on the use of and exposure to 2,4-D

b) Attributes

- total volume of 2,4-D sold in Ontario in 1986
- volume per user type (15 categories, including agriculture)
- 2,4-D sales relative to total pesticide sales
- worker exposure: days and clothing
- supply companies
- for agriculture:
  - area treated
  - volume of 2,4-D used for five crop types (from *Survey of Pesticide Use in Ontario, 1983*, by W.G. McGee, Economics Information, Economics and Policy Coordination Branch, Ontario Ministry of Agriculture and Food, Toronto, 1984)
  - for sample of cereal growers (250)
    - total cereal acreage
    - frequency of 2,4-D applications
    - other crops receiving 2,4-D
    - volume of specific 2,4-D products applied
    - use of various types of protective clothing
    - type of storage location
    - method of disposal of containers
- similar sorts of attributes for 2,4-D use in each of:
  - forestry
  - home, garden, and golf courses
  - rights-of-way
  - counties, townships, cities, and towns

- aquatic environments

c) Spatial extent
- Ontario

d) Scale, resolution, or geographical units of measurement
- for agriculture, Ontario and a representative sample of cereal growers
- for forestry, by OMNR District and by forest company
- for urban use, by company (anonymous)
- for roadsides, by Ministry of Transportation District and by county on non-provincial roadsides
- for company rights-of-way, by company
- for counties, townships, cities, and towns, by selected examples: 9 counties, 10 townships, 8 cities, 11 towns

e) Volume
- 93 pages

Structure

Not applicable

Output Format

Report: Deloitte Haskins and Sells. 1988. *A Profile of 2,4-D Use and Exposure in Ontario.* Guelph, Ontario (ISBN 0-7729-4156-4)

Date

1986 for most data

Frequency of Update or Release

None known

Methods/Data Quality

The following sources of information were consulted:
- agricultural chemical manufacturers, formulators, and distributors
- herbicide-impregnated fertilizer manufacturers and distributors
- retailers of herbicide products and impregnated fertilizer
- a sample of cereal producers in Ontario
- OMNR forestry districts
- private forestry companies
- commercial lawn maintenance companies
- utility companies that control vegetation
- selected counties, townships, cities, and towns
- various provincial ministries that use, monitor, or regulate 2,4-D

The data were compiled and analyzed.

This report provides an overview of the use and exposure of one type of herbicide by all users — not just agriculture — for one year. The agricultural data presented have no

spatial breakdown, representing the usage, products, and handling practices of a sample of cereal producers.

Availability

From above contact

Costs

None

5,6,7

Farm Level Database

Responsible Organization(s)

Farm Economic Analysis Division
Policy Branch
Agriculture and Agri-Food Canada
Sir John Carling Building
3rd Floor, Room 377
830 Carling Avenue
Ottawa, Ontario K1A 0C6

Agriculture Division
Statistics Canada
12th Floor, Jean Talon Building
Tunney's Pasture
Ottawa, Ontario K1A 0T6

Contact Person(s)

David Culver
same address (Agriculture and Agri-Food Canada)
Tel. 613-995-5880

Mario Menard
same address (Statistics Canada)
Tel. 613-951-2446

Nature of Information

Electronic database

Content

a) Purpose

- to provide information on farm income and finances for input to policy and program decisions

b) Attributes

- by individual sample farms:
  - physical characteristics
    - crops
    - areas
    - number of livestock
  - financial data
    - revenue sources and amounts
    - cost sources and amounts
    - commodity price data

- benchmark cost of production studies — surveys on each of Cash Crop, Beef, Dairy, Hogs, and possibly Apples this year
- farm cost data are collected from a selection of individual farms and averaged
- for herbicide, fungicide, and pesticide usage, for each product used:
  - product name
  - crop(s) applied to
  - rate of application broadcast per crop
  - rate of application banded per crop
  - percentage pre-planting incorporated
  - percentage pre-emergence
  - percentage post-emergence
  - acres applied per crop
  - percentage in mix of this chemical
  - other chemicals in mix

c) Spatial extent
- Canada; the benchmark studies listed are for Ontario and are set up to be a selection representative of the Ontario situation for that farm type

d) Scale, resolution, or geographical units of measurement
- data collected by individual sample farm but available only in averaged form for that farm operation type in Ontario

e) Volume
- Cash Crop example of benchmark studies: 60 farms in predominant cash crop areas of Ontario (southwest), each filling out a 15-page questionnaire

Structure
SAS, SPSS

Output Format
Tables, publications in process

Date
The project began in 1991; 1993 in full process

Frequency of Update or Release
Plan rotation of benchmark studies of about 3–4 years per farm type

Methods/Data Quality
The general database is compiled from other available databases: i.e., *National Farm Survey*, Farm Financial Surveys, Taxation Data, Commodity Price records. Taxation data can be linked to the same farms as each of the surveys, but the different surveys are from different farms. The outputs are composite estimates. The Cost of Production benchmark studies are by questionnaire and are commissioned specifically for this

database. They are meant as a sample of what is happening with the larger, more commercial producers.

With ongoing rotation of benchmark studies, this database will provide data every few years on pesticide use, amounts, crops, timing, and application method that indicate trends typical of larger operations by various farm types in Ontario. It is intended neither to be comprehensive nor to provide spatial trends within Ontario.

Availability

See above contacts — David Culver for the Cost of Production benchmark studies information; no publications yet available

Costs

Depend on request

5 *Pesticide Products Classified in Ontario*

Responsible Organization(s)

Hazardous Contaminants Coordination Branch
Location:
2 St. Clair Avenue West, 12th Floor
Toronto, Ontario
Mailing address:
Ontario Ministry of Environment and Energy
135 St. Clair Avenue West
Toronto, Ontario M4V 1P5

Contact Person(s)

John A. Miller
same address
Tel. 416-323-5110

Nature of Information

Electronic database, annual publication

Content

a) Purpose

- to document all pesticide products classified in Ontario

b) Attributes

- in electronic database:
  - PCP No.
  - Schedule No.
  - Formulation Type Code (21 types, e.g., dust, granular, particulate, solution, wettable granules, etc.)
  - Product Group Code (13 types, e.g., animal disease control, plant disease control, plant growth regulators, swimming pool chemicals, etc.)
  - Product Name
- in publication:
  - criteria for Schedules (Ontario classification of pesticide products)
  - registrant codes and addresses (105 companies)
  - pesticide products, for each including:
    - registration number
    - schedule number
    - registrant code
    - product name
    - agent code (not for all products)
  - pesticides contained in fertilizers, for each including:
    - registration number under Fertilizer Act (Canada)

- Schedule No.
- registrant under Fertilizer Act (Canada)
- fertilizer product name

c) Spatial extent
- Ontario

d) Scale, resolution, or geographical units of measurement
- not applicable

e) Volume
- 3353 products; publication (101 pages) also includes these products, 6 schedules, 105 registrants, 173 fertilizer products containing pesticides

Structure

List in WordPerfect for use on PC

Output Format

Electronic database: table, floppy disk; publication: *Pesticide Products Classified in Ontario*, January 1993, Hazardous Contaminants Coordination Branch

Date

Electronic database: February 1993; publication: January 1993

Frequency of Update or Release

As required

Methods/Data Quality

All products classified in Ontario are listed with the Ontario Ministry of Environment and Energy, which administers the Pesticides Act.

There is no indication of amount of each used or location. The product group code indicates the type of use for each product, so those applicable to agriculture or to other uses could be sorted out.

More detailed information on each pesticide is available in Agriculture and Agri-Food Canada's *Regulatory Information on Pesticide Products (RIPP)* database. An advantage of the Ontario database over RIPP is that it has selected only those pesticides used in Ontario. One approach might be to refer to the annual publication for a list of Ontario pesticides and then to RIPP for more information on the pesticides of interest.

Availability

From above contact. The electronic database is a custom retrieval, requiring a written request. The publication is available to the public.

Costs

None

5 *Pesticide Registrant Survey*

Responsible Organization(s)

Chemicals Control Division
Commercial Chemicals Branch
Environmental Protection
Environment Canada
Ottawa, Ontario K1A 0H3

Contact Person(s)

Tedd Brien
Commercial Chemicals Branch
Environment Canada
351 St. Joseph Boulevard, 14th Floor
Hull, Quebec K1A 0H3
Tel. 819-953-1685

Tom Davis
Pesticides Directorate
Agriculture and Agri-Food Canada
2200 Walkley Road
Ottawa, Ontario K1A 0C6
Tel. 613-993-4544

Nature of Information

Electronic database; confidential publication

Content

a) Purpose

- to provide information to federal agencies that are involved with environmental assessment and monitoring programs or regulatory review programs
- survey is conducted to determine the Canadian sales of selected pesticide active ingredients contained in products registered under Canada's Pest Control Products Act

b) Attributes

- sales of active ingredient by market type and use pattern
  - market type, i.e., domestic, commercial, or restricted products
  - use pattern
    - function of product
    - target organisms
    - type of host or location of target organisms, e.g., crop type
    - methods of application
    - form of the product
- individual sales data for specific products

c) Spatial extent
- Canada, excluding territories

d) Scale, resolution, or geographical units of measurement
- province

e) Volume
- for year of sales from 1981 to 1990, the number of active ingredients per year increased from 24 to 221; number of registrants increased from 115 to 498; number of products increased from 780 to 3397

Structure

Includes machine-readable copy of Agriculture and Agri-Food Canada's *Compendium of Pest Control Products* (which contains product composition and associated registration-related information); plus respondents' sales data. Additional use pattern coding is added later. Data before 1985 are not computerized.

Output Format

Tables; annual two-page summary; a confidential (under the Canadian Environmental Protection Act) annual report with restricted access (designated as Protected:B).

The computer calculates the active ingredient content of each product and produces tabulations breaking the sales down by market type and province; and by use pattern and province.

Date

1981 to present (latest available year is 1990)

Frequency of Update or Release

Currently under review

Methods/Data Quality

The survey is conducted by the Pesticides Directorate of Agriculture and Agri-Food Canada and the Commercial Chemicals Branch of Environment Canada using the authorities of section 26 of the Pest Control Products Regulations as well as subsection 15 (a) of the Canadian Environmental Protection Act. The survey is conducted by:

- selecting the active ingredients that will be included in the survey after soliciting nominations from the various data clients
- preparing and distributing questionnaire packages, which include tables that list each registrant's relevant products
- following up delinquent responses as well as questionable or ambiguous responses
- processing the responses and other data

The summary provides only the total sales for Ontario. A list of pesticides accounting for 80% of national sales flags the bigger-volume products nationally. The pesticides recommended by crop in Ontario (e.g., from OMAF's *Field Crop Recommendations*, *Fruit Production Recommendations*, and *Vegetable Production Recommendations*) would help suggest which of these is most likely in Ontario.

Availability

The publication is confidential under the Canadian Environmental Protection Act and designated Protected:B. The two-page annual summary is available.

Costs

None

2,5,6,7 *Ontario Ministry of Agriculture and Food Recommendations: specifically, Field Crop Recommendations: Publication 296 Vegetable Production Recommendations: Publication 363 Fruit Production Recommendations: Publication 360 Production Recommendations for Nursery and Landscape Plants: Publication 383 Guide to Weed Control: Publication 75*

Responsible Organization(s)

Plant Industry Branch
Ontario Ministry of Agriculture and Food
Guelph Agricultural Centre, 3rd Floor
P.O. Box 1030
Guelph, Ontario N1H 6N1

Contact Person(s)

Irene Sullivan (Field Crops — Forages)
Tel. 519-767-3257

Henry Olechowski (Field Crops — Grains)
Tel. 519-767-3257

Bill Ingratta (Fruit and Vegetables)
Tel. 519-767-3192

Howard Lang (Weeds and Seeds)
Tel. 519-767-3126

Wayne Roberts (Pest Management)
Tel. 519-767-3176

ALL AT SAME ADDRESS

Nature of Information

Publications

Content

a) Purpose

- to provide Ontario farmers with the best available advice on crop management and practices

b) Attributes

- soil management and fertilizer use
- soil management and tillage (including conservation) systems; includes section on implications for pest control

Field crops

- for each field crop (corn, soybeans, cereal crops, forage crops, dry edible beans, canola):
  - crop management — including seeding dates
  - variety selection
  - fertilizers — including rates
  - disease and insect control — including non-pesticide control measures, pesticide products, rates, recommended application methods, and timing guidelines
- for alfalfa, map of start of critical fall harvest period
- fertilizer guidelines for minor crops (buckwheat, flax, fodder rape, kale millet, mustard, sorghum, sunflowers)
- general information on pesticide use
- seed treatments and active ingredients
- insecticides: trade name, classification, days to harvest, relative toxicities, aerial application suitability, distributors, crop, Ontario Schedule (level of restriction)
- general reference

Fruit crops

- for each fruit crop (apples, apricots, blueberries, cherries, currants and gooseberries, grapes, peaches and nectarines, pears, plums, raspberries and blackberries, strawberries):
  - pesticides (per disease and insect: time to spray often based on crop development stages, material sprayed, amounts per 1000 L and per hectare)
  - cultural controls of pests
  - fertilizer guide
- thinning methods, including chemical treatments and rates
- materials and rates for promotion of fruit colouring, maturity, pre-harvest drop of apples
- rodent and deer control methods

Vegetable crops

- for each vegetable:
  - seeding treatment, dates, methods
  - fertilizer needs, rates, methods
  - disease, insect, and pest control, including for each: products, rates, timing depending on crop and insect development
- general information on soil management and fertilizer use, seed treatment, crop rotation, irrigation

Nursery and landscape plants

- a description of insects, mites, diseases
- recommendations for insect and disease pest control by pest, host plant, product, amounts, timing based on plant or pest stages
- soil management and fertilizer use
- general information on pesticide use

Weed control

- list of all herbicides used in Ontario, trade names, active ingredients, formulation

- notes on each herbicide, including crop registration; sensitive weeds; uptake and translocation; basis of selectivity; application methods including timing as it relates to crop and weed stages and to climate, equipment; residual activity; unique characteristics
- application technology: equipment types, use, and care
- for each crop:
  - non-herbicide control
  - for each weed
    - herbicide trade names and generic names
    - timing relative to crop stages
    - rate of application
    - notes re timing, machinery, weather, application methods
- ratings of herbicides by weed
- susceptibility of woody plant species to various herbicides
- recommended herbicides for aquatic plants: products by species, including rates and notes on timing and application
- susceptibility of aquatic plants to various herbicides

c) Spatial extent
- agricultural Ontario

d) Scale, resolution, or geographical units of measurement
- directed to individual farm operators

e) Volume
- *Field Crop Recommendations 1993–1994*: 96 pages
- *Fruit Production Recommendations 1992–1993*: 89 pages with 6-page 1993 Supplement
- *Vegetable Production Recommendations 1992–1993*: 84 pages
- *Production Recommendations for Nursery and Landscape Plants 1990*: 57 pages
- *Guide to Weed Control*: 208 pages

Structure

Publications with general and crop-specific sections

Output

Publications, see database titles; all include tables

Date

1993–94 for Field Crops; 1992–93 for Fruit and Vegetable Production; 1990 for Nursery and Landscape Plants; and 1992 for Guide to Weed Control

Frequency of Update or Release

For Field Crops, Fruits, and Vegetables — every two years with a supplement the second year; for Nursery and Landscape Plants, less often

Methods/Data Quality

About 800 specialists contribute to the Ontario Agricultural Services Coordinating Committee system, which develops all crop recommendations. The Committee assembles the best available recommendations based on all available research, trials, and advice.

These reports appear to be the best comprehensive approximation of conventional crop practices. OMAF emphasis is on extension rather than monitoring, so data of actual practices are not extensively collected. As these reports are the key reference materials for farmers in Ontario, in general they are very likely to represent what in fact is being practised (Irene Sullivan, pers. comm.), weather and economics permitting. For pesticides, however, the recommendations represent "worst case." Usually not every problem appears in a season, and the pest monitoring system, Agriphone, as well as IPM have led to use below that in the published recommendations (Wayne Roberts, pers. comm.). The Recommendations list all pesticides that can be used — the producer would select one. Thus, total pesticide use cannot be estimated by multiplying crop acreage by per-acre rates (Irene Sullivan, pers. comm.).

Other OMAF factsheets and shorter publications related to recommendations on pesticide use, timing, machinery, and application include:

Ontario Mushroom Pesticide Recommendations. 1989. Publication No. 367.

Roberts, W.P., and C.M. Simpson. 1982. *Pest Management for Grape Series: Monitoring and Predicting Spray Dates of the Grape Berry Moth on the Niagara Peninsula*. Order No. 82-036.

Fisher, R.W., D.R. Menzies, and A. Hikichi. 1976. *Orchard Sprayers: A Guide for Ontario Growers*. Publication No. 373. 52 pp.

Food Systems 2002: A Program to Reduce Pesticides in Food Production. 1989. OMAF brochure.

Ker, K.W., and K. Wilson. 1989. *Rodent and Deer Control in Orchards*. Order No. 89-122.

Frank, R. 1988. *Reducing Pesticide Drift and Crop Damage*. Order No. 88-118.

Frank, R. 1987. *Guide to Handling and Applying Herbicide to Protect Water Supplies and Reduce Personal Exposure*. Order No. 87-044.

Biggs, A.R., and J. Northover. 1985. *Brown Rot: Pest Management Program for Peach Series*. Order No. 85-038.

Anderson, G.W. 1989. *Flat-Fan Nozzle Tips for Field Weed Sprayers*. Order No. 89-110.

Plas, H. 1988. *Field Sprayer Calibration*. Order No. 88-129.

Availability

From Consumer Information Centre, Ontario Ministry of Agriculture and Food, 801 Bay Street, Toronto, Ontario M7A 2B2, or from each county OMAF office

Costs

None

5,6,7 *Integrated Pest Management for Apple Orchards in Ontario; for Peaches in Ontario; for Grapes in Ontario*

Responsible Organization(s)

Plant Industry Branch
Ontario Ministry of Agriculture and Food
P.O. Box 1030
Guelph, Ontario N1H 6N1

Contact Person(s)

Wayne Roberts
same address
Tel. 519-767-3176

Nature of Information

- Publication and factsheets

Content

a) Purpose

- to provide growers with information on the monitoring and integrated control of insects, mites, and diseases in apple orchards, peach orchards, and vineyards

b) Attributes

- for apples:
  - crop advisors and Agriphone numbers
  - guidelines for monitoring pest activity by crop stage, time of year
  - beneficial insects: name, description, food, where and when active
  - pest resistance to insecticides, fungicides, and miticides
  - pest monitoring procedures, including guidelines for using insect traps for various insects — preventing bee poisoning
  - alternative hosts of apple pests, by pest
  - quick decision charts: including crop phenology, pest, most susceptible cultivars, monitoring procedures and frequency of observation, action threshold, time of application, effective materials, amount per hectare, warnings, other pests affected, reference number
  - more references for each pest, including details on life history, monitoring, thresholds, timing, and control
  - days from last spray to harvest by pesticide
  - physical compatibility of spray materials
  - chemical families of pesticides
- for peaches:
  - *Pest Management Program for Peaches*: introduction to IPM and an example of a spray application — Factsheet 83-070

  - *Insect and Mite Pests of Peach in Ontario*: colour photos of peach pests — Factsheet 88-119
  - *Diseases and Nutrient Imbalances of Peach in Ontario*: colour photos of peach diseases and nutrient imbalance effects — Factsheet 88-114
  - *Tarnished Plant Bug*: biology, activity, and control of each of overwintering generation, first generation, and second generation, factors favouring tarnished plant bug injury, pesticides, and rates of application — Factsheet 83-027
  - *Oriental Fruit Moth*: biology, monitoring, including location of traps, record taking, interpretation of data for each of first, second, and third generations, timing, pesticides, and rates of application — Factsheet 83-073
  - *Oblique-Banded Leaf Roller*: biology, monitoring, materials, and rates of application — Factsheet 80-028
  - *Mite Pests of Peach*: biology of European red mite and of two spotted spider mite, mite buildup on peach, monitoring mite populations, materials, and rates of application — Factsheet 80-029
- for grapes:
  - *Monitoring and Predicting Spray Dates for the Grape Berry Moth on the Niagara Peninsula*: monitoring, including trap location, record taking, interpretation of data for each of first, second, and third generations, grape berry moth activity in different regions of Niagara, control — Factsheet 82-036
  - *Grape Berry Moth on the Niagara Peninsula*: history, life history of first, second, and third generations, control — Factsheet 82-037
  - *Grape Berry Moth*: history, biology, first-, second-, and third-generation activity, control strategies, cultural practices, chemical methods, photos — Factsheet 90-098 (revision of Factsheet 82-037)

c) Spatial extent
- Ontario

d) Scale, resolution, or geographical units of measurement
- not applicable; intended for use by individual grower

e) Volume
- *IPM for Apple Orchards*: 59 pages; 7 peach factsheets, with total of 22 pages; 3 grape factsheets, with total of 9 pages

Structure

Not applicable

Output Format

Publication: *Integrated Pest Management for Apple Orchards in Ontario*: A handbook for growers, scouts, and consultants; produced by the responsible organization and published by OMAF. Factsheets for peaches and grapes (for titles and order numbers, see under **Content** *b) Attributes*.

Date

Apples: 1990; peaches: 1980–88; grapes: 1982–90

Frequency of Update or Release

Apples: every 3–5 years, next one planned for 1994; other commodities planned, soonest of which is for muck vegetables in late 1993. Factsheets updated as required.

Methods/Data Quality

Best available information is assembled from both field extension and research experts. Extension work includes Agriphones or Code-A-Phones, where pest status is monitored regionally, and region-specific IPM recommendations placed on a phone message accessible to farmers. A copy of the publication is sent to each grower.

This type of database provides the best available compilation of recommended IPM in Ontario. A publication on muck vegetables for which there has also been a lot of work will soon be available. It should be noted that these recommendations do not necessarily represent actual use. Limited surveys have indicated actual use lies somewhere between the conventional agriculture recommendations publications and the IPM recommendations.

Availability

From above contact

Costs

None

5.6.7 *Status of IPM in Ontario*

Responsible Organization(s)

Pest Management Section
Plant Industry Branch
Ontario Ministry of Agriculture and Food
P.O. Box 1030
Guelph, Ontario N1H 6N1

Contact Person(s)

Wayne Roberts
same address
Tel. 519-767-3176

Nature of Information

Reports by commodity

Content

a) Purpose

- to provide information on current practices, problems, and research needs in IPM of 22 commodities of heaviest pesticide use in Ontario
- status reports have been completed for each of: apples, muck vegetables, pears, grapes, cole crops, tomatoes, potatoes, sweet corn, alfalfa, greenhouse floriculture, and greenhouse vegetables

b) Attributes

- for each commodity:
  - summary of IPM status, problems, and future
  - by pest:
    - well-defined strategies description
    - what is grower doing in terms of preferred strategies
    - acceptance level of IPM strategy regionally and provincially
    - non-chemical alternatives
    - problems with chemicals that are not compatible with IPM
    - research needs
    - registration needs
  - major pest control products: usage pattern in Ontario, which pests are controlled, potential injury if pests left uncontrolled, availability of registered alternatives, impacts (economic and environmental) and problems of alternatives
  - promising pest control alternatives: for each — what, what uses, current situation, advantages and disadvantages

(Other information provided by Wayne Roberts gives some IPM status. A report by the above responsible organization, *Integrated Pest Management (IPM) in Canada and the*

United States, April 1992, provides a basis for comparing Ontario with other jurisdictions. Attributes for comparison included IPM objectives, justification, resources, delivery mechanism, commodities, legislation, and method of use monitoring. Assorted tables summarize the status of 1991 IPM programs, including, by crop, the area in Ontario, the area directly involved in IPM, number of IPM pest monitoring sites (basis of Agriphone recommendations); and summarize by vegetable, pest, and pesticide the rate of application and cost if Crop Production Recommendations are followed, if the Agriphone recommendations are followed, and if a 100% IPM regime were followed.)

c) Spatial extent
- Ontario

d) Scale, resolution, or geographical units of measurement
- some regional analysis of preferred strategies

e) Volume
- pome fruit the longest at 82 pages; other commodities from 3 to 20 pages

Structure
Not applicable

Output Format
Reports: e.g., *Status of IPM on Pome Fruit in Ontario*, prepared by the Pome Fruit IPM Resource Team, Ontario Ministry of Agriculture and Food, March 1991

Date
Varies with commodity, all within approx. 1989 to present

Frequency of Update or Release
Every 2–3 years

Methods/Data Quality
Annual reports are prepared by regional pest management advisors based on their experience with growers and researchers. Every 2–3 years, these are compiled into a commodity status report.

This set of reports provides the best, most up-to-date estimates of IPM levels of use that were found. Pest management advisors' judgements are qualitative. Sometimes some regional breakdown of use strategies is noted. The sections on alternatives, problems, and needs provide background on issues growers face in IPM use and some priorities and concerns of the agricultural community.

Availability
From above contact

Costs
None

6. Application Methods

(see also Recommendations under **5. Pesticide Use**)

Note: Databases relevant to this subject area may also be found within other sections of this catalogue. The reader may want to consult the entries on pages 64, 72, 76, 79, 86 and 88.

5,6,7 *Aerial Agricultural Pesticide Use Database* and *Provincially Restricted Pesticide Use Database*

Responsible Organization(s)

Hazardous Contaminants Branch
Pesticides Section
Ontario Ministry of Environment and Energy
135 St. Clair Avenue West, Suite 100
Toronto, Ontario M4V 1P5
soon changing to:
Regional Operations Division
Pesticide Control Office
Ontario Ministry of Environment and Energy
135 St. Clair Avenue West, 14th Floor
Toronto, Ontario M4V 1P5

Contact Person(s)

All requests must be made in writing to the responsible organization

Nature of Information

Electronic database

Content

a) Purpose

- to document information from pesticide permits

b) Attributes

Aerial Agricultural Pesticide Use Database

- applicant's name, company, address, and telephone no. (confidential)
- exterminator's name, Licence No., and telephone no. (confidential)
- operator for whom work will be done, operator's licence no., and telephone no. (confidential)
- for each proposed treatment
  - location: lot, concession, township, and county
  - crop
  - name of pest
  - name of pesticide
  - number of hectares
  - rate (kg/ha)
  - treatment period
  - property owner, address, and telephone no.
  - Ministry No.
  - Ministry Regional Consent

- all areas to be protected from spray (not yet on forms or database but proposed under draft policy for "Protection of adjacent areas during aerial applications of pesticides to agricultural crops," under the Pesticides Act)

Provincially Restricted Pesticide Use Database

- permit applicant's name, home address, and telephone no.; business name, address, and telephone no. (confidential)
- name of pesticide
- formulation
- active ingredient (AI)
- concentration
- total quantity
- rate of application
- crop and area to be treated
- name of pest
- treated area's mailing address, lot, concession, township, county
- period of application (starting time and date, ending time and date)
- type of equipment
- type of applicants' licence, class, and number

c) Spatial extent

- Ontario

d) Scale, resolution, or geographical units of measurement

- lot and concession per application; available by Ministry Regions (four in southern Ontario)

e) Volume

- *Aerial Agricultural Pesticide Use Database*: 543 permits representing a potential of approx. 13 000 AI (L) volume in 1992

Structure

Tabulated in INGRES and transferred into WordPerfect for presentation tables; this may change when the databases move to Regional Operations Division

Output Format

Tables

Date

Information for the past several years has not yet been entered.

Frequency of Update or Release

Annually, although possibly less frequent in the future

Methods/Data Quality

Any aerial exterminator who applies a Schedule 1 or 5 pesticide or a Schedule 2 pesticide containing a hormone-type herbicide or TBA, fenac, picloram, or paraquat from an airborne machine requires an aerial pesticide permit. Any applicator using Schedule 1

pesticides must obtain a permit to purchase and use the pesticide. The information on the permit is input into INGRES.

The four-region breakdown provides a relatively low resolution. If some form of summary data could be negotiated for at least a county level, a clearer distribution of aerial application would be seen, and analyses could be combined with OMAF's *Survey of Pesticide Use in Ontario* database. Similarly, if accessible, a county breakdown of provincially restricted pesticide use would provide a better resolution on relative risk from these pesticides. It should be noted that Schedule 5 pesticides can also be extremely toxic and do not require a permit, so the *Provincially Restricted Pesticide Use Database* does not completely cover all extremely toxic pesticide use.

The data represent potential use rather than necessarily actual use. There is currently no system for tracking actual area treated or total amount used. The database entry is also several years behind, so any available data other than more up-to-date overview summaries would not necessarily be representative of current conditions.

Availability

All copies of the INGRES database require a licence. Otherwise, only summary data are available. Release of personal information is subject to the Freedom of Information and Protection of Individual Privacy Act. All requests for information must be made in writing to the responsible organization.

Costs

None

7. Pest Infestations

(see also Recommendations under **5. Pesticide Use**)

Note: Databases relevant to this subject area may also be found within other sections of this catalogue. The reader may want to consult the entries on pages 21, 64, 72, 76, 79 and 82.

5,6,7 *Pest Management Research Information System (PRIS)*

Datafiles include:
Thesaurus, Experimental Pest Control Products,
Pest Management Research Data, Maximum Residue Limits in Foods,
Parasitic and Predatory Insect Releases, Minor Use Program

Responsible Organization(s)

Scientific Information Retrieval Section
Research Branch
Agriculture and Agri-Food Canada
Neatby Building
960 Carling Avenue
Ottawa, Ontario K1A 0C6

Contact Person(s)

Rosalyn McNeal
same address
Tel. 613-995-7084 (ext. 7261)

Nature of Information

Electronic database, information system

Content

a) Purpose

- to supply research data on pest management in Canada in support of sustainable agriculture

b) Attributes

- experimental pest control agents (e.g., pesticides, cultivars, biological agents)
- research data (by crop pest)
- maximum residue limits in foods
- insect releases (predators, parasites)
- researchers
- minor use of pest control agents
- entire text of research reports

c) Spatial extent

- Canada

d) Scale, resolution, or geographical units of measurement

- not applicable

e) Volume

- currently approx. 75 megabytes, adding approx. 2 megabytes/year

Structure

VAX computer with custom software and IBM-compatible PC. Compilation of many databases

Output Format

Tables, text. Report: *Pest Management Research Report* (an eight-year summary)

Date

Period of record 1982 to present

Frequency of Update or Release

Annually

Methods/Data Quality

Information is obtained from government, individual, and private researchers, departmental publications. Food residue limits are as set by Health Canada.

This database is a one-stop source of information on pest management research. Assuming there are researcher addresses or Thesaurus location entries, Ontario data could be extracted.

Availability

Through the responsible organization. The database is also available on-line or on diskette from Canadian Centre for Occupational Health and Safety (CCOHS), 250 Main Street East, Hamilton, Ontario L8N 1H6, Tel. 905-572-4400.

Costs

The on-line service is free except for Datapac communications charges; the disc package is issued four times a year by CCOHS and costs $114 annually.

5,6,7 *Regulatory Information on Pesticide Products (RIPP)*

Responsible Organization(s)

Information Division
Plant Industry Directorate
Agriculture and Agri-Food Canada
Ottawa, Ontario K1A 0C6

Contact Person(s)

Tom Davis
same address
Tel. 613-993-4544

Nature of Information

Electronic database

Content

a) Purpose

- to provide support for pesticide regulation and control in Canada

b) Attributes

- for each product:
  - registration number
  - name and address of producer
  - product name and marketing type
  - date of first registration
  - product and formulation type
  - guarantee
  - crop or location of use
  - pest
  - regulatory status
  - full text label of all products registered under the Pest Control Products Act

c) Spatial extent

- Canada

d) Scale, resolution, or geographical units of measurement

- not applicable

e) Volume

- information not provided

Structure

VAX 8700 computer with INGRES DBMS and FUL/TEXT retrieval system

Output Format
Reports, tables

Date
1926 to present

Frequency of Update or Release
Daily

Methods/Data Quality
On-line entry is part of the pesticide registration process.

The labels provide product-specific specifications on application methods, rates, timing, etc. While not direct data on actual practices, they very likely reflect actual practices, as farmers would need to follow the directions for optimum results. Derivation of trends on spatial distribution of the methods, rates, etc. would require estimates of spatial distribution of the product use. Crop and location attributes of the database may give some indication of potential areas but not of actual volumes.

Availability
Direct access through Agriculture and Agri-Food Canada only. A subset is available on-line and as a subscription service on CD-ROM through the Canadian Centre for Occupational Health and Safety, 250 Main Street East, Hamilton, Ontario L8N 1H6, Tel. 905-572-4400. Lists of registered products and copies of labels on microfiche may be purchased from Xebec Imaging Services Inc., 12-1675 Russell Road, Ottawa, Ontario, Tel. 613-521-7017. Printed lists of registered products may be purchased from Ed Clutten, PACS, Box 506, Burlington, Ontario L7R 3Y3, Tel. 905-632-7232.

Costs
Contact above sources for current prices.

8. Agricultural Landscapes

Note: Databases relevant to this subject area may also be found within other sections of this catalogue. The reader may want to consult the entries on pages 10, 14, 24, 26 and 192.

8 *Ontario Land Inventory: Land Classification, Timber Use Capability, Wildlife Use Capability, Outdoor Recreation Capability*

Responsible Organization(s)

Provincial Remote Sensing Office
Land and Resource Information Branch
Ontario Ministry of Natural Resources
90 Sheppard Avenue East, 4th Floor
North York, Ontario M2N 3A1

Contact Person(s)

Tracey Ellis
same address
Tel. 416-314-1319

Nature of Information

Maps, digital data

Content

a) Purpose

- to map classification and use capability evaluations for lands in Ontario to be used by planners and resource managers for regional and provincial levels of planning

b) Attributes

Land Classification (also basis for classifying *Timber Use Capability* and *Wildlife Use Capability*)

- texture of soil materials (10 soil classes, 5 bedrock classes)
- depth of soil material (4 classes)
- relief pattern (5 classes — 1 of which not in Ontario)
- for each land unit: area, and table of land unit components by soil texture, petrography (6 lime levels), depth, moisture regime (4 classes), and percentage of land unit (but nothing on distribution pattern of components)

Timber Use Capability (uses above land unit boundaries)

- capability class (7 classes) relative to each of Hills site regions (13 site regions in Ontario, but only 2 for agricultural southern Ontario); provincial comparisons and approx. estimates of cubic metres per hectare per year
- breakdown of unit's capability class by 50%, 30%, 20% of unit
- for each land unit: table of land unit components includes a component capability ranking with its limitations to timber use related to soil moisture, fertility, permeability, and depth

Wildlife Use Capability

- for each of 14 potential species or species groups (deer, moose, woodland caribou, beaver, European hare, Ruffed Grouse, Prairie Sharp-tailed Grouse, Hungarian Partridge,

Ring-necked Pheasants, puddle ducks, wood ducks, diving ducks, migrant ducks, migrant geese), for each land unit and in some cases subunits:
  - capability class (7 classes)
  - limitations (13 for waterfowl, 11 for upland wildlife)
  - degree of effort, a ranking of current production and management effort required to reach capability (5 classes, although 2 highest degrees of effort rarely used)
- wetlands of capability classes 1, 2, and 3 and a minimum size of 25 acres or classes 4, 5, 6, and 7 and minimum size of 100 acres are mapped and classified as discrete waterfowl units

Land Capability for Recreation
- capability class (7 classes)
- upland or shoreland unit
- subclass features that provide opportunity for recreation

Shoreland Mapping
- wet beach physical characteristics — slope (6 classes), beach materials (13 classes), aquatic nuisances (4 types and 4 levels of presence)
- backshore physical characteristics — bank or cliff height (5 classes), condition (3 classes), slope (9 classes), soil material (14 classes), soil depth (3 classes)
- capability for camping
- capability for lodging
- wet beach limitations (14 types)
- backshore limitations (13 types)
- reliability index, i.e., air photo or ground check

c) Spatial extent
- Land Classification, Timber Use Capability, Wildlife Use Capability, Land Capability for Recreation: Ontario south of 50°N, northwest Ontario south of 52°N
- Shoreland Description Recreation Capability for Bathing and Lodging: central Ontario approx. from 44°N to 51°N for lakes over 500 acres

d) Scale, resolution, or geographical units of measurement
- Land Classification, Timber Use Capability: 1:250 000 — units average 20 square miles
- Wildlife Use Capability: 1:50 000, but same units as 1:250 000 Land Classification so really no extra resolution
- Land Capability for Recreation: 1:50 000, but very little extra resolution from CLI recreation maps at 1:250 000
- Shoreland Description Recreational Capability for Bathing and Lodging, Hazard Lands: 1:15 840

e) Volume
- 52 Land Classification maps, 52 Timber Use Capability maps, over 500 Wildlife Use Capability maps, over 500 Land Capability for Recreation maps, over 1000 Shoreland maps

Structure

All maps on NTS base. Shoreland on separate 1:15 840 base but can reference to NTS. Currently only Ontario Land Inventory (OLI) north of North Bay is digitized, although ultimately there are plans for digitizing southern Ontario (Tracey Ellis, pers. comm.).

Output Format

Maps; tables in *Map and Land Unit Component Description Book*; a number of unpublished reports on methods involved in each coverage, plus *A Ready Reference: Ontario Land Inventory by Inventory Unit*, 1977.

Date

Approx. 1976

Frequency of Update or Release

None

Methods/Data Quality

Existing soils, physiography, and surficial geology maps were assembled. Land units were delineated from small-scale aerial photographs (approx. 1:63 000 scale) or, for southern Ontario, by driving the road network to determine patterns. Land units were placed on soil maps to obtain estimates of distribution of land unit components. Land units were transferred to the 1:50 000 and 1:250 000 topographic maps.

For Timber Use Capability, the most productive stands in each physiographic site type were checked for basic attributes such as age, height, diameter at breast height, and species. Diameter and height were each plotted against age to develop capability ranges. Physiographic site types were assigned to the appropriate class based on measurements in the site types and consensus judgements of experts. The land unit component tables were used, assigning the capability to each component and using area weighting to estimate the land unit capability.

Wildlife Use Capability was carried out by biologists who studied maps on soils and land use and visited major land types to assess capability of the land to produce food and cover for each species of interest. Some species also required climatological information. Degree of effort was based on evaluating present habitat in relation to optimum. With new knowledge of wildlife ecology and changing habitat conditions, both capability and degree of effort may need updating. Because of new information on beaver habitat, criteria for beaver need rethinking, and the rating was discontinued. Migrant geese capability may change with new hybrid varieties of corn having shorter growing seasons.

The OLI database is large, comprehensive, and, to some extent, ecosystem based. Like its referenced soil and physiography maps, the Land Classification coverage does not get out of date. It is, however, more difficult to read, as it is number coded to a book of tables. It would be suitable for GIS analysis but has not been digitized south of North Bay. The OLI generalizes the soil information, so it is easier to use than soil maps for some broad regional- and provincial-level planning but less suitable for more detailed applications.

The interpretations for timber and wildlife present the potential of the landscape for these uses. As such, the data introduce subjective assessments. Except for the "level of

effort" class for wildlife, there is no indication of current conditions. This makes the data much less dated but means users must recognize that they reflect more "pre-settlement" conditions than current. The timber and wildlife coverages, like the Land Classification, are suitable for broad levels of planning.

Shoreland data, while more detailed, tend to occur in non-agricultural areas.

The CLI for Agriculture, Forestry, and Wildlife (see catalogue entry) used the same map units but interpreted the data on a system applicable to Canada. The Ontario system provides more resolution in its capabilities — forestry interpreted by site region; wildlife with more species, providing a wider range of capabilities and data. The CLI has been digitized by Environment Canada, and to some extent the OLI data could be linked to the units. The OLI database is set up so that it would be easily accessible for interpretation using a GIS. The CLI, however, with less resolution, dropped some unit boundaries that are still included in OLI, so completely precise linkage is not possible.

Availability

See above contact

Costs

None

8,9,10 *Natural Heritage Information Centre*

Responsible Organization(s)

Natural Resource Inventories Section
Ontario Ministry of Natural Resources
Suite 400, Roberta Bondar Place
70 Foster Drive
Sault Ste. Marie, Ontario P6A 6V5

To be located at Trent University, Peterborough, Ontario.

Contact Person(s)

Ron Alton
same address
Tel. 705-945-6680

Nature of Information

Data depository

Content

a) Purpose

- to coordinate and standardize natural heritage information collection, storage, analysis, and sharing in Ontario by creating a data centre

b) Attributes (broad categories)

- parks, Areas of Natural and Scientific Interest (ANSI), International Biological Programme (IBP) sites, Environmentally Sensitive Areas (ESA): location and site information
- wetlands: location and data and evaluation records
- land protected by non-governmental organizations (NGOs) and Conservation Authorities
- rare species and their habitats — inventory and monitoring
- aquatic inventories — habitats and fisheries
- wildlife monitoring and atlases
- habitat inventories
- species at risk

c) Spatial extent

- Ontario (focus on southern Ontario in first two years)

d) Scale, resolution, or geographical units of measurement

- varies with the database

e) Volume

- currently in formation stages, ultimately very large

Structure

There will be standard procedures for entering data but general capability for access. It will include a GIS with polygon and overlay capability. Structure will permit sorting and analysis by theme, geographic area, protection status, etc. The goal is for hardware and software that will not place excessive constraints on access. This is currently in the planning stage and will be developed over the first two years. Biological Conservation Data (BCD) System software and hardware used by the Nature Conservancy USA for similar types of data centres will be used. For further information on technical detail, contact John Osborn, Manager; Resource Systems Development, Information Technology Planning and Development Branch, Ontario Ministry of Natural Resources, Tel. 416-314-1522.

Output Format

Maps, tables, reports

Date

Announced in 1992, accessible in 1993

Frequency of Update or Release

Continual

Methods/Data Quality

The many existing databases will be compiled. OMNR and partners, including the Ontario Natural Heritage League and its affiliates, Nature Conservancy of Canada, and the Nature Conservancy USA, will develop standards and methods for accredited personnel to contribute, update, and change data. Quality control will be established on data input, accuracy, and sources of information. The first two years of compilation will include data on all Areas of Natural and Scientific Interest and wetlands in southern Ontario.

OMNR's extensive data on natural resources, including wildlife, habitat, and protected areas, are generally far too dispersed to be readily accessible, especially for southern Ontario overviews. This Centre will provide an extremely useful service of compiling the data for central and easy access. The GIS, once fully operational, will be a valuable access and analysis tool.

Availability

Plans are for wide accessibility via computer network.

Costs

No or reasonable cost dependent on request, with possibility of data exchange provisions

8 *Location, Amount, Cover Type and Productivity Ranking of Wetlands of Potential Interest to Ducks Unlimited in Parts of Northwestern Ontario*

Responsible Organization(s)

Ducks Unlimited Canada
566 Welham Road
Barrie, Ontario L4M 6E7

Contact Person(s)

Ted Gadawski
same address
Tel. 705-721-4444

Nature of Information

29 maps, unpublished report

Content

a) Purpose

- to provide an inventory of location, cover type, and productivity of wetlands in northwestern Ontario to assist Ducks Unlimited initial planning

b) Attributes

- for each wetland:
  - location
  - boundary
  - productivity ranking (High, Moderate, Low, Very Low)
  - cover type category (deep marsh, shallow marsh or wet natural meadow, swamp, shallow intermittent water, shallow lake, wet abandoned meadow)
  - area

c) Spatial extent

- the non-rock areas of the accessible portions of northwestern Ontario, totalling 8000 km^2 in areas around Thunder Bay, Rainy River, Dryden, Kenora, and Pointe du Bois

d) Scale, resolution, or geographical units of measurement

- 1:50 000

e) Volume

- 2852 wetlands, all or part of 29 NTS map sheets

Structure

Maps are colour coded for productivity ranking and letter coded for cover type. Maps are presented on NTS paper base.

Output Format

Maps (on 1:50 000 NTS base) and unpublished report with database title. A summary paper was published: Snell, E.A., C.P. Cecile, and T.R. Gadawski. 1989. "A Simple Approach to Regional Inventory of Wetland Location, Cover, Type and Productivity." In *Wetlands: Inertia or Momentum*. M.J. Bardecki and N. Patterson (eds.). Proceedings of a Conference, October 21–22, 1988, Toronto, Ontario. Federation of Ontario Naturalists, Toronto, Ontario.

Date

1985

Frequency of Update or Release

None

Methods/Data Quality

The method interpreted available data at 1:50 000 scale including the topographic map data, soil data, and agricultural land use data. Productivity rankings were based on mineral soil texture and depth of organic soil. The results were checked using data from the Peatlands Inventory of the Ontario Geological Survey, field checks, and aerial photograph (1:15 840) interpretation. The method mapped 89% of the wetlands of potential interest to Ducks Unlimited, overlooking low-priority areas of thick swamps and low-productivity bogs and fens. It was 86% correct in cover type and 84% correct in the high-productivity ranking. The method is suitable for regional planning, where most wetlands are larger than 5 ha. The database consistently covers the agricultural landscapes in northwestern Ontario.

Availability

Only one map set was created. Availability requests should be directed to the above contact person.

Costs

See above contact person

1,2,8 *Lake Erie Non-Point Source and Wetland GIS Database*

Responsible Organization(s)

Environmental Services Branch
Environment Canada
Canada Centre for Inland Waters
P.O. 5050, 867 Lakeshore Road
Burlington, Ontario L7R 4A6

Watershed Management Section
Water Resources Branch
Ontario Ministry of Environment and Energy
135 St. Clair Avenue West
Toronto, Ontario M4V 1P5

Contact Person(s)

Rimi Kalinauskas
same address (Environment Canada)
Tel. 905-336-4946

Keith Willson
same address (Ontario Ministry of Environment and Energy)
Tel. 416-314-7917

Nature of Information

GIS, original hardcopy maps

Content

a) Purpose

- to locate rural potential non-point sediment loading areas for use in monitoring compliance with targets for phosphorus reduction in the Great Lakes Water Quality Agreement, evaluating agricultural programs, and analyzing different policy scenarios
- to target locations for wetland habitat improvement from non-point source degradation

b) Attributes

- the components of the Universal Soil Loss Equation (USLE) include:
  - rainfall-climatic (R) factor
  - soil erodibility factor (K)
  - slope or topographic factor (LS) as well as the slope percent class and slope length estimate
  - land use (OMAF Land Systems)
  - crop management (C) factor
- potential soil loss from sheet and rill erosion (derived by the GIS multiplying the USLE component factors)

- delivery ratio or terrain capability to deliver waterborne pollutants to a stream
- potential sediment loading areas (derived by the GIS, multiplying the soil erosion by the delivery ratio)
- wetland boundary for all OMNR-evaluated wetlands (546, many of which are complexes with numerous individual units)
- wetland "contributing area," i.e., the area that flows overland into each wetland
- for each wetland, the wetland watershed, i.e., the basin upstream of the wetland outlet
- for each wetland contributing area, a map of the delivery ratios from the field to the wetland; delivery ratio attributes include a High, Moderate, and Low rating and 1 of 19 reasons for the rating
- background reference data (e.g., roads, streams)
- for each wetland, an accompanying dBase file includes:
  - a unique wetland number
  - OMNR District's map number for the wetland
  - wetland evaluation class
  - the wetland name used by OMNR
  - the OMNR District
  - number of polygons in the wetland complex
  - county
  - township(s)
  - NTS map number
  - comments if any issues arose from the other attributes

c) Spatial extent

- the watersheds of Lakes Erie and St. Clair west of and including the Grand River basin; this includes part or all of 37 NTS sheets and 135 townships, extending from Windsor–Sarnia north to Orangeville and east to Dunnville

d) Scale, resolution, or geographical units of measurement

- 1:50 000

e) Volume

- approx. 400 megabytes

Structure

The GIS is in SPANS. The non-point source associated data are in SPANS 4.3 and stored on diskette. The wetland data are in SPANS 5.2 and stored on tape. Conversion of all data to Version 5.2 and their linkage is planned. Because of the large number of data, organization includes sub-directories for each NTS sheet. An overall universe also joins the individual maps for the whole Lakes Erie/St. Clair watershed. The attributes applicable to each wetland are in a dBase file to facilitate ultimate linkage with OMNR dBase files on each wetland.

Output Format

Maps, tables, tapes. Publication: Kalinauskas, R., and L. Boggs (eds.). 1991. *Non-Point Source Overview Model: Workshop Proceedings*. Workshop organized by the Modelling

Task Force of the Non-Point Source Technical Subcommittee of the Canada–Ontario Agreement Respecting Great Lakes Water Quality. Water Planning and Management Branch, Inland Waters Directorate, Environment Canada, Burlington, Ontario.

Date

Compiled in 1991–92; most component databases have earlier dates (e.g., land systems: 1983)

Frequency of Update or Release

No plans

Methods/Data Quality

The data come from a variety of sources and reflect a range of quality. They are intended for regional analysis rather than site-specific analyses but do reach the farm unit and individual wetland unit level. A detailed quality assessment was conducted by Lesley Boggs (for information, see contact people). Data sources include county soil maps (variety of scales), topographic maps (1:50 000 and 1:25 000), agricultural land systems maps (1:50 000), agricultural capability maps (1:50 000), agricultural drainage maps (1:25 000), and OMNR summary evaluated wetlands maps (1:50 000 and 1:100 000).

Non-point source mapping is based on the principles of the USLE and a regional model using and interpreting existing data on land cover, slopes, soil permeability, hydrologically active areas, and stream proximity to map field-to-stream delivery ratios. Calibration confirmed the model's validity for regional flagging of problem areas.

The model was also adapted to map field-to-wetland delivery ratios for areas contributing overland to wetlands.

Methods for map interpretation and creation are outlined in Snell, E.A. 1984. *A Manual for Regional Targeting of Agricultural Soil Erosion and Sediment Loading to Streams.* Working Paper No. 36, Lands Directorate, Environment Canada; and in *Targeting for Wetland Habitat Improvement in the Lake Erie Basin*, unpublished report by Snell and Cecile Environmental Research, 1992. The GIS approach is presented in Geomatics International Inc. 1991. *Southwestern Ontario Universal Soil Loss Equation Geographic Information System: A Manual to Accompany the GIS Database*. Prepared for the Upper Thames River Conservation Authority. Conservation practices are not directly included but are available to model analysis from *Changes in Cropping, Tillage and Land Management Practices in Southwestern Ontario, 1986 and 1991.*

The delivery ratio coverage could not just target sediment loading, as when overlaid with soil loss, but also flag areas of potential concern for other surface contaminants (e.g., manure, contaminant spills) if they occurred in high delivery ratio areas.

OMNR wetland evaluation data records could also be linked when they become available.

Availability

Mechanism not finalized: see contact people

Costs

See contact people

8 *Drainage — Agricultural Resource Inventory*

Responsible Organization(s)

Resources Management Branch
Ontario Ministry of Agriculture and Food
Guelph Agricultural Centre
P.O. Box 1030
52 Royal Road
Guelph, Ontario N1H 6N1

Contact Person(s)

David Rouleau
same address
Tel. 519-767-3587

Nature of Information

Maps

Content

a) Purpose

- to provide an inventory of on-farm tile and municipal drainage systems

b) Attributes

- on-farm tile:
  - location and extent
  - pattern (random or systematic)
- municipal drains:
  - location
  - name
  - drain watershed boundary (incomplete)
- reference:
  - lot lines
  - lot and concession numbers

c) Spatial extent

- covers agricultural Ontario — this is mainly southern Ontario south of the Precambrian Shield; also included are agricultural areas in central and eastern Ontario, i.e., portions of Algoma, Cochrane, Kenora, Manitoulin, Nipissing, Parry Sound, Rainy River, Renfrew, Sudbury, Thunder Bay, Timiskaming

d) Scale, resolution, or geographical units of measurement

- 1:25 000

e) Volume

- 486 townships, many of which cover more than one map

Structure

The maps are black and white. The originals are on a reproducible chronoflex master. The maps are by township, often requiring more than one map sheet to cover a township.

Output Format

Maps

Date

1978–83

Frequency of Update or Release

None planned

Methods/Data Quality

Tile data collection included OMAF files and farmer interviews. Municipal drain data were obtained from township files and from engineering reports. Municipal drain location tends to be approximate, not always corresponding to the configuration or side of the road shown on NTS maps. Basin boundaries and tile data are also approximate as well as incomplete. The maps do show, however, many more drains than appear on NTS maps and are the only province-wide compilation of location-specific mapping of drainage found.

Availability

Paper maps are available from the above address. Township and county should be specified.

Costs

None for small requests; cost of copying for large requests

Availability

Only one map set exists. It can be viewed at the above address. District Reports are available from the above contact person.

Costs

None to view

8 ***Canada Land Inventory***

- ***Land Capability for Agriculture***
- ***Land Capability for Forestry***
- ***Land Capability for Wildlife***
  - ***ungulates***
  - ***waterfowl***

Responsible Organization(s)

Environmental Information Systems
State of the Environment Reporting
Environment Canada
Ottawa, Ontario K1A 0H3

Contact Person(s)

Ernie Beaudette
same address
Tel. 613-941-9625

Nature of Information

GIS

Content

a) Purpose

- to determine the capability of land for agriculture, forestry, and wildlife for environmental planning and modelling

b) Attributes

Agriculture
- class of land capability for agriculture (7 classes)
- type of soil (mineral or organic)
- limitations to agriculture

Forestry
- soil capability for growing commercial timber (7 classes)
- limitations
- tree species expected to yield in commercially viable volumes

Wildlife: Ungulates
- land capability for ungulate support (7 classes)
- winter ranges
- species indicators
- limitations

Wildlife: Waterfowl
- capability for waterfowl support (7 classes)
- important migration stops and wintering areas
- limitations

c) Spatial extent
- most of southern Canada

d) Scale, resolution, or geographical units of measurement
- 1:250 000 in Ontario

e) Volume

-	Agriculture	600 399 compressed bytes
-	Forestry	753 162 compressed bytes
-	Waterfowl	502 839 compressed bytes
-	Ungulates	407 169 compressed bytes

Structure

Stored on mainframe computer; downloaded to PC computers for manipulation of data with SPANS GIS software. Part of the Canada GIS. Uses Lambert projection.

Output Format

Maps, tables, text, digital files. Reports and maps on each capability and synthesizing the various capability types have been prepared.

Date

Data collection initiated in the early 1960s; GIS database developed in the 1970s

Frequency of Update or Release

None planned

Methods/Data Quality

Capabilities were interpreted from existing county soil maps, air photo interpretation, and ground checking. For agriculture, samples of productivity on many different soils helped set capability rankings. For other coverages, combinations of samples and consensus value judgements of productivity set the class. In Ontario, the capability interpretation for agriculture was originally mapped at 1:50 000 and reduced for this database. The other coverages were based more on OLI Land Classification units, for which the original scale was 1:250 000. In theory, the mapping of capability rather than actual use largely avoids the issue of becoming outdated. A few features, however, such as wintering areas, might change with changing land use.

This database provides relatively broad-scale coverage of land capability and, with the use of limitation subclasses, provides some data on permanent landscape characteristics that affect each of agriculture, forestry, ungulates, and waterfowl. The scale and lack of direct information on physical characteristics limit the survey to general land use planning purposes. Although the data are on SPANS and therefore readily available for overlay for combined analyses with other databases, care should be taken to overlay the data only with data at a comparable scale. The databases have already been overlaid with administrative and landscape layers, including census divisions, watersheds, and ecological land units, providing summaries by these features and facilitating comparisons with other databases using these units. The database is comprehensive for agricultural

Ontario. Within this area, however, some capabilities (e.g., waterfowl) show relatively little range or resolution. *Ontario Land Inventory* (see catalogue entry) classification provides a greater range. For more detailed agricultural capability, reference should be made to the original 1:50 000 maps available through OMAF but not on a GIS (unless linked to digitized soil data for some counties).

The ungulate coverage includes classes for some protected areas: national parks and provincial parks. The *National Conservation Areas Database*, however, is more complete and up to date.

Availability

Requests through contact person

Costs

State of the Environment Reporting cost recovery policy; see contact person

8 *Fruitlands*

Responsible Organization(s)

Water and Habitat Conservation Branch
Canadian Wildlife Service
Environmental Conservation Service
Environment Canada
Ottawa, Ontario K1A 0H3

Contact Person(s)

Gerry Lee
same address
Tel. 819-953-1434

Nature of Information

GIS

Content

a) Purpose

- to monitor changes in land use and cover in prime fruit-growing areas in southern Canada

b) Attributes

- fruit-growing area
- land cover (trees, shrubs, row crops, water, unimproved grassland, etc.)
- land activity (vineyards, orchards, pasture, commercial, manufacturing, extraction, forestry, ecological research, dwellings, etc.)
- agricultural capability

c) Spatial extent

- in Ontario, Niagara Peninsula (also Okanagan, Annapolis valleys, and southern Quebec)

d) Scale, resolution, or geographical units of measurement

- 1:50 000

e) Volume

- information not provided

Structure

Mainframe computer with custom software. Part of the Canada GIS.

Output Format

Tables, maps; published maps at 1:50 000

Date

1961, 1971, 1981

Frequency of Update or Release
None planned

Methods/Data Quality
Land cover and activity data were interpreted from air photos with field verification. Agricultural capability data are from CLI maps.

Availability
From above contact

Costs
According to CWS cost recovery policy — see contact person for estimate

8 *LANDSAT-Based Deer Habitat Mapping Project*

Responsible Organization(s)

Provincial Remote Sensing Office
Ontario Ministry of Natural Resources
90 Sheppard Avenue East, 4th Floor
North York, Ontario M2N 3A1

Contact Person(s)

Tracey Ellis
same address
Tel. 416-314-1300

Nature of Information

GIS and LANDSAT

Content

a) Purpose

- to demonstrate the value of LANDSAT data to map land cover types suitable for deer habitat

b) Attributes

- land cover types: water, deciduous forest, coniferous forest, mixed forest, sparse forest, wetland, open land

c) Spatial extent

- 17 townships in eastern Ontario (Tweed District)

d) Scale, resolution, or geographical units of measurement

- 1:50 000

e) Volume

- not applicable

Structure

Not applicable

Output Format

Maps

Date

1983

Frequency of Update or Release

None planned

Methods/Data Quality

A pilot project was run using a standard supervised multispectral classification. Aerial photography was used to select representative sites to set spectral reflectance values. LANDSAT imagery from February and August were used. The remaining townships were mapped based on the pilot method. The maps were ground-truthed and some adjustments made. Remaining data quality issues include classification errors at land cover unit boundaries because of the averaging of two types within a pixel and the need to lump categories to avoid errors. The latter issue meant losing the distinction of cropland, pasture, bedrock, barren areas, extractive areas, and some dry wetland, which were all lumped under "open land."

While the maps were valuable for deer management purposes in an area of low agricultural intensity, the method appears to have some limitations in distinguishing agricultural-related land uses and habitat edges common in the landscape of southern Ontario.

Availability

Copies are difficult because of present plotter incompatibility with the older data. For viewing the original maps, see above contact.

Costs

None

1,8 *Land Potential Database for Canada*

Responsible Organization(s)

Centre for Land and Biological Resources Research
Agriculture and Agri-Food Canada
Building 74
Central Experimental Farm
Ottawa, Ontario K1A 0C6

Contact Person(s)

Valerie Kirkwood
same address
Tel. 613-995-5011

Nature of Information

GIS

Content

a) Purpose

- to describe the land units in terms of soil characteristics, physiography, climate, agricultural potential, and risk of degradation

b) Attributes

- climate (30-year normals for temperature, precipitation, solar radiation, etc., by month and for growing season) — 30 attributes
- soil description (characteristics, physiography, land use) — 49 attributes
- agroclimatic resource index — 4 attributes
- soil climate — 8 attributes
- actual yield (by crop) — 19 attributes
- soil degradation — 8 attributes
- constraint-free yield (modelled potential crop yields) — 11 attributes
- CLI: capability for agriculture and limitations — 6 attributes
- provincial proportion for cross-boundary polygons — 9 attributes
- soil suitability (for various crops) — 4 attributes

c) Spatial extent

- Canada

d) Scale, resolution, or geographical units of measurement

- 1:5 000 000

e) Volume

- 755 polygons, each with the above 148 attributes

Structure

Data are stored on VAX and IBM PC, using ARC/INFO GIS software. The data are a compilation derived from several other databases. The data are available in a PC INFO database management system or as ASCII sequential files.

Output Format

Tables, maps; ASCII, PC INFO, dBase files via diskettes. *The Land Potential Data Base for Canada Users' Handbook*, by V. Kirkwood, J. Dumanski, A. Bootsma, R.B. Stewart, and R. Muma, 1989, Technical Bulletin 1983-4E, LRRC Contribution No. 86-29, published by Land Resource Research Centre, Research Branch, Agriculture Canada, Ottawa, Ontario, is available and provides a directory to all attributes.

Date

Soil data from 1977 (which in Ontario were probably derived from County Soil maps since approx. 1930); climate from 1951–80 normals; actual yield — 1980s

Frequency of Update or Release

Yield data updated annually

Methods/Data Quality

Soil data were obtained from Agriculture Canada Soil Survey, which in Ontario was generalized from county soil surveys; climate data from Atmospheric Environment Service; actual yield data from provincial yearbooks. All data are referenced to the map units on the Soils of Canada, 1:5 000 000.

The database provides a very broad-scale national spatial overview of the agricultural components of agro-ecosystems — soils, climate, crops. Agriculture and Agri-Food Canada (Centre for Land and Biological Resources Research) will be preparing a more detailed Ontario agro-ecological resource areas database at 1:2 000 000 with similar attributes.

Other associated files used for various projects are maintained in a compatible format keyed to the soil map unit. These include Land Flexibility (opportunity for land use diversification), provincial crop reporting areas (e.g., counties); Census of Agriculture Enumeration Areas, and Crop Growth Model Yields. These files greatly expand the possible analyses, allowing links with such large data sets as the census and provincial crop statistics.

Availability

See above contact

Costs

None

8

Soil Landscapes of Canada
and
Water Erosion Risk: Ontario–South
(part of the Soil Landscape Maps Degradation File)

Responsible Organization(s)

Land Resource Research Centre
Research Branch
Agriculture and Agri-Food Canada
Neatby Building
960 Carling Avenue
Ottawa, Ontario K1A 0C6

Contact Person(s)

Dick Coote or Jack Shields
same address
Tel. 613-995-5011

Nature of Information

GIS, publications

Content

a) Purpose

- Soil Landscapes: to provide information on soils to identify actual and potential agricultural constraints, locate areas suitable for particular agricultural uses, and assess productivity over large regions
- Water Erosion Risk: to provide spatial information about the risks of water erosion on agricultural land useful for regional applications

b) Attributes

Soil Landscapes

- dominant soil type
- soil development
- material type
- genetic origin
- texture
- surface form
- slope class
- in accompanying reports, additional detail for each polygon for dominant and subdominant soils; surface texture; drainage class; depth to water table; type compacted layer; depth compacted layer

Water Erosion Risk

- the Soil Landscape attributes have been interpreted for:

- risk of water erosion on bare, unprotected mineral soil — both for dominant and for subdominant soil (5 classes)
- proportion of polygon area that is farmland (5 classes)
- protection from water erosion provided by usual crop management within the farmland area (5 classes)

c) Spatial extent
- Soil Landscapes are national, excluding Northwest Territories
- Water Erosion Risk is for southern Ontario south of 48°N latitude

d) Scale, resolution, or geographical units of measurement
- 1:1 000 000

e) Volume
- for Water Erosion Risk, 455 polygons

Structure

Soil Landscapes attribute data use a micro-computer with dBase III software; the GIS (CanSIS) uses ARC/INFO on VAX MATE

Output Format

Maps, tables, text. Soil Landscape maps, corresponding reports, and illustration pages are available for southern Ontario (as well as other parts of Canada). *Water Erosion Risk: Ontario–South* is a report and map by Shelton, I.J., G.J. Wall, and D.R. Coote, Contribution No. 90-71, Publication 5277/B, published in 1991 by Land Resource Research Centre, Research Branch, Agriculture Canada.

Date

The *Soil Landscapes* database was established in 1984 based on data from 1940 to present. *Water Erosion Risk* was published in 1991.

Frequency of Update or Release

Database updated as more recent soil survey information available, but maps not updated

Methods/Data Quality

Soil Landscape data were compiled and summarized from the most recent soil survey information. In southern Ontario, this would largely be summaries of county soil surveys and maps. These data were interpreted for the Water Erosion Risk map. This map used the USLE for bare unprotected soils, adding rainfall and snowmelt erosivity indices for each polygon, calculating soil erodibility on the basis of surface texture, and estimating average slopes and lengths for each polygon based on landforms. Proportion in farmland was calculated by overlaying 1:500 000 land use maps from the Atlas of Canada. Protection by usual crop management was estimated by a) overlaying 1981 enumeration areas to use the Census of Agriculture to assign percentage of each map polygon used for each crop; b) assigning a crop practice figure for each crop by four regions in southern Ontario; and c) area weighting each polygon.

As linkage of the database polygons has already been made with the Census of Agriculture Enumeration Areas, the huge census database becomes more easily accessible for interpretation of trends in the state of the agricultural environment related to the soil landscape and water erosion risk. These soil databases are appropriate only for broad regional or southern Ontario analyses, as more location-specific data have been summarized over each polygon.

Availability

Printed resources are available from the responsible organization. For electronic data, see above contact.

Costs

Printed material has been no charge, but this is subject to change. For electronic data, see above contact.

8 *Forest Biomass Inventory*

Responsible Organization(s)

Forest Inventory Project
Petawawa National Forest Institute
Canadian Forestry Service
P.O. Box 2000
Chalk River, Ontario K0J 1J0

Contact Person(s)

Katja Power
same address
Tel. 613-589-2880

Nature of Information

Electronic database, GIS

Content

a) Purpose

- to inventory biomass as a potential future fuel (ENFOR program)

b) Attributes

- land status
- ownership
- qualities (site class, stand age)
- data source (type of inventory)
- productive, unproductive
- site quality (potential production)
- stocking (stocked, unstocked)
- disturbance (cut over, burned, pest damage)
- age (maturity, regeneration)
- forest type (hardwood, mixed wood, softwood)
- access
- area (ha)
- biomass (merchantable trees); total above ground; percentage stem wood, stump wood, stump bark, stem bark, top, line branches, foliage
- biomass submerchantable trees
- year of inventory

c) Spatial extent

- Canada

d) Scale, resolution, or geographical units of measurement

- in agricultural Ontario, by township (possibly by FRI map sheet)

e) Volume
- information not provided

Structure
VAX 780 computer with ARC/INFO, FORTRAN, SAS

Output Format
Tables, maps, graphics. Report: Bonner, G.M. 1985. *Inventory of Forest Biomass in Canada*. Canadian Forestry Service, Chalk River, Ontario.

Date
1984

Frequency of Update or Release
None planned

Methods/Data Quality
The estimates were summarized to a township level from the provincial FRI maps, which are generally at 1:15 840 scale.

The data provide a comprehensive overview of forest biomass and related forest attributes. While the Canadian Forestry Service confirmed township units, Ron Alton (OMNR) suggested some units may be by FRI map sheet. In that case, it would likely not affect the resolution much but would mean not all boundaries would correspond to townships for easy comparison with other township data.

Availability
See above contact

Costs
None

8 *Forest Inventory 1986*

Responsible Organization(s)

Forest Inventory Project
Petawawa National Forest Institute
Canadian Forestry Service
P.O. Box 2000
Chalk River, Ontario K0J 1J0

Contact Person(s)

Katja Power
same address
Tel. 613-589-2880

Nature of Information

Electronic database, GIS

Content

a) Purpose

- to provide information about Canada's forests to the public

b) Attributes

- ownership status (native, federal, provincial, private)
- land class (water, land, productive, non-productive, forest, non-forested)
- site quality
- stocking class
- age class (20-year classes)
- maturity
- forest type
- predominant genus
- volume (m^3/ha; 19 species groups)
- area (ha)
- maturity class
- auxiliary information includes productivity (mean annual increment)

c) Spatial extent

- Canada

d) Scale, resolution, or geographical units of measurement

- in agricultural Ontario, by township (possibly by FRI map sheet)

e) Volume

- information not provided

Structure

VAX 780 and SUN workstation computer with ARC/INFO, FORTRAN, SAS, INGRES

Output Format

Tables, maps, graphics. Reports: *Canada's Forest Inventory, 1986* (1988). *Canada's Forest Inventory 1986 — Technical Supplement* (1989).

Date

1986

Frequency of Update or Release

Planned every five years where there are new provincial data. In Ontario, there are not yet any new data.

Methods/Data Quality

The data are obtained from the provincial inventories, in Ontario the FRI, and summarized to township.

The data provide a comprehensive overview of forest type and related attributes. While the Canadian Forestry Service confirmed township units, Ron Alton (OMNR) suggested some units may be by FRI map sheet. In that case, it would likely not affect the resolution much but would mean not all boundaries would correspond to townships for easy comparison with other township data.

Availability

See above contact. Some restrictions exist.

Costs

None

8 *Forest Landscapes of Southern Ontario*

Responsible Organization(s)

Technical Services Department
ENCON – Lines
Ontario Hydro
393 University Avenue, D12 C6
Toronto, Ontario M5G 2L6

Contact Person(s)

Steve Hounsell
same address
Tel. 416-506-5482

Nature of Information

GIS

Content

a) Purpose

- to map woodlots and evaluate them for their value for forest interior habitat to provide input to facility planning so it can avoid these remnants of the original landscape and help stem the decline of forest interior birds

b) Attributes

- woodlots
- forest landscape units
- conservation value/forest landscape unit
- conservation value/woodlot (Greater Toronto Area only)
- area
- shape indices, including distance from woodlot edge
- habitat heterogeneity (Greater Toronto Area only)
- proximity and connectivity to adjoining woodlots (Greater Toronto Area only)
- sub-systems of forest landscape units (Greater Toronto Area only)
- background landmarks, e.g., roads, streams
- ecodistricts
- watersheds

c) Spatial extent

- agricultural southern Ontario, south of the Precambrian Shield; some more detailed analysis, while possible elsewhere, so far done only for Greater Toronto Area, i.e., from Toronto to north of Lake Simcoe

d) Scale, resolution, or geographical units of measurement

- LANDSAT imagery at 25-m pixel level, which is appropriate for a variety of scales to a maximum resolution of 1:25 000. Forest landscape units mapped at 1:250 000; sub-landscape units mapped at 1:50 000; woodlot evaluation mapped at 1:25 000 to 1:10 000, depending on the source of digital data (LANDSAT TM or digital FRI).

e) Volume

- information not provided

Structure

ARC/INFO format, used digital LANDSAT imagery and, where available (Cambridge and Timmins OMNR Districts), digital FRI

Output Format

Maps, tables

Date

1990–92; LANDSAT imagery from 1985 to 1990

Frequency of Update or Release

Unknown

Methods/Data Quality

LANDSAT satellite imagery was analyzed for forest cover. Some spectral confusion was found but was adequately addressed. Patterns were visually interpreted based on density, pattern orientation, size, and distribution, to derive 137 forest landscape units across agricultural southern Ontario. Each was characterized and evaluated for conservation value.

For more detailed planning, individual woodlots were assessed based on size, habitat heterogeneity, shape, and proximity/connectivity to surrounding woodlots. These factors were derived from the FRI and automated GIS functions. Field tests and tests using the Ontario Breeding Bird Atlas have confirmed the usefulness of the evaluation system.

This database is a very valuable characterization of woodlot habitat fragmentation. It is available at a range of scales, providing useful classifications from the provincial overview to the regional level. The resolution of the imagery could catch wider treed hedgerows but is more appropriate for woodlot-scale units.

The satellite imagery approach offers the chance for change monitoring.

Availability

Needs negotiation; see above contact

Costs

Cost recovery

1,8,9,10

Ontario Hydro: Transmission Facility Environmental Assessment Database Example: Sudbury Toronto Area Transmission Reinforcement

Responsible Organization(s)

Technical Services Department
Lines Division
Ontario Hydro
393 University Avenue, D12 A6
Toronto, Ontario M5G 2L6

Contact Person(s)

Andrew Robertson
same address
Tel. 416-506-5508

Nature of Information

GIS

Content

a) Purpose

- to create a database for environmental assessment of new transmission facilities

b) Attributes

- OBM data, e.g., streams, roads, buildings, park and township boundaries
- existing Ontario Hydro facilities — lines, transformer stations
- types of buildings and built-up land use
- Official Plan designations
- toxic areas, landfills, etc.
- proposed land uses
- Crown land uses
- communications towers, airport restriction zones
- CLI (1:250 000)
- mineral resources by type
- recreation areas, uses, and facilities by type
- ANSIs, local ESAs
- fisheries habitat
- wildlife habitat values (5 levels) — Ontario Hydro developed model
- watersheds
- wetlands by class and unclassified
- biological management areas by type (wildlife, waterfowl, fish, floral)
- wildlife communities, e.g., deer yards, moose wintering, raptor habitat, Red- shouldered Hawk/shrike/Osprey/heron areas, eagle nests, herpetological habitat
- forest management areas by type

- forest resource values (5 levels) — Ontario Hydro developed model
- Agricultural Land Use Systems (updated by Ontario Hydro field checks)
- maple syrup operations
- historic buildings, routes, and archaeological sites — by type
- archaeological potential
- visual/cultural factors — e.g., viewsheds of lines, of communities, of recreational sites/features

c) Spatial extent
- for planning corridors

d) Scale, resolution, or geographical units of measurement
- varies with level of planning down to 1:25 000 and 1:10 000

e) Volume
- approx. 20 gigabytes in on-site and off-site storage

Structure

ARC/INFO and CARSS (Ontario Hydro's internal GIS)

Output Format

Maps, tables, graphics (e.g., charts, histograms), spreadsheets

Date

Varies with project — Sudbury Toronto is 1992–93. Projects range from 1979 to 1993.

Frequency of Update or Release

Usually none per project unless project areas overlap

Methods/Data Quality

Existing databases are collected and compiled for the study area. There is some field data collection, modelling of data from various sources, and satellite image analysis.

For those areas that have been under study for transmission facilities, Ontario Hydro has collected an enormous number of existing data in a GIS format. Agricultural data are limited to simplified but updated land systems and generalized CLI. Landscape features related to wildlife and protected areas are covered as best available from OMNR. Other cultural features are very well covered as well. All existing data will have the limitations of the original databases, unless upgraded by Ontario Hydro.

Availability

Would require negotiation; see above contact

Costs

Cost recovery based on a percentage of the original cost of creation for original data created by Ontario Hydro or retrieval cost/staff time for previously published information

8 *Forest Cover Patterns in Southwestern Ontario*

Responsible Organization(s)

Department of Geography
University of Western Ontario
London, Ontario N6A 5C2

Ontario Ministry of Natural Resources
Ontario Renewable Resources Research Granting Program

Contact Person(s)

Dr. Cheryl Pearce
same address (University of Western Ontario)
Tel. 519-661-3423

Nature of Information

Remote sensing and GIS

Content

a) Purpose

- to describe patterns of forest fragmentation in southwestern Ontario to improve management for natural heritage preservation

b) Attributes

- woodlots and wooded corridors
- for each woodlot:
  - area
  - perimeter
  - perimeter/area index
  - various edge zone widths
  - amount of forest interior
  - average inter-patch distance
  - deciduous or coniferous
- summary of above attributes

c) Spatial extent

- two areas, each 60 km × 60 km: 1) from Brantford to Long Point, Tillsonburg to Hagersville; 2) from London to Aylmer south to Lake Erie

d) Scale, resolution, or geographical units of measurement

- LANDSAT TM satellite data have a ground resolution of 30 m × 30 m (0.09 ha)

e) Volume

- 4 million resolution cells for each of the seven wavelengths

Structure

LANDSAT-5 TM data were analyzed on an IBM PC using PCI EASI/PACE image analysis software. GIS analysis was done using MAP.FACTORY, a raster-based GIS for Apple MacIntosh computers under development by C. Kirby, Department of Geography, University of Western Ontario.

Output Format

Map, tables. Papers:

Pearce, C.M. 1992. Pattern Analysis of Forest Cover in Southwestern Ontario. *The East Lakes Geographer* 27:65–76.

Pearce, C.M. 1993. Coping with Forest Habitat Fragmentation in Southern Ontario. In: *Proceedings, Size and Integrity Standards for Natural Heritage Areas in Ontario*, Toronto, Ontario, June 18, 1992. Provincial Parks and Natural Heritage Policy Branch, OMNR.

Date

1991 and 1992 imagery

Frequency of Update or Release

Continuous through OMNR

Methods/Data Quality

June 1991 and 1992 imagery was analyzed for deciduous and coniferous forest patches and checked in the field or with aerial photography. Each unique patch was assigned an identifier and the GIS used to automatically measure the attributes and calculate the indices.

The resolution of the imagery catches wider treed hedgerows but is more appropriate for woodlot-scale units. C. Pearce has also used 10 m × 10 m SPOT data and OMAE digital databases for finer-scale topography, land use, etc. interpretations.

This database has some similarities to the more extensive Ontario Hydro (S. Hounsell) coverage without the landscape unit classification. Local OMNR staff have used the database in Ontario Municipal Board hearings and to help define wetland buffers.

The satellite imagery approach offers the chance for change monitoring. C. Pearce has studied change from 1972 to 1992.

Availability

See above contact or Brad Graham, Ontario Ministry of Natural Resources, 353 Talbot Street West, Aylmer, Ontario N5H 2S8.

Costs

Depend on request

8 *Forest Resources Inventory (FRI)*

Responsible Organization(s)

Natural Resource Inventories Section
Ontario Ministry of Natural Resources
Suite 400, Roberta Bondar Place
70 Foster Drive
Sault Ste. Marie, Ontario P6A 6V5

Contact Person(s)

Ron Alton
same address
Tel. 705-945-6680

Nature of Information

Maps, some digitized, publication

Content

a) Purpose

- to provide information about the forest cover in Ontario for timber management planning on a management unit basis

b) Attributes

- for each stand:
  - stand number and area (ha)
  - stand type (19 kinds)
  - working group — an aggregate of stands having the same predominant species and rotation (22 kinds)
  - main species composition (33 categories, often a stand has more than one, showing the basal area proportion of each)
  - age and height
  - stocking — relationship between actual basal area and normal
  - site class — age–height relationship from normal yield tables
  - for non-forested land: land use, i.e., developed agricultural land, grass or meadow, other unclassified (built-up and extractive uses)
  - type of non-productive forest land: e.g., muskeg, alder, outcrop

c) Spatial extent

- Ontario from the southern limits to latitude 50°N in northeastern Ontario and latitude 52°N in the northwest

d) Scale, resolution, or geographical units of measurement

- 1:10 000 for southern Ontario, enlarged from pre-digital 1:15 840 photography; 1:20 000 for northern Ontario from 1:20 000 photography

e) Volume

- approx. 4000 tiles — will be 10 000 as OBM conversion proceeds; approx. 1500 digitized OBM tiles — inventoried since 1988

Structure

Maps are on three bases: geographic township, FRI base map, and OBM. Each FRI base sheet mosaic is 7'30" longitude wide and 15' latitude high. Digitized maps have been put on OBMs. An inventory set is the mapping for each forest management unit; at present, 138 are inventoried.

Output Format

Maps on an air photo mosaic base; also publication, *The Forest Resources of Ontario 1986*, 1987, by Forestry Resources Group, Ontario Ministry of Natural Resources, Report 86-08-14. The report summarizes FRI data by eight OMNR administrative regions, three of which correspond to agricultural southern Ontario.

Date

Southern Ontario 1978–79 photos; for province — 1960s to present

Frequency of Update or Release

20-year cycle, which may be shortened if digital approach allows

Methods/Data Quality

Air photos are interpreted by specialists and classified according to a standard legend.

The database is comprehensive and detailed for regional-scale studies. Although the database is directed at forestry applications, the species and maturity indicators are useful ecological attributes. It may be the closest to a comprehensive terrestrial habitat inventory available. The data are somewhat dated, and, without field confirmation, species interpretations cannot always be correct. Any site-specific studies should consider the data only as an initial indicator of conditions and supplement it with field checks. The line boundaries have sometimes shifted in the transfer to the mosaic, but in southern Ontario the field and woodlot pattern on the mosaic shows clearly where shifts have happened, and the map reader can make suitable adjustments.

The database is more appropriate for regional studies. In using the data, Steve Hounsell at Ontario Hydro has avoided some of the species misinterpretations by lumping data into upland and lowland forests and into mature and immature.

The area figures provide the ability to quantify stands.

Long-range plans include digital FRI. The database would then be more usable over large areas.

The mosaics themselves, which are also available without the FRI information, can be a useful base for detailed studies, keeping in mind that they are circa 1978.

Availability

Maps can be ordered from Natural Resources Information Centre, Room M1-73, Macdonald Block, 900 Bay Street, Toronto, Ontario M7A 2C1. For digital data, see above contact.

Costs

$3.60 plus tax for each hardcopy map; $75/sheet + $100 setup for each digital data set or attributes for a management unit

8,9 *Flood Risk Mapping*

Responsible Organization(s)

Canada/Ontario Flood Damage Reduction Program
Engineering Branch
Ontario Ministry of Natural Resources
Room 5620, Whitney Block
99 Wellesley Street West
Queen's Park
Toronto, Ontario M7A 1W3

Environmental Services Branch
Ontario Region
Environment Canada
867 Lakeshore Road, P.O. Box 5050
Burlington, Ontario L7R 4A6

Contact Person(s)

Karen Abrahams
same address (Ontario Ministry of Natural Resources)
Tel. 416-314-2396

Michael Shaw
same address (Environment Canada)
Tel. 905-336-4957

Nature of Information

Maps, some digital

Content

a) Purpose

- to reduce flood damage and risk of loss of life along Ontario rivers and lakes by mapping flood risk areas where development should be discouraged

b) Attributes

- on engineering maps:
  - topographic map features including contours (1-m interval at 1:2000), wooded areas, buildings, roads, usual water extent of rivers
  - regulatory flood line
  - within the flood line, a line separating the floodway and flood fringe to distinguish between areas with faster, more destructive waters and those with slower and more shallow floodwaters
  - point elevations, geo-references
- on public information flood risk maps:

- some topographic features, e.g., roads, buildings, wetland symbols
- normal water surface extent
- flood risk area

c) Spatial extent

- in southern Ontario along many of the major rivers and streams and approximately half of the lower Great Lakes – St. Lawrence shoreline; near towns in central and northern Ontario

d) Scale, resolution, or geographical units of measurement

- engineering maps vary — 1:2000 or 1:5000; public information maps vary — 1:10 000 to 1:25 000

e) Volume

- approx. 9500 km of watercourse mapped over hundreds of engineering maps and, in agricultural Ontario, about 45 public information summary maps

Structure

The maps are organized by Conservation Authority in southern Ontario and by OMNR District in those parts of northern Ontario where there are no Conservation Authorities. Each watercourse was mapped separately. Some maps are on orthophoto format; others are line drawn. Most Great Lakes shoreline mapping was produced digitally.

Output Format

Maps

Date

Initiated in 1978 with mapping ongoing

Frequency of Update or Release

Ongoing release as new areas mapped; updates depend on the amount of new development

Methods/Data Quality

The flood risk areas were determined through hydrologic and hydraulic analyses determined on the basis of the Regulatory Flood. This is established from the most severe storms recorded for an area, e.g., Hurricane Hazel, the Timmins Storm, or 1-in-a-100-year storm. The analyses and mapping were all done in accordance with specifications of the Canada/Ontario Flood Damage Reduction Program Agreement (Class A NATO standards whereby 90% of map features will fall within 0.5 mm at map scale of their actual location and 90% contour elevations will fall within half of a contour interval relative to their true elevation). Shoreline mapping used 1:8000 aerial photography.

While no habitat definition is intended in the mapping, the combination of wooded area and floodplain extent and of wetland symbols and floodplain extent all available on the engineering maps would provide an estimate of riparian and floodplain habitat. The database's lack of comprehensiveness and its enormous numbers of maps at varying but

detailed scales mean it would be most useful in defining extent of floodplain habitat for localized areas.

Availability

Detailed engineering maps are available at the appropriate Conservation Authority office, municipal office, or at Inland Waters Directorate, Burlington (see above address). Public information flood risk maps may be obtained from individual Conservation Authorities and regional OMNR offices. A catalogue of *Flood Risk Mapping in the Province of Ontario: 1992* is available from the above contact people.

Costs

None for small requests; printing charge may apply to 1:2000 scale maps

8 *Pre-Settlement Forest Maps of Southwestern Ontario*

Responsible Organization(s)

Development Plans Review
Heritage Branch
Ontario Ministry of Culture, Tourism and Recreation
15 Centre Street
London, Ontario N6J 1T4

Contact Person(s)

Neal Ferris
same address
Tel. 519-433-8401

Nature of Information

Hardcopy maps

Content

a) Purpose

- to map original vegetation to help locate archaeological sites

b) Attributes

- major vegetation types (e.g., beech–maple, oak, willow swamp, marsh)
- other subdominant tree species, usually 1–3, sometimes 6

c) Spatial extent

- southwestern Ontario, west from and including Simcoe and Halton counties

d) Scale, resolution, or geographical units of measurement

- 1:100 000 maps with precise resolution along concession roads; estimated often along lot lines between concessions
- occasional township also has more detailed notes

e) Volume

- about 30 maps, i.e., sometimes more than one per county

Structure

One set of black and white (pencil) paper maps on Ontario Ministry of Transportation's 1:100 000 base maps, which show lots and concessions and some streams

Output Format

Maps — major forest types in different hatchings; subdominant trees in letter code

Date

Circa 1780–1850

Frequency of Update or Release

None

Methods/Data Quality

Students reviewed the earliest available original surveyors' notes for each township. Using the lot, concession, and chain locations, the forest type and subdominant trees were mapped along the concessions. Extrapolations between concessions were made, generally using lot lines.

This map set represents the situation before European-style agriculture and offers a benchmark against which to compare current conditions.

The coverage, while not comprehensive for agricultural Ontario, is extensive, covering the most intensively farmed part of the province as well as including less intensively farmed areas in the Bruce/Grey/Dufferin/Simcoe areas. The method could be applied to other parts of the province.

Users, especially those comparing or combining databases, should keep in mind the method and resolution — relative precision along concession boundaries; extrapolation elsewhere because of no data between concession boundaries. More precise extrapolations are likely possible by analyzing the maps in conjunction with the county soil maps. The texture and drainage classifications (which reflect pre-settlement conditions) along with known site preferences would guide extrapolations between the surveyed concession lines.

Availability

Currently the one set of maps can be viewed at the contact person's office. The possibility of making a reproducible set for wider distribution is being investigated (M. Cadman, Environmental Conservation Branch, Guelph, pers. comm.).

Costs

None to view

8 *Maitland Valley Conservation Authority: Ecosystem Health Project*

Responsible Organization(s)

Maitland Valley Conservation Authority
Box 127
Wroxeter, Ontario N0G 2X0

Contact Person(s)

Phil Beard or Rick Steele
same address
Tel. 519-335-3557

Nature of Information

Maps, electronic database, GIS planned

Content

a) Purpose

- to determine the health of the ecosystems in the watershed and human impacts on ecosystems

b) Attributes

Agricultural soil health

- for a representative selection of farms (approx. 40 by 1993):
  - soil organic matter
  - soil structure
  - soil biology: bacteria, microorganisms, and earthworms
  - soil pollution, including agricultural chemicals
  - soil compaction
  - soil erosion

Terrestrial ecosystem health

- for all sub-basins by 1993, for each forest or wetland:
  - forest/wetland size
  - forest/wetland shape
  - linkages, e.g., hedgerows, river valleys
  - regeneration
  - alien species
  - disease
  - species diversity
  - isolation
  - interaction
  - habitat diversity
  - contour diversity

Aquatic ecosystem health

- for 35 stream sites:

- water temperature
- dissolved oxygen
- nutrient levels
- stream bed and bank habitat
- sediment levels
- discharge
- adjoining land use
- aquatic species
- dissolved carbon dioxide
- substrate
- pH

c) Spatial extent
- watersheds of Maitland River, Nine Mile River, and Eighteen Mile River

d) Scale, resolution, or geographical units of measurement
- 1:10 000; organized into 42 sub-basins

e) Volume
- approx. 140 maps; computer spreadsheet — 42 files onto one high-density 5.25-inch floppy

Structure
IBM PC 386 with Quattro Pro and SPANS GIS

Output Format
Maps, tables, final report in 1994

Date
1992–94

Frequency of Update or Release
Ongoing monitoring

Methods/Data Quality
Criteria for health were established in consultation with university experts (Jane Bowles, University of Western Ontario; and John FitzGibbon and Les Thomas, University of Guelph). For agricultural soils, farms were chosen to be representative of soil type, operation type, and location in the watershed. Each farm was visited and a qualitative analysis completed based on visual signs of erosion and crop stress. For terrestrial areas, all naturalized areas were mapped and the attributes assessed. For aquatic health, sites were sampled, some of which had historical data. In 1993, they will be sampled again throughout the year with lab analysis. Following data collection, the three components will be integrated to develop an indication of the relative health of the watershed and to locate problem areas requiring remedial action.

This database covers only one relatively small agricultural watershed and is not a province-wide project of Conservation Authorities. It does, however, cover an area with a range of farm types typical of much of southern Ontario.

Availability

In process, see above contact

Costs

Unknown

8 *Maitland Valley Conservation Authority: Resource Mapping and Restoration Mapping*

Responsible Organization(s)

Maitland Valley Conservation Authority
Box 127
Wroxeter, Ontario N0G 2X0

Contact Person(s)

Phil Beard or Rick Steele
same address
Tel. 519-335-3557

Nature of Information

Maps, electronic database, GIS planned

Content

a) Purpose

- to determine the location and types of existing resource lands to assist Authority and municipal planning decisions and development review
- Restoration Maps determine lands that are marginal for agricultural use and could be potentially restored as natural areas in the Maitland watershed

b) Attributes

Resource mapping

- watercourses
- floodplains
- headwaters
- recharge areas
- forests
- wetlands

Restoration mapping

- potential areas in need of restoration:
  - floodplain
  - headwater areas
  - wetland
  - marginal agricultural land
  - stream corridor
- fragile lands, i.e., high agricultural capability lands with high susceptibility to erosion when tilled (this attribute is planned but as yet unmapped)

c) Spatial extent

- watersheds of Maitland River, Nine Mile River, and Eighteen Mile River

d) Scale, resolution, or geographical units of measurement
- Resource Mapping — 1:5000, summarized at 1:20 000
- Restoration Mapping — 1:5000, summarized at 1:20 000; GIS will be on 1:10 000 OBM base

e) Volume
- number of maps: 240 Resource Maps (17 summarized) and 240 Restoration Maps (17 summarized); 44 000 acres of potential restoration lands mapped

Structure
IBM PC 386; Quattro Pro spreadsheet; GIS system: SPANS

Output Format
Maps, tables

Date
Resource Maps: since 1985
Restoration Maps: 1990–93

Frequency of Update or Release
As required

Methods/Data Quality
Resource maps were from municipal-scale photomaps. Maps were interpreted using existing information and field checks.

For the Restoration Maps, a Restoration Mapping Manual was prepared. Agricultural Capability maps (1:50 000) were used to locate all Class 4–7 lands. Any floodplains, stream corridors, river valleys, former wetlands, and headwater areas located on these lower-class lands were mapped. The former wetlands were located from Wetland Mapping Series (1:50 000); the other features were all available from watershed resource mapping (1:5000 with summaries at 1:20 000). Potential recharge areas with low agricultural capability were mapped.

These databases provide data on the landscape both as it is (Resource Maps) and as it has potential to become while maintaining a viable agricultural industry (Restoration Maps). The 1:5000 photobase would provide visual indication of significant hedgerows, fencerows, and shelterbelts. Some of the data sources for the maps were not at the 1:5000 scale: field checks may have helped refine the data closer to the presentation scale, but some caution might be needed on boundary definition for these data. The GIS (in planning stages and awaiting OBM coverage) will expand analysis possibilities and help in the handling of these large-scale map sets.

Availability
See contact person

Costs
Cost recovery

8 *Physiography of Southern Ontario*

Responsible Organization(s)
Ontario Ministry of Natural Resources

Contact Person(s)
Information not provided

Nature of Information
Published maps and report

Content

a) Purpose
- to survey the landforms of southern Ontario

b) Attributes
- on the maps:
  - glacial and post-glacial landforms
- in the report, for each physiographic area:
  - description of landform and land use

c) Spatial extent
- all of Ontario south of latitude 46°N

d) Scale, resolution, or geographical units of measurement
- 1:253 440

e) Volume
- five map sheets

Structure
Hardcopy map sheets (not electronic)

Output Format
Maps, reports:

Chapman, L.J., and D.F. Putnam. 1972. *The Physiography of Southern Ontario.* Ontario Department of Mines and Northern Affairs (Maps 2224, 2225, 2226, 2227).

Chapman, L.J. 1975. *The Physiography of the Georgian Bay – Ottawa Valley Area of Southern Ontario*. Geoscience Report 128. Ontario Division of Mines, OMNR (Map 2228).

Chapman, L.J. and D.F. Putnam. 1984. 3rd edition. *The Physiography of Southern Ontario.* Ontario Geological Survey. Special volume 2. Ontario Ministry of Natural Resources. Toronto.

Date

1972

Frequency of Update or Release

None

Methods/Data Quality

The maps are based on aerial photo interpretation and intensive ground checks. While the maps are highly accurate at the mapping scale, for more site-specific work they provide guidance to the likely landform but should be field checked. The maps are in colour and easily interpreted, providing a consistent database across southern Ontario. The maps are relatively old, but, since physiography does not change, they remain equally valid today.

Availability

Check with Ontario Government Publications to see if in print; otherwise university libraries

Costs

Information not provided

8 *Surficial Geology Maps: Quaternary Geology of Southern Ontario* and *Ontario Engineering Geology Terrain Study*

Responsible Organization(s)

Ontario Geological Survey
Ontario Ministry of Northern Development and Mines
933 Ramsay Lake Road, 4th Floor
Sudbury, Ontario P3E 6B5

Geological Survey of Canada
601 Booth Street
Ottawa, Ontario K1A 0E8

Contact Person(s)

Information not provided

Nature of Information

Maps and accompanying reports

Content

a) Purpose

- to map glacial and post-glacial deposits

b) Attributes

- type of deposit, often in stratigraphic sequence
- texture or nature of soil material
- mode of deposition
- type of topography and drainage

c) Spatial extent

- Quaternary Geology maps cover most of agricultural southern Ontario; Geology Terrain maps cover most of Ontario between latitudes 45°N and 51°N, including agricultural areas in central and northern Ontario

d) Scale, resolution, or geographical units of measurement

- Quaternary Geology maps are variable, most at 1:63 360 or 1:50 000
- Geology Terrain maps are at 1:100 000

e) Volume

- approx. 75 Quaternary Geology maps, 111 Geology Terrain maps

Structure

Many of the Quaternary Geology maps fit NTS 1:50 000 base, but not all. Geology Terrain maps are based on latitude and longitude, each map 1° longitude wide and 0.5° latitude long.

Output Format

Maps

Date

Quaternary Geology: each map done in different year
Geology Terrain: 1977–79

Frequency of Update or Release

No updates known

Methods/Data Quality

The mapping was done from aerial photo interpretation with ground checks.

The Quaternary Geology maps of southern Ontario provide more detail than Physiography of Southern Ontario maps. The Geology Terrain maps provide landform coverage for agricultural portions in northern Ontario.

Availability

From Natural Resource Information Centre, Ontario Ministry of Natural Resources, Room M1-73, Macdonald Block, 900 Bay Street, Toronto, Ontario M7A 2C1. Some Quaternary Geology maps from Publications Office, Geological Survey of Canada, 601 Booth Street, Ottawa, Ontario K1A 0E8.

Costs

Information not provided

8 *Ontario Soil Survey*

Responsible Organization(s)

Ontario Institute of Pedology
Resources Management Branch
Ontario Ministry of Agriculture and Food
P.O. Box 1030
Guelph, Ontario N1H 1G3

Contact Person(s)

Bob van den Broek
same address
Tel. 519-767-3572

Nature of Information

Published maps, GIS

Content

a) Purpose

- to map soils of agricultural Ontario

b) Attributes

- for each county soil map, for each soil polygon:
  - soil series
  - parent material
  - surface texture
  - drainage class
  - slope and stoniness classes (not all counties)
- reports include text description and elaboration of each series' characteristics, sample soil profile descriptions, soil physical and chemical data, and ratings for agriculture — generally becoming more detailed with the more recent reports

c) Spatial extent

- agricultural southern Ontario plus portions of northern Ontario around and including agricultural areas

d) Scale, resolution, or geographical units of measurement

- various from 1:20 000 to 1:250 000; most are 1:50 000 and 1:63 360

e) Volume

- 52 county or area maps

Structure

The maps are county based in southern Ontario and NTS based in northern Ontario. For those that are on GIS, ARC/INFO is used.

Output Format

Maps and accompanying reports

Date

From about 1930 to present, although the older maps have been remapped, leaving the oldest map at about 1948

Frequency of Update or Release

Generally not updated because soils are constant, but maps in the order of 50 years old have been redone with new classifications and methods

Methods/Data Quality

In agricultural areas, soil mapping is based on air photos with a great deal of field checking and mapping. In non-agricultural areas, the intensity of field checking is not as great. Some variation in quality occurs among counties, largely because of date and scale differences. The maps are generally high quality. While soil maps are generally accurate at the scales mapped and therefore suitable for regional analyses, site analyses would need field confirmation and map refinement. For those county maps on GIS, the potential exists for overlay with other features and for relative ease of interpretation.

Availability

From Consumer Information Centre, Ontario Ministry of Agriculture and Food, 801 Bay Street, Main Floor, Toronto, Ontario M7A 2B2. Some maps have no report or the report is out of print.

Costs

Depends on area: from no charge to $9 per county/area but generally $1–$2

8 *Ontario Basic Mapping*

Responsible Organization(s)

Land and Resource Information Branch
Provincial Mapping Office
Topographic Mapping and Data Base
Ontario Ministry of Natural Resources
90 Sheppard Avenue East, 4th Floor
North York, Ontario M2N 3A1

Contact Person(s)

Tom Malone
same address
Tel. 416-314-1215

Nature of Information

Maps, hardcopy and digital

Content

a) Purpose

- to provide a comprehensive mapping system that will permit the rapid and visual geographic correlation of the physical properties, legal status, resources, and use of lands in Ontario

b) Attributes

- wooded areas and hedgerows
- drainage features: e.g., dams, dikes, flooded land, marsh/fen, reservoirs, streams, rivers, shorelines, falls, rapids
- buildings and other cultural point features
- cultural line features: e.g., fence, pipeline, wall
- aggregate pits and piles
- transport features: e.g., roads, rail lines, bridges, airstrips
- cartographic spot elevations and contours
- boundaries: townships, parks, Indian Reservations
- lots and concessions, text and geographical names
- digital terrain model data; 1000-m grid

c) Spatial extent

- Ontario, although not all areas completed

d) Scale, resolution, or geographical units of measurement

- 1:10 000 (with 5-m contours) south of North Bay area; 1:20 000 (with 10-m contours) for northern Ontario up to approx. 51°N in the east half and to approx. 54°N in the west

half; extreme north at 1:50 000. Urban areas will be covered by 1:2000 (with 1-m contours)
- Mapping Office has hardcopy maps — 1:1 000 000, 1:600 000, and 1:100 000

e) Volume
- once complete, over 14 000 map sheets

Structure

The database is partitioned into tiles or maps 5000 m^2 in area in southern Ontario and 10 000 m^2 in area in northern Ontario. Each is uniquely numbered using scale, Universal Transverse Mercator (UTM) zone, and UTM coordinates. Multiple thematic layers of information are maintained for each tile. The data are stored in a topological data structure managed by ARC/INFO GIS software.

Output Format

Hardcopy maps; digital data: dissemination format for digital data is DFX, DLG-OPTION 3 (ASCII), ISIF (ASCII), ESRI EXPORT, or ARC/INFO formats. Digital topographic data: 0.5-inch magnetic tape, 9 track, unlabelled ASCII, blocksize 960 bytes, 80-byte record length, 1600 or 6250 bpi density; 3.5-inch floppy disk; 8-mm tape

Date

First maps about 1976; the most current coverage is 1992 for some areas; ongoing additions, still incomplete

Frequency of Update or Release

Not set; strategic plan has commenced

Methods/Data Quality

Aerial photography is the main data source. Other data are obtained from Ontario Geographic Names Board, Survey Records, Parks and Recreational Areas Branch for park boundaries. Compilation specifications were developed for standards and accuracy of data capture and delivery. Compilation is done by private industry. Delivered data are rigorously checked, split into thematic layers, and edge matched. Positional accuracy of ± 1 m is maintained.

These maps (OBM) are the standard base maps for Ontario. Their scale makes them a suitable and accurate base for relatively site-specific studies. For broad-scale studies, their number is unwieldy (and, in the case of digital files, relatively costly), and the broader-scale maps (1:100 000 to be digital soon) or the NTS maps may be more appropriate.

OBM contour interval of 5 m (1:10 000) is a lower resolution than the 1:25 000 NTS maps, which had 10-foot intervals and were a more manageable size for large study areas. This NTS series is now out of print and old but is still worth reference in university libraries for contour data. In its absence, OBMs become the best comprehensive coverage source for slope interpretation.

The coverage, while very extensive, is also incomplete, preventing its use in areas of gaps. Within 1–2 years, however, southern Ontario will have full coverage (Tom Malone, pers. comm.).

Availability

Maps (include full map numbers) may be ordered from Natural Resources Information Centre, Room M1-73, Macdonald Block, 900 Bay Street, Toronto, Ontario M7A 2C1.

Requests for digital data should be directed in writing to the responsible organization.

Index maps show map existence and reference numbers. Lists give maps available in digital format.

Costs

Maps are $3.65 plus tax each. Digital data cost $100 to service a request plus $75 for each sheet requested.

8 *National Topographic System of Canada*

Responsible Organization(s)

Canada Map Office
Natural Resources Canada
615 Booth Street
Ottawa, Ontario K1A 0E9

Contact Person(s)

Claude Gervais
same address
Tel. 613-995-2123

Nature of Information

Maps, digital data

Content

a) Purpose

- to provide accurate data on topography and landscape features for all parts of Canada

b) Attributes

- on maps:
  - roads (11 types depending on size, surface)
  - built-up areas
  - railways
  - cultural landscape features, e.g., bridges, buildings in rural areas, churches, schools, post offices, cemeteries, sewage lagoons, gas and oil wells, pipelines, power transmission lines, campsites, sports tracks
  - mines, pits and quarries, embankments, dikes
  - boundaries and names: international, provincial, county, township, city, reserves
  - benchmarks with elevation, spot and water elevation, contours
  - streams, ditches, lakes, intermittent lakes, seasonally flooded land, marsh or swamp, falls, rapids, dugouts, flats, dams, wharves
  - cliffs, eskers, sand dunes, moraine
  - wooded area, orchard, vineyard
- National Topographic Data Base (NTDB) has similar data without symbology, toponymic information, or administrative boundaries

c) Spatial extent

- Canada

d) Scale, resolution, or geographical units of measurement

- maps — 1:50 000; 1:250 000; 1:1 000 000; discontinued scales include 1:25 000 and 1:500 000

- digital topographic data — 1:50 000 (incomplete coverage) and 1:250 000

e) Volume

- thousands of maps; for agricultural southern Ontario, approx. 125 1:50 000 map sheets; all or parts of 14 1:250 000 map sheets; parts of 4 1:1 000 000 map sheets

Structure

Maps are based on latitude and longitude boundaries: 1:50 000 maps are 15′ (N/S) by 30′ (E/W); 1:250 000 are 1° (N/S) by 2° (E/W): 1 000 000 are 4° (N/S) by 6° (E/W).

The NTDB is in the Canadian Council on Geomatics Interchange Format (CCOGIF). Various types of structuring software and data collection systems are available to users.

Output Format

Maps: paper or stable base; NTDB is available on 9-track tape.

Other digital products include National Atlas Information Service products (1:2 000 000 and smaller scales); Canadian Geographical Names Data Base; Digital Terrain Elevation Data; and 12-inch videodisks that hold 200 standard maps on one side.

◊ Data collection systems are available on tape, cartridge, and cassette and include documentation and manuals.

Date

Maps: varies with map sheets; most of agricultural southern Ontario covered in the past 10 years except Bruce/Grey county areas, where late 1970s coverage

Digital topographic data: since 1978 — for southern Ontario — in production in 1992

Frequency of Update or Release

In the past as significant changes in features, in southern Ontario approx. every 10 years; in future every five years in southern Ontario

Methods/Data Quality

Interpretation is made using state-of-the-art equipment from air photos with cultural ground checks.

Digital topographic data methods have changed from less structured methods of conversion into digital vector format without having been cleaned geometrically and without identification of areas and attributes. New NTDB specifications have been set, and all data are being cleaned, structured, and standardized. Southern Ontario 1:50 000 data are still unstructured.

NTS maps are the standard base maps for 1:50 000 and 1:250 000 scales and are very accurate at those scales. Their colour format makes them easier to read than OBM maps, with woodlots in green easily distinguishable and line features such as contours, roads, and streams all different colours. Their scale also makes them more manageable than OBMs for large-area regional studies.

The new metric scale contour intervals are now 10 m at 1:50 000. This is lower resolution than the older series' 25-foot contours or the 1:25 000's 10-foot contours. If these old maps are accessible (e.g., university libraries), they could be referred to for finer

topographical resolution, using the most recent coverage for the up-to-date cultural and woodlot mapping. The recent metric series also picks up more streams.

The wooded area mapping (1:50 000) is more precise than the same-scale Agricultural Resource Inventory Land Use maps. It shows widths in the order of 50 m. In agricultural southern Ontario, wetland symbols accurately show marshes, both lakeshore and inland, to the 1:50 000 scale. They also indicate many swamps but are not comprehensive, as many swamps are represented just as woodlots.

Availability

Maps from responsible organization or from local outlets, e.g., in Toronto, Canada Map Company, 211 Yonge Street, Toronto, Ontario M5B 1M4. When ordering, refer to index map to quote the right map number. Out-of-print maps (e.g., 1:25 000 series) may be available for use at some university libraries.

Digital data are available from Digital Distribution Services, Products and Services Division, 615 Booth Street, Room 400, Ottawa, Ontario K1A 0E9, Tel. 613-995-0314.

For terms and conditions for electronic information, see Natural Resources Canada; Surveys, Mapping and Remote Sensing; Policy 1-91, The Distribution of Electronic Information.

Costs

Maps: $8/sheet for 1:50 000; digital files: depending on the size of order — $378–$540 per file; other products, see Digital Products price list

8,10 *Ontario Ministry of Natural Resources: Cambridge District Geographical Information System*

Responsible Organization(s)

Cambridge District
Ontario Ministry of Natural Resources
P.O. Box 21048
Beaverdale Road
Cambridge, Ontario N3C 2W1

Contact Person(s)

Ted Harvey or Chris Eckstein
same address
Tel. 519-658-9355

Nature of Information

GIS

Content

a) Purpose

- to compile the geographical data into a GIS for improved access, organization, retrieval, and analysis for use in natural resource management decisions
- to act as a pilot to test the value of GIS for OMNR

b) Attributes

- coverages (each with a set of attributes; some with linked tabular data sets) include:
  - Aggregate Resources Inventory — Bedrock Resources
  - Aggregate Resources Inventory — Sand and Gravel Resources
  - ANSIs — Provincial Significance
  - ANSIs — Regional Significance
  - Breeding Bird Atlas Squares
  - Bronte Creek Park Trails
  - Carolinian Canada
  - Classified Waterbodies
  - Crown Land Parcels
  - Deer Winter Habitat Inventory — Concentration Areas
  - Deer Winter Habitat Inventory — Deer Trails
  - ESAs
  - Evaluated Wetland
  - Evaluated Wetland — Buffered
  - Evaluated Wetland — Historical 1991
  - Featured, Rare, Threatened, and Endangered Species
  - Fish Distribution Stations
  - Forest Resources Inventory

  - Lakes and Rivers Improvement Act Permits
  - Licensed Pits and Quarries
  - Lower Tier Official Plans
  - Managed Forests
  - Management Units (Baitfish, Fur)
  - Municipal Boundaries
  - Niagara Escarpment Plan Boundary
  - OBMs
  - Petroleum Resource Pools
  - Petroleum Resources Wells
  - Recreational Trails
  - Upper Tier Official Plans
  - Waterlots
  - Watersheds
  - Wayside Pits and Quarries
  - Wildlife Management Units
- for more detail on each coverage, refer to the Cambridge District GIS Data Dictionary compiled in 1992

c) Spatial extent
- Cambridge District, which includes the Regional Municipalities of Waterloo, Halton, and Hamilton–Wentworth and parts of the counties of Brant, Wellington, Oxford, and Dufferin

d) Scale, resolution, or geographical units of measurement
- original maps usually range from 1:10 000 to 1:50 000 depending on the coverage

e) Volume
- 53 layers of information — 16 from OBM; 41 themes; 350 1:10 000 OBM sheets to cover District

Structure

Uses ARC/INFO GIS software running on a networked mini-computer. Users can access the GIS software and databases from graphics terminals and from PCs and laptops using TNET emulation software. Spatial User Interface (SUI) provides user-friendly query access to all graphic and tabular attribute data, allowing modelling and analysis functions.

Output Format

Maps, tables

Date

Started in 1988

Frequency of Update or Release

Ongoing new input as appropriate data acquired (e.g., Classified Forests)

Methods/Data Quality

Databases and maps available at Cambridge District were collected, standardized, and in some cases updated. OBM and FRI were obtained in digital form from OMNR. Some external databases were collected and integrated (Niagara Escarpment and Official Plan boundaries, Ontario Breeding Bird Atlas, Ontario Rare Breeding Bird Program, Ontario Herpetofaunal Summary, Halton Environmental Data Bank). All data were adjusted to 1:10 000 scale, which is beyond the accuracy of some of the original databases (e.g., 1:50 000). Accuracy estimates are included in coverage documentation.

Currently GIS databases are available only in Cambridge and Timmins districts.

The database includes a large number of the other wildlife and landscape databases, already in this catalogue, compiled for ease of access and comparison. This creates a powerful tool for many analyses. For those data originally mapped at 1:10 000, analyses approaching site level would be possible. For coverages originally collected at broader scales, however, caution must be taken in interpretation not to assign more accuracy than was intended. The data can also be analyzed for regional studies.

No agricultural data are included. OMAF's GIS also uses ARC/INFO, so there is potential of combined analyses, although this has not yet been pursued in depth.

Most natural landscape coverages are subsets of the landscape — i.e., evaluated wetlands, not all wetlands; significant natural areas, but not all natural areas — so it might be difficult to use this database for a comprehensive overview of the landscape and all habitat types.

Availability

See above contact. A data dissemination policy is being drafted stressing partnerships.

The GIS appears to be designed mainly for OMNR staff use. So far, output available outside OMNR has not been extensive, and the original maps are not as available. Ultimately, the Natural Heritage Information Centre will be the central access point, with even more user-friendly and sophisticated systems.

Costs

Depend on request; data trades are encouraged

8 *Ontario Wetland Map Series*

Responsible Organization(s)

Federation of Ontario Naturalists
355 Lesmill Road
Don Mills, Ontario M3B 2W8

Contact Person(s)

Tel. 416-444-8419

Nature of Information

Maps

Content

a) Purpose

- to provide a comprehensive regional-scale coverage of wetland extent and conversion in southern Ontario to assist wetland policy and program decisions and provide a baseline for future monitoring

b) Attributes

- for wetlands existing in 1982:
  - location and boundaries
  - soil classes and boundaries: organic or mineral — if mineral, includes agricultural capability (Classes 2–7) and likely texture (clay, medium, sand or gravel, shallow over bedrock) and fertility (fertile, moderately fertile, low fertility, very low fertility)
  - vegetation classes and boundaries: treed/tall shrubs, or emergent/non-treed
- for converted wetlands, locations and boundaries of each of:
  - long-term losses (circa 1800–1967)
  - recent losses (1967–82)
  - recent gains (1967–82)

c) Spatial extent

- southern Ontario, south of the Precambrian Shield; Shield coverage north to approximately Gravenhurst–Bancroft–Arnprior

d) Scale, resolution, or geographical units of measurement

- 1:50 000

e) Volume

- 125 map sheets

Structure

On mylar base maps of the NTS

Output Format

Paper copies of the Wetland Map Series (Third Approximation) based on the 1:50 000 NTS system (approx. 90 cm × 120 cm each)

Date

Wetland situation as of pre-European settlement, 1967 and 1982
Project undertaken 1981–83

Frequency of Update or Release

None planned

Methods/Data Quality

Original wetlands were mapped using county soil map data of originally saturated soils: i.e., organic soils and poorly and very poorly drained mineral soils. This was interpreted from the 1:50 000 CLI agricultural capability (organic and wetness limitation categories). Wetlands remaining in 1967 were mapped by overlaying 1967 1:50 000 CLI land use maps on the saturated soils maps to locate where natural vegetation remained in saturated soils. An overlay of OMAF's 1:50 000 Land System maps indicated land use changes by 1982 within originally saturated soil areas. Topographic maps (1:50 000) and CWS 1:25 000 Great Lakes shoreline marsh maps supplemented the overlays by indicating wetlands, largely marshes, that were beyond the resolution of the soil and land use map combination.

Accuracy checks from user surveys, field checks, and comparisons with other methods suggest about 85% accuracy with particular value in mapping swamp extent. The maps are suitable for regional-scale uses rather than site-scale and show no wetlands smaller than 2 ha. They tend to underestimate lakeshore marsh conversion and to be liberal in the extent of remaining wetlands.

Availability

From the responsible organization. The order form includes a map sheet index.

Costs

$7.00 per map sheet plus postage and handling

8 *Wetland Distribution and Conversion in Southern Ontario*

Responsible Organization(s)

Environmental Conservation Branch
Environment Canada
152 Newbold Court
London, Ontario N6E 1Z7

Contact Person(s)

Gary McCullough
same address
Tel. 519-681-0486

Nature of Information

Electronic database, report

Content

a) Purpose

- to provide a comprehensive regional-scale coverage of wetland extent and conversion in southern Ontario to assist wetland policy and program decisions and provide a baseline for future monitoring

b) Attributes

- in electronic database, by township:
  - whether on, off, or on margin of Precambrian Shield
  - township area
  - area of swamp in 1967
  - area of marsh in 1967
  - area of wetland lost between circa 1800 and 1967
  - area of swamp converted to each of: intensive agriculture, low-intensity agriculture, idle land, reforested land, built-up area, extractive uses, intensive recreational uses between 1967 and 1982
  - area of marsh converted to each of: intensive agriculture, low-intensity agriculture, idle land, reforested land, built-up area, extractive uses, intensive recreational uses between 1967 and 1982
  - area of gain for each of treed swamp, thicket swamp, pastured treed swamp, and marsh from 1967 to 1982
  - total area of loss of swamp to all uses from 1967 to 1982
  - total area of loss of marsh to all uses from 1967 to 1982
  - total area of gain of wetland from 1967 to 1982
- in report, the above data are presented and analyzed by county

c) Spatial extent

- southern Ontario, south of the Precambrian Shield

d) Scale, resolution, or geographical units of measurement
- electronic database by township, report by county

e) Volume
- approx. 320 townships, each with 25 attributes; report has 53 pages

Structure

The township database is in dBase.

Output Format

Tables; published report: Snell, E.A. 1987. *Wetland Distribution and Conversion in Southern Ontario.* Working Paper No. 48, Inland Waters and Lands Directorate, Environment Canada, Ottawa. Catalogue No. En 73-4/48E (ISBN 0-662-15077-5).

Date

Wetland situation as of pre-European settlement, 1967 and 1982

Frequency of Update or Release

None planned

Methods/Data Quality

Ontario Wetland Map Series maps were analyzed to create the database. See the *Ontario Wetland Map Series* catalogue entry for its method/data quality. The township area statistics were derived using a digitizing table to measure all the polygons on all the maps.

Like the *Ontario Wetland Map Series* on which the database is based, the data tend to underestimate lakeshore marsh conversion and to be liberal in the extent of remaining wetlands. It is, however, the only comprehensive regional database of wetland extent and conversion found for southern Ontario.

Availability

See above contact

Costs

See above contact

8,9,10 *Ontario Wetland Evaluation System*

Responsible Organization(s)

Ontario Ministry of Natural Resources
Wildlife Branch
Outdoor Recreation Group
90 Sheppard Avenue East, 6th Floor
North York, Ontario M2N 3A1

Contact Person(s)

Kevin Loftus
same address
Tel. 416-314-1064

Nature of Information

Maps, data depository, electronic database

Content

a) Purpose

- to assist land use planning by providing consistent data on every evaluated wetland to be able to rate the relative significance of each wetland and to provide a preliminary biophysical inventory of each wetland

b) Attributes

- for each wetland: name, OMNR District, Conservation Authority, township, county, lot, concession, latitude and longitude, UTM grid reference, topographic map, and air photo reference numbers
- map showing wetland boundary and community boundaries

Southern Manual (Hill's Site Regions 6 and 7) (data and evaluation points for each parameter):

- Biological Component:
  - productivity (growing degree-days/soils, wetland type, site type)
  - biodiversity (number of wetland types, vegetation communities, diversity of surrounding habitat, proximity to other wetlands, interspersion, open water type)
  - size
- Social Component:
  - economically valuable products (wood products, wild rice, commercial fish, bullfrogs, snapping turtles, furbearers)
  - recreational activities
  - landscape aesthetics (landscape distinctness, absence of human disturbance)
  - education and public awareness (educational uses, facilities and programs, research and studies)
  - proximity to areas of human settlement
  - ownership
  - size

  - aboriginal values and cultural heritage
- Hydrological Component:
  - flow attenuation (upstream detention, wetland attenuation)
  - water quality improvement (short term based on watershed improvement factor, adjacent and watershed land use, pollution uptake; long-term nutrient trap; groundwater discharge)
  - carbon sink
  - shoreline erosion control
  - groundwater recharge (site type, soils)
- Special Features Component:
  - rarity: of wetlands, and of species (breeding habitat for an endangered species; traditional migration or feeding habitat for an endangered species; provincially, regionally, or locally significant species)
  - significant features and habitats (colonial waterbirds; winter cover for wildlife; waterfowl staging and/or moulting areas; waterfowl breeding; migratory passerine, shorebird, or raptor stopover area; fish habitat: spawning and nursery, migration and staging)
  - ecosystem age
- documentation of wetland features not included in the evaluation (purple loosestrife abundance, length of seasonally flooded areas, Osprey and loon presence)

Northern Manual (Hill's Site Regions 2, 3, 4, and 5) (data and evaluation points for each parameter):

- Biological Component:
  - productivity (growing degree-days/soils, wetland type, site type)
  - biodiversity (number of wetland types, vegetation communities, diversity of surrounding habitat, proximity to other wetlands, interspersion, open water type)
  - size
- Social Component:
  - economically valuable products (wood products, low bush cranberry, wild rice, commercial bait fish, furbearers)
  - recreational activities
  - landscape aesthetics (landscape distinctness, absence of human disturbance)
  - education and public awareness (educational uses, facilities and programs, research and studies)
  - proximity to areas of human settlement
  - ownership
  - size
  - aboriginal values and cultural heritage
- Hydrological Component:
  - flow attenuation (upstream detention, wetland attenuation, surface form)
  - groundwater recharge (site type, soils)
  - downstream water quality improvement (watershed improvement factor, adjacent and watershed land use, vegetation form)
  - carbon sink
  - shoreline erosion control
  - groundwater discharge

- Special Features Component:
  - rarity: of wetlands, and of species (breeding habitat for an endangered species; traditional migration or feeding habitat for an endangered species; provincially, regionally, or locally significant species; species of special status)
  - significant features and habitats (colonial waterbirds; winter cover for wildlife; waterfowl staging and/or moulting areas; waterfowl breeding; migratory passerine, shorebird, or raptor stopover area; ungulate habitat; fish habitat: spawning and nursery, migration and staging)
  - ecosystem age
- documentation of wetland features not included in the evaluation (purple loosestrife abundance, length of seasonally flooded areas, Osprey and loon presence)

In the composite digital database, for each wetland:

- wetland name, class, OMNR District, Site District, Conservation Authority, county, township, UTM coordinates, zone, block, topographic map (scale, name, and number), year evaluated
- size and number in a complex
- percentage and area of bog, fen, swamp, and marsh
- site type
- ownership
- catchment

c) Spatial extent

- wetlands throughout Ontario

d) Scale, resolution, or geographical units of measurement

- 1:10 000 with some earliest evaluated wetlands at various scales

e) Volume

- approximately 2000 wetlands evaluated in southern Ontario (out of possible 3500–4500 over 2 ha); so far, relatively few in northern Ontario. The accompanying *Southern Manual* is 177 pages; *Northern Manual* is 181 pages. The digital database has 39 parameters for each wetland included and will be adding data from northern Ontario as available.

Structure

Some parameters have been input into a dBase file on an IBM computer. Some districts have computerized their own data (e.g., Cambridge with ARC/INFO GIS software).

Output Format

A map and data record file for each wetland, for some districts — summary tables and maps; published report: Glooschenko, V., B. Parker, L. Coo, R. Kent, C. Wedeles, A. Mason, J. Dawson, D. Herman, and P. Smith. 1987. *Provincially and Regionally Significant Wetlands in Southern Ontario: Interim Report*. Wildlife Branch, Ontario Ministry of Natural Resources, Toronto, Ontario.

The two manuals are:

Ontario Wetland Evaluation System: Southern Manual. Covering Hill's Site Regions 6 and 7 (Third Edition), NEST Technical Manual TM-002, MNR Warehouse #50254-1, published by Ontario Ministry of Natural Resources in March 1993.

Ontario Wetland Evaluation System: Northern Manual. Covering Hill's Site Regions 2, 3, 4, and 5 (First Edition), NEST Technical Manual TM-001, MNR Warehouse #50254, published by Ontario Ministry of Natural Resources in March 1993.

Date

Southern Ontario started in 1984 and is ongoing. Northern Ontario started in 1993.

Frequency of Update or Release

As needed for individual evaluations

Methods/Data Quality

A standard evaluation manual, *Ontario Wetland Evaluation System: Southern Manual* (First Edition), was compiled by a federal–provincial steering committee, which hired various experts. Development since then has included testing and revisions. Evaluators receive training in its use. Each wetland is evaluated using data from both existing information and field visits as directed in the manual. A standard evaluation score is derived from the data. The data and evaluation do not include vulnerability to development pressures or management strategies. For southern Ontario, OMNR estimates that 90% of provincially significant wetlands and about 60% of wetlands larger than 2 ha have been evaluated. The *Northern Manual* was completed in 1993 and designed to be compatible with the *Southern Manual*. The focus for wetland evaluation in northern Ontario will be areas under threat from development.

Availability

Individual wetland evaluations and data records as well as district summary maps and tables (where available) can be obtained from the local OMNR office or Conservation Authority. The composite database can be accessed in digital form through the above contact with restrictions on completeness both in the number of parameters per wetland and in the number of wetlands.

Costs

Generally none for small requests, cost of copying for large ones. Manuals are $25 each.

8 *Historic Coastal Wetland Database*

Responsible Organization(s)

Environmental Conservation Branch
Environment Canada
70 Fountain Street East
Guelph, Ontario N1H 3N6

Contact Person(s)

Laurie Maynard
same address
Tel. 519-766-1593

Nature of Information

Maps, GIS database, reports

Content

a) Purpose

- to provide data to help analyze changes in lower Great Lakes wetland quality, quantity, value, and function due to water level fluctuations (in support of the IJC Water Levels Reference Study Phase II)

b) Attributes

- a map of:
  - vegetation communities (open water, submergents, flat/wet emergents, emergents, tall/dense emergents, meadow, bog, trees — with occasional subcategories of dominant species)
  - adjacent land use (agriculture, built up, idle land, diked wetland not affected by water levels, orchard, park, marina, causeway or dike, sand or disturbed soil, forest, lake, river, pond, marsh)

  for each of 5–7 different years and water level conditions
- monthly mean water level information for Lakes St. Clair, Erie, and Ontario, from Marine Environmental Data Services, Ottawa

c) Spatial extent

- six wetlands — St. Clair Marshes on Lake St. Clair; Big Creek–Holiday Beach, Rondeau Shores, and Turkey Point on Lake Erie; and Oshawa Second Marsh and Presqu'ile Marsh on Lake Ontario — each including a strip of surrounding upland about 1 km wide

d) Scale, resolution, or geographical units of measurement

- 1:10 000

e) Volume

- 37 maps

Structure

Maps digitized on SPANS GIS Version 5.0. Water level data are stored on Quattro Pro.

Output Format

Original mylar maps, digital GIS maps, and reports:

Snell and Cecile Environmental Research. 1988. *Wetland Impact Evaluation: IJC Lake Levels Reference: Vegetation Community Mapping of Four Lower Great Lakes Marshes at Five Water Level Conditions.*

Snell and Cecile Environmental Research. 1989. *Wetland Impact Evaluation: IJC Lake Levels Reference: Vegetation Community Mapping of Eastern Lake St. Clair Marshes at Five Water Level Conditions.*

Snell and Cecile Environmental Research. 1992. *Historic Coastal Wetland Mapping Study: Part I. Vegetation Community Mapping for Six Lower Great Lakes Wetlands.*

Ecological Services for Planning Ltd. 1992. *Historical Coastal Wetland Mapping Study: Phase 2.*

All maps and reports are unpublished.

Date

The maps cover a set of years between 1953 and 1989. The water level data are from 1927 to 1991. The mapping was done in 1988–92 and digitized in 1992.

Frequency of Update or Release

As new air photo coverage for existing sites, and possible inclusion of additional wetlands

Methods/Data Quality

Available historical air photo coverage was obtained and interpreted for wetland vegetation community and adjacent land use. No field checks were possible. Air photo coverage scales varied from 1:8000 to 1:53 500 and seasons from April to August. These ranges created some inconsistency in map resolution. The polygons were transferred to a 1:10 000 scale using the OBM base. The maps were digitized and, with the assistance of the GIS, analyzed for changes and relationships related to water level changes. 1988–89 coverages were incomplete owing to limited air photo extent.

Availability

Contact the responsible organization and contact person

Costs

Contact the responsible organization and contact person

8 *Ecological Land Classification*

Responsible Organization(s)

Environmental Information System Division
State of the Environment Reporting
Environment Canada
1547 Merivale Road
Ottawa, Ontario K1A 0H3

Contact Person(s)

Ed Wiken
same address
Tel. 613-941-9612

Nature of Information

GIS, maps, reports

Content

a) Purpose

- to integrate data related to landforms, geology, soils, vegetation, climate, hydrology, and wildlife into a common ecological and spatial framework for resource management and planning and other environmental decision-making processes

b) Attributes

- ecozones: qualitative description
- ecoregion: qualitative description
- ecodistrict: identifier and map sheet
  - land activity (intensive agriculture, low-intensity agriculture, productive forest, unproductive forest, hunting/trapping, conservation, extraction, recreation, built up, surface transportation, none) — both primary and secondary classes
  - land cover (forested, vegetated, barren, sparse, tundra, wetlands, farmland, rangeland, built up, water, marine, permanent snow/ice) — both primary and secondary classes
  - elevation (mean high/low)
  - presence of soil
  - primary and secondary soil thickness
  - primary and secondary soil texture
  - primary and secondary soil group

c) Spatial extent

- Canada

d) Scale, resolution, or geographical units of measurement

- ecozones at 1:30 000 000; ecoregions at 1:7 500 000

e) Volume

- for Canada: 15 ecozones, 325 ecoregions, and 5400 ecodistricts

Structure

Mainframe computer with custom software. Ecodistricts are in SPANS compatible format. The database is part of the Canada GIS database.

Output Format

Maps, tables, reports in the Ecological Land Classification Series; includes report and map on ecozones, and some reports and maps on subsets of ecodistricts

Date

Began in 1970s and ongoing

Frequency of Update or Release

As data available

Methods/Data Quality

Data were compiled from field surveys, air photo, and remote sensing interpretation and existing material. Parameters such as physiography, vegetation, soils, climate, hydrology, and wildlife are used to establish the ecological units in increasing levels of detail. Ecodistrict data are computerized.

Availability

See contact person

Costs

Cost recovery

8 *Great Lakes Shoreline Classification and Mapping Study: Canadian Side*

Responsible Organization(s)

Environmental Services Branch
Environment Canada
Canada Centre for Inland Waters
P.O. Box 5050
867 Lakeshore Road
Burlington, Ontario L7R 4A6

Contact Person(s)

Wendy Leger
same address
Tel. 905-336-4630

Nature of Information

Maps, GIS, electronic database

Content

a) Purpose

- to map the Great Lakes – St. Lawrence River shoreline showing features related to erosion resistance and shore protection

b) Attributes

- Geomorphic Classification: high (> 15 m) bluff, high bluff with beach, low (< 15 m) bluff, low bluff with beach, sandy/silty banks, clay banks, sandy beach/dunes, coarse beach, bay mouth or barrier beach, resistant bedrock, non-resistant bedrock, low plain, open shoreline wetland, semi-protected wetland, composite shorelines, artificial, unclassified
- Protection Classification: heavily protected, moderately protected, minor protection, no protection, non-structural protection, unclassified
- Subaqueous/Nearshore Classification: clay, sand, sand/gravel over clay, resistant bedrock, non-resistant bedrock, unclassified
- map of reaches

c) Spatial extent

- Canadian Great Lakes – St. Lawrence shoreline from Lake Superior to Trois-Rivières

d) Scale, resolution, or geographical units of measurement

- 1:50 000 south of Severn Sound, Georgian Bay; 1:250 000 north for rest of Lake Huron and Lake Superior

e) Volume

- 10 maps at 1:250 000, 77 maps at 1:50 000; report including data appendices is several hundred pages

Structure

ARC/INFO plot files and SPANS GIS; hardcopy maps on NTS base; GIS database per each of six water bodies; dBase — Canadian side

Output Format

Maps, tables; report: Geomatics International Inc. and R. Davidson-Arnott. 1992. *Great Lakes Shoreline Classification and Mapping Study: Canadian Side (Final Report)*. Prepared for the responsible organization.

Date

1992

Frequency of Update or Release

None planned

Methods/Data Quality

Data were compiled and interpreted from colour video tapes (1991), 1:8000 air photos (1985, 1986, 1988, 1989), Canada/Ontario Coastal Zone Atlas (1975), surficial geology maps, Nearshore Sediment Characteristic Maps (N. Rukavina), remedial action plans for Great Lakes Areas of Concern, personal knowledge of investigators. The study area was mapped by just two investigators to maximize consistency. Because the classification is descriptive, there is some variability. The shoreline was digitized, giving each reach a code to link it to the dBase files. The shoreline classification and protection are presented on hardcopy maps. The report summarizes the classification by lake, connecting channel, and whole system as well as presenting complete tables for each reach. It includes recession rate data as well.

Availability

See contact person

Costs

None

8 *International Joint Commission Great Lakes Coastal Zone Database*

Responsible Organization(s)

Environmental Services Branch
Environment Canada
Canada Centre for Inland Waters
P.O. Box 5050
867 Lakeshore Road
Burlington, Ontario L7R 4A6

Contact Person(s)

Wendy Leger
same address
Tel. 905-336-4630

Nature of Information

Maps, GIS, electronic database

Content

a) Purpose

- to map data on terrestrial, wetland, and aquatic environments of the Great Lakes – St. Lawrence River system to help assess impacts of fluctuating water levels and of possible response measures

b) Attributes

- maps and dBase data for:
  - NTS original mapped data, including map number, sheet name, and scale
  - associated water body
  - land use (agricultural field crop, agricultural specialty crop, residential, commercial, industrial, transportation and communications, recreational, extraction, water, wetlands, forestry, grassland, barren, other)
  - bathymetry: 2-m and 5-m contours
  - reach information
  - 100-year flood contour and flood zone
  - 100-year erosion contour and erosion zone
  - buildings information
  - wetland vegetation types: open water/floating leaved/submergent, emergent, and shrub/tree (maps only — not digitized)
  - wetland types: open shoreline, unrestricted bay, shallow sloping beach, river delta, restricted riverine, lake-connected channel, protected (maps only — not digitized)
  - fish habitat (very limited data)
  - littoral cell definitions

c) Spatial extent
- Canadian Great Lakes Coastal Zone from west end of Lake Superior to Trois-Rivières
- wetland maps (not digitized) cover only Lake Erie, Lake Ontario, and St. Lawrence River
- GIS database is partially complete for Lakes Ontario and Erie and incomplete for Lakes Huron and Superior and the St. Lawrence River

d) Scale, resolution, or geographical units of measurement
- 1:25 000 from Sorel, Quebec, to Ipperwash, Ontario; 1:50 000 for remainder

e) Volume
- 255 map sheets (approx. 125 map sheets digitized)

Structure

SPANS GIS version 4.2 (Compaq 286 PC), which is being upgraded to SPANS 5.2 (486PC); dBase III; maps by NTS base and grouped by major water body including mylar sets for each of land use, bathymetry, and 100-year floodline/erosion hazard

Output Format

Maps, tables. Reports of inventory can be made by water body. The database was used in IJC Phase I Water Level Reference Study (see catalogue entry *Inventory and Assessment of Land Uses and Shoreline Management Practices*). Also available is *IJC Great Lakes Coastal Zone Database Information Guide* by M.K. Marshall of Water Planning and Management Branch, Environment Canada, April 1991.

Date

1987–89 (work discontinued in 1989)

Frequency of Update or Release

Updating of files from SPANS 4.3 to 5.2 during 1993; no other plans to update or complete the database

Methods/Data Quality

Data were obtained from 1:25 000 NTS maps, OMNR 1988 Littoral Cell Definition report, Great Lakes Erosion Monitoring Program (Boyd 1981), 1978 Great Lakes Flood and Erosion Prone Area maps, interpretation of air photos (1985, 1988), and Canadian Hydrometric Service bathymetric maps. Some inconsistencies occur with different land use interpreters, and some digital data quality control checks remain to be done. Wetlands information appears to be from 1:25 000 CWS maps of lower Great Lakes wetlands. The database remains incomplete, particularly the SPANS portion.

Availability

See contact person

Costs

None

8 *Inventory and Assessment of Land Uses and Shoreline Management Practices*

Responsible Organization(s)

Environmental Services Branch
Environment Canada
Canada Centre for Inland Waters
P.O. Box 5050
867 Lakeshore Road
Burlington, Ontario L7R 4A6

Contact Person(s)

Ralph Moulton
same address
Tel. 905-336-4580

Nature of Information

Electronic database

Content

a) Purpose

- to assess land use and management of the Canadian Great Lakes – St: Lawrence River shoreline to assist studies of measures to alleviate adverse effects of fluctuating water levels

b) Attributes

- land use:
  - maps and tables of area and length of each use by reach (agricultural field crops, agricultural specialty crops, residential, commercial and institutional, industrial, transportation and communication, recreation, extraction, water, wetlands, forest, grassland, barren/denuded land)
- shoreline management:
  - land use regulatory practices (setback requirements, elevation requirements, habitat protection, shoreline alteration, requirements, deed restrictions/regulations, development controls for public infrastructure, non-structural land use practices)
  - land use incentive base practices (tax incentives/disincentives, loans, grants, insurance, shore protection alternatives, structural shore protection to prevent erosion, structural shore protection to prevent flooding, non-structural shore protection)

c) Spatial extent

- parts of Canadian side of the Great Lakes – St. Lawrence River shore from Lake Superior to Trois-Rivières

- additional land use detail for Thunder Bay area, Severn Sound north to Penetanguishene, Windsor to Belle River, Port Burwell to Clear Creek, Mississauga to Etobicoke, and Ste. Anne de Bellevue to Champlain Bridge

d) Scale, resolution, or geographical units of measurement
- land use at 1:25 000 from Sorel, Quebec, to Ipperwash, Ontario; 1:50 000 for remainder
- shoreline management practices by jurisdiction (municipalities, Conservation Authorities, OMNR Districts) and lakes

e) Volume
- report is 47 pages plus several hundred pages of appendices of data

Structure

Lotus 123

Output Format

Tables, maps. Triton Engineering Services Ltd. and Ecologistics Ltd. 1992. *International Joint Commission Water Level Reference Study Report: Inventory and Assessment of Land Uses and Shoreline Management Practices*. Prepared for Working Committee 2, Land Use and Management Task Group, Task 15.1 Report.

Date

1992

Frequency of Update or Release

None planned

Methods/Data Quality

Existing data were utilized, including *Great Lakes Coastal Zone Database* (GIS), Canada–Ontario Coastal Zone Atlas, air photos (1985, 1988, some 1990), land use maps, planning documents, and past surveys, including 1989 Riparian Survey. A questionnaire was developed and circulated to Conservation Authorities, OMNR District offices, and selected shoreline municipalities. Land use analysis included past changes, existing conditions, and projected trends. Shoreline management analysis included an assessment of existing measures and their effectiveness and identification of areas for more detailed future assessment. Incomplete extent of the GIS database limited the spatial extent of the analysis and prevented basin-wide summaries. Land use detail is best for Lakes Ontario, Erie, and Huron.

Availability

See contact person

Costs

None

8 *Natural Areas Along the Lake Ontario Waterfront*

Responsible Organization(s)

Waterfront Regeneration Trust
207 Queen's Quay West, Suite 580
Box 129
Toronto, Ontario M5J 1A7

Contact Person(s)

Irene Rota
same address
Tel. 416-314-9486

Nature of Information

Maps, report

Content

a) Purpose

- to provide data to assist coordinated natural heritage systems planning for the Lake Ontario waterfront

b) Attributes

- maps show location, code number, and boundaries of natural areas
- site descriptions include:
  - name, topographic map number, UTM coordinates
  - site location, ownership, and size
  - summary of physical and biological features
  - disturbances
  - rating of information status
  - designation
  - information sources
- includes lists of significant vascular plants, breeding birds, mammals, amphibians, and reptiles found along the Lake Ontario waterfront from Burlington to Trenton

c) Spatial extent

- Lake Ontario waterfront from Burlington to Trenton

d) Scale, resolution, or geographical units of measurement

- 1:50 000

e) Volume

- 160 natural areas; report is 193 pages

Structure

Hardcopy maps on NTS base, summary by site

Output Format

Maps; reports:

Brownell, V.R. 1993. *Waterfront Natural Areas — Part I: An Overview of Natural Areas Along the Lake Ontario Waterfront from Burlington to Trenton.* Prepared for the Waterfront Regeneration Trust, May.

Brownell, V.R. *Waterfront Natural Areas — Part II: A Biological Inventory and Evaluation of Natural Areas Along the Lake Ontario Waterfront from Newcastle to Trenton*. Prepared for the Waterfront Regeneration Trust. Under preparation.

Date

Published in 1993

Frequency of Update or Release

Not applicable

Methods/Data Quality

Data on ESAs; ANSIs; wetlands; critical fish and wildlife habitat (e.g., warm and cold water fisheries, colonial bird breeding habitat, deer yards); and habitat of rare, threatened, vulnerable, and endangered species were collected and summarized. Data were from OMNR, Conservation Authorities, municipalities, environmental groups, and biologists. They were mapped at the study scale of 1:50 000 and site summary attributes compiled. In general, anthropogenic communities were not included, although reference is made to some old fields and railway rights-of-way containing significant species.

Availability

See contact person

Costs

No cost to receive copies of the report

8 *Great Lakes Shoreline Environmental S and Video Tapes*

Responsible Organization(s)

Protection and Prevention Branch
Environment Canada
25 St. Clair Avenue East, 7th Floor
Toronto, Ontario M4T 1M2

Contact Person(s)

Philip Baker
same address
Tel. 416-973-5854

Nature of Information

Video tapes, maps, GIS

Content

a) Purpose

- to document sensitive resources and response coun shoreline to assist planning for shoreline protection and potential oil spills

b) Attributes

- maps of:
  - shore types
  - indicators of resources sensitive to oil spill damage
  - response countermeasure features

c) Spatial extent

- Lake Ontario, Detroit River, Lake St. Clair, St. Clair Rive

d) Scale, resolution, or geographical units of measurement

- tapes have continuous coverage of the shoreline, incl extent
- maps are 1:50 000

e) Volume

- not applicable

Structure

Video tapes by lake; hardcopy maps are on NTS base; system

9. Protected Areas

Note: Databases relevant to this subject area may also be found within other sections of this catalogue. The reader may want to consult the entries on pages 98, 129, 136, and 165.

9 *Grand River Conservation Authority Properties — Example of a Conservation Authority Database on Properties*

Responsible Organization

Property Administration
Grand River Conservation Authority
400 Clyde Road, Box 729
Cambridge, Ontario N1R 5W6

Contact Person(s)

Robert Steinberg
same address
Tel. 519-621-2761

Nature of Information

Maps, electronic database

Content

a) Purpose

- to document the properties owned by the Grand River Conservation Authority (GRCA)

b) Attributes

- on maps:
  - boundary of each property
  - property type, i.e., demonstration area, flood control area, floodplain, fish and wildlife area, reforestation area, recreation area, source area, leased land
  - leased residence
  - watershed boundary
- on tables, information on leased properties:
  - area number (referenced to maps)
  - tenant
  - acres leased
  - arable acres, or indication of other use

c) Spatial extent

- GRCA, i.e., Grand River watershed

d) Scale, resolution, or geographical units of measurement

- 1:100 000, an overview map at approx. 1:261 000

e) Volume

- GRCA owns 18 000 ha; 34 township maps

Structure
Hardcopy maps

Output Format
Maps by township, one overview map of the watershed, tables

Date
Maps approx. 1990, leased land data 1992

Frequency of Update or Release
Maps every two or three years, leased land data ongoing as they change

Methods/Data Quality
Data are based on purchase and leasing records. Very small parcels beyond the resolution of the maps (usually in urban areas) are not shown.

The small-scale watershed map indicates the pattern of distribution of GRCA properties at a glance. Its only classification is that of Conservation Areas and authority-owned properties that are not Conservation Areas. For more information on each Conservation Area, the GRCA has a Guide Book that briefly describes each area and its recreation facilities and includes a location map.

The township maps (1:100 000) classify each property according to its reason for purchase. The purchase reason gives some indication of natural areas (e.g., fish and wildlife areas) but not a precise documentation. For example, Flood Plain or Recreation Areas could include natural areas or could be all lawn. Joint reference to an NTS or OBM map could at least indicate whether the area is wooded. Thus, while the database shows GRCA-protected areas, it is not fully clear on the natural status of each protected area.

Availability
See above contact.

The data are periodically submitted to Environment Canada's *National Conservation Areas Database* (see catalogue entry). While the latter may lag a bit in its updates, depending on how often the Conservation Authorities submit updates, its advantage is that it has already compiled all 38 Authorities into one GIS database. The individual Authority databases may be worth consulting only to add new areas since the last update, and that exercise might be more efficiently done just by asking the Property Manager for the Authority rather than by comparing maps.

Costs
None

9 *Federal Land Database*

Responsible Organization(s)

Environmental Information System
State of the Environment Reporting
Environment Canada
Emerald Plaza, 5th Floor
1547 South Merivale Road
Ottawa, Ontario K1A 0H3

Contact Person(s)

V. Neimanis
same address
Tel. 613-941-9614

Nature of Information

Electronic database, maps, GIS

Content

a) Purpose

- to identify federally owned and administered lands in Canada to help provide environmental and land use advice on their management to support legislation and policy

b) Attributes

- province
- census division and subdivision
- property description
- area
- dominant land use
- earliest and latest acquisition dates
- tenure status
- constituency
- metrocade (urban centre)
- latitude and longitude
- number of buildings
- unique property identifier number

c) Spatial extent

- 10 provinces

d) Scale, resolution, or geographical units of measurement

- information is compiled on 1:250 000 NTS maps

- holdings greater than 64.7 ha are recorded as polygons, smaller properties as point data

e) Volume

- 16 870 records; dBase file occupies 3.1 megabytes

Structure

dBase III/SPANS micro-computer workstations; Canada GIS mainframe for plotting polygon data

Output Format

Tables, maps, graphs, inventory listing for selected variables

Date

Compilation began in 1977; data verification and mapping completed to April 1986

Frequency of Update or Release

Future updates are undecided.

Methods/Data Quality

Data were collected from the annual Public Works Canada Central Real Property Inventory and from location input from individual land records of federal departments and agencies.

Availability

This database is not readily available for queries. Some records are confidential, and there are no guidelines for use or sale. See contact person.

Costs

See contact person

9 *National Conservation Areas Database*

Responsible Organization(s)

State of the Environment Reporting
Environment Canada
Emerald Plaza
1547 South Merivale Road
Ottawa, Ontario K1A 0H3

Contact Person

Tony Turner
same address
Tel. 613-941-9620

Nature of Information

Electronic database, GIS

Content

a) Purpose

- to inventory natural heritage and conservation-oriented sites (public and many private organizations) in Canada for analyses of distribution, protective status, and impacts

b) Attributes

- for each protected area:
  - latitude and longitude
  - province
  - name
  - jurisdiction
  - source of data
  - type of area (15 major groups and 75 other specific types)
  - legal protection
  - World Conservation Union (IUCN) category (10 old categories; 5 new ones)
  - area
  - year established
  - authorization legislation
  - management authority
  - Parks Canada natural region
  - ecoregion
  - boundaries for sites greater than 50 000 ha
  - if private land — more data on number of sites, number of site expansions, number of organizations, conservation program, level of significance, brief site description

c) Spatial extent

- Canada

d) Scale, resolution, or geographical units of measurement

- site specific; output maps have been at 1:7 500 000 but could be at other scales

e) Volume

- approx. 3000 government-protected sites for Canada; approx. 10 000 more private areas being added

Structure

The database could be used on an IBM-PC or compatible micro-computer with dBase; it is also referenced to GIS.

Output Format

Tables, maps, statistical summaries, fact sheets, digital files

Date

Areas protected as of March 1990

Frequency of Update or Release

As required

Methods/Data Quality

Data are collected by survey of federal, provincial, and territorial departments as well as of NGOs that manage and protect natural areas.

This database is a one-stop database, with complete and up-to-date coverage of all areas protected by federal and provincial governments, Conservation Authorities, and many NGOs, including Ontario Heritage League, Nature Conservancy of Canada, Federation of Ontario Naturalists, Niagara Escarpment Commission, Royal Ontario Museum, Queen's University, and Ducks Unlimited. The sites are retrievable by maps allowing visual analysis of distribution and potential of analysis with other spatial databases. Conservation Areas from Conservation Authorities do not indicate the intention of the purchase, i.e., it could be a non-natural area used for flood control. Little indication of site features is provided. Municipally protected natural areas are not yet included. Each set of data can be no more up to date than the contributing agencies' data and depends on that agency submitting updates.

While on a GIS, the point location data limit the overlay potential to mainly broad-scale databases (e.g., 1:7 500 000), with clear understanding of the assumptions in such an overlay.

Tony Turner (the contact person) has undertaken a study as an example of biodiversity risk by ecoregions — agricultural Ontario is at very high risk. Analyses of protected area representation of habitat in agricultural Ontario would need more detail in both Conservation Area boundaries and site characteristics.

Availability

See contact person

Costs $200

8,9

Ontario Ministry of Natural Resources: Protected Areas and Areas of Natural and Scientific Interest Databases including: Ontario Provincial Parks: 1992 Guide and *Conservation Areas Guide* *Parks and Other Provincially Owned Protected Natural Areas Database* *ANSI Database*

Responsible Organization(s)

For Guides:
Natural Resources Information Centre
Room M1-73, Macdonald Block
900 Bay Street
Toronto, Ontario M7A 2C1

For Parks and Other Provincially Owned Protected Natural Areas:
Provincial Parks and Natural Heritage Policy Branch
Ontario Ministry of Natural Resources
90 Sheppard Avenue East, 6th Floor
North York, Ontario M2N 3A1

For Areas of Natural and Scientific Interest (ANSIs):
Provincial Parks and Natural Heritage Policy Branch
Ontario Ministry of Natural Resources
P.O. Box 7000
Peterborough, Ontario K9J 8M5

Contact Person(s)

Tom Beechey (parks and other protected areas)
same address
Tel. 416-314-1101

George Cordiner (ANSIs)
same address
Tel. 705-740-1220

Nature of Information

Guides: guidebook publications
Parks and Other Protected Areas: electronic database
ANSIs: electronic database

Content

a) Purpose

- to provide information on protected and important natural areas. The Guides provide information to the general public with a list of parks and Conservation Areas and a brief guide to facilities at each. The electronic databases are for OMNR management needs.

b) Attributes

Ontario Provincial Parks: 1992 Guide

- for each Provincial Park and St. Lawrence Park Commission:
  - address and telephone number
  - camping information: e.g., no. of sites, no. with electricity, no. of interior sites
  - reservation service times and telephone number
  - services and facilities
  - operating period
- a small map of Ontario locating each park and classifying it as Recreation, Natural Environment, Nature Reserve, Waterway, Wilderness, Historical

Conservation Areas Guide

- for each listed Conservation Area
  - Conservation Authority and telephone
  - directions to reach area
  - area
  - camping information, e.g., no. of sites
  - reservations
  - parking
  - facilities and services
- nine regional maps showing Conservation Area location

Parks and Other Provincially Owned Protected Natural Areas Database

(note this includes only provincially owned areas — not Conservation Areas belonging to Conservation Authorities, nor private or non-governmentally owned areas)

- for each protected area:
  - latitude and longitude
  - name
  - site features
  - area
  - year established
  - management authority and address
  - Hill's Site Region

ANSI Database

- for each area:
  - name
  - location
  - site features
  - area
  - owner
  - Hill's Site Region

c) Spatial extent
- Ontario

d) Scale, resolution, or geographical units of measurement
- Parks Guide Map: approx. 1:6 000 000; Conservation Areas Guide Maps: approx. 1:850 000; parks, protected areas, and ANSIs site specific

e) Volume
- Parks Guide: 54 pages; Conservation Areas Guide: 46 pages

Structure

No computer database for guides

Output Format

Guidebooks with general information, tables, and maps; parks, protected areas, and ANSIs: tables

Date

Parks Guide: 1992; Conservation Areas Guide: 1986; ANSI database still being compiled

Frequency of Update or Release

As needed

Methods/Data Quality

All data are compiled from each park and Conservation Authority into standard format. The *ANSI Database* is being compiled using a questionnaire to the OMNR field offices.

The Guides give a general overview of park and Conservation Area distribution and features. They do not represent all protected areas, nor are they precisely located as in the *Parks and Other Provincially Owned Protected Natural Areas Database*. They are easily accessible summaries that can show at a glance general distribution and are suitable as a quick initial regional reference.

The *Parks and Other Provincially Owned Protected Natural Areas Database* has been included in State of the Environment Reporting's *National Conservation Areas Database* (see catalogue entry). The latter database is more accessible and more comprehensive in extent, including non-provincially owned protected areas.

The *ANSI Database*, when accessible, will provide a comprehensive database on significant natural areas under any form of ownership. It may have some restrictions regarding private land information.

Availability

From responsible organization. Electronic database access needs to await the development of the Natural Heritage Information Centre.

Costs

Guides: single copies free. Bulk orders may involve charges. Electronic databases will be on a cost recovery basis.

10. Wildlife Populations

Note: Databases relevant to this subject area may also be found within other sections of this catalogue. The reader may want to consult the entries on pages 24, 98, 129, 158 and 165.

10 *Atlas of the Breeding Birds of Ontario*

Responsible Organization(s)

Federation of Ontario Naturalists
355 Lesmill Road
Don Mills, Ontario M3B 2W8

Long Point Bird Observatory
P.O. Box 160
Port Rowan, Ontario N0E 1M0

Contact Person(s)

Madeline Austen
same address (Federation of Ontario Naturalists)
Tel. 416-444-8419

Nature of Information

Map per species, publication, electronic database of the breeding evidence and abundance for each species in each square, mapping program presenting the data on maps

Content

a) Purpose

- to produce accurate and up-to-date maps of the distribution of birds breeding in Ontario during the period 1981 through 1985

b) Attributes

- 233 species are recorded in southern Ontario, 57 species recorded only in northern Ontario
- for each square for each species:
  - species observed
  - possible breeding
  - probable breeding
  - confirmed breeding
  - estimate of abundance (optional so not available for all species in each square)
- for each square:
  - which years the square was surveyed
  - first and last field visit each year
  - total hours each year
  - total number of confirmed, probable, and possible records
  - total number of species observed
  - highest breeding abundance code for each species
  - observer name and address
- for each species:
  - a one-page account with a sketch (in the Atlas)

c) Spatial extent
- Ontario

d) Scale, resolution, or geographical units of measurement
- the data were collected and are stored by 10 km × 10 km UTM squares

e) Volume
- raw data file — summary of data from field cards is 407 000 records; master (rolled-up) file — highest breeding evidence record for each species in each square is 220 000 records

Structure

Paradox Data Base Program; master computer file combines data from different years for each square

Output Format

Tables, maps, published atlas: *Atlas of the Breeding Birds of Ontario*, 1987, compiled by M.D. Cadman, P.F.J. Eagles, and F.M. Helleiner, University of Waterloo Press.

Date

Data were collected from 1981 to 1985.

Frequency of Update or Release

Every 20 years, starting in 2001

Methods/Data Quality

Data were collected by 1351 volunteers, averaging 92 field hours. They were instructed by a guidebook and regular newsletters. Indicators of behaviour for each breeding category attribute were required. Atlassers were encouraged to visit all habitat types in their square. Data cards underwent a system of checks. Special arrangements were made to ensure coverage of remote parts of northern Ontario. The greatest effort was spent in agricultural Ontario and near populated areas. The census estimates that it reported 92% of the species present in an average square, a high accuracy for this form of census. Nocturnal birds such as owls are not as well reported. Abundance estimates were screened to err on underestimation. All records of rare species were documented and assessed prior to inclusion. The census is considered very reliable.

The atlas is comprehensive, clear, and reliable for a "snapshot" of breeding bird species distribution on a regional scale.

Availability

Printouts of atlas data per square can be purchased from the Federation of Ontario Naturalists. Requests are reviewed according to a Policy for Access to Data and, if approved, are subject to conditions presented in the Policy to protect species and sites.

Searches can be done by 10 km × 10 km square, 1 km × 1 km square, 100 m × 100 m square, groups of squares, species, date, county, or OMNR District.

For information about the electronic database, see the above contact.

Costs

The Atlas is $53.50. Data are available to OMNR, CWS, non-profit organizations, and approved academic studies for a nominal handling charge of $25 per request. Other searches are $100 per square for 1–5 squares; $80 per square for 6–20 squares, and $50 per square for 21–100 squares.

10 *Ontario Rare Breeding Bird Program*

Responsible Organization(s)

Federation of Ontario Naturalists
355 Lesmill Road
Don Mills, Ontario M3B 2W8

Contact Person(s)

Madeline Austen
same address
Tel. 416-444-8419

Nature of Information

Data forms, electronic database, status reports, book to be published in 1994

Content

a) Purpose

- to clarify and report on the current status and location of the rarest breeding birds in Ontario and thereby contribute to planning their conservation

b) Attributes

- for 58 species of concern:
  - breeding locations, and for each site:
    - numbers of pairs of birds present for different years
    - breeding evidence
    - ownership (private or public) and degree of protection (inconsistently filled out)
    - human impact
    - site maps and descriptions (in some cases)

c) Spatial extent

- Ontario south of North Bay and Sault Ste. Marie, and the District of Thunder Bay and the Lake of the Woods area; incomplete coverage

d) Scale, resolution, or geographical units of measurement

- where there is coverage, site-specific locations precise to within 100 m × 100 m UTM

e) Volume

- over 2500 rare breeding bird sites; over 500 contributors

Structure

Computer database uses Paradox, a DOS-based relational database; Ontario distribution maps and North American breeding range maps are prepared using QUIKMap; Site History Report Forms, standard data forms on known breeding sites

Output Format

Tables; maps; 58 status reports (1 per species) by April 1993; book to be published in 1994

Date

Field data for 1989–91, historical records back to 1930s, but primarily 1980s

Frequency of Update or Release

Site registration proposed to continue, plus selected species surveys; status reports as required

Methods/Data Quality

The program uses the network and experience gained from the *Atlas of the Breeding Birds of Ontario*. Volunteers are given the background material to direct survey timing, study area, and habitat type. They are kept informed through both provincial and regional newsletters and reports. Workshops were offered. Data were screened by regional coordinators and staff. The data are high quality, but the coverage is incomplete, meaning record of "presence" is useful, but record of "absence" is not. Therefore, the data are not as suitable for general distribution as the *Atlas of the Breeding Birds of Ontario*.

The data fit GIS needs and could be linked to other databases because locations are precise.

Availability

The Policy on Access to Data applies. Even for CWS and OMNR there are restrictions on availability and use to ensure information on birds and locations is available only to those who need it for conservation purposes. Precise locations are being made available to OMNR; OMNR biologists then map the sites and the maps are used by planning staff in reviewing applications for development.

Searches can be done by 10 km × 10 km square, 1 km × 1 km square, 100 m × 100 m square, groups of squares, species, date, county, or OMNR District.

Costs

Data are available to OMNR, CWS, non-profit organizations, and approved academic studies for a nominal handling charge of $25 per request. Other searches are $100 per square for 1–5 squares; $80 per square for 6–20 squares, and $50 per square for 21–100 squares.

10 *Ontario Herpetofaunal Survey*

Responsible Organization(s)

Aylmer District Office
Ontario Ministry of Natural Resources
353 Talbot Street West
Aylmer, Ontario N5H 2S8

Contact Person(s)

Michael Oldham
same address
Tel. 519-773-9241

Nature of Information

Standardized field records, electronic database, computer-generated maps

Content

a) Purpose

- to gather and publish distributional data on Ontario amphibians and reptiles, to gather ecological data, to monitor the status of rare and endangered species, and to increase public awareness

b) Attributes

- for each siting:
  - date
  - location — county, township, atlas square, topographic map, UTM
  - species
  - other remarks, e.g., habitat, behaviour, weather
  - contributor
- annual summaries with:
  - maps
  - graphs of seasonal occurrence
  - written summaries
  - species accounts

c) Spatial extent

- almost complete coverage on agricultural southern Ontario, good coverage in cottage country, very scattered coverage north of Sault Ste. Marie/North Bay area

d) Scale, resolution, or geographical units of measurement

- 10 km × 10 km squares

e) Volume

- approx. 80 000 records; 60 000 to 70 000 from 1984 to 1992 and 10 000 to 20 000 pre-1984

Structure

Data are stored in a dBase file. Contributors can either submit standard sighting cards or directly enter data.

Output Format

Annual reports; planning an Atlas to be published in 1994 or 1995; printout

Date

1984–92 plus historical data

Frequency of Update or Release

Adding data as available; will probably try to continue after Atlas

Methods/Data Quality

The approach uses that of the Breeding Bird Atlas, which proved successful. Volunteers each cover a 10 km × 10 km square, fill out a standard form on their observations, and submit it to compilers for entry in the database. Some areas have less complete coverage, but several gaps were targeted for coverage. There are instructions for contributors and a standard data card. Existing data were also compiled from various sources: e.g., Canadian Museum of Nature, Royal Ontario Museum, universities.

The data will provide a regional database for herpetofaunal distribution. Its layout, consistent with that of the breeding bird data, will facilitate its use. It is the most comprehensive distribution database for Ontario, including records from the Canadian Museum of Nature Herpetology Database (see *Canadian Museum of Nature Collections Information System* catalogue entry).

The database is not designed to monitor change. For this purpose, an amphibian monitoring project is being set up using the approach of the Breeding Bird Survey. This involves car transects with regular half-mile stops to record calls, to be repeated annually. The survey has been set up with 80 transects in southwestern Ontario (Bruce County to Hamilton and southwest). The database will be separate (contact: Christine Bishop, CWS). The only long-term change data currently available for southern Ontario are in Waterloo Region. There, a similar car transect approach carried out in the 1970s is being repeated in the 1990s. The output is not yet available (contact: Jeff Robinson, Kitchener–Waterloo).

Availability

Must fill out a "Request for Access to the Ontario Herpetofaunal Survey Database" form obtainable from the Business Manager of the Ontario Field Herpetologists, R.R. 22, Cambridge, Ontario N3C 2V4. Possible restrictions will depend on the use.

Costs

Cost recovery. Minimum charge $25. Normal charges are up to $100 per square (10 km × 10 km) for a computer search plus $0.50 per record retrieved. Individuals and non-profit organizations may have reduced rates.

Reports, including Technical Supplements, are also at cost, in the range of $13–$18 each. Technical Supplements contain computer printouts of all records for that year.

10 *Breeding Bird Survey*

Responsible Organization(s)

Migratory Birds Populations Division
Canadian Wildlife Service
National Wildlife Research Centre
Environment Canada
Ottawa, Ontario K1A 0H3

Long Point Bird Observatory
P.O. Box 160
Port Rowan, Ontario N0E 1M0

Contact Person(s)

Connie Downes
same address (Canadian Wildlife Service)
Tel. 819-953-1425

Barb Charlton
same address (Long Point Bird Observatory)
Tel. 519-586-3531

Nature of Information

Electronic database, publications

Content

a) Purpose

- to estimate population trends of birds that breed in North America

b) Attributes

- at each location:
  - number of each species heard
  - number of each species seen within 100 m

c) Spatial extent

- North America

d) Scale, resolution, or geographical units of measurement

- in Ontario — approx. 50–75 (varies each year) randomly distributed roadside routes, each consisting of 50 stops 0.8 km apart; 1–4 routes are within each 9° block of latitude and longitude, but not all are run

e) Volume

- approx. 2500–3750 sites per year in Ontario

Structure

Micro IBM AT, custom and dBase III software

Output Format

Occasional publications, e.g.:

Collins, B., and J.S. Wendt. 1989. *The Breeding Bird Survey of Canada 1966–1983: Analysis of Trends in Breeding Bird Populations.* Tech. Rep. Ser. No. 75. Can. Wildl. Serv., Ottawa, Ontario.

Erskine, A.J., B.T. Collins, E. Hayakawa, and C. Downes. 1992. *The Cooperative Breeding Bird Survey in Canada 1989–91.* Prog. Notes No. 199, Can. Wildl. Serv., Ottawa, Ontario.

BBS Canada. An annual Breeding Bird Survey Newsletter that reports the trends in population to volunteers.

The First 10 Years of the Cooperative Breeding Bird Survey in Canada. 1978. Can. Wildl. Serv. Rep. Ser. No. 42.

Progress Notes are published about every two years and summarize trends.

Date

In Ontario: 1967 to present

Frequency of Update or Release

Annually in February

Methods/Data Quality

Skilled participants, coordinated by the Long Point Bird Observatory in Ontario, each cover a route one morning at the height of the breeding season (June in Ontario), starting half an hour before sunrise. They stop 3 min at each stop, recording all birds seen and heard. Volunteers submit their data on forms to CWS. These data are then processed to provide indices of trends in songbird populations. The survey is standardized and long running, providing good coverage of roadside habitats. It is not, however, necessarily representative of the entire landscape, especially forest interior and natural areas. The coverage density in Ontario is relatively low compared with adjacent states. Most routes in southern Ontario are covered; it is northern Ontario that has much more sparse coverage. In Ontario, the survey gives a good estimate of trends for about 50 species and usable but imprecise trends for perhaps an additional 50. Strong correlation of results with those from Long Point Bird Observatory migration monitoring data suggests that trends reflect population-level changes.

The database provides a long-term set of data for historical analysis of population levels. It is not yet, however, habitat specific, nor is it as spatially comprehensive as the "snapshot" Breeding Bird Atlas.

Availability

Trends are available on request and are summarized in Progress Notes.

For data, see above contact. Data on threatened or endangered species are restricted.

Costs

None

10 *Forest Bird Monitoring Program*

Responsible Organization(s)

Environmental Conservation Branch
Environment Canada
70 Fountain Street East
Guelph, Ontario N1H 3N6

Contact Person(s)

Michael Cadman
same address
Tel. 519-766-1594

Nature of Information

Electronic database, publications

Content

a) Purpose

- to provide population trend and habitat association data for birds breeding in all the major forest habitat types in Ontario

b) Attributes

- at each site:
  - number and species of all birds seen and heard
  - breeding evidence
  - forest type based on vegetation (incomplete, i.e., few sites so far, but more in future)

c) Spatial extent

- Ontario

d) Scale, resolution, or geographical units of measurement

- forest sites representing relatively mature, stable forests of the major forest habitat types are chosen; the samples are site specific
- currently, about 300 stations at 60 sites are surveyed in Ontario

e) Volume

- 300 stations × 6 years × approx. 10 species/station

Structure

PC based; Paradox software

Output Format

Tables, some reports in progress; newsletter to volunteer participants and other interested parties

Date

Pilot year in 1987 and ongoing since

Frequency of Update or Release

Annually each breeding season (about early June)

Methods/Data Quality

Skilled observers record all birds seen and heard from five permanent listening stations (10 minutes per station) in a wooded site. Vegetation data are collected at some sites. This permits valid year-to-year comparisons and site type comparisons.

CWS is also working with OMNR Forest Ecosystem Classification to categorize habitat.

The data will provide baseline information for habitats under less agricultural stress, useful for comparison with populations under more agricultural influence.

Availability

See above contact

Costs

Depend on request

10 *The Christmas Bird Count*

Responsible Organization(s)

National Audubon Society
In Ontario:
1472 Lee Court
Sarnia, Ontario N7S 3L6

Contact Person(s)

Dennis Rupert
same address
Tel. 519-542-7122

Nature of Information

Electronic database, publications

Content

a) Purpose

- to provide data on the distribution, abundance, and population trends of wintering birds

b) Attributes

- numbers and species of birds observed
- date of count

c) Spatial extent

- North America

d) Scale, resolution, or geographical units of measurement

- survey unit is a constant 15-mile-diameter circle, usually centred around a community; in 1986, Ontario had 63 units

e) Volume

- very large — e.g., in 1989, 43 000 people tallied 120 million birds of 594 species in 1548 counts across North America; Ontario has a high participation

Structure

Information not provided

Output Format

North American results are published annually in *American Birds* (and its predecessors). Canadian results were published for several years in the *Canadian Field-Naturalist*.

Results from 1963 to 1972 are presented in Root, T. 1988. *Atlas of Wintering North American Birds.* University of Chicago Press, Chicago; includes maps.

Ontario results from 1968 through 1977 were summarized in map form in *Birds of Ontario* (Speirs, J.M. 1985. Birds of Ontario. Vol. 2. Natural Heritage, Toronto).

Date

Since 1900 for North America

Frequency of Update or Release

Annually

Methods/Data Quality

The count is carried out for one day within two weeks of Christmas, in the same 15-mile-diameter circle each year. Teams of volunteer birdwatchers cover assigned portions of the circle, reporting every bird seen that day. While partly a social event, the standardized approach and popularity in Ontario provide useful data on wintering birds. In interpreting data, the effects of land use change within the 15-mile-diameter circles should be recognized, as well as factors such as weather and the variability in effort.

Availability

In *American Birds* or write S. Drennan, National Audubon Society, 950 Third Avenue, New York, NY 10022, U.S.A.

Costs

Contact responsible organization

10 *Ontario Nest Record Scheme*

Responsible Organization(s)

Department of Ornithology
Royal Ontario Museum
100 Queen's Park
Toronto, Ontario M5S 2C6

Contact Person(s)

George Peck or Ross James
same address
Tel. 416-586-5519

Nature of Information

Data cards, books, annual reports

Content

a) Purpose

- to document nesting characteristics of the birds of Ontario

b) Attributes

- location — geographic and specific site
- species
- breeding habitat
- species of tree in which nest found or nest location on ground
- colony sizes
- colony site tenacity
- height and size of nest
- materials used to build nest
- number of eggs laid, of nestlings, and of fledglings
- incubation period
- egg dates
- nest parasitism

c) Spatial extent

- Ontario (plus a few from adjacent Northwest Territories, James and Hudson bay islands)

d) Scale, resolution, or geographical units of measurement

- site specific by UTM, latitude and longitude, as well as descriptive locations of variable quality

e) Volume

- over 100 000 cards

Structure

Standard data cards; computerization is proceeding

Output Format

Breeding Birds of Ontario: Nidiology and Distribution, Vols. 1 and 2 (G.R. Peck and R.D. James, 1983 and 1987, Life Sci. Misc. Publ., R. Ont. Mus., Toronto, Ontario); *Ontario Nest Record Scheme Annual Reports*

Date

Since 1956

Frequency of Update or Release

Ongoing

Methods/Data Quality

Participants record data on standard forms. Other forms have been filled from sources in the ornithological literature. Data quality is highly variable. Computerization (in process) will facilitate use.

Availability

See Peck and James volumes; public information available for any legitimate use. User must extract own data for large requests.

Costs

None at present; ROM developing costs for computerized database users — likely minimal for government

10 *Project FeederWatch*

Responsible Organization(s)

In Canada:
Long Point Bird Observatory
P.O. Box 160
Port Rowan, Ontario N0E 1M0

Contact Person(s)

Michael Bradstreet
same address
Tel. 519-586-3531

Nature of Information

Electronic database

Content

a) Purpose
- to document feeder use in North America

b) Attributes
- location
- date
- weather
- species
- numbers of each species
- type of food offered
- habitat near feeders

c) Spatial extent
- North America

d) Scale, resolution, or geographical units of measurement
- individual feeders

e) Volume
- hundreds of thousands

Structure

Computer-scannable data forms

Output Format

Two newsletters per year summarize data; tables

Date

Started in Ontario under Ontario Bird Feeder Survey in 1976; pilot expansion project with Cornell Laboratory of Ornithology in 1987, and continent-wide since

Frequency of Update or Release

Annual

Methods/Data Quality

Participants record the peak number of each species of bird at their feeder over two consecutive days every two weeks from November through March. Standard computer-scannable forms are filled out.

While not as long a data record as the *Christmas Bird Count* (see catalogue entry), the season-long and site-specific data may provide a firmer basis for habitat response studies, at least for recent and current conditions.

Availability

Data from D. Tessaglia, Cornell Laboratory of Ornithology, 159 Sapsucker Woods Road, Ithaca, NY 14850, U.S.A.

Costs

Small retrieval fee

10 *Atlas of the Mammals of Ontario*

Responsible Organization(s)

Federation of Ontario Naturalists
355 Lesmill Road
Don Mills, Ontario M3B 2W8

Contact Person(s)

Jon A. (Sandy) Dobbyn
R.R. #4
Wiarton, Ontario N0H 2T0
Tel. 519-534-3581

Nature of Information

Electronic database, publication including maps

Content

a) Purpose

- to document the current and historical distribution of mammals in Ontario

b) Attributes

- for historical data:
  - location
  - name of observer
  - dates surveyed
  - presence of each species
  - evidence of each species' presence
- for current observations, above attributes plus:
  - no. of hours surveyed
  - no. of hours bat surveying
- for current observations of unusual species, all above attributes plus:
  - habitat
  - map of location
  - time of day, distance, equipment used, light conditions
  - animal behaviour and appearance
  - name and address of observer

c) Spatial extent

- Ontario

d) Scale, resolution, or geographical units of measurement

- locations are generally specific to a 10 km × 10 km square (UTM coordinates)
- for unusual species, site specific

e) Volume
- 96 000 records

Structure

Three types of report forms: historical, regular survey, unusual species; computer database uses Paradox 3.5, Borland Int'l.

Output Format

Provisional Atlas planned for publication in 1994, to include maps plotted by 10 km × 10 km squares

Date

Field survey 1991–93, with historical records

Frequency of Update or Release

Constant update during project

Methods/Data Quality

Data were collected by volunteers. They were instructed by two guidebooks and Regional Coordinators. Volunteer were assigned a 10 km × 10 km square. Electronic bat detectors were loaned to interested observers and workshops on their use given. Live small mammal trapping was carried out in eight regions. Data cards underwent a system of checks. Unusual species reports were reviewed by both Regional Coordinators and a Data Review Committee. Special arrangements will be made to ensure coverage of remote parts of northern Ontario. The greatest effort was spent in agricultural Ontario and near populated areas.

The Atlas will be a comprehensive source of data on mammal distribution for the province. It will provide a benchmark to show future changes. The extra habitat information on unusual species will provide background to help build landscape ecology relationships. Data provide species presence but not abundance.

Availability

Provisional Atlas to be published by March 1994; database available 1994

Costs

Data are available to OMNR, CWS, non-profit organizations, and approved academic studies for a nominal handling charge of $25 per request. Other searches are $100 per square for 1–5 squares; $80 per square for 6–20 squares, and $50 per square for 21–100 squares.

10 *National Harvest Survey*

Responsible Organization(s)

National Wildlife Research Centre
Canadian Wildlife Service
Environmental Conservation Service
Environment Canada
Ottawa, Ontario K1A 0H3

Contact Person(s)

Hélène Lévesque
same address
Tel. 819-953-1426

Nature of Information

Electronic database, publications

Content

a) Purpose

- to determine harvest limits for the following year and population trends for migratory game birds

b) Attributes

- federal migratory game bird hunting permit sales
- migratory game bird harvest (species, age, sex, date, location)
- hunter activity (number of recreation days, seasonal and daily bag)

c) Spatial extent

- Canada

d) Scale, resolution, or geographical units of measurement

- 10′ degree blocks

e) Volume

- basic files (1966–92) include 11 million permit records; 500 000 Harvest Questionnaire Survey records; 700 000 Species Composition Survey records; 195 000 duck calendar records; 85 000 goose calendar records

Structure

UNIX 386 (SCO) with custom software: data stored on hard disk and optical disk (permits)

Output Format

Tables; detailed annual report — *Migratory Game Birds Harvested in Canada During the Hunting Season*; Progress Note that compares new data with those of most recent years; Summary Historical Harvest file to be available in computer format at the end of fiscal year 1993–94

Date

1967 to present; permit data — 1966 to present

Frequency of Update or Release

Annually

Methods/Data Quality

Hunters return wings along with data on location, date, etc. Data on the season's total harvest and hunting activity are obtained using a questionnaire. Both the Species Composition Survey and the Harvest Questionnaire Survey use a stratified sampling based on hunter experience and success. The National Harvest Survey is also stratified geographically — three sampling zones are used in Ontario. Agricultural Ontario is found in Zone 1. CWS has formulae to adjust the harvest numbers to population numbers.

The 10′ block is an uncommon unit for spatial comparisons with other databases. (The *Eastern Habitat Joint Venture* [see catalogue entry] translated these units into a township base for ease of comparison with other databases.)

Where there is heavy hunter activity, the database is very reliable, taking advantage of the thousands of data collectors available. In agricultural Ontario, coverage is generally very good, with the exception of areas near cities where hunting is not permitted. For agricultural Ontario, this database is the most comprehensive available on waterfowl populations and their yearly trends (D. Dennis, pers. comm.). In southern Ontario, use of harvest before October 15 is considered a good estimate of resident dabbler ducks (G. McCullough, pers. comm.).

Availability

From above contact person (permit holder names are not available)

Costs

None

10 *Breeding Pair Surveys of Waterfowl in Southern Ontario*

Responsible Organization(s)

Environmental Conservation Branch
Environment Canada
152 Newbold Court
London, Ontario N6E 1Z7

Contact Person(s)

D.G. Dennis or Gary McCullough (re habitat)
same address
Tel. 519-681-0486

Nature of Information

Electronic database, GIS planned

Content

a) Purpose

- to document the status of breeding waterfowl populations in southern Ontario and to identify habitat preferences

b) Attributes

- date and time of day of observation
- for each site and each species:
  - number of pairs
  - number of single males
  - number of flocked males
  - number of "indicated pairs"
- since 1981 for each site, wetland habitat type (15 types)

c) Spatial extent

- southern Ontario south of North Bay

d) Scale, resolution, or geographical units of measurement

- plots are 800 m × 800 m or 64 ha

e) Volume

- there are 463 plots, although not all are visited each survey; 266 plots have been visited each survey

Structure

Information not provided

Output Format

Tables, maps are planned; reports:

Dennis, D.G. 1974. Breeding Pair Surveys of Waterfowl in Southern Ontario. Pages 45–52 in Boyd, H. (ed.), *Canadian Wildlife Service Waterfowl Studies in Eastern Canada, 1969–1973.* Can. Wildl. Serv. Rep. Ser. No. 29.

Ross, R.K., D.G. Dennis, and G. Butler. 1984. Population Trends of the Five Most Common Duck Species Breeding in Southern Ontario, 1971–76. Pages 22–25 in Curtis, G., D.G. Dennis, and H. Boyd (eds.), *Waterfowl Studies in Ontario, 1973–81.* Can. Wildl. Serv. Occas. Pap. No. 54.

Date

Since 1971

Frequency of Update or Release

Surveyed every 2–3 years approx.

Methods/Data Quality

Plots were chosen throughout southern Ontario to cover all habitat types and based on Mallard harvest density data from the National Harvest and Species Composition surveys. Each plot has road access. Each plot is visited by two observers and often a Labrador retriever. Visits are in April or May, with timing correlated to the corn heat unit map to maintain similar phenologies. Tests have shown the data are comparable from year to year. Habitat types and changes were collected since 1981. Population extrapolations are made based on population density values and total area.

These data are the best directly measured surveys for waterfowl in southern Ontario.

The trends in population for the last 20 years may show some influences of agriculture. Because agriculture varies so much in southern Ontario, these influences might be better isolated by lumping data by agriculturally more homogeneous areas. Gary McCullough has done this for eight physiographic areas for use in Eastern Habitat Joint Venture under the North American Waterfowl Management Plan. His plans to input the data into the GIS would also help compare trends with other agriculturally related variables.

Availability

See above contact person

Costs

Information not provided

10 *Committee on the Status of Endangered Wildlife in Canada (COSEWIC)*

Responsible Organization(s)

Committee on the Status of Endangered Wildlife in Canada
Canadian Wildlife Service
Environment Canada
Ottawa, Ontario K1A 0H3

Contact Person(s)

Sylvia Normand
same address
Tel. 819-997-4991

Nature of Information

Publications, data depository

Content

a) Purpose

- to assess the national status of selected plant and animal species to determine protection priorities and provide information relevant for developing recovery plans

b) Attributes

- species name (Latin, common)
- taxonomic history
- distribution
- habitat description, ownership
- population biology
- population ecology
- management activities
- threats to survival
- legal status
- status assessment
- information sources
- status report author

c) Spatial extent

- Canada

d) Scale, resolution, or geographical units of measurement

- species-specific information

e) Volume

- approx. 250 books, reports, publications; 6 files of correspondence

Structure

Hardcopy files

Output Format

Text per species with maps and figures; also publications on recovery plans and detailed ecological studies of some species; book on endangered species in Canada prepared by State of the Environment Reporting of Environment Canada; annual lists of a) all species and their status; and b) new species and their status added during the current year.

Date

1977 to present

Frequency of Update or Release

Irregularly, as status reports are prepared or revised

Methods/Data Quality

Individuals or organizations compile all available information to prepare a status report.

This database provides relevant data for species of high priority for concern because of their population status.

Availability

From Distribution Section, Canadian Wildlife Service, 3rd Floor, Place Vincent Massey, Ottawa, Ontario K1A 0H3

Costs

No charge for reasonably sized requests

1,10 *Threatened and Endangered Species*

Responsible Organization(s)

Wildlife Toxicology
National Wildlife Research Centre
Canadian Wildlife Service
Environment Canada
Ottawa, Ontario K1A 0H3

Contact Person(s)

David Ward
same address
Tel. 819-953-9508

Nature of Information

GIS, electronic database

Content

a) Purpose

- to examine the relationship between the distribution of nationally endangered and threatened species and pesticide use

b) Attributes

- species parameters:
  - name
  - distribution
  - status
  - source of information
  - habitat type
  - limiting factors
  - activity during various months
- crop data:
  - distribution of crops

c) Spatial extent

- Canada

d) Scale, resolution, or geographical units of measurement

- species distribution ranges from individual sites to large ranges
- crop information is at the consolidated census subdivision level

e) Volume

- SPANS MAP files are 1.5 megabytes; dBase files are 0.5 megabytes

Structure

Micro-computer with SPANS and dBase III+ software; combination of two other databases

Output Format

Maps, tables

Date

On species from 1978 to 1987; on crops from 1986

Frequency of Update or Release

Formerly annually as new species were designated by COSEWIC, no longer updated since 1987

Methods/Data Quality

Species data are obtained from status reports prepared for COSEWIC (see catalogue entry), individual researchers, or other national databases at the Canadian Museum of Nature. Crop information is from the 1986 Census of Agriculture, Statistics Canada.

This database has taken COSEWIC a step further by combining it with crop data. Relationships of endangered status with particular crop types could help flag practices of particular concern. In Ontario, this would probably involve consultation with crop recommendation publications to determine what practices may have occurred with each crop. Addition of crop data (and corresponding year's reports of crop recommendations) for other censuses both before and after 1986 (i.e., 1981 and 1991) might provide some basis to analyze changes in species data relative to changes in agriculture. Caution would be needed in interpreting comparisons because of the differing degrees of resolution and dates between the crop data and at least some species data.

Availability

From above contact (information on exact locations of species is restricted)

Costs

None for reasonably sized requests

10 *Canadian Museum of Nature Collections Information System*

Responsible Organization(s)

Canadian Museum of Nature
Box 3443, Station D
Ottawa, Ontario K1P 6P4

Contact Person(s)

Peter Frank, Registrar
same address
Tel. 613-954-2583

Nature of Information

Electronic databases

Content

a) Purpose

- to record all data on all native flora and fauna specimens held by the museum

b) Attributes

- for amphibians and reptiles:
  - species
  - locality (description, grid reference)
  - collector, date, number of specimens
- for mammals:
  - species name, file number, accession number
  - sex, age
  - location (region, latitude, longitude, altitude)
  - collector, means of acquisition
  - measurements
  - breeding data
  - identifier
- other databases include similar attributes as above for birds, fish, invertebrates, vascular plants, lichens, and bryophytes

c) Spatial extent

- international, most specimens from Canada

d) Scale, resolution, or geographical units of measurement

- individual specimens referenced by locality description and by UTM and/or latitude, longitude

e) Volume

- e.g., for amphibians and reptiles — over 120 000 specimens

Structure

Digital VAX mini-computer with Powerhouse/Interbase software

Output Format

Tables, text, numerous published papers; books, e.g., *Natural History of Amphibians and Reptiles of Canada* is in preparation and likely to be published by about 1995

Date

Amphibians and reptiles: 1885 to present; mammals: 1870s to present

Frequency of Update or Release

Ongoing as new specimens are acquired

Methods/Data Quality

Specimens are collected by museum staff or sent to the museum by collectors. Data are collected from museum catalogues, field notes, and specimen labels.

The information systems for which there are Ontario atlases might be most valuable for additional data not noted in the atlas, such as specimen measurements, breeding data, historical data or very recent data, or location detail beyond the atlas projects.

Availability

Data will be released at the discretion of the Chief, Collections Division, on the recommendation of the Collections Manager and researcher. The person requesting information will be required to fill in a Collections Data Release Agreement, which places conditions on the use that can be made of the data.

The Ontario occurrences in this information system are noted in the corresponding atlases in Ontario (e.g., the Ontario Herpetofaunal Survey, the Atlas of the Mammals of Ontario) and will likely be included in the Natural Heritage Information Centre.

Costs

To be determined

10 *Migratory Game Bird Population Status*

Responsible Organization(s)

Wildlife Conservation Branch
Canadian Wildlife Service
Environmental Conservation Service
Environment Canada
Ottawa, Ontario K1A 0H3

Contact Person(s)

Kathryn Dickson
same address
Tel. 819-953-1415

Nature of Information

Electronic database

Content

a) Purpose

- to establish trends in population size and monitor long-term patterns in waterfowl abundance

b) Attributes

- population indices for each species of waterfowl in various seasons

c) Spatial extent

- North America, in Ontario approx. from Algonquin area to Geraldton area

d) Scale, resolution, or geographical units of measurement

- for Ontario, survey units are 44 plots each 100 km^2

e) Volume

- for Ontario, currently less than 1 megabyte

Structure

DOS-based micro-computer with dBase III +, or Quattro software, ASCII files can also be produced

Output Format

Computer files are on floppy disks. Selected parts of files, summary tables, and figures can be prepared in hard copy.

A semi-annual report, *Status of Waterfowl in Canada*, is produced by CWS. An annual report, *Status of Waterfowl*, is produced by the U.S. Fish and Wildlife Service.

Date

1955 to present; for Ontario, 1990 to present

Frequency of Update or Release

Annually

Methods/Data Quality

Data are collected through aerial and ground surveys. In Ontario, data are collected from helicopter surveys.

While this database does not cover southern Ontario, it does cover some of the scattered agricultural areas in the boreal area of northeastern Ontario. It is anticipated that this survey will continue and will provide the only long-term systematic data set for boreal parts of Ontario and eastern Canada.

Availability

See above contact. Users must have knowledge of usefulness and limitations of avian census techniques — a manual of standard operating procedures for waterfowl breeding population surveys is available. Data on rare, threatened, or endangered species are restricted.

Costs

None. Requester must submit floppy disks with request.

10 *Northern Ontario Waterfowl Database*

Responsible Organization(s)

Environmental Conservation Branch
Environment Canada
49 Camelot Drive
Nepean, Ontario K1A 0H3

Contact Person(s)

Ken Ross
same address
Tel. 613-952-2415

Nature of Information

Electronic database, GIS

Content

a) Purpose

- to monitor northern Ontario waterfowl populations and to determine range and habitat requirements

b) Attributes

- species
- age
- density
- wetland habitat type

c) Spatial extent

- Ontario north of the French and Mattawa rivers

d) Scale, resolution, or geographical units of measurement

- wetland specific within 2 km × 2 km plots, referenced by UTM coordinates

e) Volume

- approx. 15 000 records

Structure

PC based using dBase, SAS, and SPANS software

Output Format

Tables and maps

Date

1980 to present

Frequency of Update or Release
Yearly

Methods/Data Quality
Plots surveyed by helicopter

Availability
See above contact

Costs
None

11. Policies, Bylaws, Acts

11 *Provincial Permits, Licences, Regulations, Guidelines, Policies and Other Approvals in the Planning Process*

Responsible Organization(s)

New Planning for Ontario
The Commission on Planning and Development Reform in Ontario
180 Dundas Street West, 22nd Floor
Toronto, Ontario M5G 1Z8

Contact Person(s)

Dale Moore, Librarian
same address
Tel. 416-325-8734

Nature of Information

Research report

Content

a) Purpose

- to document the various provincial approvals currently required in the land use planning process

b) Attributes

- ministry responsible and legislation
- permits and licences
- regulations
- other approvals
- guidelines
- policies and policy statements

c) Spatial extent

- Ontario

d) Scale, resolution, or geographical units of measurement

- not applicable

e) Volume

- 12 ministries and 178 different approvals

Structure

All approvals listed by type under ministry responsible

Output Format

List in draft background research report to Commission

Date
1992

Frequency of Update or Release
While no specific plans, consideration of producing a handbook or guidebook in "a timely fashion" (it is currently a draft report)

Methods/Data Quality
Each ministry provided a summary.

Availability
Not published yet. Photocopies may be available: see above contact.

Costs
None

11 *Agricultural Pollution Control Manual: Codes and Regulations*

Responsible Organization(s)

Engineering Resources Unit
Resources Management Branch
Ontario Ministry of Agriculture and Food
P.O. Box 1030
Guelph, Ontario N1H 1G3

Contact Person(s)

Michael Toombs
Ontario Ministry of Agriculture and Food
1110 Stellar Drive, Unit 102
Newmarket, Ontario L3Y 7B7
temporarily seconded to:
Tel. 416-314-6431

Nature of Information

Publication

Content

a) Purpose

- to present the codes and legal obligations associated with agricultural pollution control on the farmstead

b) Attributes

- code, protocols, and acts
- for each:
  - purpose
  - brief description
  - requirements
  - administering body

c) Spatial extent

- Ontario

d) Scale, resolution, or geographical units of measurement

- not applicable

e) Volume

- 7 pages

Structure

Not applicable

Output Format
Chapter in the Manual

Date
1991

Frequency of Update or Release
Unknown

Methods/Data Quality
The author summarized the codes and regulations related to agricultural pollution control, a useful summary for the layperson. Reference to the Revised Statutes of Ontario would be needed for any detail.

Availability
From above responsible organization

Costs
None

11 *A Summary of Wildlife-Related Statutes Applicable to Ontario*

Responsible Organization(s)

Wildlife Working Group
c/o Wildlife Policy Branch
Ontario Ministry of Natural Resources
P.O. Box 7000
Peterborough, Ontario K9J 8M5

Contact Person(s)

Paul Gray
same address
Tel. 705-740-1528

Nature of Information

Compendium report

Content

a) Purpose

- to summarize wildlife-related legislation as part of a review of legislation affecting the management and protection of wildlife and wildlife habitat in Ontario

b) Attributes

- for each act:
  - title
  - responsible agency
  - summary of contents

c) Spatial extent

- Ontario

d) Scale, resolution, or geographical units of measurement

- not applicable

e) Volume

- 113 provincial statutes, 63 federal statutes, 4 private acts; all covered in 69 pages

Structure

Not applicable

Output Format

Report: *A Summary of Wildlife-Related Statutes Applicable to Ontario*, compiled by Carol-Ann Itel in June 1990, for the Wildlife Working Group (see above address)

Date
1990

Frequency of Update or Release
None planned

Methods/Data Quality
The database, Revised Statutes of Ontario (S.O. Database offered by QL Systems), was searched using key words: agriculture, amphibian(s), animal(s), arthropod, assessment, avifauna, bird(s), bog(s), disease(s), endangered, fen(s), field(s), forest(s), herpetofauna, hunter(s), Indian, insect(s), lake(s), mammal(s), marsh(es), Metis, migration, parasite(s), park(s), pest(s), planning, plant(s), preserve(s), reptile(s), species, stream(s), swamp(s), trapper(s), and vegetation. Also consulted were: Ministry of Natural Resources Legislation Summaries; *Provincial Statutes Index*; *The State of the Environment Report for Canada, 1986*, Environment Canada; all private acts passed from 1974 to 1989.

The list of statutes appears very comprehensive, likely catching any legislation that might involve agriculture and wildlife. Possible key words that were not listed include: agricultural economics, conservation, crops, farm practices, habitat, land use, livestock, pesticides, wetlands, wildlife. These and any other key words could likely be searched in the Revised Statutes database to see if they catch any omitted acts. The summary of each act is brief, useful for an overview of the legislation.

Availability
None left; can be borrowed from OMNR libraries

Costs
None

11 *Drainage Legislation*

Responsible Organization(s)

Resources Management Branch
Ontario Ministry of Agriculture and Food
P.O. Box 1030
Guelph, Ontario N1H 1G3

Contact Person(s)

Sid Vander Veen
same address
Tel. 519-767-3552

Nature of Information

Published factsheets

Content

a) Purpose

- to summarize drainage legislation and acquaint farmers with the drainage assistance at their disposal

b) Attributes

Drainage Legislation Factsheet 89-166

- note on Common Law
- The Drainage Act:
  - Mutual Agreement Drains: brief description
  - Petition Drains: 38-point Order of Procedure, plus requirements under maintenance, repair and improvement, abandonment, and grants
  - Requisition Drains: 11-point Order of Procedure
  - Appeals: Court of Revision, Ontario Drainage Tribunal, Drainage Referee
- The Tile Drainage Act
- The Agricultural Tile Drainage Installation Act
- Award Drains

Common Law Aspects of Water Factsheet 74-058

- historical background
- natural watercourses, including rules
- water having no defined course
- underground waters

Understanding Drainage Assessment, Factsheet 92-035

- responsibilities under Common Law
- responsibility under the Drainage Act
- engineer's report

Drainage Act Appeals, Factsheet 86-014

- court of revision

- Ontario Drainage Tribunal
- the Drainage Referee
- list of appeals in categories of assessment, benefits and costs, construction and design, legal and procedure, and other: for each, a set of grounds for appeal, who can appeal, section of the Drainage Act, time limit for appeal, and appeal body

Municipal Drains and the Landowner, Publication 55

- summarizes the landowner's decisions for each step of the Drainage Act procedures and the landowner's input: includes for each activity — the owners' decisions, interested parties, obligations of the owner and the appeal body

c) Spatial extent

- Ontario

d) Scale, resolution, or geographical units of measurement

- not applicable

e) Volume

- 20 pages total

Structure

Not applicable

Output Format

Published OMAF factsheets:

Irwin, R.W. 1989. *Drainage Legislation*. Order No. 89-166.
Irwin, R.W. 1974. *Common Law Aspects of Water.* Order No. 74-058.
Vander Veen, S. 1992. *Understanding Drainage Assessment.* Order No. 92-035.
Johnston, J. 1986. *Drainage Act Appeals.* Order No. 86-014.
Clayton, R. 1990. *Municipal Drains and the Landowner.* Publication 55.

Date

1974–92 (see under **Output Format**)

Frequency of Update or Release

Revised as changes to legislation

Methods/Data Quality

Experts in the field summarized the legislation and responsibilities.

Availability

From Consumer Information Centre, Ontario Ministry of Agriculture and Food, 801 Bay Street, Main Floor, Toronto, Ontario M7A 2B2, or county OMAF offices

Costs

None

11 *Acts Administered by the Ministry of Agriculture and Food*

Responsible Organization(s)

Ontario Ministry of Agriculture and Food
Communications Branch
801 Bay Street, 12th Floor
Toronto, Ontario M7A 2B2

Contact Person(s)

Tel. 416-326-3020

Nature of Information

List

Content

a) Purpose

- to list the acts administered by OMAF with contacts

b) Attributes

- act name
- administering branch
- telephone no.

c) Spatial extent

- Ontario

d) Scale, resolution, or geographical units of measurement

- not applicable

e) Volume

- 54 acts, 4 pages

Structure

Hardcopy table

Output Format

Table: Appendix A of OMAF's *Access and Services Directory*, published by the Queen's Printer for Ontario

Date

1992

Frequency of Update or Release

Annual

Methods/Data Quality

The list is compiled and maintained by OMAF. The list provides an initial reference for acts administered by OMAF. No detail of what each act covers is included beyond the act name. More information could be obtained using the contact information listed or the Revised Statutes of Ontario.

Availability

From Consumer Information Centre, 801 Bay Street, Toronto, Ontario M7A 2B2

Costs

None

12. Miscellaneous

12 *Collection of References on Practical Advice About Wildlife for the Landowner*

Responsible Organization(s)

Centre for Land and Water Stewardship
Richards Building
University of Guelph
Guelph, Ontario N1G 2W1

Contact Person(s)

Stewart Hilts, Director
same address
Tel. 519-824-4120 Ext. 2702

Nature of Information

Bibliography and library

Content

a) Purpose

- to collect publications providing practical advice on wildlife issues to the landowner, as a basis for possible future projects involving landowners

b) Attributes

- papers and reports describing Agriculture/Wildlife Interface, Managing for Wildlife, Animal Nuisance, Habitat Improvement, Wildlife in Specific Habitats, Forestry and Wildlife, Canada Goose Damage Issues in Wisconsin
- bibliography with the same headings

c) Spatial extent

- sources are mainly American, a few Canadian and from Ontario

d) Scale, resolution, or geographical units of measurement

- not applicable

e) Volume

- about 1 m of shelf space for the collection
- about 200 references in bibliography

Structure

Collection divided by file boxes into categories under **Content** *b) Attributes*
Bibliography alphabetical by author under categories

Output Format
Bibliography listing

Date
Summer 1992

Frequency of Update or Release
Unknown, depends on funding

Methods/Data Quality
The collection was made by a student over the summer term. The bibliography is unedited and incomplete, put on hold at the end of the summer. To fulfil its potential for use in encouraging changes in landowner practices affecting wildlife, support to complete it and to create a mechanism for landowner access would be required.

Availability
Currently can be viewed at the above address

Costs
Information not provided

12 *White-Tail Deer Damage Survey*

Responsible Organization(s)

Ontario Fruit and Vegetable Growers' Association
355 Elmira Road, Unit 103
Guelph, Ontario N1K 1S5

Contact Person(s)

Michael Mazer
same address
Tel. 519-763-6160

Nature of Information

Response forms and summary tables

Content

a) Purpose

- to assess deer damage to orchards and vegetable crops

b) Attributes

- location (township and county)
- main crops and acreage
- significant deer damage to which crops
- time and extent of deer damage
- damage increasing or not
- existence of a deer hunt
- distance of operation from natural habitat

c) Spatial extent

- fruit and vegetable growers in Ontario

d) Scale, resolution, or geographical units of measurement

- individual farm operations

e) Volume

- 276 respondents

Structure

Survey forms

Output Format

Summary tables; map of distribution of damage

Date

Winter of 1990

Frequency of Update or Release

Sometime in 1993 or 1994 with OMNR

Methods/Data Quality

A one-page questionnaire was distributed to fruit and vegetable growers to fill in and mail back. Partners included OMNR, OMAF, and the Ontario Apple Marketing Commission.

The database links damage with factors such as hunting, deer population, and habitat proximity. More specific data on population and habitat would likely be needed to provide firm relationships. The database provides an indication of the scale of damage and of possible compensatory magnitudes that may need to be considered if wildlife and agriculture interactions are to be encouraged.

Availability

From Ontario Fruit and Vegetable Growers' Association

Costs

None

12 *Avian Use of Agrohabitats*

Responsible Organization(s)

Wildlife Toxicology
National Wildlife Research Centre
Canadian Wildlife Service
Environment Canada
Ottawa, Ontario K1A 0H3

Contact Person(s)

David Ward
same address
Tel. 819-953-9508

Nature of Information

Electronic database

Content

a) Purpose

- to collect data and documentation to help assess risk to bird species of new and currently used registered pesticide products in Canada

b) Attributes

- for each of 65 habitat types:
  - bird species list
  - species presence by (where possible, depending on information in the original citation):
    - month
    - activity (feeding, loafing, nesting, roosting, perching)
    - intensity (bird/nest territorial density, proportion of time spent in habitat)
  - habitat description
    - general crop type (oil seeds, legumes, hay, etc.)
    - specific crop type (alfalfa, soybeans, corn, barley, etc.)
    - land area of each crop
  - citation (information source)

c) Spatial extent

- most of southern Ontario and a portion of southern Quebec (Great Lakes – St. Lawrence region of Canada)
- bird documentation was gathered from other areas with similar habitats

d) Scale, resolution, or geographical units of measurement

- habitat summaries for whole region and for each ecozone (four in southern Ontario)

e) Volume

- 65 habitats/crop combinations/cultivation practices; 168 species; 1432 records; 750 000 bytes

Structure

Micro-computer with dBase III software

Output Format

Tables, report: Freemark, K., H. Dewar, and J. Saltman. 1991. *A Literature Review of Bird Use of Farmland Habitats in the Great Lakes – St. Lawrence Region.* Can. Wildl. Serv. Tech. Rep. Ser. No. 114, Ottawa, Ontario.

Date

Database completed in 1988; report published in 1991

Frequency of Update or Release

None planned

Methods/Data Quality

Data on bird species use of habitat were obtained from the literature (approx. 65% American; 35% Canadian). If activity was not originally reported on a monthly basis, it was recorded as occurring in all months of the study. Intensity of use was recorded in the same units as in the source reference (converting to metric). For some references, use data were also categorized by relative intensity. Crop habitat data were from the 1986 Census of Agriculture.

The summary of agricultural land use by the four ecozones in southern Ontario is a useful link of data types but very general in scale.

Because of lack of studies in Ontario, the literature review tends to provide a background of possible bird use of different crop habitats in Ontario rather than data on actual use.

Availability

See above contact

Costs

None for reports; inquire regarding database prices

12 ***Scare and Kill Permits***

Responsible Organization(s)

Regional CWS offices; in southwestern Ontario:
Environmental Conservation Branch
Environment Canada
152 Newbold Court
London, Ontario N6E 1Z7

Contact Person(s)

Darryll Dennis
same address
Tel. 519-681-0486

Nature of Information

File of permits

Content

a) Purpose

- to document issuance of Scare and Kill Permits

b) Attributes

- name (not available)
- lot and concession
- problem species
- problem

c) Spatial extent

- Canada

d) Scale, resolution, or geographical units of measurement

- permit per landowner, best resolution lot and concession

e) Volume

- in southwestern Ontario: hundreds (275 last year, most of which geese)

Structure

Individual permit forms

Output Format

Possible to map locations

Date

Long term, but only since about 1980 that Canada Geese, the main problem, have been a problem, so most records since then

Frequency of Update or Release

Continual

Methods/Data Quality

A permit form is completed with each approval of a scare or kill request. This database provides some indication of depredation, a concern often raised by farmers but about which there has been little study in Ontario.

Availability

Inquire from contact person

Costs

None

12 *National Registry of Toxic Chemical Residues*

Responsible Organization(s)

Wildlife Toxicology Division
National Wildlife Research Centre
Canadian Wildlife Service
Environment Canada
Ottawa, Ontario K1A 0H3

Contact Person(s)

Jim Learning
same address
Tel. 819-997-1412

Nature of Information

Electronic database

Content

a) Purpose

- to provide data on toxic chemicals in wildlife for use in determining contaminant effects and assessing trends in contaminant levels

b) Attributes

- wildlife characteristics
  - species
  - age
  - sex
  - breeding condition
- collection data (where, when, how, by whom)
- specimen analysis methods (where, when, tissue)
- analysis results
  - common tissue parameters (% fat, % water)
  - contaminant levels
- sample storage (where, when, how many)

c) Spatial extent

- Canada; some samples from United States, Central and South America

d) Scale, resolution, or geographical units of measurement

- specimen-specific locations

e) Volume

- approx. 11 000 records for Ontario

Structure

Micro-computer with dBase software; upgrading ongoing to an SQL database

Output Format

Reports:

Noble, D.G., and D. Elliott. 1986. *Environmental Contaminants in Canadian Seabirds, 1968–1984: Trends and Effects.* Can. Wildl. Serv. Tech. Rep. Ser. No. 13, Ottawa, Ontario.

Toxic chemical residues catalogue series/region, i.e., one for Ontario

Format as requested

Date

1963 to present

Frequency of Update or Release

Continuous

Methods/Data Quality

The registry collects the results of laboratory analysis of specimens collected in the field.

Availability

From above contact. Guides on the database and availability are available from the responsible organization.

Costs

None

12 *Agricultural Information Manager (AIM): Version 3.0*

Responsible Organization(s)

Engineering Resources Unit
Resources Management Branch
Ontario Ministry of Agriculture and Food
P.O. Box 1030
Guelph, Ontario N1H 1G3

Contact Person(s)

Michael Toombs
Ontario Ministry of Agriculture and Food
1110 Stellar Drive, Unit 102
Newmarket, Ontario L3Y 7B7
temporarily seconded to:
Tel. 416-314-6431

Nature of Information

Bibliographic electronic database

Content

a) Purpose

- to provide a complete list of OMAF and Agriculture and Agri-Food Canada publications available on any particular subject

b) Attributes

- full publication title and publication number
- Agdex number when applicable
- description if necessary and list of key words

c) Spatial extent

- Ontario

d) Scale, resolution, or geographical units of measurement

- not applicable

e) Volume

- 3200 entries

Structure

Any IBM-compatible computer running DOS 3.x or higher

Output Format

List of titles; a short Users' Manual, which includes installation instructions, a Keyword Dictionary, and a Quick (one-page) Reference Guide

Date

Started 1990; current version 1993

Frequency of Update or Release

Twice a year

Methods/Data Quality

The database was created from the following sources: OMAF Publications, OMAF Factsheets, OMAF Engineering Resources Unit Specialists, Agriculture Canada Publications, Agriculture Canada Plan Service Plans, Agriculture Canada Plan Service Restricted Plans, Agriculture Canada Plan Service Leaflets, and Innovation Agriculture references and videos. Searches look for a match of any of the database information with the key words entered by the user.

Availability

See above contact; not intended for public distribution

Costs

Information not provided

12 *Directory of Records: Provincial Ministries and Agencies — 1993/94*

Responsible Organization(s)

Management Board Secretariat
Freedom of Information and Privacy Branch
Government of Ontario
56 Wellesley Street West, 18th Floor
Toronto, Ontario M7A 1Z6

Contact Person(s)

Tel. 416-327-2187

Nature of Information

Directory

Content

a) Purpose

- to assist individuals in locating general records and personal information maintained by provincial government institutions

b) Attributes

- for each ministry and agency:
  - name
  - address of minister or head
  - access person for freedom of information and privacy issues
  - location of reading room
  - mandate
  - organizational structure
- for each division or affiliated agency:
  - description of division's role
  - description of records used to support programs and list of general types of records maintained
  - list of manuals issued to employees to support operation of division
  - list of personal information banks maintained and brief description of each, including location, legal authority, information maintained, uses, users, individuals in the data bank, retention and disposal of data

c) Spatial extent

- Ontario

d) Scale, resolution, or geographical units of measurement

- not directly applicable, many personal information databases include individual addresses

e) Volume

- 532 pages, hundreds of databases

Structure

Directory is compiled by ministry and agency. Each database listed has its own structure.

Output Format

Directory under the database title: ISSN 0847-0936. Individual databases have various output formats.

Date

1992

Frequency of Update or Release

Every two years

Methods/Data Quality

Each ministry and agency submits required data. The listed databases each have individual methods.

While only a very general listing, the directory gives an indication of the types of data that are maintained. The personal information banks listing provides more detail.

Availability

The Directory is available from Publications Ontario, 880 Bay Street, Toronto, Ontario M7A 1N8, Tel. 416-326-5320. Individual databases would require contact with the listed contact person for each ministry or agency. The personal information databases would likely be subject to some restriction for information other than one's own personal files. Accessibility might depend on there being some way of maintaining individual anonymity, amalgamating data to a broader geographical unit (e.g., counties), or working in cooperation with the agency involved.

Costs

Directory: $20.00. Individual databases, see contact persons.

REFERENCES AND OTHER CONSULTED CATALOGUES

Bardecki, M.J. 1984. *Wetland Conservation Policies in Southern Ontario. A Delphi Approach.* Geographical Monographs No. 16. Atkinson College, York University, Downsview, Ontario.

Boyd, G.L. 1981. *Great Lakes Erosion Monitoring Program.* Final Report. Ocean Science and Surveys. Bayfield Laboratory for Marine Science and Surveys. Burlington, Ontario. Unpublished Manuscript. 220 pp.

Bordt, M. (ed.). 1991. *Human Activity and the Environment 1991.* Environment and Wealth Accounts Division, System of National Accounts, Statistics Canada, Ottawa, Ontario. Catalogue 11-509E. ISBN 0-660-14173-0.

Cadman, M.D., and J.A. Dobbyn. 1991. *Atlas of the Mammals of Ontario: Participants' Manual Number 1: Compiling Existing Occurrence Data.* Federation of Ontario Naturalists, Don Mills, Ontario.

Cameron, M., C. Keddy, and T. McRae. 1992. *Databases for Environmental Analysis.* System of National Accounts, Statistics Canada, and State of the Environment Reporting, Environment Canada, Ottawa, Ontario. Catalogue 11-527E. ISBN 0-660-14650-9.

Dobbyn, J.A., V.L. McKay, and M.D. Cadman. 1991. *Atlas of the Mammals of Ontario: Participants' Manual Number 2: Surveying a 10 × 10 km Square.* Federation of Ontario Naturalists, Don Mills, Ontario.

Environment Canada. 1986. *State of the Environment Report for Canada.* Ottawa, Ontario. 263 pp.

Environment Canada. 1991. *Envirosource (First Edition): Reference Directory to Information Holdings.* Information Holdings Management Branch, Ottawa, Ontario. ISBN 0-662-19249-4.

Environment Canada. 1991. *Summary Catalogue of SPANS Databases.* Environmental Information Systems, State of the Environment Reporting, Ottawa, Ontario.

Freemark, K., H. Dewar, and J. Saltman. 1991. *A Literature Review of Bird Use of Farmland Habitats in the Great Lakes–St. Lawrence Region.* Can. Wildl. Serv. Tech. Rep. Ser. No. 114, Ottawa, Ontario.

Hyslop, C. (ed.). 1991. *Bird Trends: A Report on Results of National and Regional Ornithological Surveys in Canada.* Number 1, Summer 1991. Canadian Wildlife Service, Ottawa, Ontario.

Keddy, C.J., and T. McRae. 1989. *Environmental Databases for State of the Environment Reporting: Conservation and Protection Headquarters.* Technical Report Series Report No. 9, Strategies and Scientific Methods Division, State of the Environment Reporting, Canadian Wildlife Service, Environment Canada, Ottawa, Ontario.

Lauricella, C. 1993. *Wetland Inventory and Database Catalogue* (draft). Prepared for Canadian Wildlife Service – Ontario Region, Environment Canada, Toronto, Ontario.

Long Point Bird Observatory. No date. Summary pages of Long Point Bird Observatory Selected Projects. Port Rowan, Ontario.

McRae, T. 1990. *Environmental Databases for State of the Environment Reporting: Atmospheric Environment Service, Canadian Parks Service.* Corporate Policy Group, Environment Canada Regional Offices. Technical Report Series Report No. 16, Strategies and Scientific Methods Division, Sustainable Development/State of the Environment Reporting, Corporate Policy Group, Environment Canada, Ottawa, Ontario.

Natural History Research Group and Long Point Bird Observatory. 1989. *Volunteer Natural History Projects in Ontario: 1989.* The Natural History Research Group, University of Waterloo, Waterloo, Ontario.

Ontario Ministry of Natural Resources. 1992. *Strategic Management Review — Natural Resource Inventories Listing Section.* Unpublished Task Force report.

Ontario Ministry of Natural Resources and U.S. Environmental Protection Agency. 1991. *Environmental Applications of GIS's in the Great Lakes Region: Canadian and American 1990/91 Survey.*

Pierpoint, G., and P. Uhlig. 1985. *Catalogue of Land Resource Surveys in Ontario of Major Value in Forest Management.* Forest Resources Group, Ontario Ministry of Natural Resources, Toronto, Ontario.

Snell, E.A. 1987. *Wetland Distribution and Conversion in Southern Ontario.* Working Paper No. 48, Inland Waters and Lands Directorate, Environment Canada, Ottawa. Catalogue No. En73-4/48E.

Statistics Canada. 1992. *Agricultural Profile of Canada. Part 1.* Ottawa, Ontario. 119 pp.

Wallace, G.E. 1990. *Songbird Monitoring and Conservation Research in Canada: The Current Situation.* Unpublished report for Non-Game Birds and Latin American Program, Migratory Birds and Wildlife Conservation Branch, Canadian Wildlife Service, Environment Canada, Ottawa, Ontario.

Appendix I

OTHER DATABASES IN PLANNING STAGES OR OF POSSIBLE RELEVANCE

A. Relevant Databases in Planning Stages

Agro-Ecological Land Classification

- involving Agriculture and Agri-Food Canada, Environment Canada, Ontario Ministry of Agriculture and Food, and Ontario Ministry of Natural Resources
- *Contacts:* Ian Marshall, State of the Environment Reporting, Environment Canada, Ottawa, Ontario K1A 0H3, (819) 953-1453; Jim Baker, Ecosystems Section, Ontario Ministry of Natural Resources, 90 Sheppard Avenue East, 6th Floor, North York, Ontario M2N 3A1, (416) 314-1076

Gap Analysis for Protection of Rare, Threatened and Endangered Species

- plan to overlay OMNR database on rare, threatened, and endangered species (from Nature Conservancy's Carolinian project, Canadian Museum of Nature's Rare Plant data, OMNR old Central Region data) with Steve Hounsell's (Ontario Hydro) forest landscapes database; with OMNR's protected areas database; with areas of potential development — to identify where further protection and stewardship programs are needed
- *Contact:* Jim Baker, Ecosystems Section, Ontario Ministry of Natural Resources, 90 Sheppard Avenue East, 6th Floor, North York, Ontario M2N 3A1, (416) 314-1076

Wildlife Habitat Inventory

- plan research to establish habitat affiliations by species and then develop methods of mapping them at the various scales necessary, including eco-element level; currently a list of all species and general habitat preferences, stressing forested habitats
- *Contact:* Jim Baker, Ecosystems Section, Ontario Ministry of Natural Resources, 90 Sheppard Avenue East, 6th Floor, North York, Ontario M2N 3A1, (416) 314-1076

B. Databases of Possible Relevance to Project

Crops and Livestock

Field Crop Reporting Series

Contact: Oliver Code, Crop Reporting Unit, Agriculture Division, Statistics Canada, 12th Floor, Jean Talon Building, Tunney's Pasture, Ottawa, Ontario K1A 0T6, (613) 951-8719

Pesticides

Compendium of Fertilizer-Use Pesticides
Contact: John Ramsay, Feed Section, Plant Products Division, Animal and Plant Health Directorate, Agriculture and Agri-Food Canada, Neatby Building, 960 Carling Avenue, Ottawa, Ontario K1A 0C6, (613) 995-7900

Pesticide Database System (re residue limits in food)
Contact: Gary Trivett, Food Regulatory, International and Interagency Affairs Division, Health Protection Branch, Health Canada, Tunney's Pasture, Ottawa, Ontario K1A 0L2, (613) 957-1316

Pesticide Properties and Movement in Soil (bibliographic)
Contact: Bruce Bowman, Agriculture and Agri-Food Canada, London, Ontario N5V 4T3 (519) 645-4452

Pesticide Residues on Plants
Contact: Alain Baril, National Wildlife Research Centre, Canadian Wildlife Service, Environment Canada, 100 Gamelin Boulevard, Hull, Quebec, K1A 0H3, (819) 997-6131

Residues in Agri-Foods Monitoring Program
Contact: P.W. Saschenbrecker, Food Inspection Directorate, Food Production and Inspection Branch, Agriculture and Agri-Food Canada, 2255 Carling Avenue, Ottawa, Ontario K1A 0Y9, (613) 995-5433

Landscapes and Habitat

Canada Soil Information System (CANSIS)
Contact: Dick Coote, Land Resource Research Centre, Research Branch, Agriculture and Agri-Food Canada, Ottawa, Ontario K1A 0C6, (613) 995-5011

Canadian Museum of Nature Lichens Program Database
Contact: Barbara Kobolak, Botany Division, Canadian Museum of Nature, P.O. Box 3443, Station D, Ottawa, Ontario K1P 6P4, (613) 990-6450

Canadian Museum of Nature Mosses Program Database
Contact: Linda Ley, Botany Division, Canadian Museum of Nature, P.O. Box 3443, Station D, Ottawa, Ontario K1P 6P4, (613) 990-6448

Canadian Museum of Nature Vascular Plants Program Database
Contact: Barbara Kobolak, Botany Division, Canadian Museum of Nature, P.O. Box 3443, Station D, Ottawa, Ontario K1P 6P4, (613) 990-6450

Canadian Parks Service Basic Resource Inventory
Contact: for Ontario, Jim Barlow, Canadian Parks Service, 111 Water Street, Cornwall, Ontario K6H 4V7, (613) 938-5931

Ontario Landscape Units on Canada Geographic Information System at 1:2,000,000 of each of Ecodistrict Divisions, Watershed Sub-Divisions and 1986 Census Divisions

Contact: Client Services, Environmental Information Systems Division, State of the Environment Reporting, Environment Canada, Ottawa, Ontario K1A 0H3, (819) 953-3972

Paleoecological Database

Contact: Hélène Jetté, Geological Survey of Canada, Natural Resources Canada, 601 Booth Street, Ottawa, Ontario K1A 0E8, (613) 992-7301

1992 Purple Loosestrife Survey (Wellington and Lanark Counties)

Contact: Madeline Austen (519) 856-2089 or Margaret McLaren, Wildlife Policy Branch, Ontario Ministry of Natural Resources, 90 Sheppard Avenue East, 6th Floor, North York, Ontario M2N 3A1, (416) 314-1054

Reference System to Water Resource Databases in Canada (D-REF)

Contact: Ron Gauthier, Ecosystem Conservation, Environmental Conservation Service, Environment Canada, Ottawa, Ontario K1A 0H3, (819) 953-1531

Wildlife

Avian Census Plots — long-term trends by habitat type: Canada

Contact: Kathy Dickson, Canadian Wildlife Service, Environment Canada, Ottawa, Ontario K1A 0H3, (819) 953-1415

Bird Banding and Recovery Database

Contact: Ellen Hayakawa, Migratory Birds Surveys, National Wildlife Research Centre, Canadian Wildlife Service, Environment Canada, 100 Gamelin Boulevard, Hull, Quebec K1A 0H3, (819) 953-1425

Breeding Bird Census: very few plots in Ontario

Contact: Dan Welsh, Canadian Wildlife Service, Environment Canada, 1725 Woodward Drive, Ottawa, Ontario K1A 0E7, (613) 952-2405

Canadian Lakes Loon Survey (longest running in Ontario)

Contact: Chris McCall or Lisa Enright, Long Point Bird Observatory, Box 160, Port Rowan, Ontario N0E 1M0, (519) 586-3531

Canadian Museum of Nature Collections (fish, invertebrates, vascular plants, lichens, bryophytes; birds, mammals, amphibians, and reptiles are in the catalogue)

Contact: Peter Frank, Collections Division, Canadian Museum of Nature, P.O. Box 3443, Station D, Ottawa, Ontario K1P 6P4

Canadian Zooplankton Database
Contact: Kazimirez Patalas, Biological Services Directorate, Freshwater Institute, Department of Fisheries and Oceans, 501 University Crescent, Winnipeg, Manitoba R3T 2N6

Committee on the Status of Endangered Wildlife in Canada Reports
Contact: Steven Price, World Wildlife Fund, 90 Eglinton Avenue East, Suite 504, Toronto, Ontario M4P 2Z7, (416) 923-8173

Freshwater Planktonic Invertebrate Database
Contact: Rama Chengalath, Zoology Division, Canadian Museum of Nature, P.O. Box 3443, Station D, Ottawa, Ontario K1P 6P4, (613) 954-4958

General Invertebrates Database
Contact: Rama Chengalath, Zoology Division, Canadian Museum of Nature, P.O. Box 3443, Station D, Ottawa, Ontario K1P 6P4, (613) 954-4958

Hawk Migration Counts
Contact: Mary Ellen Foley, 32 Maplewood Drive, St. Catharines, Ontario L2M 3P1, (416) 937-7671

Importance of Wildlife to Canadians
Contact: Fern Filion, Canadian Wildlife Service, Environmental Conservation Service, Environment Canada, Ottawa, Ontario K1A 0H3, (819) 997-1360

International Shorebird Survey
Contact: R.I.G. Morrison, Canadian Wildlife Service, Environment Canada, 1725 Woodward Drive, Ottawa, Ontario K1A 0E7, (613) 952-2411

Inventory of Colonial Water Birds of the Great Lakes
Contact: Hans Blokpoel, Canadian Wildlife Service, Environment Canada, 49 Camelot Avenue, Nepean, Ontario K1A 0H3, (613) 952-2410

Mid-January Waterfowl Inventory
Contact: Dr. J.L. Harcus, Ontario Ministry of Natural Resources, 90 Sheppard Avenue East, North York, Ontario M2N 3A1, (416) 314-1063

Migration Monitoring Program
Contact: Jon McCracken, Long Point Bird Observatory, P.O. Box 160, Port Rowan, Ontario N0E 1M0, (519) 586-3531

Monitoring Avian Productivity and Survivorship (MAPS) — only two sites in Ontario:
Contact: D. DeSante, Institute of Bird Populations, P.O. Box 554, Inverness, California 94937, U.S.A., (415) 669-1663

Northern Ontario Waterfowl Database

Contact: Ken Ross, Canadian Wildlife Service, Environment Canada, 49 Camelot Avenue, Nepean, Ontario K1A 0H3, (613) 952-2415

Ontario Heronry Inventory: 1980–81 and 1990–91

Contact: Long Point Bird Observatory, P.O. Box 160, Port Rowan, Ontario N0E 1M0, (519) 586-3531

Regional Bird Information Summaries, e.g., Durham Region, Rondeau Region, Point Pelee, Lambton County.

Contact: Ross James, Royal Ontario Museum, (416) 586-5519

Seasonal Summaries of Bird Observations

Contact: Ron Weir, 294 Elmwood Street, Kingston, Ontario K7M 2Y8

Sightings of Banded Birds

Contact: Bird Banding Office, Canadian Wildlife Service, Environment Canada, Ottawa, Ontario K1A 0H3, (819) 997-1121

Spring Breeding Waterfowl Survey

Contact: Kathryn Dickson, Wildlife Conservation Branch, Canadian Wildlife Service, Environmental Conservation Service, Environment Canada, Ottawa, Ontario K1A 0H3, (819) 953-1415

Spring Woodcock Survey

Contact: Dr. J.L. Harcus, Ontario Ministry of Natural Resources, 90 Sheppard Avenue East, North York, Ontario M2N 3A1, (416) 314-1063

Study of Nesting Snapping Turtles

Contact: Ron Brooks, Department of Zoology, University of Guelph, Guelph, Ontario N1G 2W1, (519) 824-4120

Other

Agriculture and Meteorology (AGMET)

Contact: Denis Chaput, Land Resource Research Centre, Research Branch, Agriculture and Agri-Food Canada, Building 74, Central Experimental Farm, Ottawa, Ontario K1A 0C6, (613) 995-5011

Canadian Sources of Environmental Information

Contact: Paulette Smith, Information Holdings Management Branch, Finance and Adminstration Service, Environment Canada, Ottawa, Ontario K1A 0H3, (819) 997-0217

CCME Inventory of Environmental Protection Research and Development Projects
Contact: Anne-Marie Lefebvre, Technology Development Branch, Environmental Protection Service, Environment Canada, 3439 River Road, Ottawa, Ontario K1A 0H3, (819) 953-7246

Contaminants in Fish Database
Contact: Marilyn Hendzel, Inspection Services Branch, Central and Arctic Region, Department of Fisheries and Oceans, Freshwater Institute, 501 University Crescent, Winnipeg, Manitoba R3T 2N6, (204) 983-5067

D-REF (Data Reference): re water-related databases
Contact: Ron Gauthier, Ecosystem Conservation, Environmental Conservation Branch, Environment Canada, Ottawa, Ontario K1A 0H3, (819) 953-1531

Envirosource (description of Environment Canada holdings)
Contact: Edith Dubois, Information Holdings Management Branch, Finance and Administration Service, Environment Canada, Ottawa, Ontario K1A 0H3, (819) 997-1254

Family Farm Stewardship Library
Contact: Elbert van Donkersgoed or Velvet Rollin, Christian Farmers Federation of Ontario, 115 Woolwich Street, Guelph, Ontario N1H 3V1, (519) 837-1620

Great Lakes Biological Tissue Archive
Contact: W. Hyatt, Bayfield Institute, Great Lakes Laboratory for Fisheries and Aquatic Sciences, 867 Lakeshore Road, Burlington, Ontario L7R 4A6, (905) 336-4861

Great Lakes Contaminants Surveillance Program
Contact: D. Whittle, Bayfield Institute, Great Lakes Laboratory for Fisheries and Aquatic Sciences, 867 Lakeshore Road, Burlington, Ontario L7R 4A6, (905) 336-4565

Heavy Metal Concentrations in Fertilizers and Fertilizer Materials
Contact: Margaret Kenny, Feed Section, Plant Products Division, Animal and Plant Health Directorate, Agriculture and Agri-Food Canada, Neatby Building, 960 Carling Avenue, Ottawa, Ontario K1A 0C6, (613) 995-7900

Infosource: Newsletter of the Soil and Water Conservation Information Bureau, and ASKELTON (bibliographic database)
Contact: Doug Robinson or Helen Lammers, Soil and Water Conservation Information Bureau, Richards Building, University of Guelph, Guelph, Ontario N1G 2W1, (519) 824-4120 Ext. 2451

International Register of Potentially Toxic Chemicals (IRPTC) Database
Contact: Ruta Whittaker, Monitoring and Criteria Division, Bureau of Chemical Hazards, Environmental Health Directorate, Health Protection Branch, Health Canada, Ottawa, Ontario K1A 0L2, (613) 957-1506

Juvenile Fish Biomonitoring Program

Contact: G. Hitchin, Bioassessment Unit, Watershed Management Section, Water Resources Branch, Ontario Ministry of Environment and Energy, 125 Resources Road, Rexdale, Ontario M9W 5L1, (416) 235-5802

National Registry of Toxic Chemical Residues (NRTCR)

Contact: Bryan Wakeford, National Wildlife Research Centre, Canadian Wildlife Service, Environment Canada, 100 Gamelin Boulevard, Hull, Quebec K1A 0H3, (819) 997-1412

National Water Quality Database (NAQUADAT)

Contact: Peter Brooksbank, Ecosystem Sciences and Evaluation, Environment Canada, 351 St. Joseph Boulevard, Hull, Quebec K1A 0H3, (819) 997-3424

Pollution Incident Report Records Collection

Contact: Peter Mazerolle, National Environmental Emergency Centre, Environment Canada, 351 St. Joseph Boulevard, 15th Floor, Hull, Quebec K1A 0H3, (819) 997-3742

Sediment Quality

Contact: R. Jaagumagi, Bioassessment Unit, Watershed Management Section, Water Resources Branch, Ontario Ministry of Environment and Energy, 1 St. Clair Avenue West, 4th Floor, Toronto, Ontario M4V 1K6, (416) 323-4928

Sport Fish Contaminants Monitoring Program

Contact: C. Cox, Bioassessment Unit, Watershed Management Section, Water Resources Branch, Ontario Ministry of Environment and Energy, 1 St. Clair Avenue West, 4th Floor, Toronto, Ontario M4V 1K6, (416) 323-4931

Surface and Ground Water Quality Evaluation by Tertiary Watershed (includes environmental effects)

Contact: Karen Marner, Fiscal Planning and Performance Monitoring, Fiscal Planning and Economic Analysis Branch, Ontario Ministry of Environment and Energy, 135 St. Clair Avenue West, 11th Floor, Toronto, Ontario M4V 1P5, (416) 323-4687

Sustainable Agriculture Bibliographic Database

Contact: Stewart Hill, MacDonald College, McGill University, Montreal, Quebec, (514) 398-7909

Wildlife Toxicology Bibliographic Database

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Appendix II

ACRONYMS USED IN TEXT

AI	Active Ingredient
AIM	Agricultural Information Manager
ANSI	Area of Natural and Scientific Interest
ARC/INFO	Geographical Information System software
ASCII	American Standard Code for Information Interchange
BCD	Biological Conservation Data
CANSIS	Canada Soil Information System
CARSS	Ontario Hydro's internal GIS
CCME	Canadian Conference of Ministers of the Environment
CCOGIF	Canadian Council on Geomatics Interchange Format
CCOHS	Canadian Centre for Occupational Health and Safety
CD-ROM	Compact Disk – Read Only Memory
CLI	Canada Land Inventory
COSEWIC	Committee on the Status of Endangered Wildlife in Canada
CWS	Canadian Wildlife Service
DOS	Computer operating system
EASI/PACE	Image analysis software
EIS	Environmental Information System
ESA	Environmentally Sensitive Area
FORTRAN	Programming language
FRI	Forest Resource Inventory
FUL/TEXT	Text retrieval software
GIS	Geographic Information System
GRCA	Grand River Conservation Authority
IBM	International Business Machines (company name)
IBM AT	Microcomputer brand name
IBP	International Biological Programme
IJC	International Joint Commission
INGRES DBMS	Database management system
IPM	Integrated Pest Management
IUCN	International Union for the Conservation of Nature and Natural Resources (now called the World Conservation Union)
LANDSAT	Satellite conducting remote sensing of the earth's surface
NFS	National Farm Survey
NGO	Non-Governmental Organization
NTDB	National Topographic Data Base
NTS	National Topographic Series
OBM	Ontario Basic Mapping (Map)
OFMAP	Ontario Farm Management Analysis Project
OLI	Ontario Land Inventory
OMAF	Ontario Ministry of Agriculture and Food
OMNR	Ontario Ministry of Natural Resources

PC	Personal Computer
PC INFO	Database management system
PRIS	Pest Management Research Information System
RIPP	Regulatory Information on Pesticide Products
SAS	Statistical analysis software package
SCO	Santa Cruz Operation (company name)
SPANS	Geographic information system software
SPSS	Statistical analysis software package
SQL	Structured Query Language
SUI	Spatial User Interface
SUN	Sun Microsystems (company name)
SWEEP	Soil and Water Environmental Enhancement Program
TM	Thematic Mapper
UNIX	Computer operating system
USLE	Universal Soil Loss Equation
UTM	Universal Transverse Mercator
VAX	Computer brand name