



Agricultural Land Management Practices in Ontario: Lake Erie Basin Watersheds

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Ontario's Agricultural Land Management

- **Presentation Outline:**

- perspective on farming/ecosystem connections
- current agricultural land management practices in Ontario's Lake Erie Basin
- knowledge management of Ontario farming practices
 - overview of selected data sources
- a “new” agricultural resource inventory” ARI for Ontario

Ontario Agriculture: Ecosystem Connections

- **Agriculture in Ontario's Lake Erie Basin:**

- has a long heritage – predates European settlement
- was a main driver for urban placement and growth
- has become diverse: farm size, field size, commodities
- is distributed throughout this region; it is “here to stay”
- has land management practices that have modified ecosystem form and function
- has a critical role to play in ecosystem futures

Ontario's Agricultural Land Management

- **Currently in Ontario's Lake Erie Basin watersheds:**
 - much of the original forest cover was cleared; some watersheds (particularly in the SW) have less than 2% cover
 - substantial artificial drainage network has been established throughout this region; this network includes systematic and random field tiles & municipal drains

Ontario's Agricultural Land Management

- **Currently in Ontario's Lake Erie Basin watersheds:**

- tillage systems vary between farms: no-till to conventional
- corn-beans-wheat rotation dominates cropping systems; edible beans, small grains and alfalfa are also prominent; high-value horticultural crops in specific areas (ex. Leamington)
- nutrient applications: manure, fertilizers and biosolids

Knowledge Management: Farm Practices

- **Database sources have evolved through time...**

- various historical “atlases” of agriculture in Ontario; soils, crops, livestock
- agricultural census data; every 5 years; 2006 is most recent
- government program information; stewardship efforts (PLUARG, SWEEP, Land Stewardship, EFP, etc.) and nutrient management planning (NMA 2002); no GIS layers available
- government agricultural land use GIS databases:
 - OMNR-SOLRIS
 - OMAFRA agricultural resource inventory (ARI) 1983
 - “new” OMAFRA ARI being developed

Government Agricultural Census

- **Statistics Canada – Census of Agriculture**

- “snapshots”; census survey every 5 years
- generally aggregated by County; also quaternary level watershed (OMAFRA has 2001 & 2006); doesn't track individual farms and fields
- quantitative cropping, tillage, livestock and nutrient information
- opportunities to track some farm practice “trends” over time; coarse GIS-layer spatial resolution (only at county/quaternary watershed level)

Government Stewardship Programs

- **Environmental Farm Plan (EFP)**

- foundation for agri-environmental education, risk assessment and programming | Ontario
- voluntary and confidential
- on-farm cost-share implementation projects
- plans and information on project locations, etc. are confidential;
- aggregate practice data available by watershed (ex. Grand) and county

Government Nutrient Management Programs

- **Nutrient Management Act (NMA 2002)**

- OMAFRA & OMOE responsible for different parts
- Plans & Strategies; on-farm documents required
- farms > 300 NU; expanding farms > 5NU
- commonly “triggered” by building permit process
- most Plan & Strategy details are confidential; however “Records of Approval” are available publicly
- no GIS layer of farm practices associated with NMA
 - Under development

Agricultural Resource Inventory (ARI)

- **OMAFRA Agricultural Resource Inventory (1983)**

- one-time “windshield survey” activity (completed in 1983); pre-dated digital GIS; project not continued
- aggregated “cropping systems” approach for “farm blocks”; not by individual field
- no tillage, nutrient or livestock information
- gives a “snapshot” of cropping patterns at that time
- maps subsequently digitized; GIS layer developed

Agricultural Resource Inventory (ARI)

- **OMNR-SOLRIS GIS Layer**

- was not differentiated – just called “agriculture”
 - no individual farms or fields
 - no tillage, nutrient or livestock information
 - no value/understanding of cropping patterns
- However, updates are coming; agricultural activity based on remote sensing (sporadic satellite) imagery – classes = “perennial, annual, mixed, idle”
 - gives limited land management practice information

Agricultural Resource Inventory (ARI)

- **“New” OMAFRA Agricultural Resource Inventory**
 - Digital imagery coverages
 - 30cm X 30cm SWOOP 2006
 - 20cm X 20cm GTA 2002
 - seamless digital framework; all landscape features
 - farmstead, farm field, fencerow, roadway, ditch, and riparian and rough land areas
 - builds on OMNR-SOLRIS “woodlands”, “wetlands” and “urban” layers

Agricultural Resource Inventory (ARI)

- **“New” OMAFRA Agricultural Resource Inventory**
 - direct “windshield survey” observations for cropping season; build GIS layer for census period
 - crops, tillage, nutrient and livestock information
 - on-going effort needed to capture cropping and tillage patterns (trends & change detection) over time
 - serve as “ground truth” for remote sensing calibrations; plan to use high resolution imagery for both retrospective and future mapping

Agricultural Resource Inventory (ARI)

- “New” OMAFRA Agricultural Resource Inventory

Farm field-specific ARI attributes help to better understand **Farm Environmental Stewardship**

- crop rotation patterns; crop selection responses to market drivers (ex. Winter Wheat planted in Fall 2007)
- tillage system practices in relation to soil erosion and runoff management
- crop-specific nutrient application distribution
- crop-specific pest-management practice distribution
- crop-specific water budget/management needs

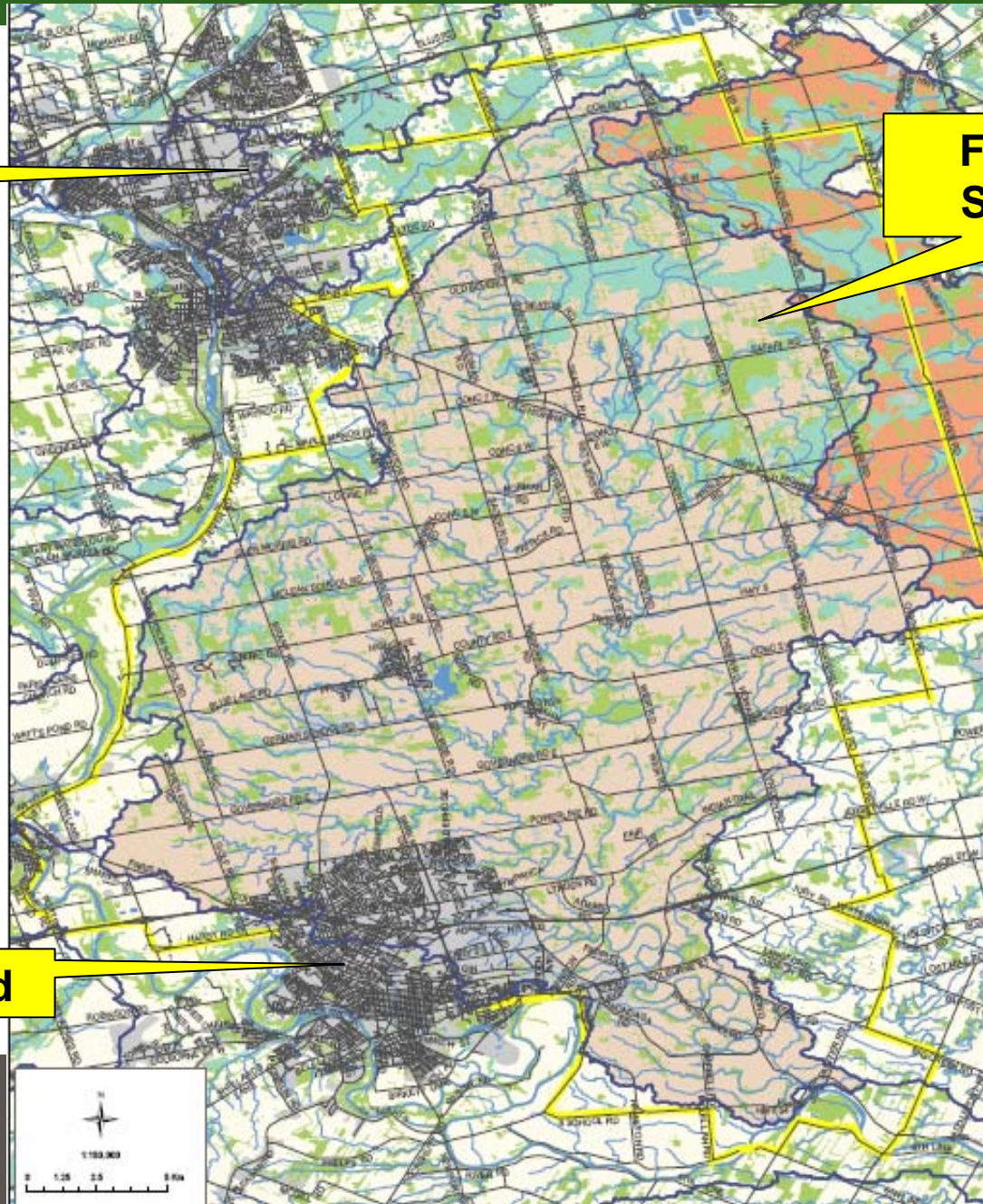
Agricultural Resource Inventory (ARI)

- “New” OMAFRA Agricultural Resource Inventory

ARI attributes for farm fields include:

- type of **crop** (pasture, hay, field or horticultural crop, etc.), **crop residue** (previous season(s)) and **planting information** (direction, row spacing, etc.); leads to **crop rotation patterns**
- **tillage system** (type: conventional; conservation; no-till; etc) and **direction**; also leads to **stewardship practices**
- **nutrient applications** (or stocking density on pastures); mapped only where directly observed; will give very limited but useful information on practices

Lake Erie Basin Watershed ARI Pilots



Cambridge

**Fairchild Creek
Sub-watershed**

Brantford

**ARI Project
Funded by
OMAFRA-OGLP
2007-2010**

Lake Erie Basin Watershed ARI Pilots

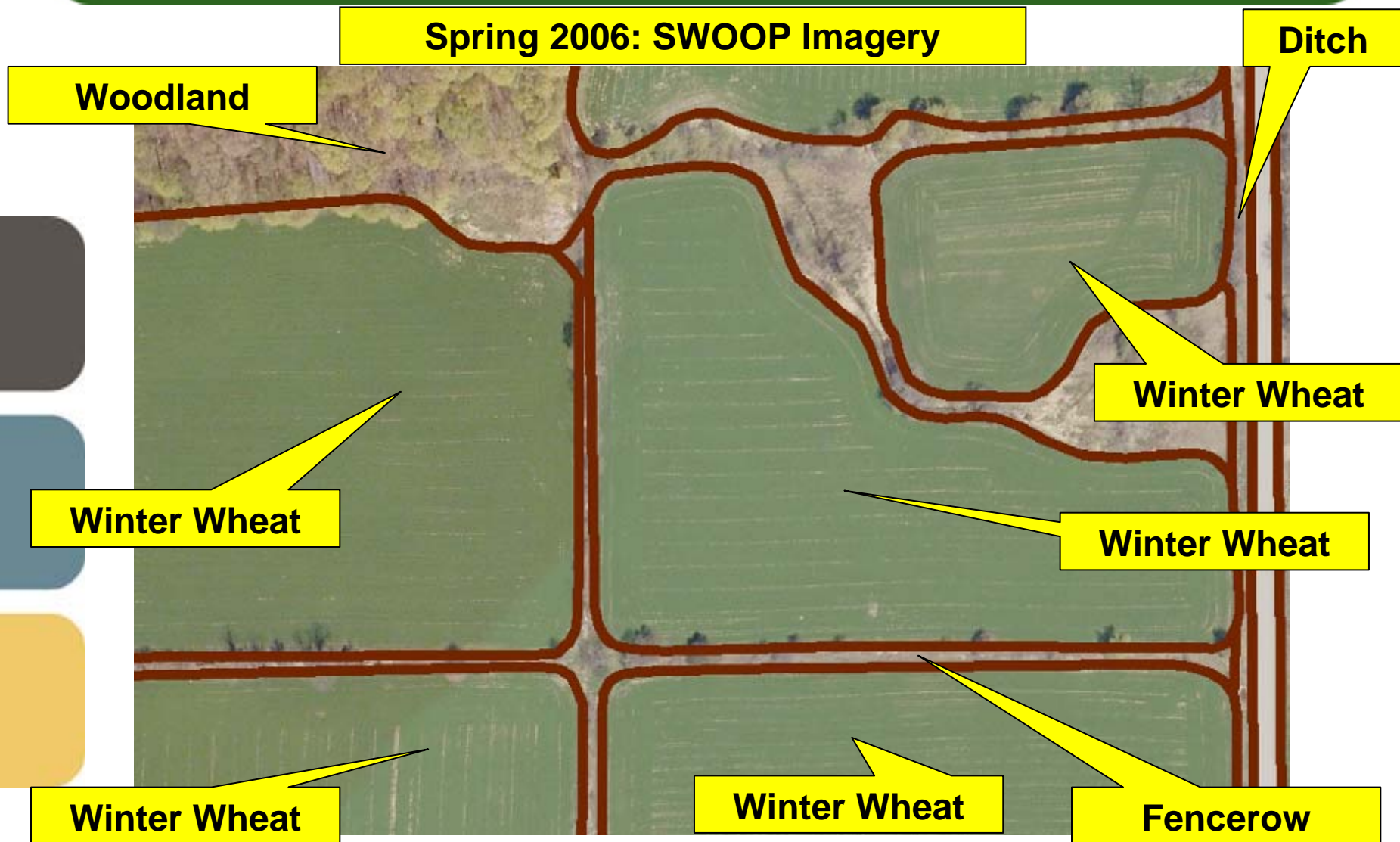


Lake Erie Basin Watershed ARI Pilots

Spring 2006: SWOOP Imagery

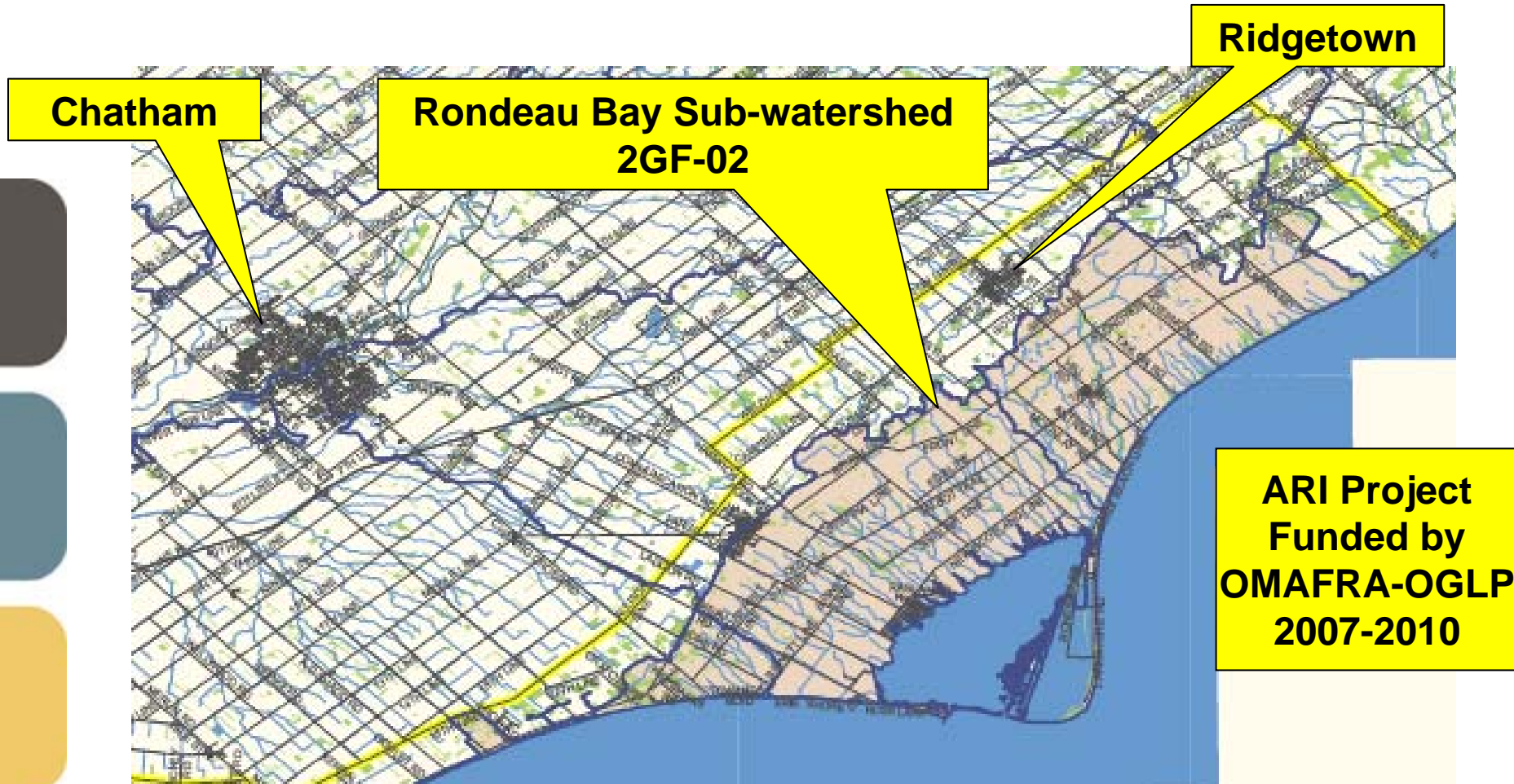


Lake Erie Basin Watershed ARI Pilots



Digitized Polygons: Example from Fairchild Creek Sub-watershed

Lake Erie Basin Watershed ARI Pilots



Ontario's Agricultural Land Management Practices

Some thoughts on land side needs

Data: watershed based land use, practice use, better resolution DEM

Contribution areas better defined: particulate and dissolved
Role of Nitrogen

BMP role and effectiveness, particularly related to DRP

Climate effect: more intense events

Soil test data

Economics of proposed management actions

Thank You