Agriculture in the Great Lakes Basin:

How is it Changing and What is the Effect?

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Outline

• Purpose
• Methods
• Trends pre-1900-2006 and 1976-2006
• Comparison with PLUARG predictions
• Conclusions
Purpose

• Examine long term trends in Ontario agriculture
  – Land use, crops, livestock, stewardship
  – Provincial scale; not regional or GIS analysis

• Compare with PLUARG predictions on agricultural land use & pesticides
Data: Census & Farm Stewardship

- Long term pre-1900-2006 and 1976-2006 Agriculture Census at provincial scale
  - Numbers of farms, types of farms, farm & crop area, livestock numbers
  - Some land practices: fertilizer use, tillage
- Recent stewardship activities 1993-2010
- PLUARG Predictions
Trends in Ontario Agriculture

• Historic period of agricultural expansion
  19th century & early 20th century

• Decrease in land occupied by agriculture in 20th century, growth in non-farm rural

• 20th century shifts created by markets, specialization, genetics, mechanization & efficiency

• What factors have changed, how & why
Farmland Area 1870-2006

- Farmland area
- Crop & pasture area

Hectares x1000

Farm & Crop Area 1921-2006

The chart shows the trend of total area of farms and land in crops from 1921 to 2006. The total area of farms shows a general decrease over the years, with fluctuations. The land in crops also shows a decrease but with less volatility compared to the total area of farms. The year 2004 is marked with a red arrow labeled "PLUARG."
How Much Have Things Changed?

Percent Change 1976-2006

- Decreasing
- Increasing
Major Land Use Change

- Land in Crops
- All Other Land (woodland, wetland)
- Pasture (unimproved)
- Pasture (improved)

Hectares

Livestock 1976-2010

- **Cattle**
- **Pigs**
- **Chickens**
- **Sheep**

Graph showing the number of animals (cattle, pigs, chickens, sheep) from 1975 to 2010.
Trends

- Less area devoted to farms, fewer farms
- Economic productivity growth, like all sectors
- Decrease in farm population, net income
- Amount of cropland stable, pasture decreasing, woodland/wetland decreasing
- Ownership decreasing, land rental increasing
- Pasture, woodlot, wetland appear to be shifting to non-farm rural landowners
- Crops shifting, soybean-wheat-corn rotation prevalent
- Growth in vegetable & greenhouse sectors
- Increase in chickens, decrease in cattle, hogs cyclical
- Specialization, regional trends
Fertilizer Use

- Hectares
- Percentage of total farms

Graph showing the change in hectares and percentage of total farms from 1981 to 2006.
On-Farm Environment Projects
2005-2010

Investment >$250M including >$150M of farmers funds
PLUARG Predictions

• Landmark 1970s PLUARG studies predicted trends in land use & effects
• Predicted agricultural land use, pesticide use, fertilizer use for 1980, 2000, 2020
• How accurate were those predictions?
Pesticide Use: Predictions vs. Survey

- **Herbicide**
  - Predicted: 19.5%
  - Survey: -40.4%
  - Difference: -1.1%

- **Fungicide**
  - Predicted: 61.2%
  - Survey: -49.0%
  - Difference: 10.2%

- **Insecticide**
  - Predicted: 8.8%
  - Survey: -51.8%
  - Difference: 59.6%
Predictions vs. Trends

- Agricultural land predictions fairly accurate
- Change in pasture not examined
- Assumed livestock would increase
- Pesticide use predictions assumed no change in practices
  - Programs put in place as a result of PLUARG
  - Food Systems 2002, Integrated Pest Management, prices, Environmental Farm Plans
Conclusions

• Need to look at long term changes on land and in lakes to understand environmental trends
• Agriculture’s effects on water quality are changing as agriculture changes
• Changes in agriculture not always what the public perceive them to be
• Changes in production respond to consumers, marketplace and food system