

Using APFO's Imagery Archive to Study Land Use Change

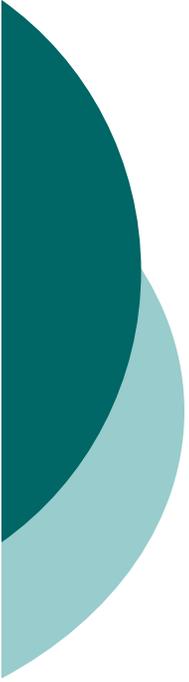
Zack Adkins, Nathan Pugh
USDA/FSA/APFO/Service Center Support Section

2009 USDA Imagery Planning Meeting



Outline

- Introduction and Overview of Projects
- Methodology
- Projects
 - Sacramento
 - Dallas
- Questions



Introduction and Overview

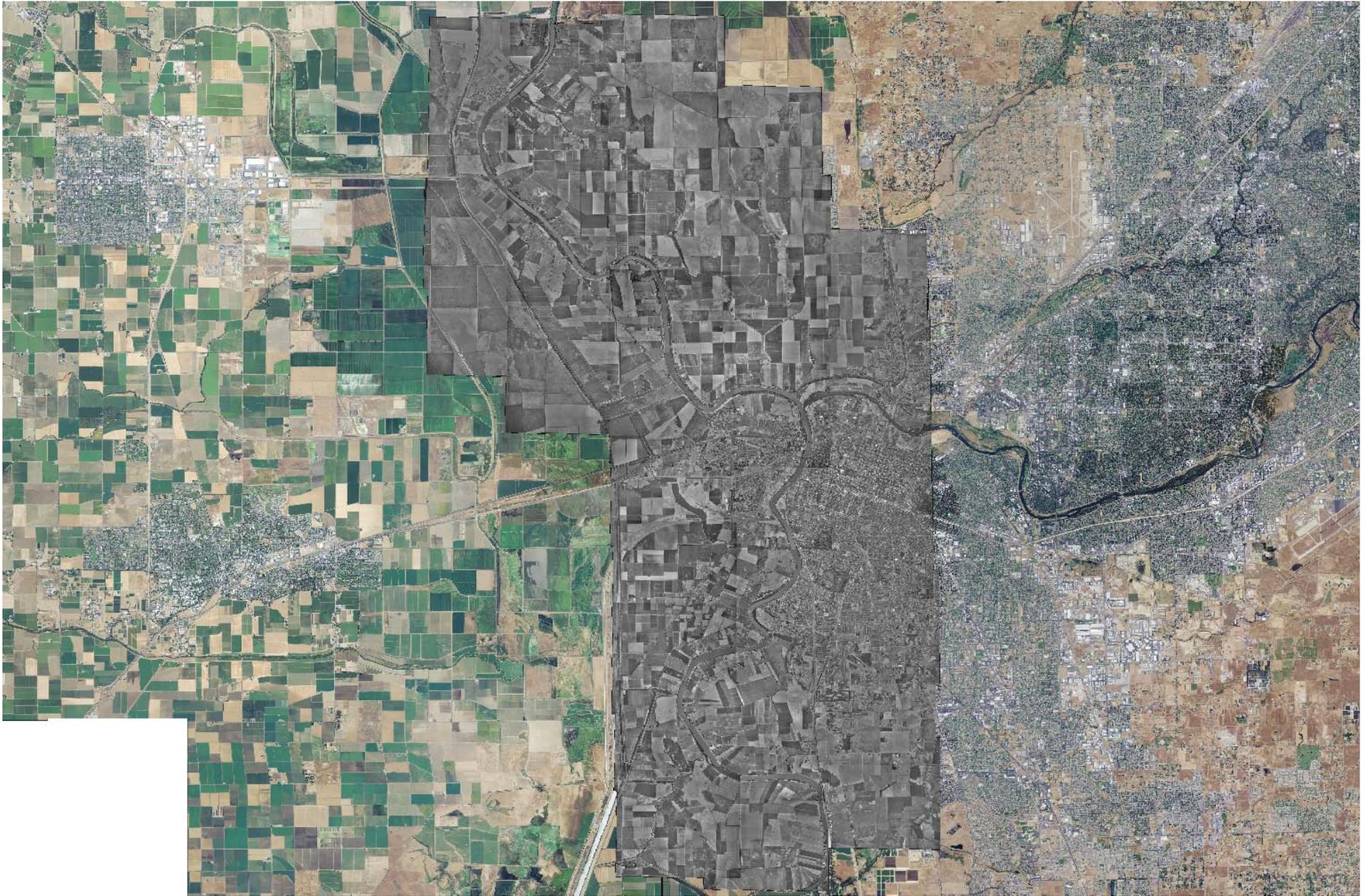
- Request from WDC
 - Using FSA data, show what is happening to farm and ranch lands as a result of urban sprawl, land use change, etc.
 - Six areas of interest
 - Chicago, Dallas, Sacramento, Raleigh, Springfield(MA), Chesapeake Bay area



Introduction and Overview

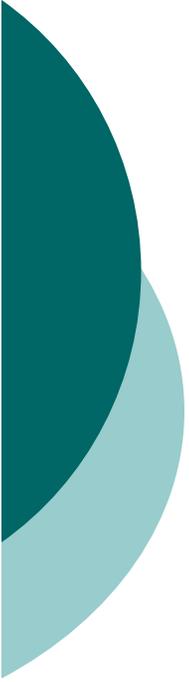
- Resources
 - Data
 - Imagery, CLU, farm records data
 - Software
 - ESRI, ERDAS, GeoExpress
 - Personnel
 - 10 employees in Geospatial Services Branch





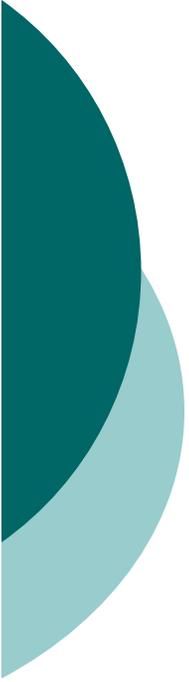
12/17/2009





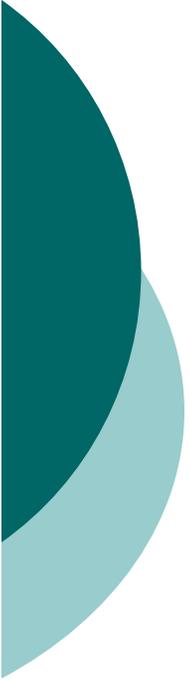
Methodology

- Imagery analysis
 - Supervised/Unsupervised Classification
 - Ag/Non-ag, crop type, general land cover types
 - Manual Classification
 - Heads-up digitizing of agricultural areas
 - Heads-up digitizing to determine land use for a small area



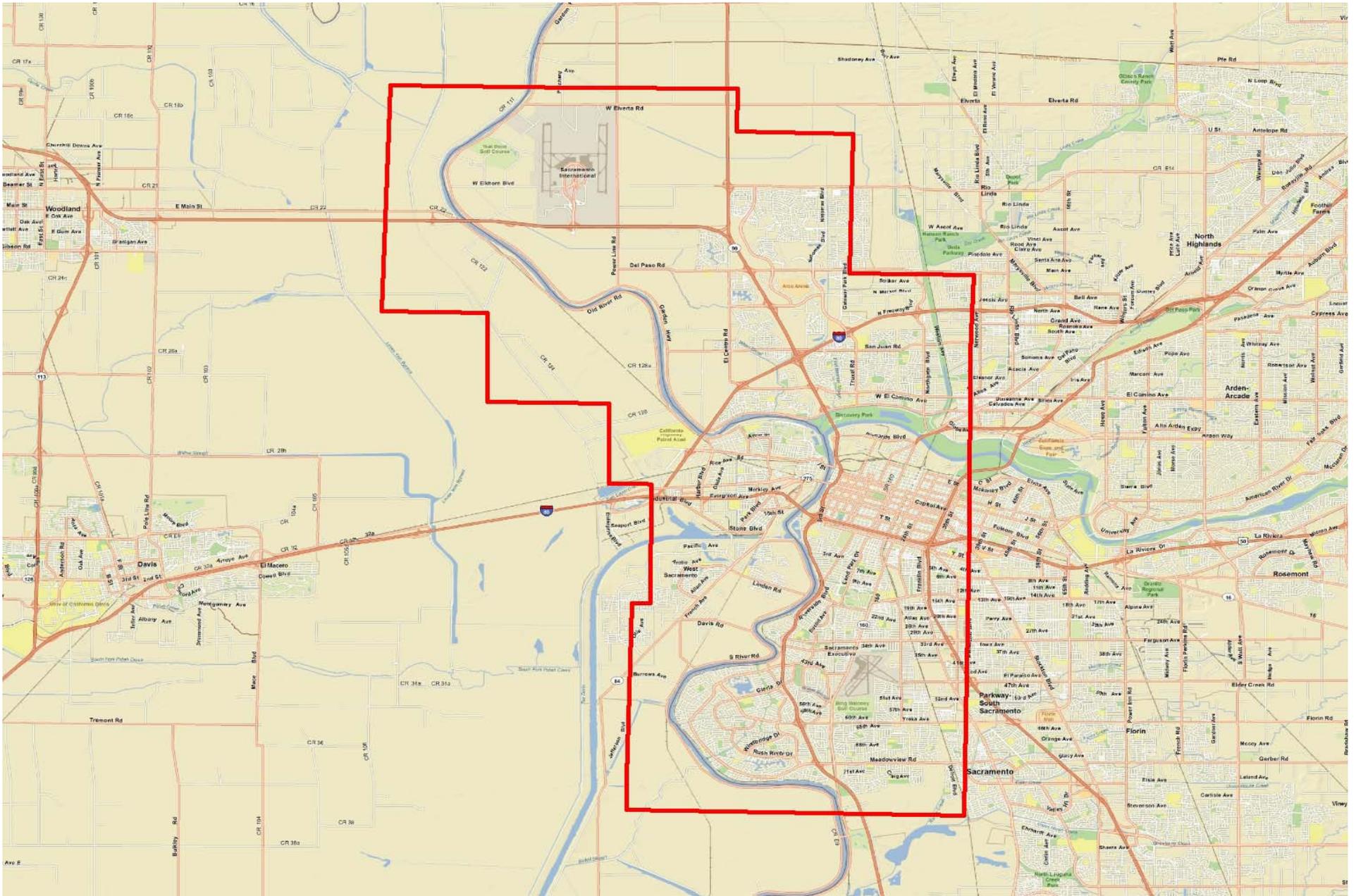
Methodology

- Other data analysis
 - DCP and ACRE data
 - CLU
 - Loss of CLU over time
 - Identifying potential non-agricultural CLU
 - Farm records data
 - Crop type
 - CRP data



Methodology

- Generate final products
 - Map layouts (hard and soft copy)
 - Graphs, charts, tables, etc.
 - PowerPoint show
 - Project report



12/17/2009





Project-Sacramento

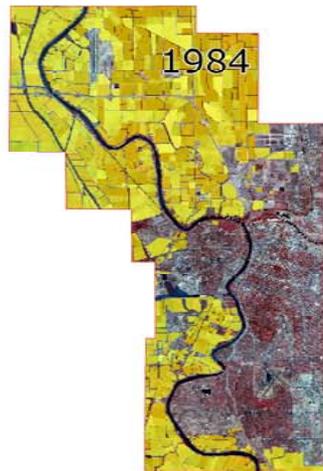
- Imagery
 - 1958, 1964, 1972, 1984, 1998, 2009
- Other Data
 - CLU, DCP/ACRE records
- Data sources
 - APFO, ESRI, FSA-California



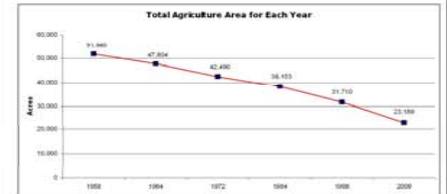
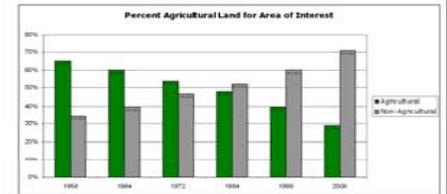
Project-Sacramento

- Agriculture loss over time
 - Agricultural areas were manually digitized for all years of imagery
 - Acreage totals were analyzed for each year

Agricultural Loss Around Sacramento, CA: 1958-2009

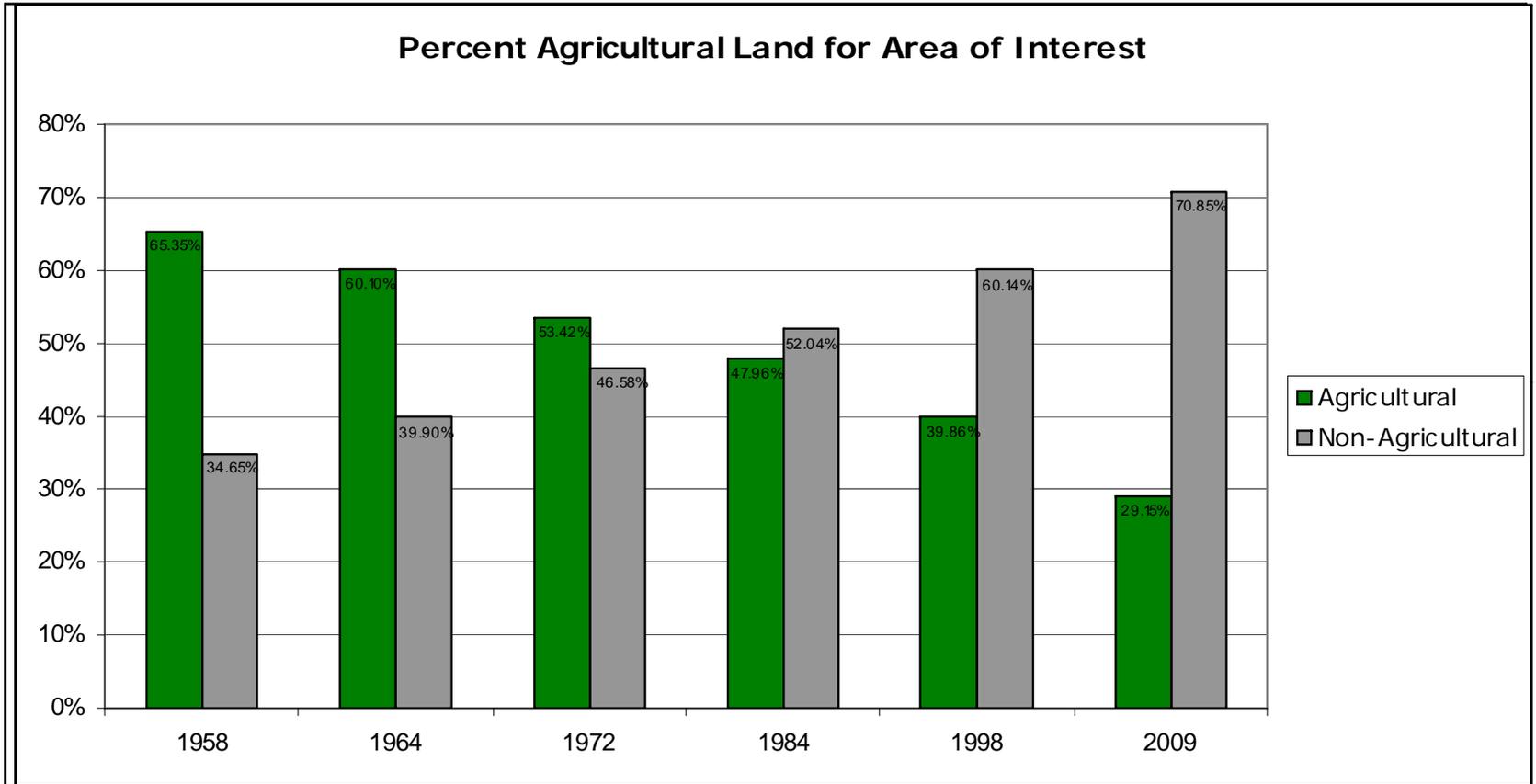


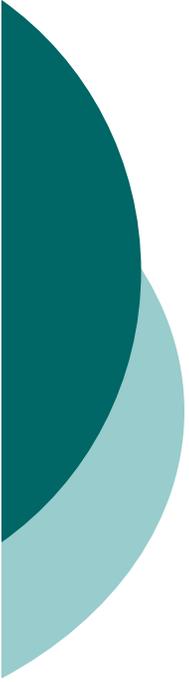
This graphic shows the loss of agriculture land around Sacramento from 1958 to 2009. The area of interest is along the Sacramento River from near the present day airport in the north to the Pocket-Greenhaven area in the south. Overall, the area has experienced a 55% loss in farmland. This is most evident in Pocket-Greenhaven which was nearly all agriculture in 1958; in 2009 it is entirely devoid of farmlands.



Data Sources: USDA/FSA/APFO, ESRI, FSA-California
 Note: Areas in transparent yellow represent agriculture.

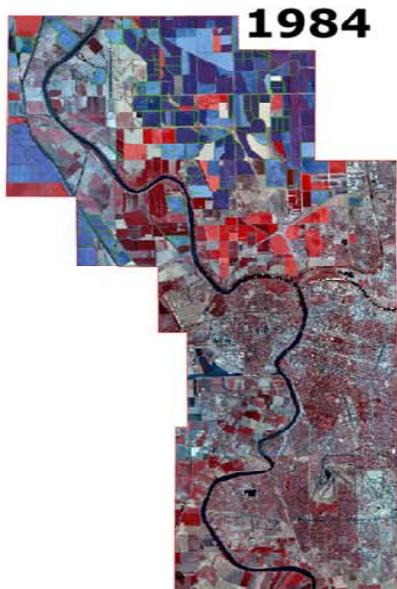
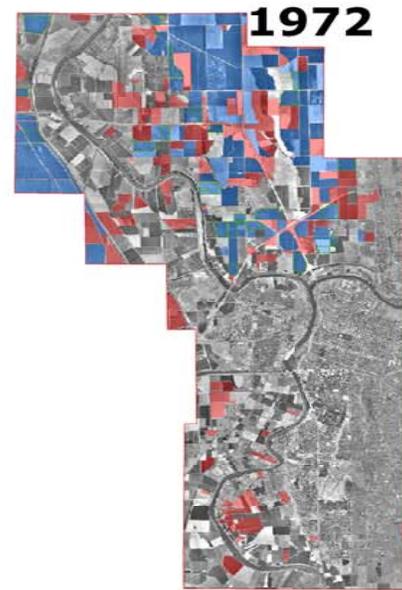
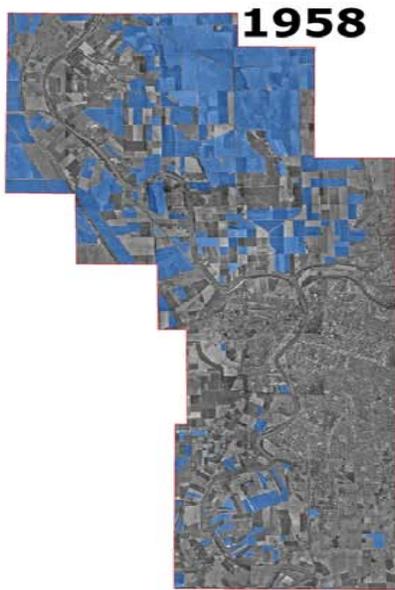






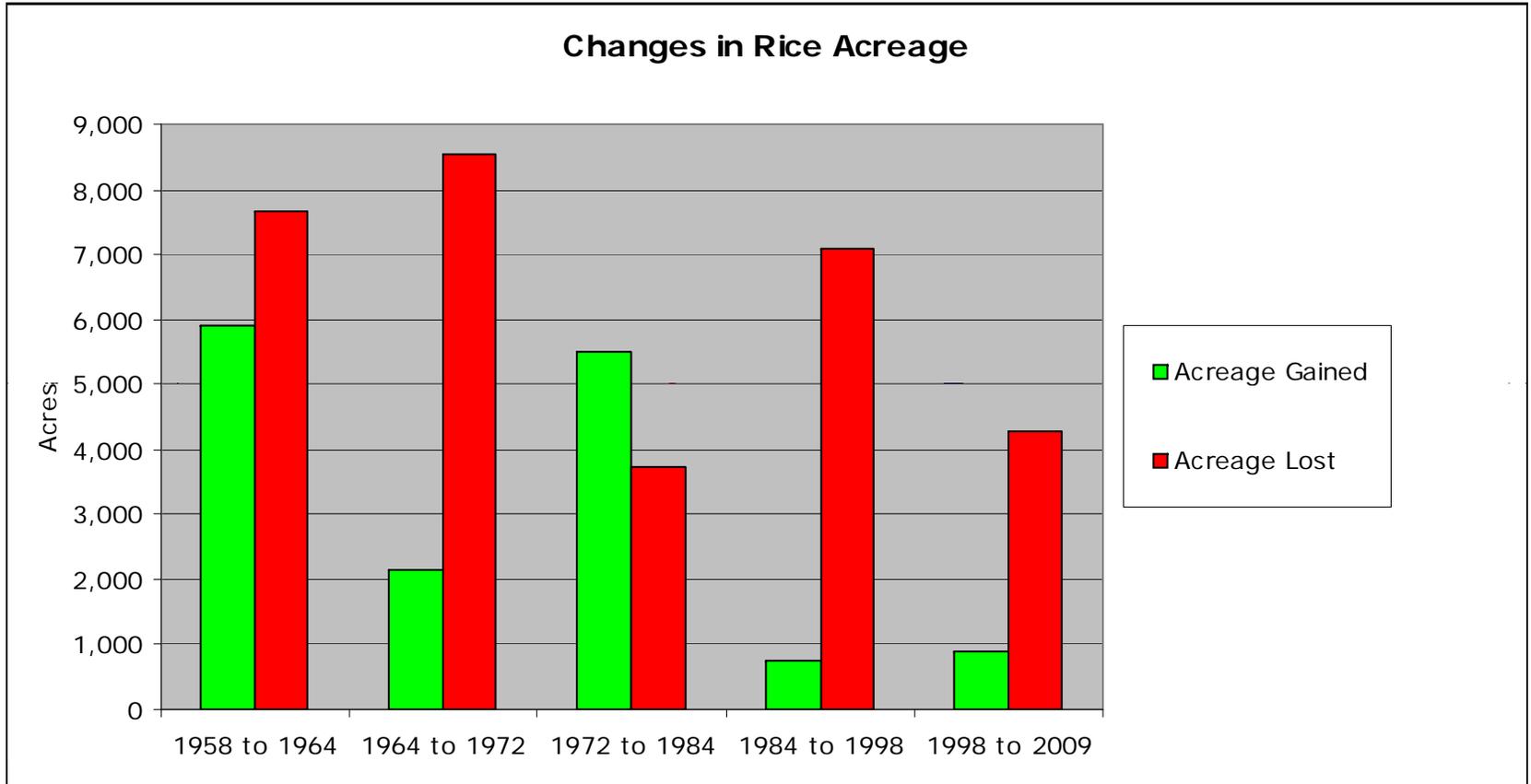
Project-Sacramento

- Rice cropland loss over time
 - Rice growing areas were manually digitized for all years of imagery
 - Acreage totals were analyzed for each year



12/17/2009



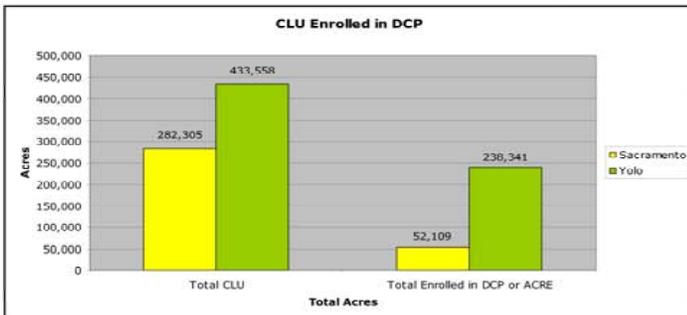
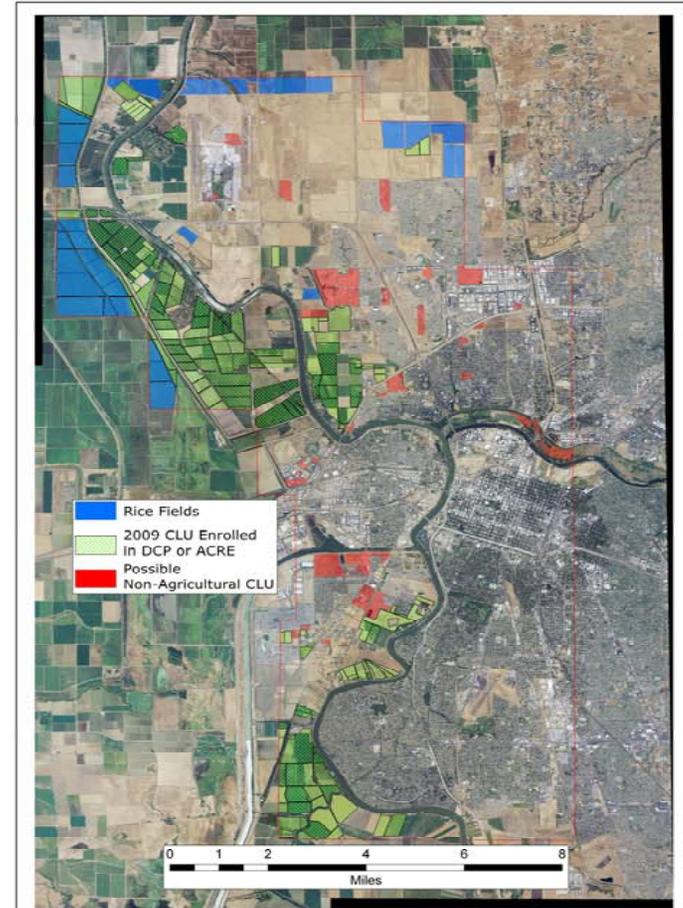
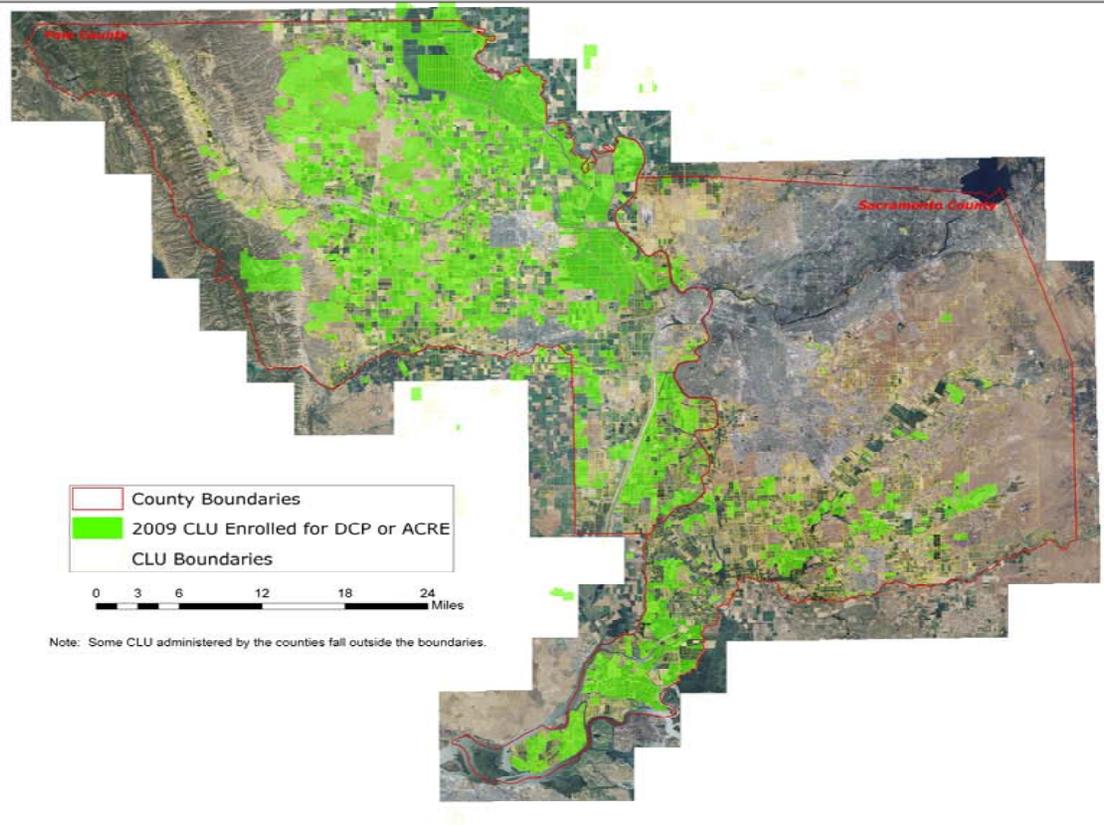




Project-Sacramento

- CLU enrollment in DCP/ACRE
 - Farms enrolled in DCP/ACRE were extracted from a tabular database
 - Farm data joined with CLU for Yolo and Sacramento Counties
- Identifying CLU enrolled in programs that may no longer be agricultural

2009 DCP and ACRE Enrollment for Sacramento and Yolo Counties

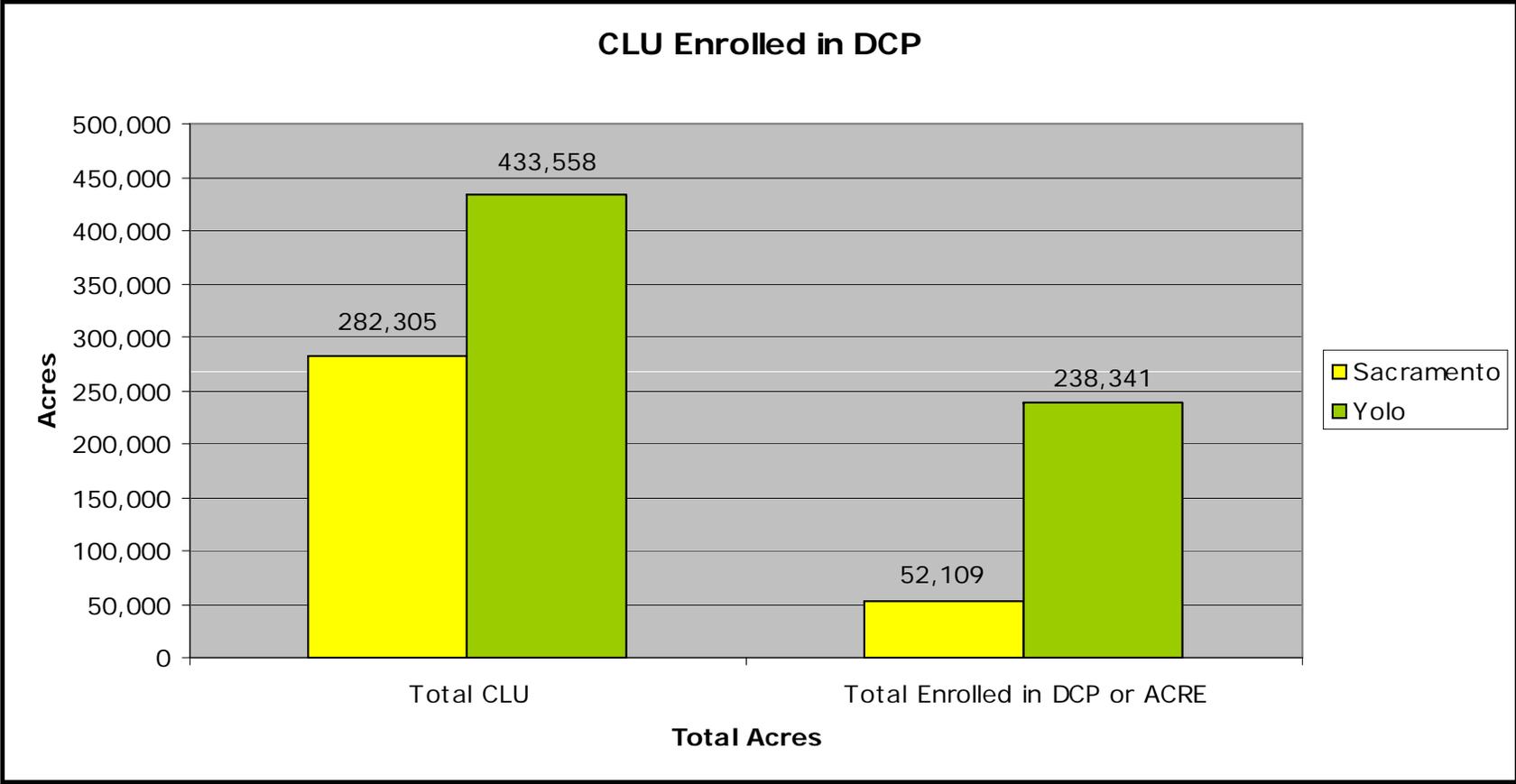
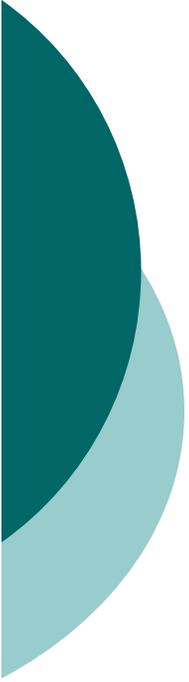


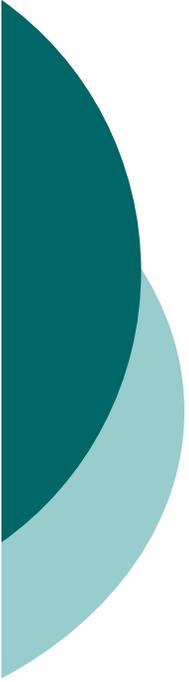
The above graphic shows CLU (Common Land Units) that are enrolled in the FSA DCP and ACRE programs. DCP (Direct and Counter-Cyclical Payment) and ACRE (Average Crop Revenue Election) provide payments to producers who are eligible on enrolled farms. For 2009, Sacramento County has 18% of CLU enrolled and Yolo County has 55% CLU enrolled. The graphic on the right shows DCP acreage for an area of interest along the Sacramento River. Of the estimated rice acreage in the AOI, 59% is enrolled in DCP or ACRE. For all CLU within the AOI, 1,927 acres were deemed to be possibly no longer of an agricultural use. None of this acreage is enrolled in the DCP or ACRE programs.

Data Sources: USDA/FSA/APFO, ESRI, FSA-California

Note: Colors in the above graphics are represented as transparencies.



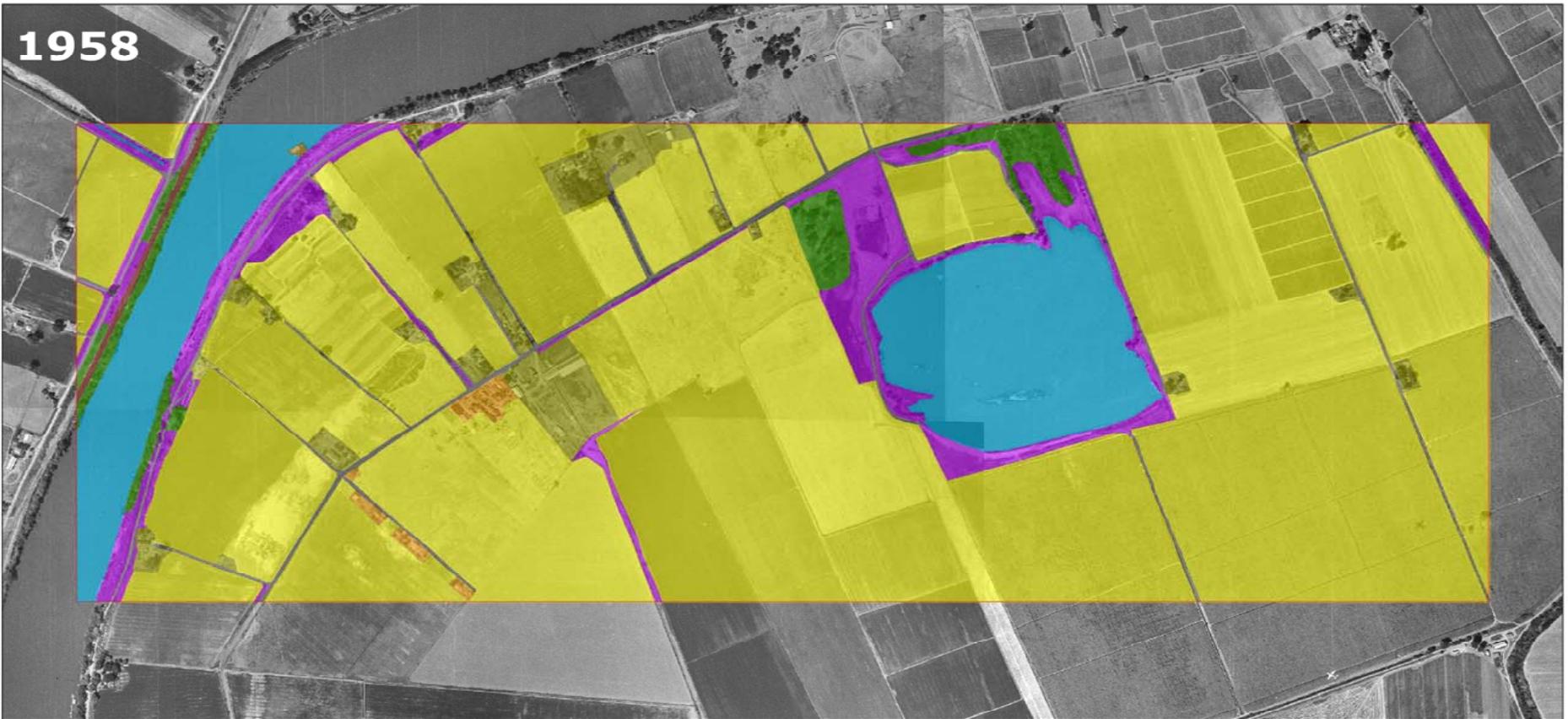




Project-Sacramento

- Land use change over time
 - Area of interest in Pocket/Greenhaven
 - 1.3 square miles
 - 10 land cover class types
 - Farmland, water, road, railroad, residential, commercial/industrial, forest/woodland, recreational, farm, other
 - Class types manually digitized
 - 1958 and 2009

1958



Land Cover Types

 farmland	 commercial/industrial
 water	 forest/woodland
 road	 recreational
 railroad	 farm
 residential	 other



2009



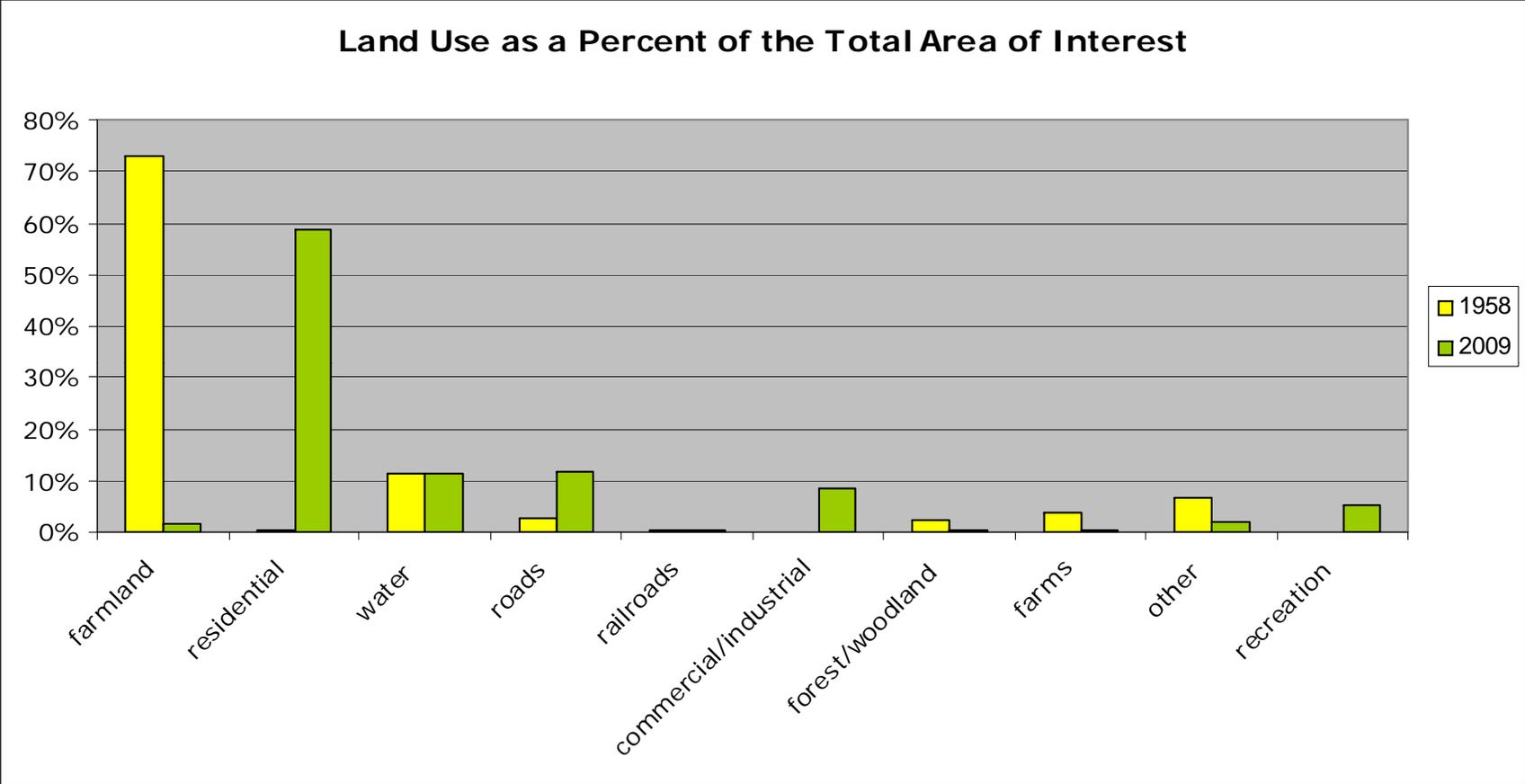
Land Cover Types

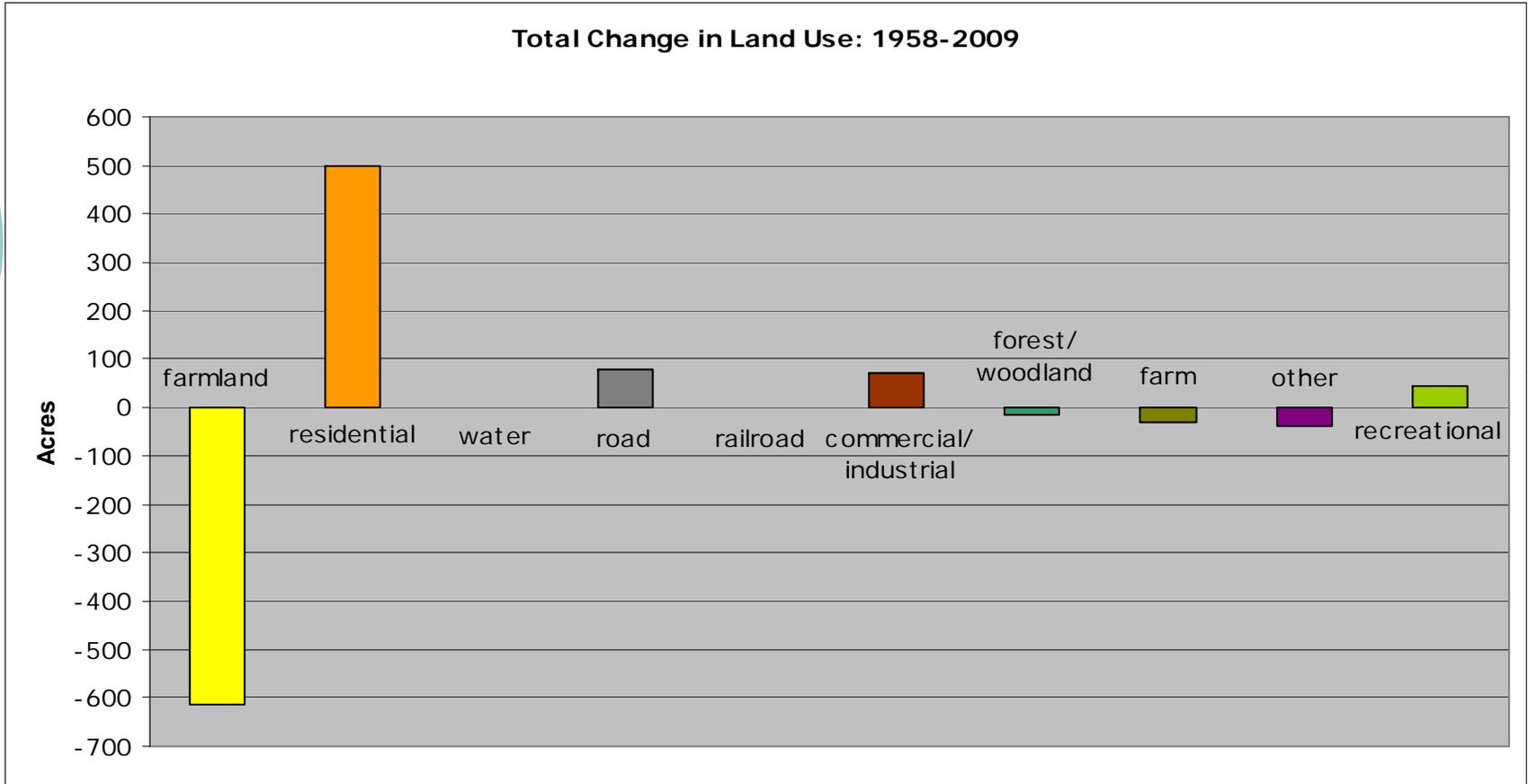
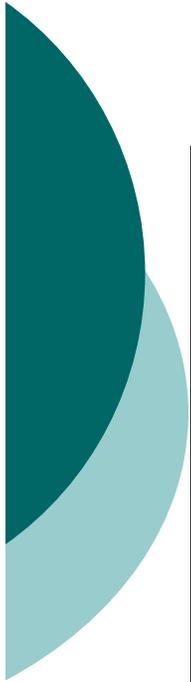
	farmland		commercial/industrial
	water		forest/woodland
	road		recreational
	railroad		farm
	residential		other

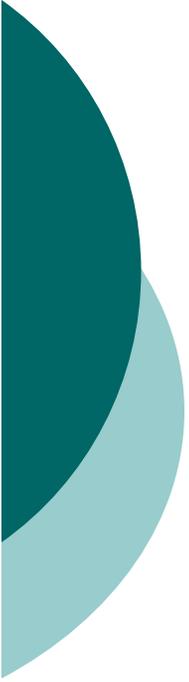




Land Use as a Percent of the Total Area of Interest

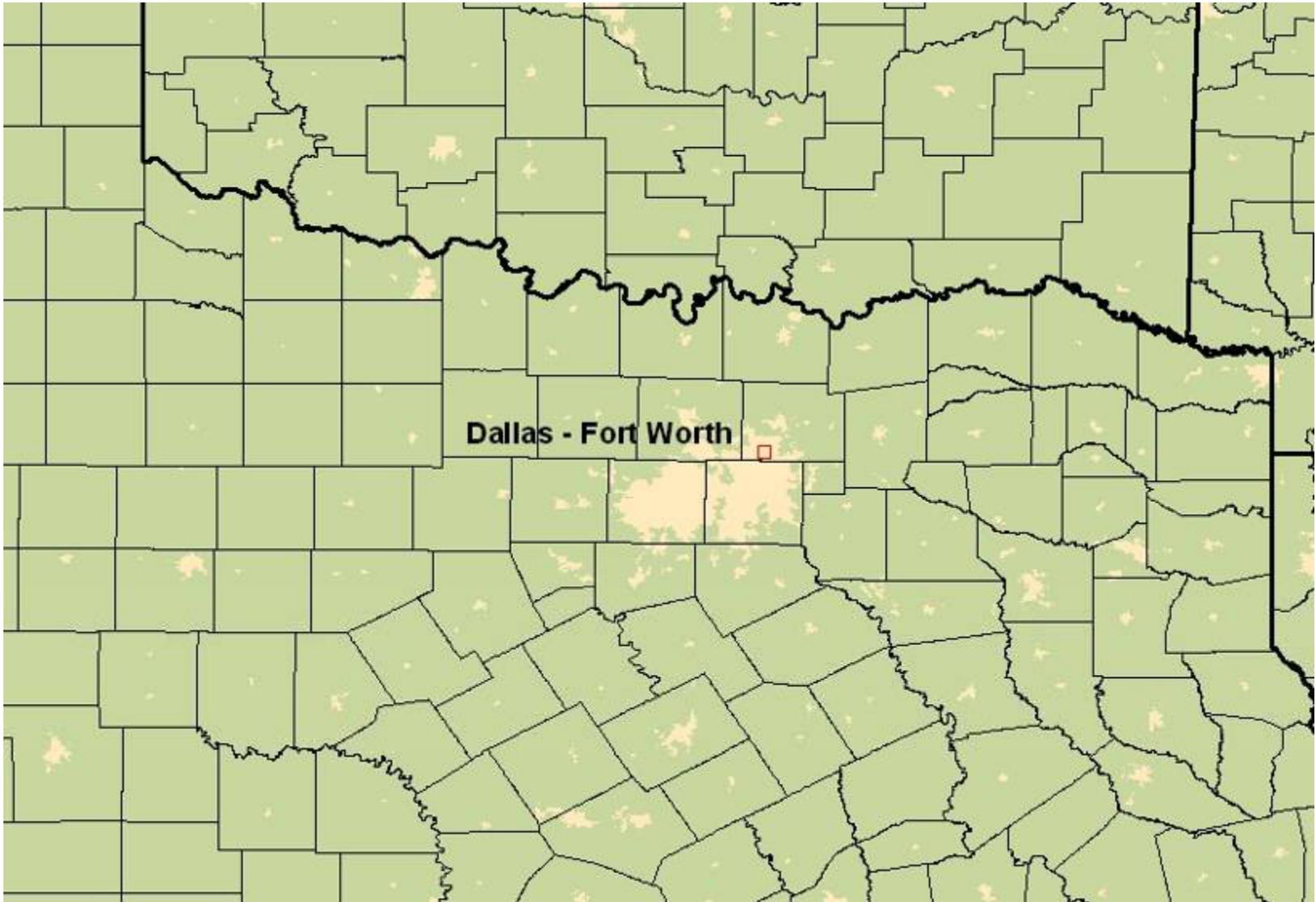






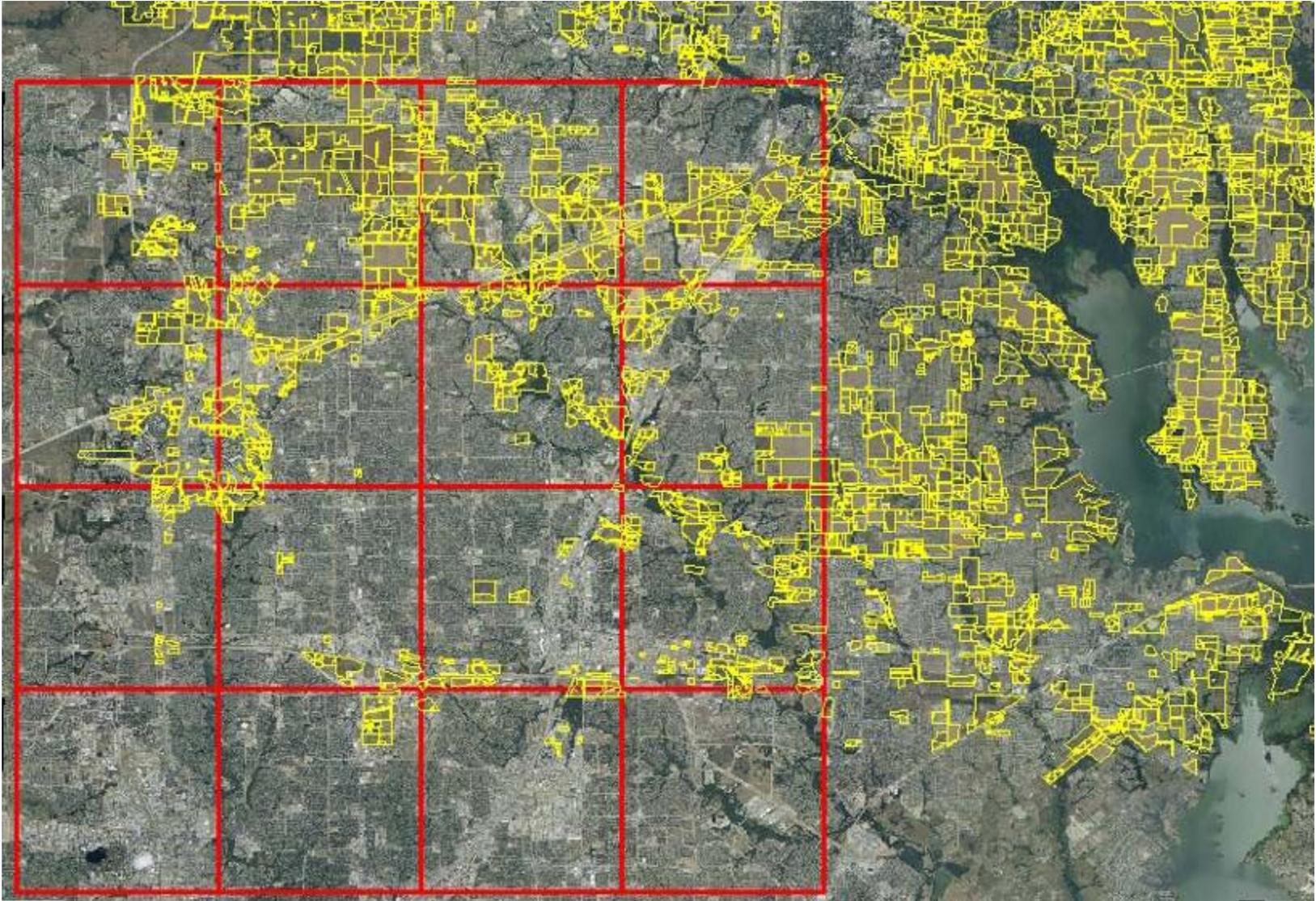
Project-Dallas

- Area of Interest near Plano
- Study focus
 - Loss of agricultural land over time
 - Land use change for a specific area
 - CLU – DCP – CRP – Farm Records



12/17/2009





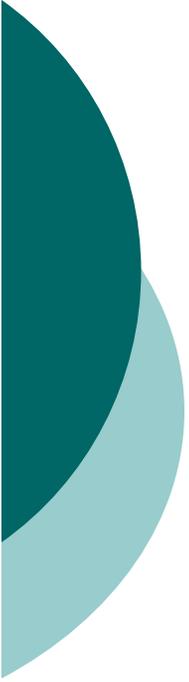
12/17/2009





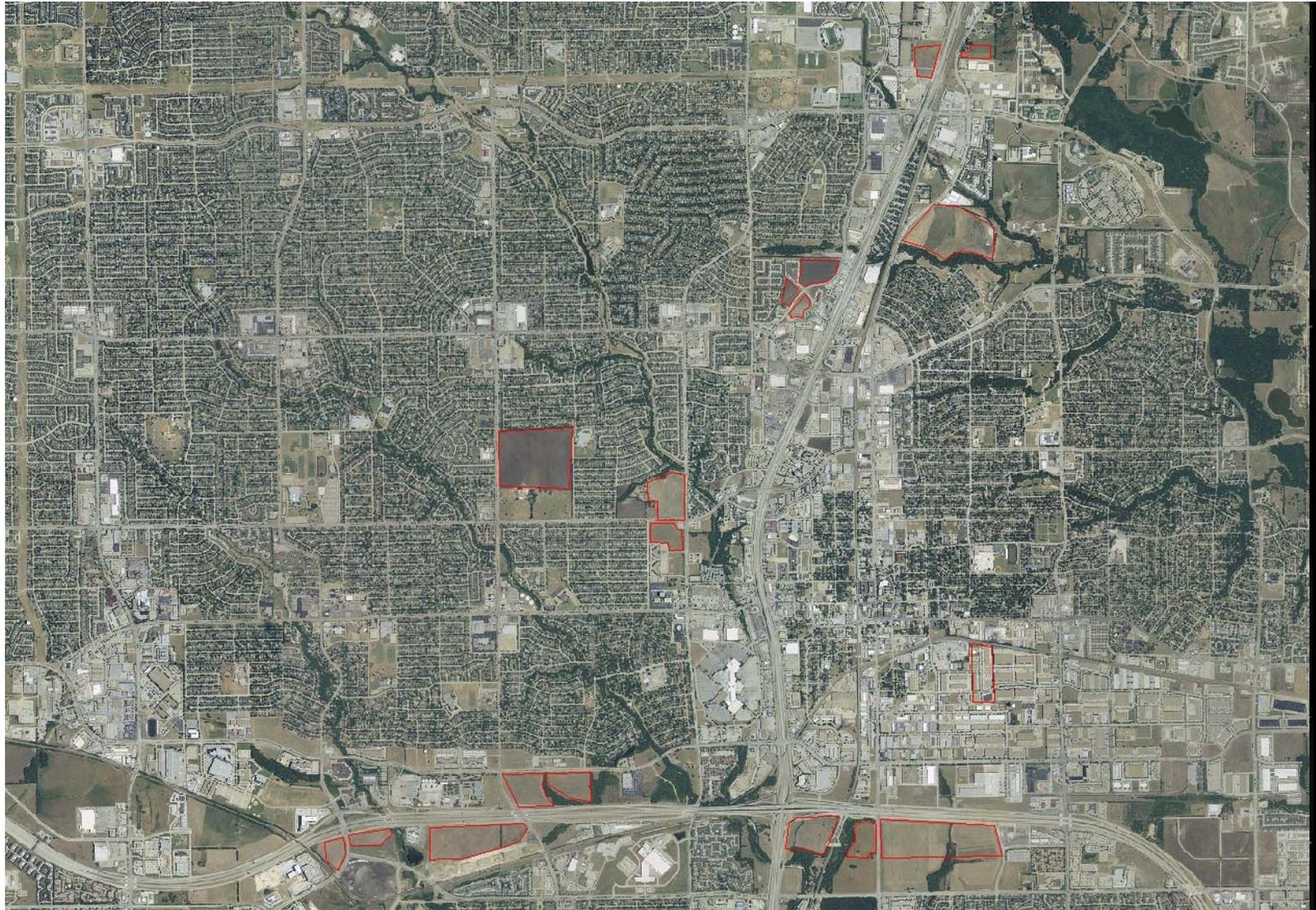
Project-Dallas

- Imagery
 - 1964, 1972, 1980, 1990, 1998, 2008
- Other Data
 - CLU, DCP/ACRE records, CRP, Farm Records
- Data sources
 - APFO, ESRI, FSA-Texas, FSA-Washington, DC



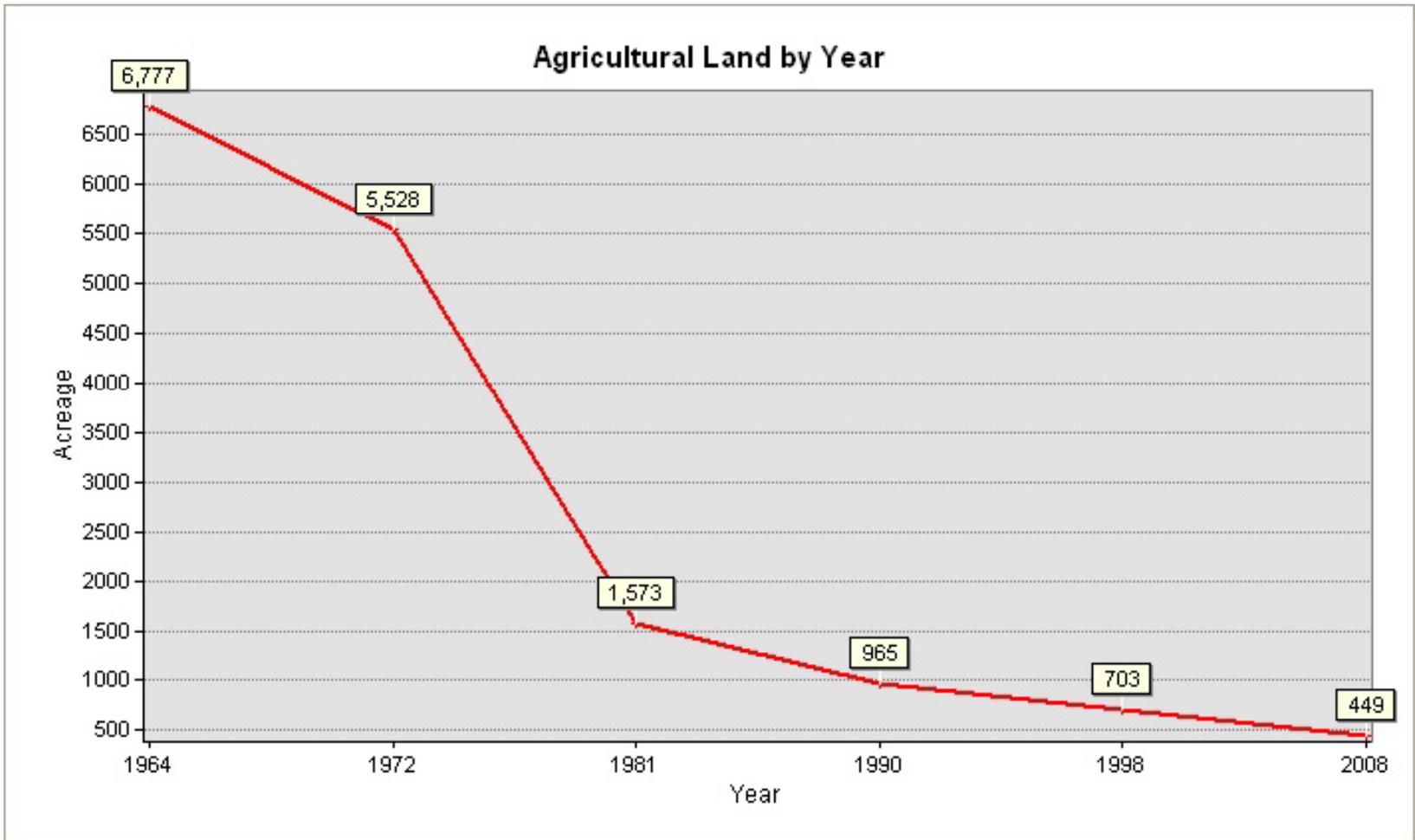
Project-Dallas

- Agriculture loss over time
 - Agricultural areas were manually digitized for all years of imagery
 - Acreage totals were analyzed for each year



12/17/2009







Project-Dallas

- Example of CRP enrollment with Imagery
 - Check CRP program with current and historical imagery

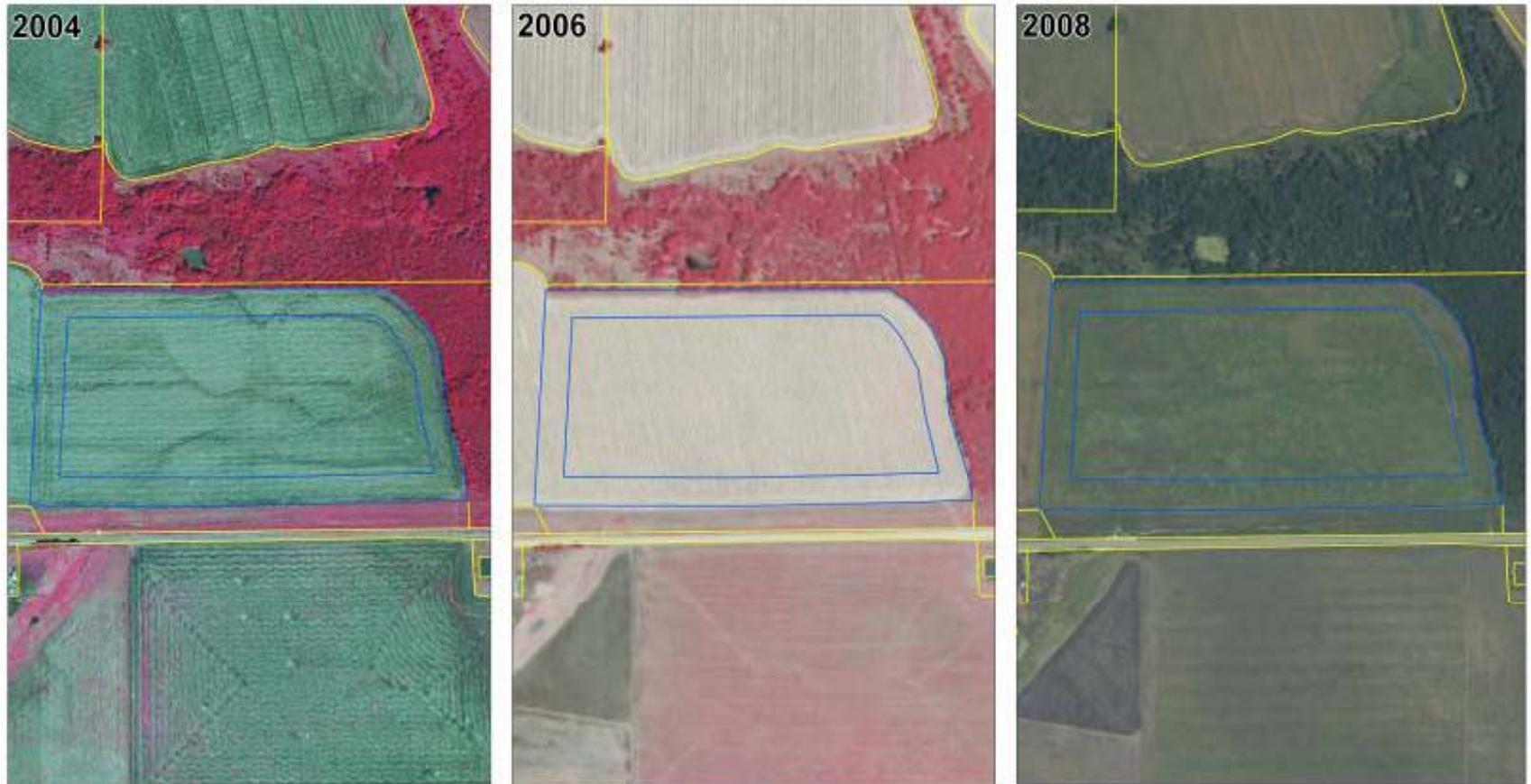
CRP - HABITAT BUFFERS FOR UPLAND BIRDS PROGRAM CP33

Habitat buffers for upland birds are strips of vegetation established around the edges of crop fields to provide habitat for bobwhite quail, ring-neck pheasant, and other upland birds. Many of these birds have suffered population declines due to loss of habitat. These buffers can provide important nesting, brood rearing and escape cover while also serving as travel corridors between areas of suitable habitat. In addition to habitat for upland birds, these buffers may provide habitat for other animals and may limit sediment, nutrients, pesticides, and other contaminants from entering streams and other water bodies.

By diversifying vegetation in these buffers, desirable habitat will develop. The growth forms of a variety of species, combined with management to increase open cover, will provide food sources in the forms of seed, insects and soil invertebrates. Shrubs may be included to diversify cover and food, but are optional.

 CP33 Polygon

Based on the CRP CP33 polygon location it looks like the area has changed from crop land in 2004 and 2006 to being a habitat buffer in 2008.



Buffers can be established around field edges on any eligible cropland. Buffers can be planted along one or more sides of a field, however establishing a buffer around the entire field should be considered and is highly encouraged. CP33 is considered permanent habitat, and as such, should be considered "hands off" from any farming operations.

CP33 should be designed to be adjacent to cropland and is not intended as a whole field retirement practice. The "infeasible-to-farm" rule does not apply.
CP33 can be established through either natural succession, or through planting a mixture of native warm season grasses (WIG), legumes, and forbs.

The only cool season grasses allowed under this practice are: Canada, Riverbank, and Virginia Wildrye. Consider using the Wildrye species when planting, such as where fields are adjacent to woodlands, is a concern.

Limited tree and shrub plantings, up to 10% of the practice acreage, are allowed.

Buffer widths will be a minimum of 30 feet and up to a maximum average width of 120 feet (measured from the edge of the field).

Habitat buffers will not be grazed, hayed, or mowed during the life of the contract.

Shrub rows will be six (6) feet apart and spaced three (3) to four (4) feet apart within each row.

Habitat buffers for upland birds do not include food plots. Food plots will not be established within habitat buffers for upland birds.

Habitat buffers for upland birds will not be used as run rows, lanes, roads, or for storage of crops or equipment.

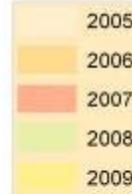
Grassland bird populations (especially quail) will be monitored on some of CP33 practices to and evaluate the success of this practice.



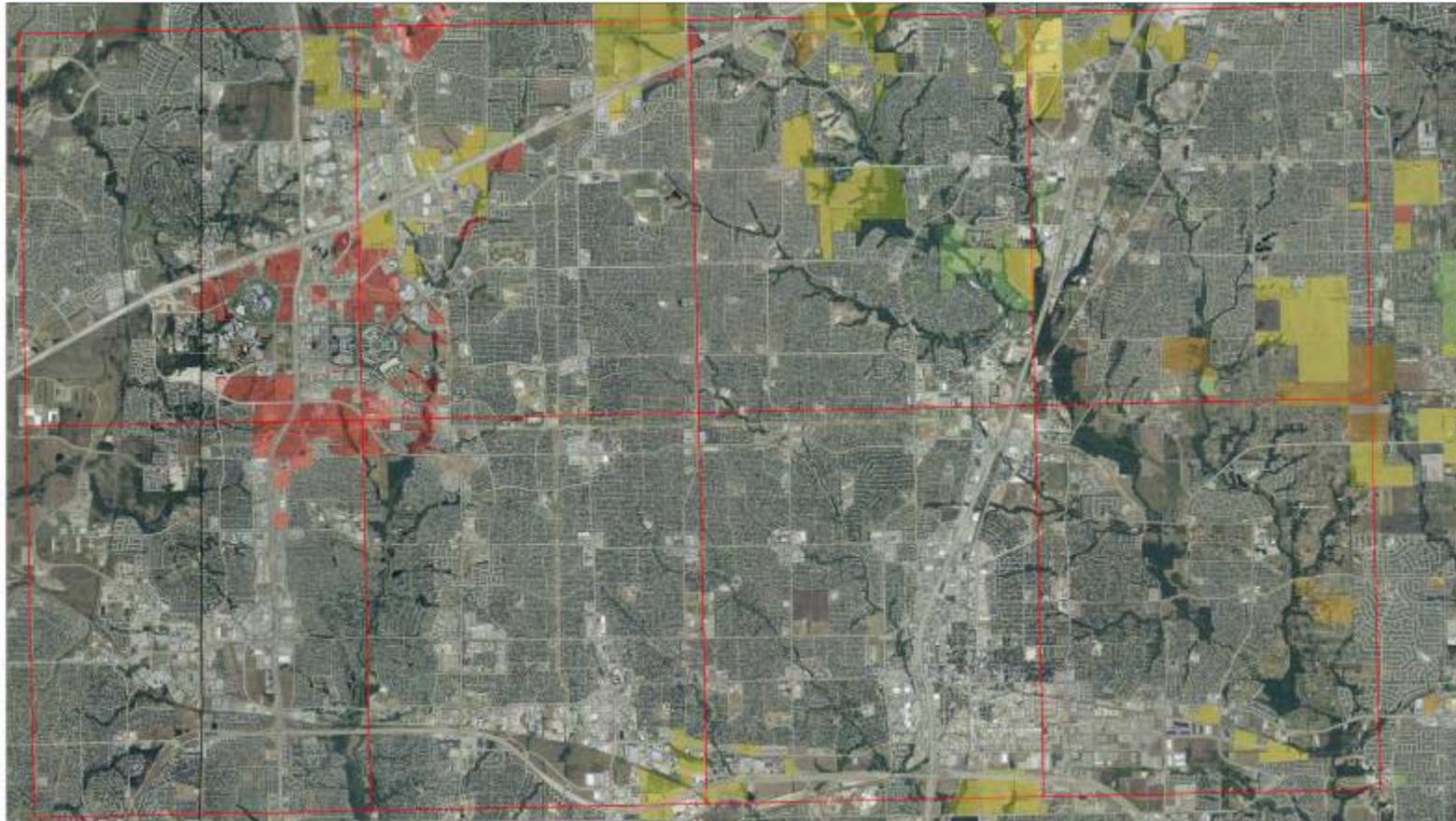
Project-Dallas

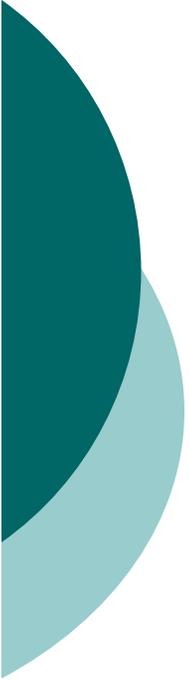
- CLU enrollment in DCP
 - Farms enrolled in DCP were extracted from a tabular database
 - DCP data joined with CLU for Collin County, Texas
 - Identifying Urban CLU potentially enrolled in agricultural programs

CLU - DCP APPROVED 2005 - 2009 PLANO, TEXAS



The Direct and Counter-cyclical Payment Program (DCP) provides payments to eligible producers on farms enrolled for the 2008 through 2012 crop years. There are two types of DCP payments - direct payments and counter-cyclical payments. Both are computed using the base acres and payment yields established for the farm. DCP is authorized by the Food, Conservation and Energy Act of 2008 (Farm Bill) and is administered by the U.S. Department of Agriculture's Farm Service Agency (FSA).



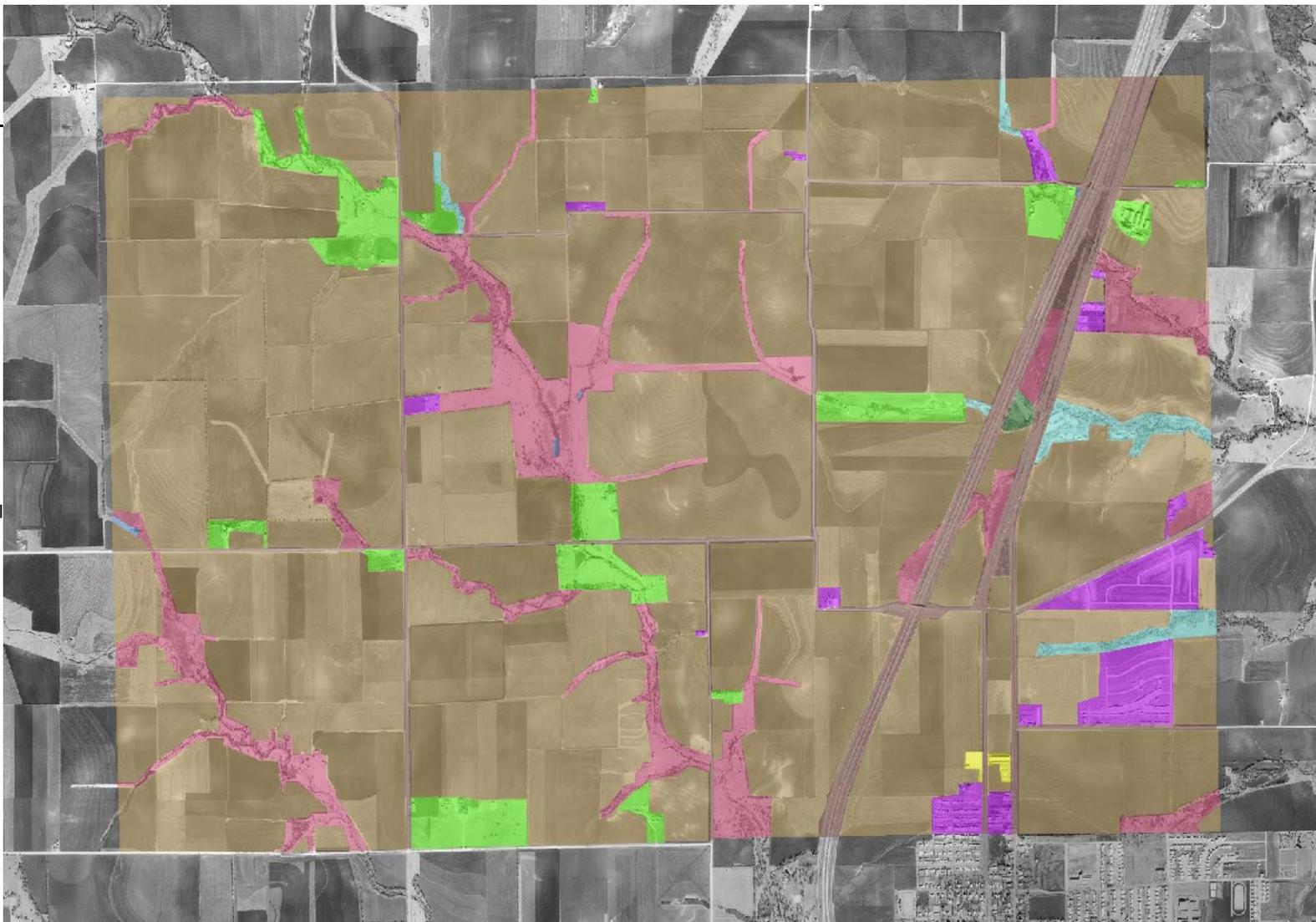


Project-Dallas

- Land use change over time
 - Area of interest in Plano
 - 9 square miles
 - 10 land cover class types
 - Farmland, water, road, railroad, residential, commercial/industrial, forest/woodland, recreational, Farm Facilities, other
 - Class types manually digitized
 - Poor Results with Automated Classification
 - 1964 and 2008

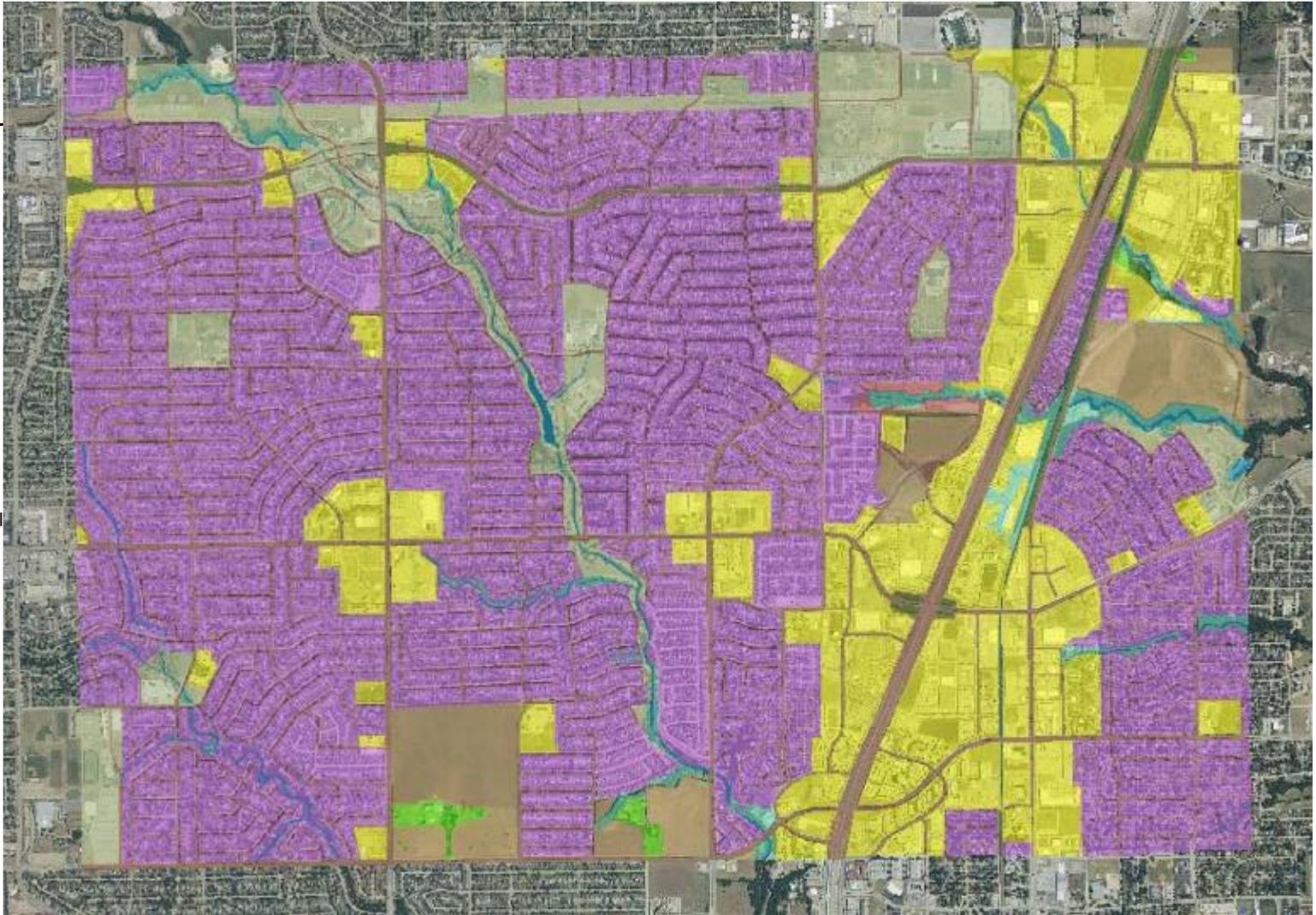
Project-Dallas-1964

- Commercial/Industrial
- Farm Facilities
- Farmland
- Forest/Woodland
- Grassland/Pasture
- Other
- Railroad
- Recreational
- Residential
- Roads
- Water



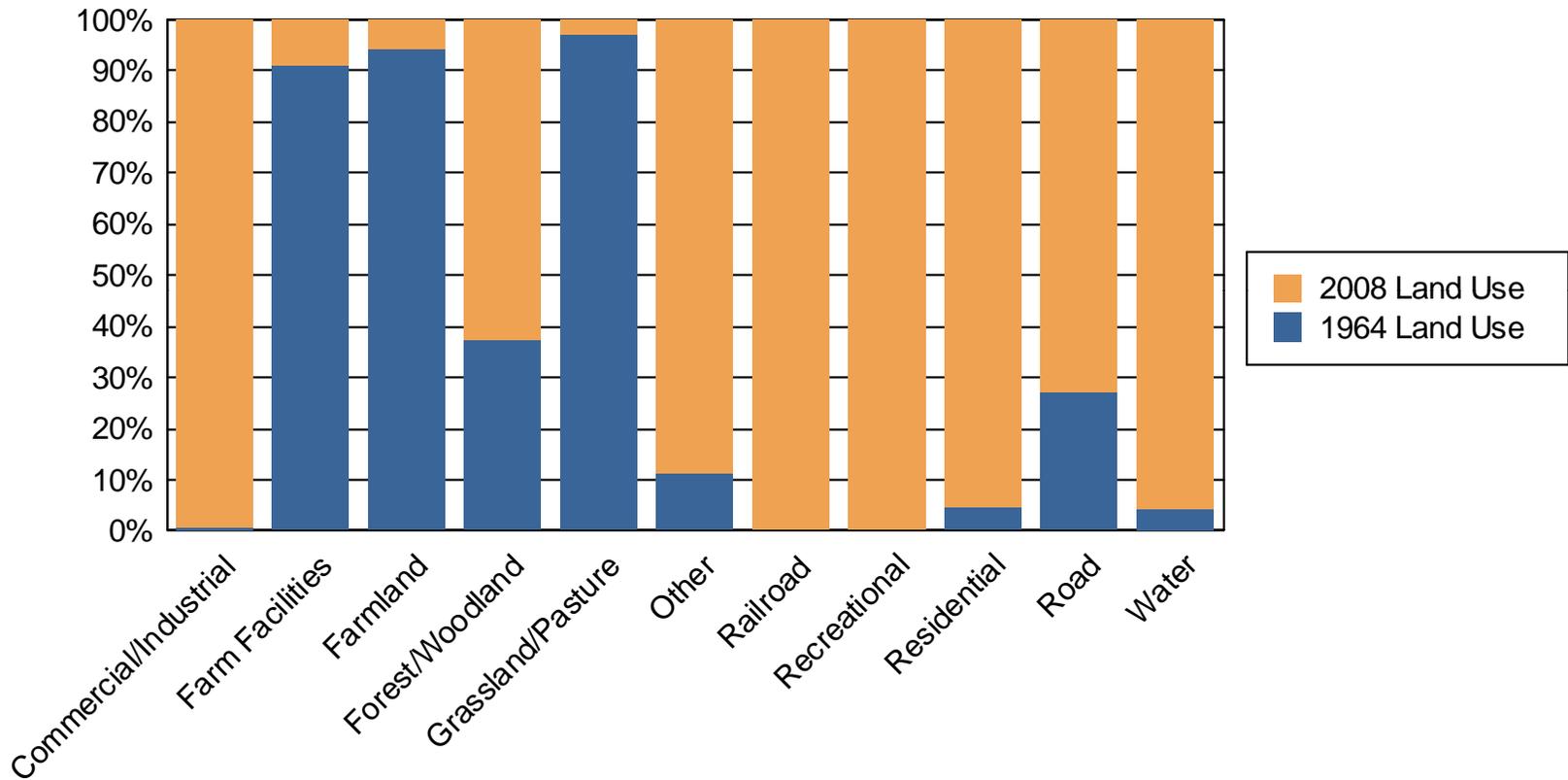
Project-Dallas-2008

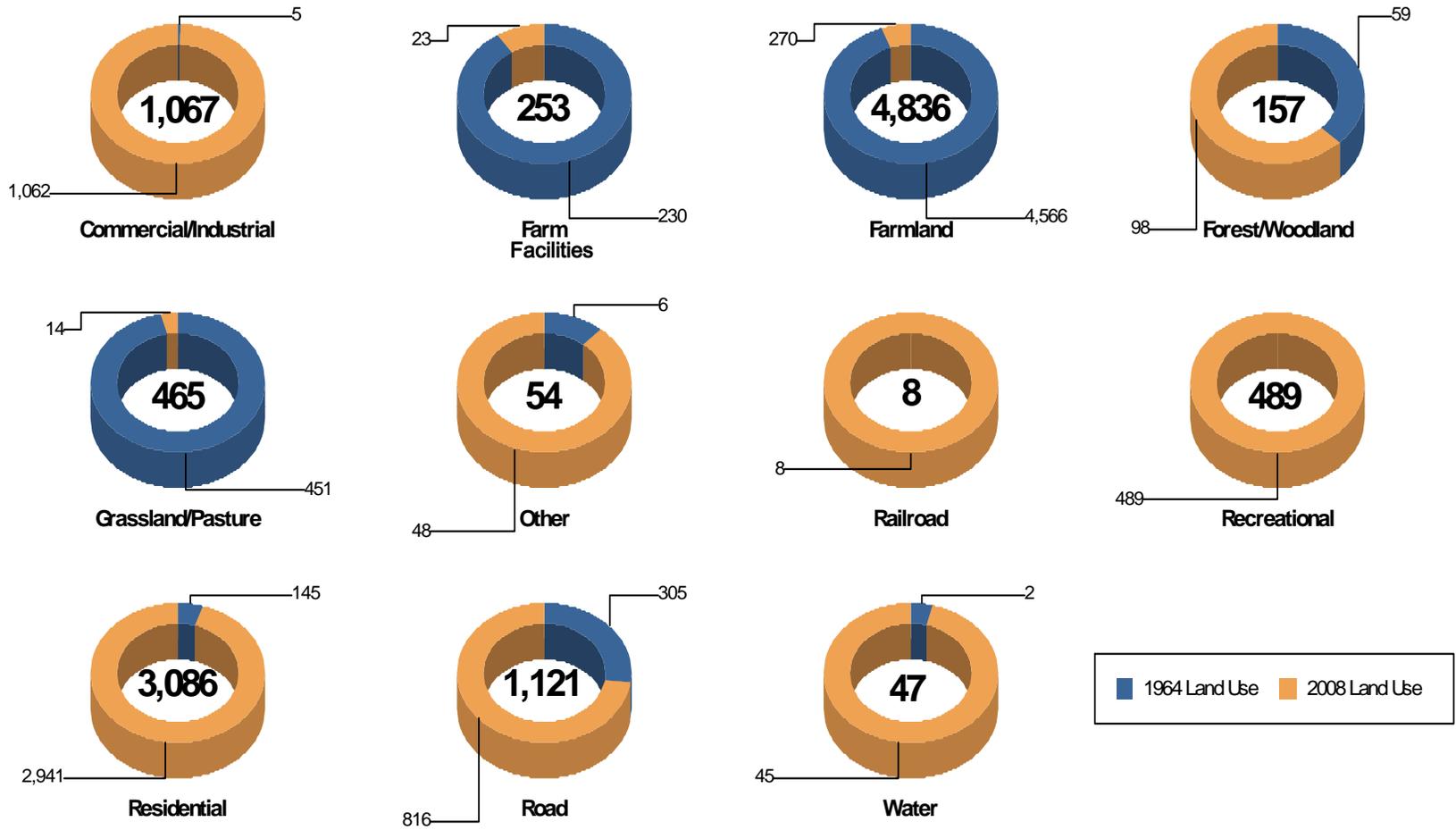
- Commercial/Industrial
- Farm Facilities
- Farmland
- Forest/Woodland
- Grassland/Pasture
- Other
- Railroad
- Recreational
- Residential
- Roads
- Water



12/17/2009







Questions?



12/17/2009



42