



# Land Use Academy

Center for Land Use Education and Research

# Welcome!

Map Reading and Mapping  
Resources  
for Land Use Commissioners  
May 16, 2026



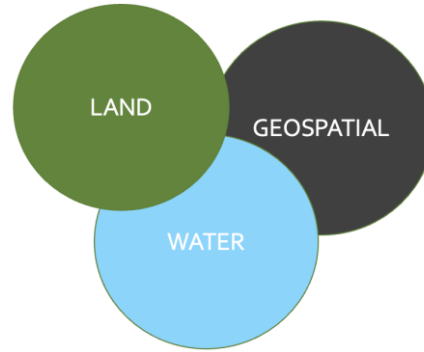
# Where is everyone from?

- Planning/zoning
- ZBA
- Inland wetlands
- Conservation commission
- Land use planner/other municipal staff
- Interested resident
- Other



CLEAR provides research, tools, information, and outreach to communities in support of:

- better land use decisions
- healthier natural resources
- more resilient communities

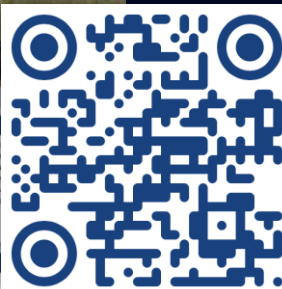
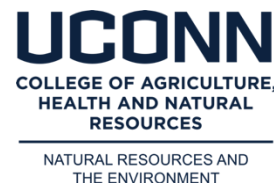


# UConn Center for Land Use Education and Research (CLEAR)

<https://clear.uconn.edu>



A partnership of:



# Agenda



- 9:10\* Finding Map Layers for Your Site and Beyond
  - Emily Wilson, Geospatial Genius
- 10:15\* Pastry Break
- 10:30\* Site Plan Reading
  - Renata Bertotti, Planner Extraordinaire and BFF of CLEAR
- 12:30\* Enjoy the DAY!

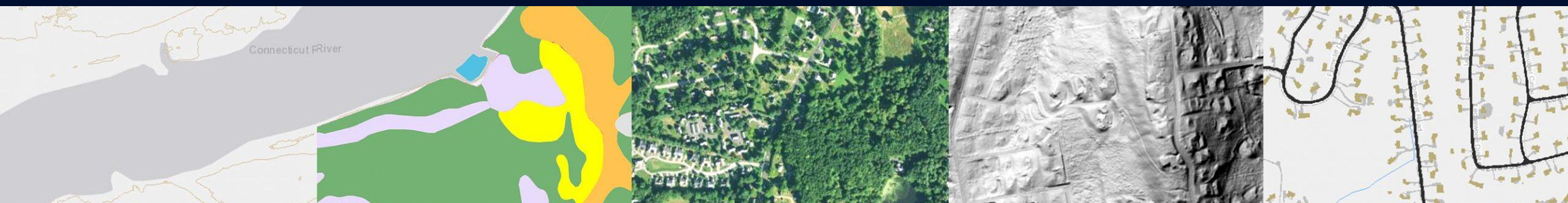
\* All times are “ish”

# Finding Map Layers for Your Site and Beyond

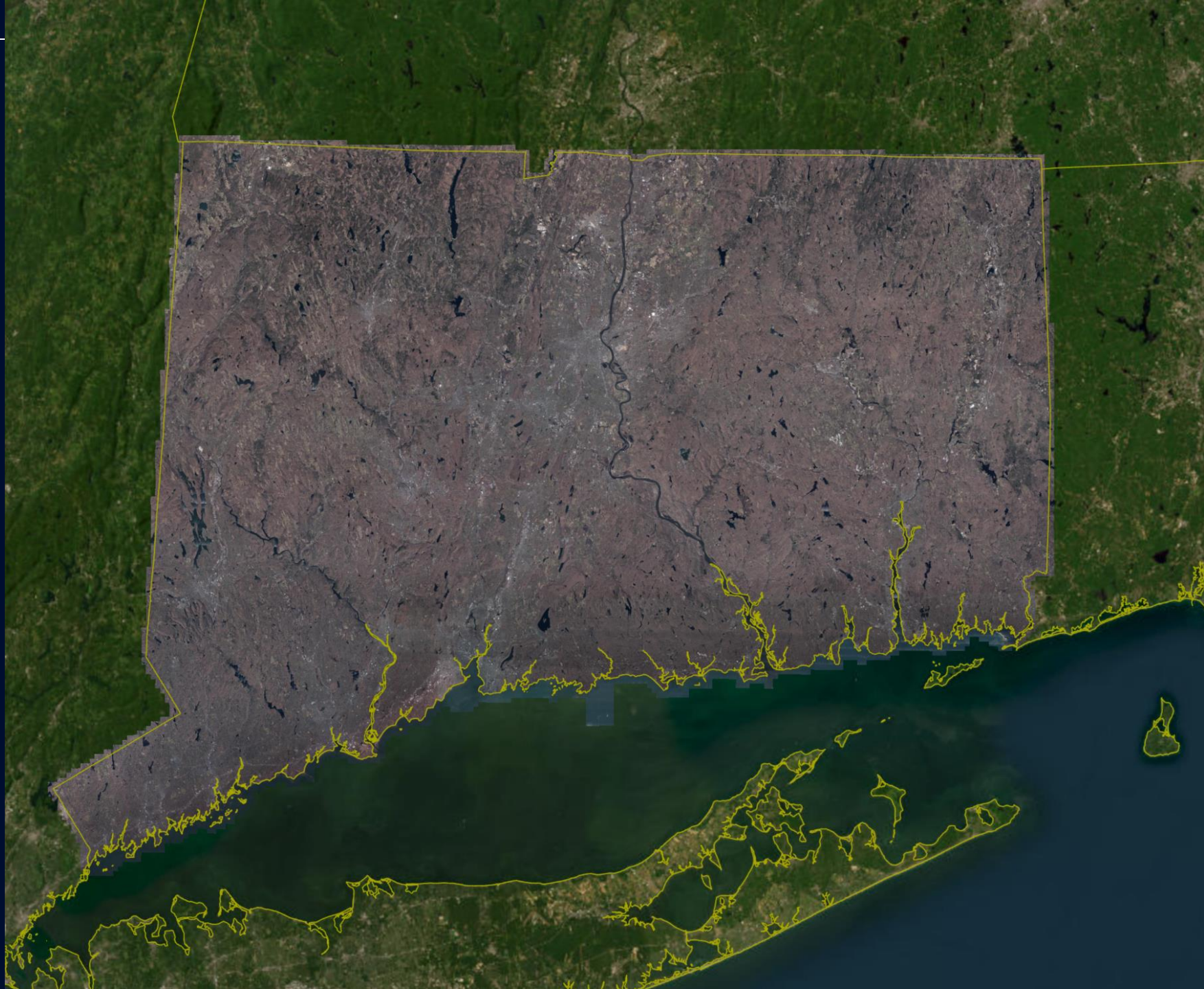
## *CT ECO Map Viewers*



Emily H. Wilson, Geospatial Educator  
University of Connecticut, Extension, CLEAR









# Outline

Intro and background

Key GIS datasets

- Parcels
- Elevation
- Aerial imagery

Where to get them and others

Demo

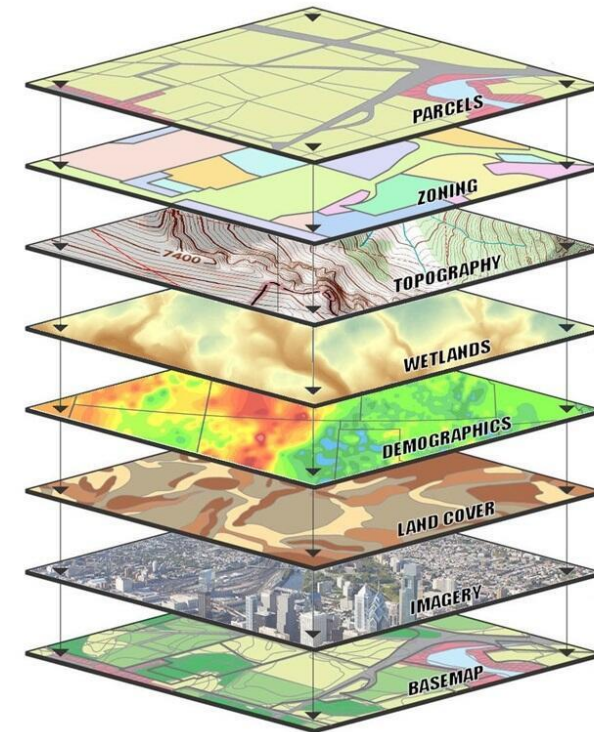
Questions

# GIS = Geographic Information System

- How we work with digital geographic data using software on a computer
- GIS is also a tool
- And a profession



Coordinates  
&  
Layers



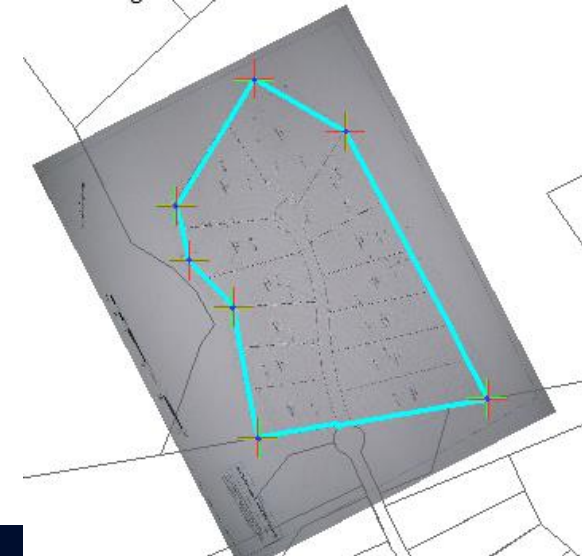
USGS

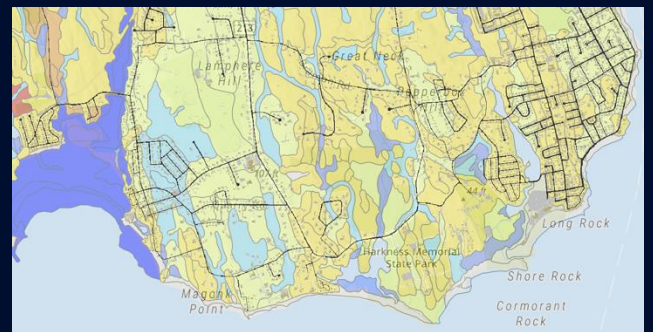
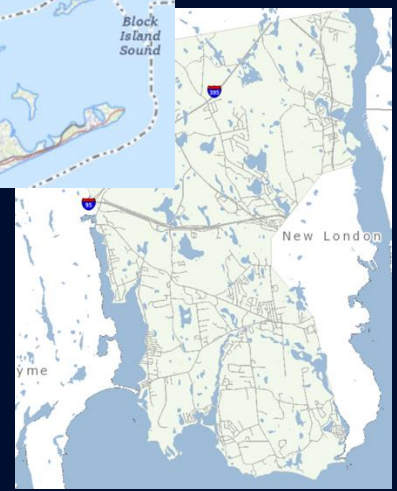
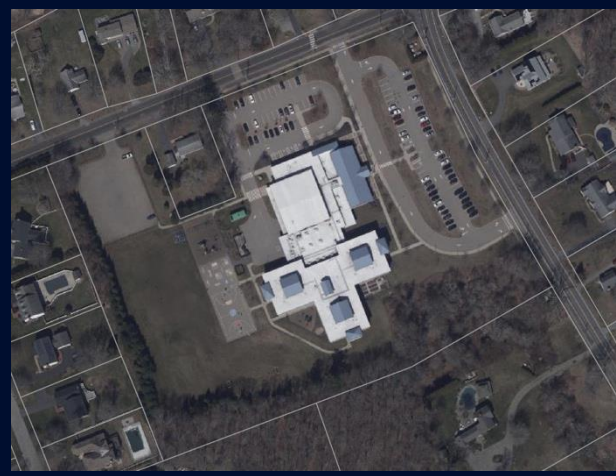
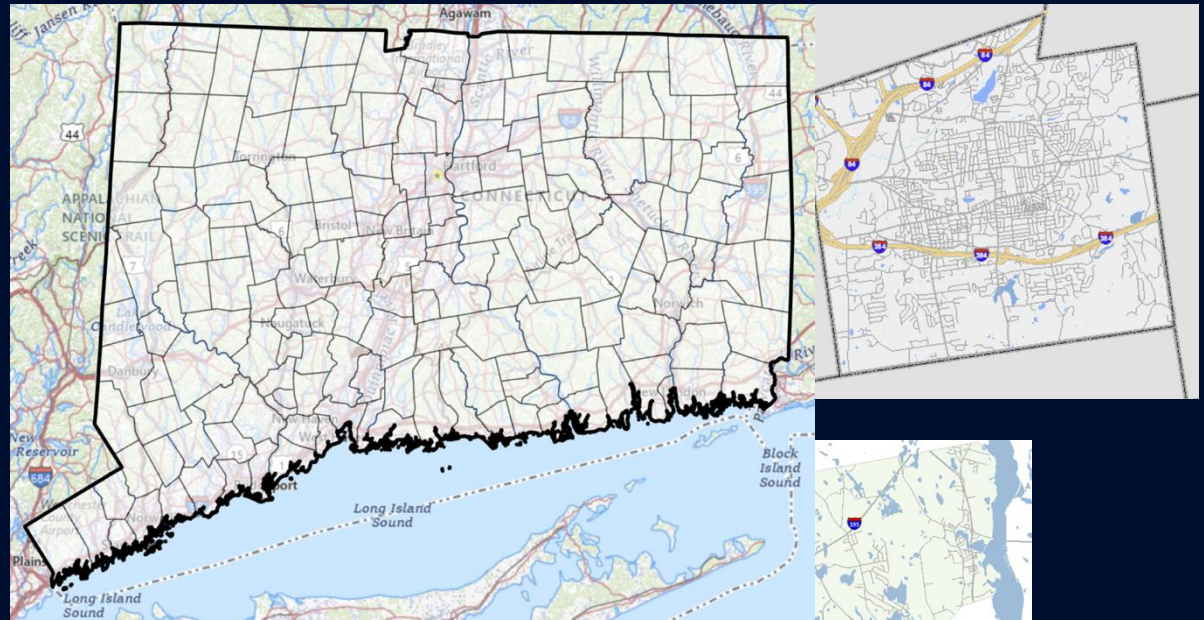
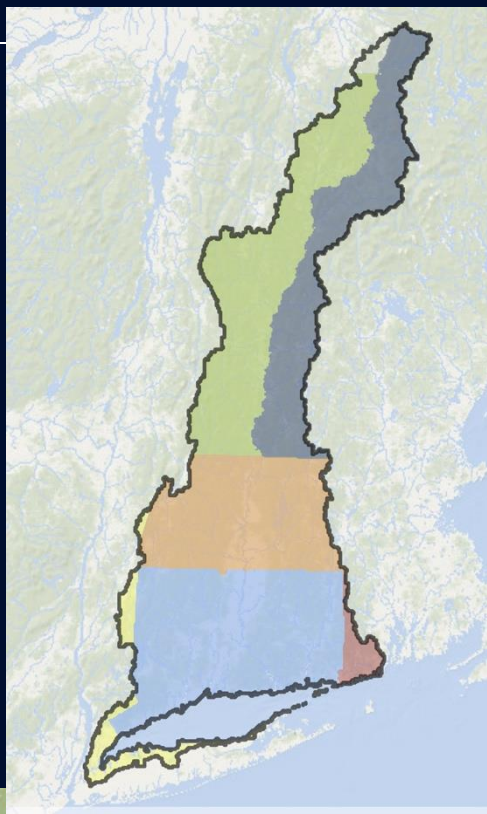
# “Georeference”

Method to assign coordinates so a dataset can be used with other layers.

## Site Plan

1. Scan (must be digital)
2. Find ground control points, or tie points
3. Assess warping etc.
4. Save





# Scrutinize!

- Appropriateness
  - Different layers for different geographies
  - Detail (or lack of)
- Where did it come from?
- Who is providing?
- When was it created/collected?





# GIS Dataset: Parcels

Vector dataset

*lines, points, polygons*

Intro and background

Key GIS datasets

- Parcels
- Elevation
- Aerial imagery

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# Parcels

*A piece or unit of land, defined by a series of measured straight or curved lines that connect to form a polygon*

- Parcel Geometry: the polygons that make up the parcel shapes
- CAMA (assessor's computer-assisted mass appraisal) database – information about the parcel. Aka the table attributes.

The screenshot shows a GIS application interface with a map of a residential area. A parcel is highlighted in cyan. The interface includes a toolbar with various tools, a contents pane on the left, and a pop-up window on the right displaying attributes for the selected parcel.

**Contents**

- Map1
  - Connecticut\_CAMA\_and\_Parcel\_Layer
  - Waterford\_site\_pic\_crop.jpg
  - images\Ortho\_2023\_tiled
  - World Imagery

**Pop-up**

Connecticut\_CAMA\_and\_Parcel\_Layer - Waterford

Town Name	Waterford
Location	165 GREAT NECK ROAD
CAMA_Link	80280-2756
Parcel_ID	245000
Parcel Type	PARCEL
Unit_Type	<Null>
Link	2756
Collection_year	2025
Editor	<Null>
Editor Comment	<Null>
Edit_Date	<Null>
Link_From_CAMA	80280-2756
Location_CAMA	165 GREAT NECK ROAD
Property_City	Waterford
Property_Zip	06385
Owner	WATERFORD TOWN OF
Co_Owner	GREAT NECK SCHOOL
Mailing_Address	15 ROPE FERRY RD
Mailing_City	WATERFORD
Mailing_State	CT
Mailing_Zip	06385
Assessed_Total	17404410
Assessed_Land	1243550
Assessed_Building	15868800
Pre_Yr_Assessed_Total	17404410
Appraised_Land	1776500
Appraised_Building	22669710
Appraised_Outbuilding	202320
Valuation_Year	2025
Land_Acres	9.5



# Parcels

- Management of digital parcels varies - GIS staff, COGs, consultants
- Pursuant to Section 7-100I of the Connecticut General Statutes, each municipality is required to submit a digital parcel file and an accompanying CAMA file to its COG.
- 2023: the CT GIS Office started annual aggregation of the parcel and CAMA data into a singular, unified dataset.



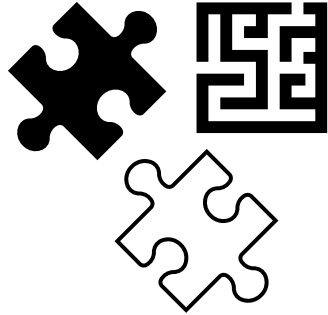
# Parcels

A piece or unit of land, defined by a series of measured straight or curved lines that connect to form a polygon

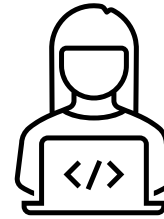
**Municipality**  
managing GIS



COG



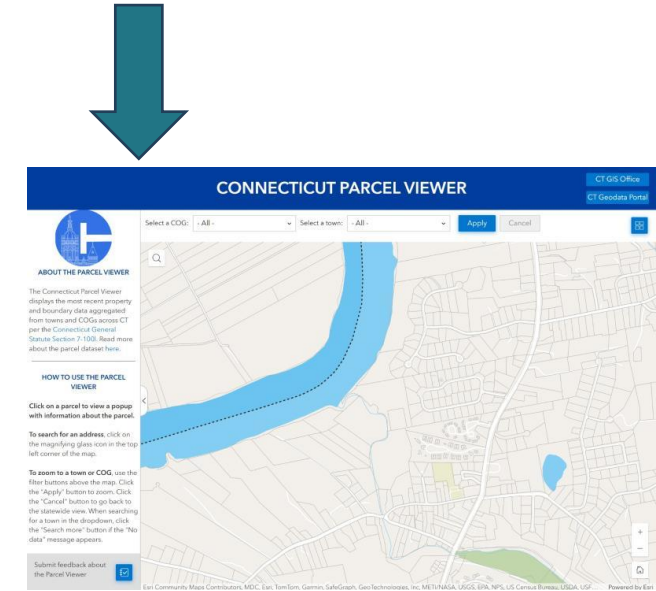
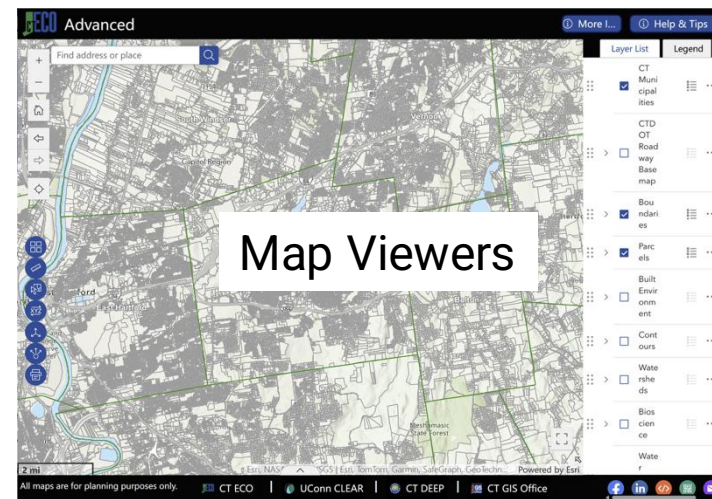
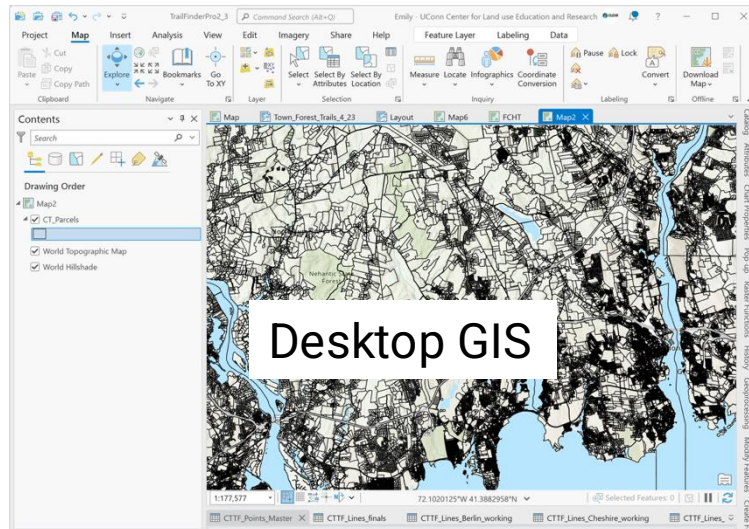
CT GIS  
Office



CT GIS Office  
Geodata Portal

**Online service of  
parcel map data**

managing CAMA





# Parcels

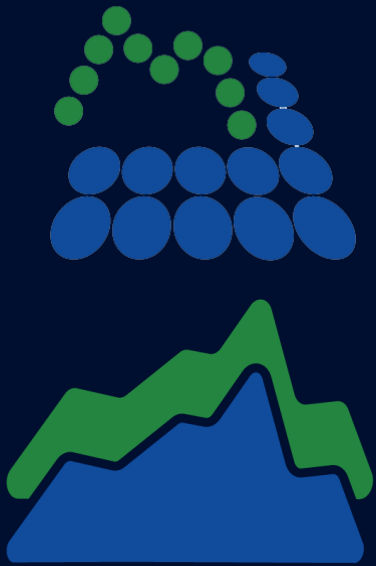
- Statewide annual aggregation improving every year
- It's not perfect
  - Puzzle pieces don't fit (town boundary issue)
  - Towns handle polygons differently (parcel drafting standards in process)
  - CAMA data stored differently (improving!)
- ★ Parcels in statewide dataset are only as good as municipal dataset



Field:	Selection:	Highlighted:
MBL	Location	Street
0	B150020000	9 COUNTRY VIEW RD COUNTRY VIEW
0	B150020000	11 COUNTRY VIEW RD COUNTRY VIEW
0	B150020000	13 COUNTRY VIEW RD COUNTRY VIEW
0	B150020000	15 COUNTRY VIEW RD COUNTRY VIEW
0	B150020000	17 COUNTRY VIEW RD COUNTRY VIEW
0	B150020000	19 COUNTRY VIEW RD COUNTRY VIEW
0	B150020000	21 COUNTRY VIEW RD COUNTRY VIEW
0	B150020000	23 COUNTRY VIEW RD COUNTRY VIEW

HouseNo	PropertyOwner
74	GANIN VITALI & GANINA OLGA
74	HABERLEIN STEVEN C & LESLIE K
74	KARDASH WILLIAM & KAREN M
74	WEICHBROOD ARTHUR & EDITH S
74	PETER ALEXIS M TRUSTEE
74	CORTINA FERNANDA TRUSTEE
74	BOLLMANN JUERGEN TR &
74	COOK STEPHEN J & MARIA



# GIS Dataset: Elevation

*Point cloud*

*Raster pixels: bare earth elevation*

*Vector lines: contours*

Intro and background

Key GIS datasets

- Parcels
- Elevation
- Aerial imagery

Where to get them and others

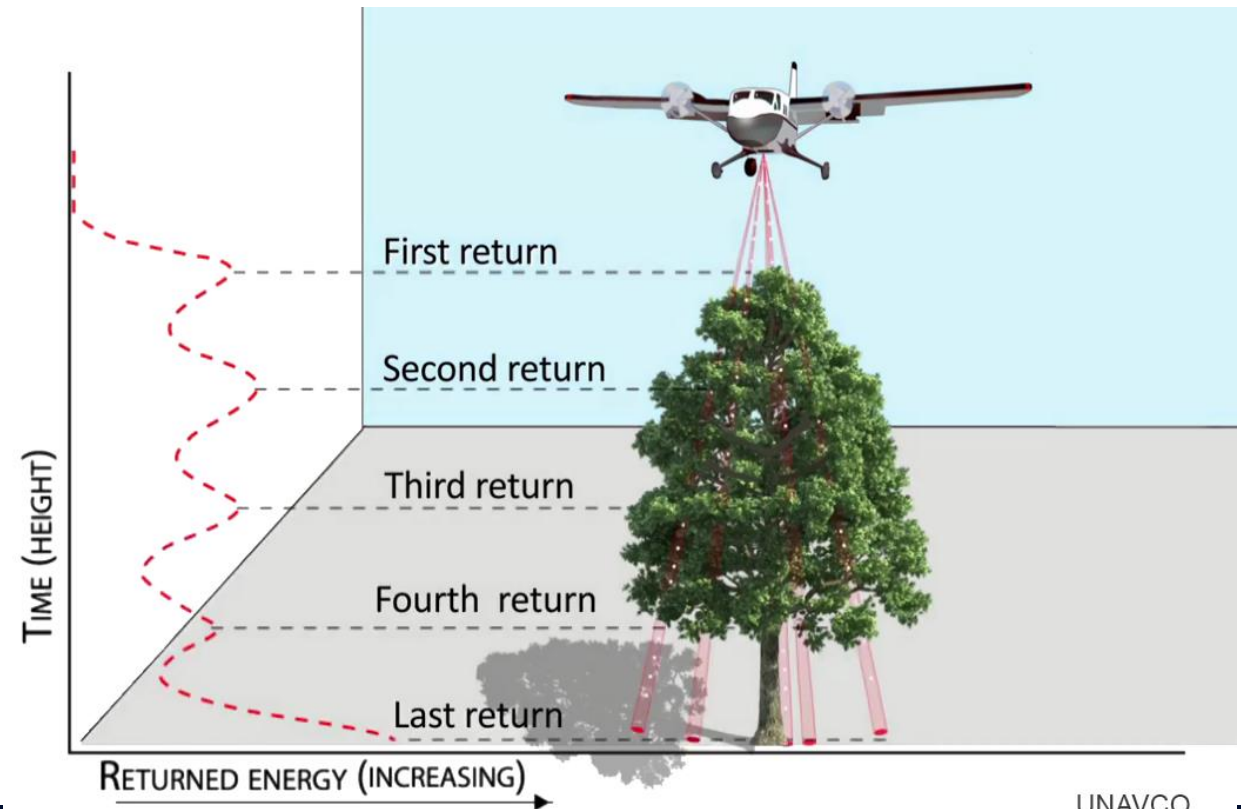
Demo

Questions

# Elevation: Lidar (Light detection and ranging)

*The foundation of elevation datasets*

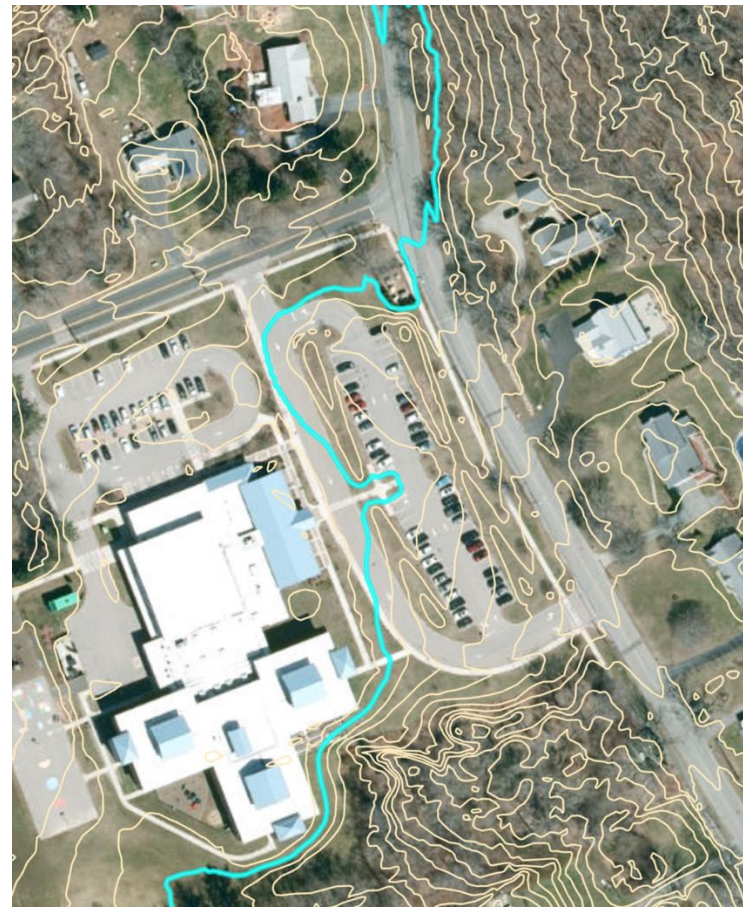
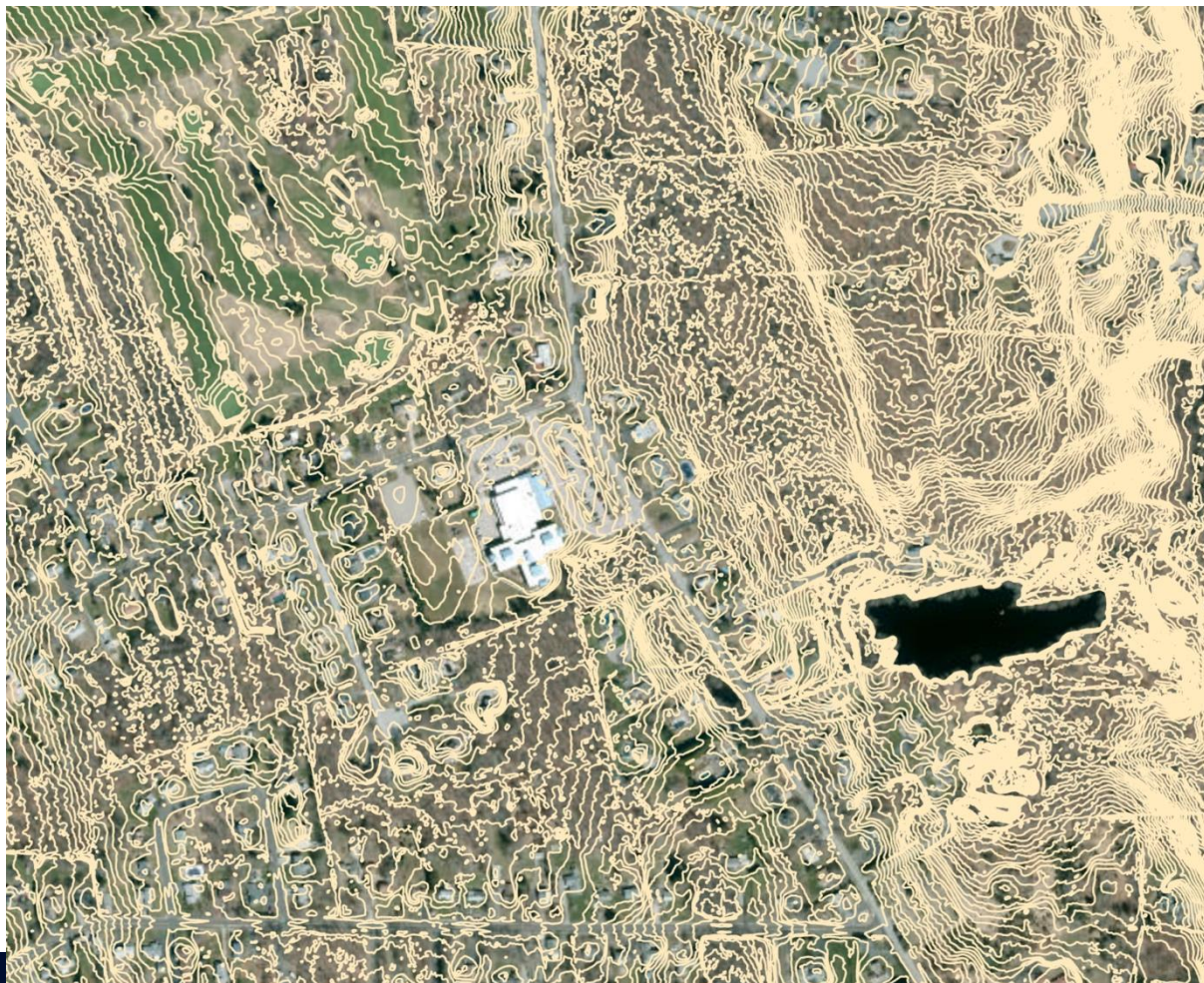
- Laser sensor on an aircraft measures two-way travel time of laser pulse to determine distance
- Result is a point cloud
  - First return = surface
  - Last return = ground





# Elevation: Contours

1 foot contours from 2016 lidar and 2023 lidar



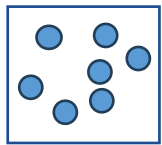
Contour Line, Intermediate	
Block_04_F2_Contours - Contour Line, Inter...	
OBJECTID	200161
LAYER	Contour Line, Intermediate
ELEVATION	91
CLOSED_CON	YES
Shape_Length	23428.529497
Measure	NaN
Minimum Measure	NaN
Maximum Measure	NaN
Measure Values	NaN's
Parts	1
All Measures Unknown	True



# Elevation: DEM/DTM

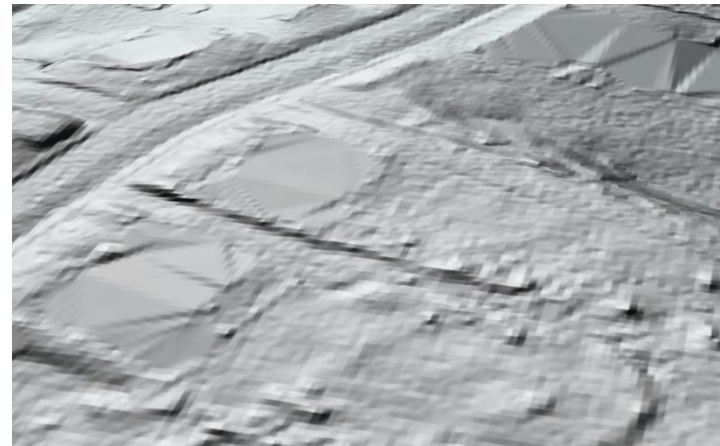
- Digital Elevation Model (DEM), Digital Terrain Model (DTM)
- Bare earth elevation = underneath trees, buildings removed

Lidar points – select bare earth



Average of all  
points within  
pixel

Pixels (2ft) with bare earth elevation



Lidar Specs

2016: minimum of 2 points/sq. meter

2023: minimum of 15 points/sq. meter



# Elevation: DEM/DTM

## Views

- Elevation
- Hillshade
- Hillshade SE illumination
- Shaded Relief
- Slope
- Aspect





# GIS Dataset: Aerial Imagery

Raster dataset

*pixels*

Intro and background

Key GIS datasets

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- Elevation
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Where to get them and others

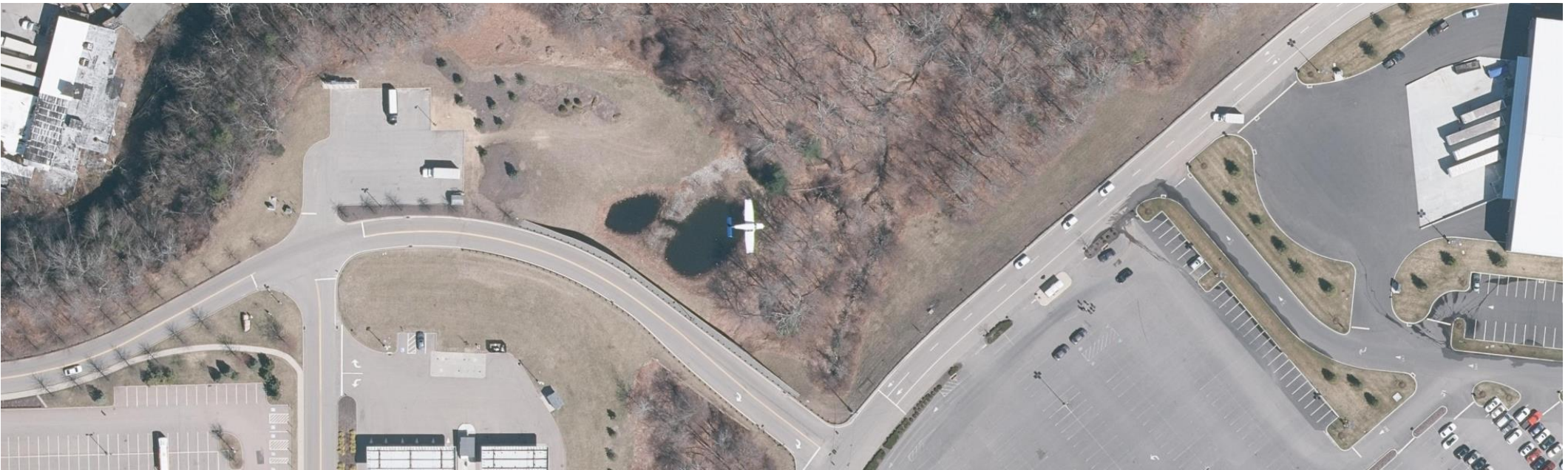
Demo

Questions

# Aerial Imagery Considerations

- Basis for mapping of all kinds
- Accurate measurements

Ortho = corrected for topography so that it can be used for accurate measurements





# Aerial Imagery Considerations

- Area - statewide, coastal, regional, municipal
- Year captured
- Season - spring (no leaves) or summer (leaves)
- Pixel size - 3 inch, 6 inch, 2 foot, 1 meter, ... (smaller pixels = more detail)

*must have coordinates to be in GIS*

# Aerial Imagery: must have coordinates to be in GIS

UConn Air Photo Archive

(1 of 2)

**1951-52, Town: Manchester**

Scale	1:8000
Date of Photo	8/3/1951
Town	Manchester
X Centerpoint	-72.49
Y Centerpoint	41.81
PDF	<a href="#">More info</a>
TIF	<a href="#">More info</a>

Zoom to

MassGIS, UConn/CTDEEP, Esri Co



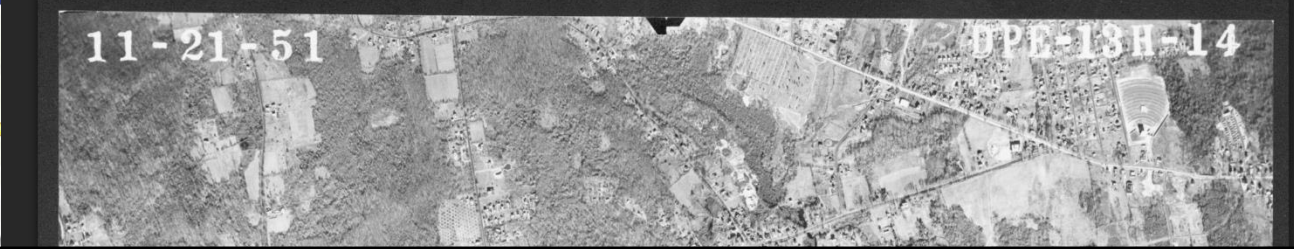
UConn Air Photo Archive

adimg\_37831\_11\_DPE13H14\_1951\_s20\_pma\_1.p... 1 / 1 - 100% +

Search bar with magnifying glass icon

Map navigation controls: +, -, Home, Layers, Full Screen, Measure, Rotate, Print, Share

Scale bar: 0 1 2mi



Layers

- AirPhoto 1934 CT
- Airphoto 1951 - 1952 CT >
- Airphoto 1957 CT
- Airphoto 1970 CT
- Airphoto 1986 CT
- Airphoto 1990 CT
- Airphoto 1995 - 1996 CT
- Airphoto 2004 CT
- Airphoto 2006 CT
- Air Photo 2008 CT
- Airphoto 2010 CT - Airphoto 2010 CT and 1990 map

# CT ECO Imagery

- All of Connecticut's statewide digital aerial imagery
- 22 datasets and counting



DATASET		BANDS*	SEASON	PIXEL SIZE	ORIGINATORS	Map Catalog	Aerial Imagery Viewer	Image Service	
1990		1	spring	3.28 ft	USGS	✓	✓	✓	<a href="#">metadata</a> 
2004		1	spring	0.8 ft	CT (DEP, DOT, DPS)	✓	✓	✓	<a href="#">metadata</a> 
2006		3	summer	3.28 ft (1 m)	USDA (NAIP)	✓	✓	✓	<a href="#">metadata</a> 
2008		4	summer	3.28 ft (1 m)	USDA (NAIP)	✓	✓	✓	<a href="#">metadata</a> 
2010		4	summer	3.28 ft (1 m)	USDA (NAIP)	✓	✓	✓	<a href="#">metadata</a> 
2012		4	summer	3.28 ft (1m)	USDA (NAIP)	✓	✓	✓	<a href="#">metadata</a> 
2012		4	spring	1 ft	CT (DOT, DPS)	✓	✓	✓	<a href="#">metadata</a> 
2014		4	summer	3.28 ft (1 m)	USDA (NAIP)		✓	✓	<a href="#">metadata</a>
2016		4	summer	0.6 m (~2 ft)	USDA (NAIP)		✓	✓	<a href="#">metadata</a> 
2016		4	spring	0.25 ft (3 in)	CT (CRCOG, OPM)		✓	✓	<a href="#">metadata</a> 
2018		4	summer	0.6 m (~2 ft)	USDA (NAIP)		✓	✓	<a href="#">metadata</a> 
2019		4	spring	0.5 ft (6 in)	USGS, NRCS, DOT, DESPP, DEEP		✓	✓	<a href="#">metadata</a> 
2021		4	summer	0.6 m (~2 ft)	USDA (NAIP)		✓	✓	<a href="#">metadata</a> 
2023		4	spring	0.25 ft (3 in)	OPM (GIS Office)			✓	<a href="#">metadata</a> 
2023		4	summer	0.3 m (~1ft)	USDA (NAIP)		✓	✓	<a href="#">metadata</a>



# Where to get GIS Datasets

*CT ECO, CT Geodata Portal*

Intro and background

Key GIS datasets

- Parcels
- Elevation
- Aerial imagery

Where to get them and others

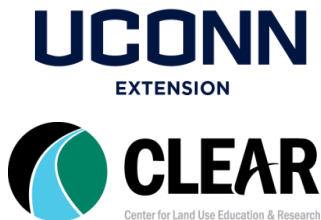
Demo

Questions

# CT ECO Website



CT ECO is a website that provides a variety of online maps and tools for viewing and accessing natural resources data, aerial imagery, elevation, and land cover.



A PARTNERSHIP BETWEEN UCONN & CT DEEP  
Connecticut Environmental Conditions Online



Search this site...

Home Maps Data Information Featured News

## Maps and Geospatial Data for Everyone

LEARN MORE



### Map Viewers

view and explore maps



### Map Catalog

printable static pdf maps by town



### Map Services

connect to data with GIS software



### Guides

information about map layers



### Download

download GIS files



### Help

answers to questions, instructions and tips

### Recent Updates and Quick Links

2023 CONTOUR DOWNLOAD

1 foot contours now available.

2023 AERIAL SERVICES

Dynamic and tiled. Look for 2023 Spring 4 band, 3 inch.

2023 NAIP SERVICE

Dynamic. Look for 2023 NAIP Summer, 4 band 0.3m.

2023 FLIGHT INFO

Links, updates, and more.

### CT ECO News & Updates

View all CT ECO News & Updates Posts

#### Update: 2023 Aerial Services and Contour Download

November 12, 2024

This information and more can be found on the 2023 Flight page. 2023 Aerials Dynamic and Tiled Image Services Both the dynamic and tiled image services of the 2023 aerials are now complete and available, along with metadata. Find them: Map and Image Services page under Imagery –

### CT State GIS Office News & Updates

View all CT GIS Office News & Updates

#### Update on Imagery and GIS data

May 7, 2024

Update by Carl Zimmerman, PhD, CT GIS Office This is an update from the CT GIS Office on the production, review, and publication of the imagery and GIS data collected during the spring 2023 flight. The production is divided into four geographic blocks: Block 1 (northwest), Block 2 (southwest), Block 3 (central), and Block 4 [...]

**Newish!**

# CT GIS Office

... manage a **geospatial data clearinghouse for public access**



# CT Geodata

Search or browse GIS data

[New & Noteworthy](#) | [CT at a Glance](#) | [Data](#)

The mission of the Geodata Portal is to provide Connecticut data practitioners across all sectors with a trusted and reliable platform where users can expect to easily find and access valuable data.

<https://geodata.ct.gov/#anchor-2>

CT Geodata Portal

Type: Web Mapping Application

Source: CT ECO

Type

- Feature Service (151)
- Image Service (44)
- Web Mapping Application (15)
- Web Experience (10)
- Document Link (7)

Show 8 more

Source

- Department of Energy & Environmental Protection (107)
- State of Connecticut (62)
- CT ECO (57)
- Connecticut Department of Transportation (15)
- U.S. Department of Agriculture, Natural Resources Conservation Service (7)

Show 2 more

- Application**  
[CT High Res Land Cover Viewer](#)  
CT ECO  
Connecticut high resolution (1 meter) land cover created from 2016 aerial imagery through the NOAA Coastal Change Analysis Program (C-CAP). The viewer is a quick and easy...  
Type: **Web Mapping Application** Date updated: **11/15/2022**  
Tags: **landcover, ccap, CLEAR, UConn CLEAR, ...** Categories: **Land Cover**
- Application**  
[Lower Long Island Sound Watershed Land Cover](#)  
CT ECO  
The Lower Long Island Sound Land Cover Viewer contains Changing Landscape statewide land cover in an easy-to-explore tool.  
Type: **Web Mapping Application** Date updated: **12/12/2022**  
Tags: **landcover, change, land cover change, UC...** Categories: **Land Cover**
- Application**  
[CT Land Cover Viewer](#)  
CT ECO  
The Connecticut Land Cover Viewer contains Connecticut's Changing Landscape statewide land cover in an easy-to-explore tool.  
Type: **Web Mapping Application** Date updated: **12/12/2022**  
Tags: **landcover, change, land cover change, UC...** Categories: **Land Cover**
- Application**  
[CT Population Viewer](#)

# CT ECO Viewers

- 19 and counting
- Different formats

Today!

- Advanced Viewer v2

The screenshot shows the UConn CT ECO website interface. At the top, it features the UConn logo and 'UNIVERSITY OF CONNECTICUT' text. Below this is a navigation bar with links for Home, Maps, Data, Information, Featured, and News. A search bar is located in the top right corner. The main content area includes a large banner with the text 'Map Data for Everyone' and a dropdown menu for 'Maps' containing options like 'Map Overview', 'Map Catalog', 'Viewers', and 'CT ECO on ArcGIS Online'. Below the banner are five service icons: 'Map Viewers' (view and explore maps), 'Map Catalog' (printable static pdf maps by town), 'Map Services' (connect to data with GIS software), 'Download' (download GIS files), and 'Help' (answers to questions, instructions and tips). A section titled 'Recent Updates and Quick Links' contains four buttons: 'NEW! IMPERVIOUS SURFACE LAYERS', 'NEW! LAND COVER TOOLS', 'DOWNLOAD TOOL!', and '2023 FLIGHT INFO (2026 COMING SOON)'. At the bottom, there are two blue buttons for 'CT ECO News & Updates' and 'CT State GIS Office News & Updates'.



# Demo!



Intro and background

Key GIS datasets

- Parcels
- Elevation
- Aerial imagery

Where to get them and others

Demo

Questions

Thank you!  
Questions?

<https://cteco.uconn.edu>

### Info pages to explore

- Parcels
- Elevation
- Aerial Imagery

### Viewers to explore

- Advanced Viewer
- Elevation Viewer
- Aerial Imagery Viewer
- Air Photo Archive



Emily H. Wilson

`emily.wilson@uconn.edu`