Connecticut Statewide GIS Working Group

Presentation on a Statewide GIS Center

Connecticut General Assembly – Planning & Development Committee
Public Information Forum

Thursday, February 4th, 2021

Thursday, Feb. 4th 2:00 – 4:00 p.m. – Statewide GIS Center Information Forum

Opening remarks by Rep. McCarthy Vahey and Legis. leaders

What is GIS and Why is it Important? – Emily Wilson

Intro. of the Task Force work – Getting together to learn – John G./CCAPA

3- minute presentations on "Why GIS is critical to our work and why centralization would help"

- -Greg Ciparelli - DOT
- -Stuart DeLand/Bill Toussaint - DEEP
- -Gary Archambault/Eric McPhee - DPH
- -Dan Czaja - DESPP
- -Erik Snowden - CRCOG
- -Mark Hoover - MetroCOG
- -John Elsesser - CCM
- -Pete Sampiere - UI
- -Meg McGaffin – SLR/Milone & MacBroom
- -Eric Lindquist/Scott Gaul – OPM-
- -Emily Wilson - UConn

What Other States are doing/Why centralizing is key – Tyler Kleykamp

Q&A (30-45 minutes)

Closing remarks/next steps – McCarthy Vahey

WHAT IS GIS
and
WHY IS IT IMPORTANT

Emily H. Wilson

University of Connecticut

Center for Land Use Education and Research (CLEAR)

Department of Extension

College of Agriculture, Health and Natural Resources

UCONN
COLLEGE OF AGRICULTURE, HEALTH AND NATURAL RESOURCES
Extension

CLEAR

Geographic Information System

GIS is a System.

Not just data or software or applications. But the combination.

data + software + applications + people

GIS is a Profession.

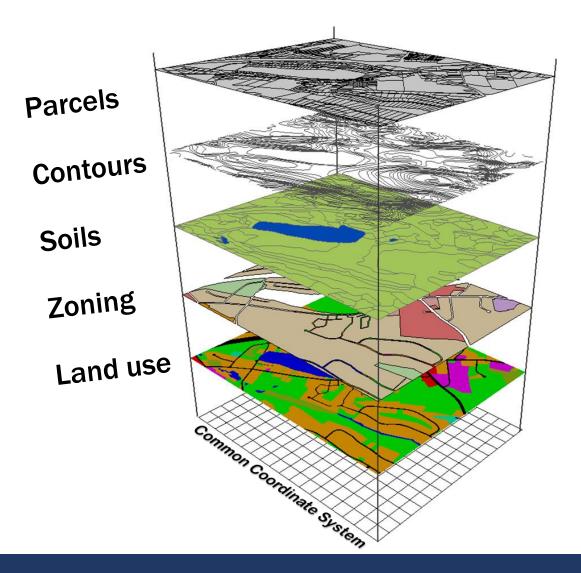Most GIS professionals have a degree or two in GIS or a related field.

GIS is a Tool.

A tool to answer questions from all different disciplines about all different things.

How GIS Works: Layers

- Single topic data layers
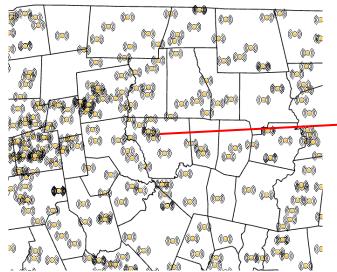- Tied together with geographic coordinates (location)

How GIS Works: Tables

Tabular (attribute) information is tied to features (which have locations)

Attributes are the key to display, answering questions, summarizing, selecting, querying, filtering, and more.

OBJECT_ID	742
Town	Mansfield
Address	855 Bolton Road (Nathan Hale Inn)
Latitude	41-48-10.6
Latdd	41.802944
Longitude	72-14-56
Longdd	-72.248889
Tower_Type	rooftop
Owner	
Height	
Comments	
carrier_1	cingular @ 60'
carrier_2	verizon @ 47'

DEEP Property - Harkness Memorial

OBJECTID	151
deepgis_DEP_PARCELS.DEP_ID	209
OBJECTID_1	185
REGION_ID	279
REGION_NAME	Harkness Memorial
DEP_ID	209
MANAGEMENT_AREA	Harkness Memorial State Park
AGNCYFN_CD	EP
AV_LEGEND	State Park
IMS_LEGEND	State Park or Preserve

Interstates Highways - Interstates Highways

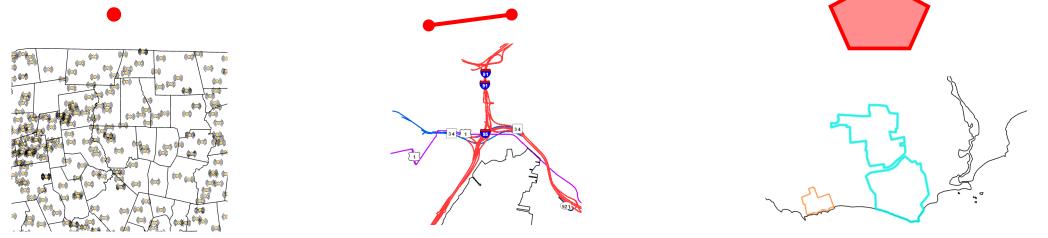| Shape.STLength()	8288.023996
OBJECTID	3501
RouteID	95-S
BeginMilePoint	45.79
EndMilePoint	49.65
RouteDirection	R
RoutePrefix	I
RouteNumber	95
RouteSuffix	Null
RampNumber	Null
RampSuffix	Null
RoadType	M
TownNumber	092
TownName	NEW HAVEN
OverlapStatus	PRI

Spatial Data: Vector

- Point, line, polygon layers *with geographic coordinates!*
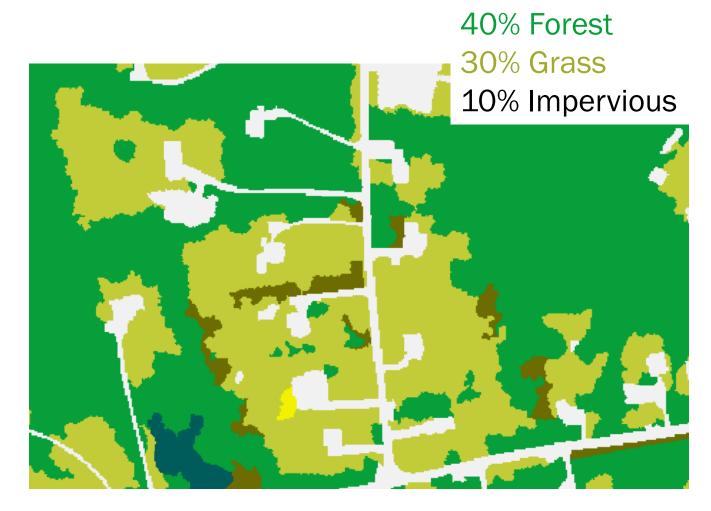
Spatial Data: Vector

- Point, line, polygon layers *with geographic coordinates!*

- Attributes (table information tied to map features!)
- Quality concerns
  - Spatial accuracy
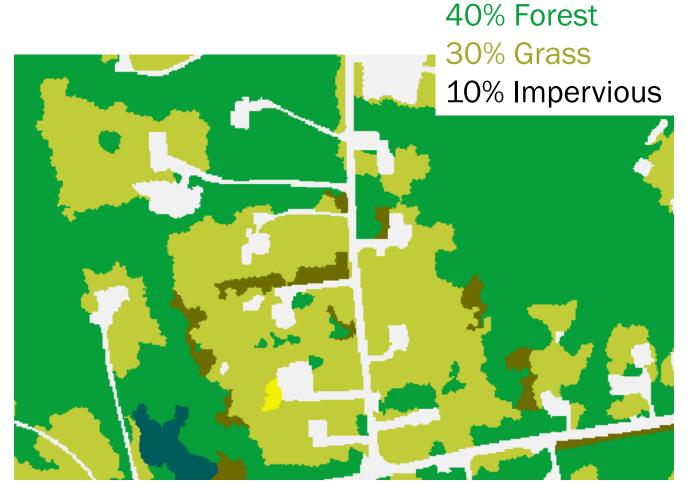 - What is included or excluded (geographic features AND attributes)
  - Updates

Spatial Data: Raster

- Pixels *with geographic coordinates!*

40% Forest
30% Grass
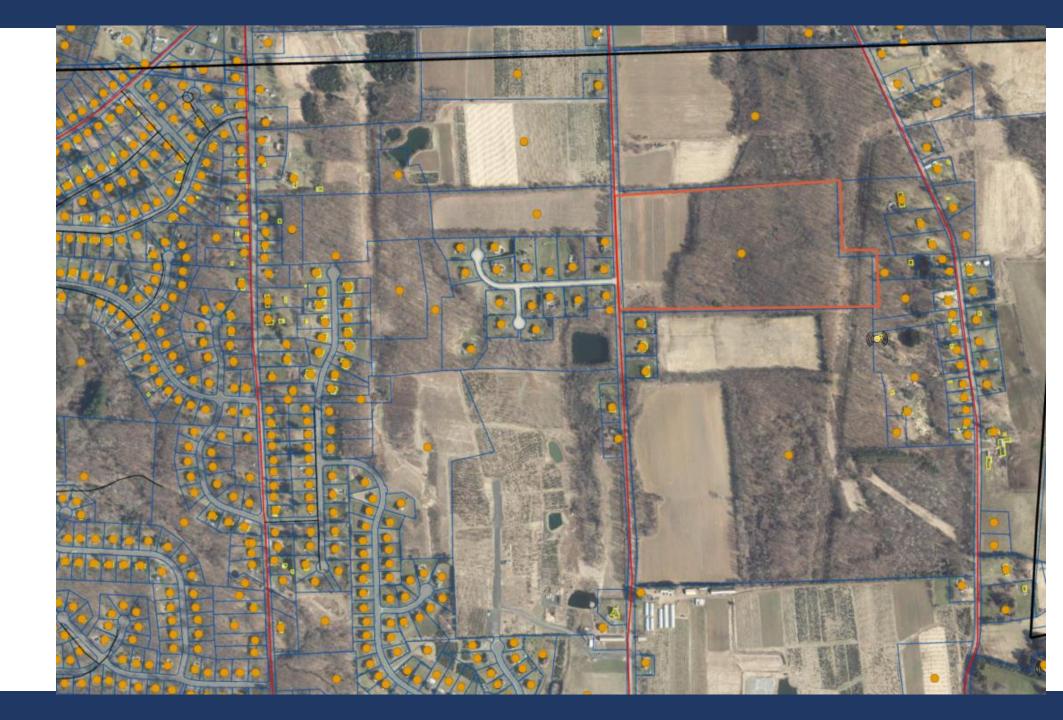10% Impervious

Spatial Data: Raster

- Pixels *with geographic coordinates!*

- Quality concerns
    - Detail, or size of pixel
      1km, 30m, 10m, 1m, 1ft, 6 inch, 3 inch
    - other things

40% Forest
30% Grass
10% Impervious

Bring it all together

Sharing

GIS Data (professionals)

- Datasets exist at all different places
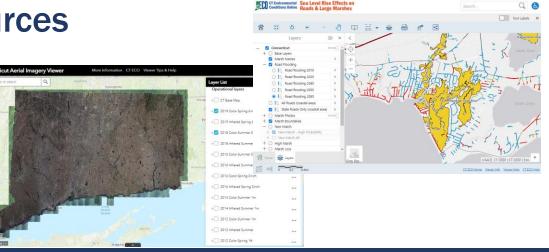- WHERE is the DATA?

Sharing

GIS Data (professionals)

- Datasets exist at all different places
- WHERE is the DATA?

Maps (everyone)

- GIS data formats cannot be opened in regular software
- Outputs are critical and require resources
  - Paper maps, pdfs (cartography)
  - Online web maps or apps
  - Dashboards or story maps

Why is GIS important?

- The rest of the agenda will answer
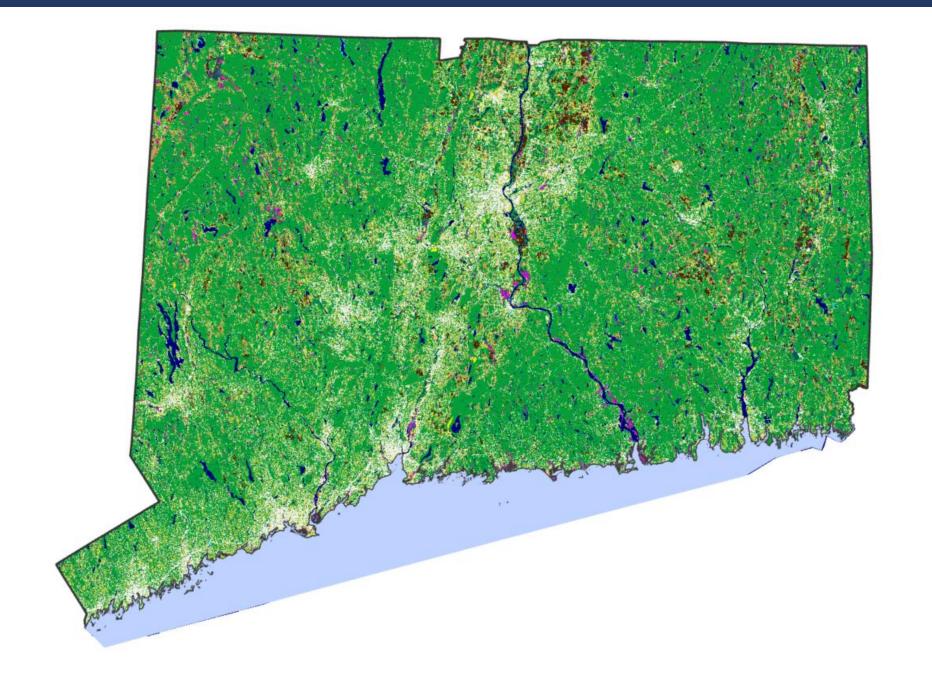 So Many Applications!

Why is GIS important?

- The rest of the agenda will answer
  So Many Applications!

Why is GIS coordination important?

- GIS provides the building blocks for applications across users and disciplines
- Overlapping geography, many similar needs

MAP ONCE
USE A BUNCH

IT IS TIME

- Proactive, not reactive

- When the high quality building blocks are in place, there is so much potential for applications, efficiencies, and improved capabilities

data + software + applications + people

Emily Hoffhine Wilson
emily.wilson@uconn.edu

Story map at https://ctgis.uconn.edu/ct_gis_center/

Connecticut Chapter of the American Planning Association
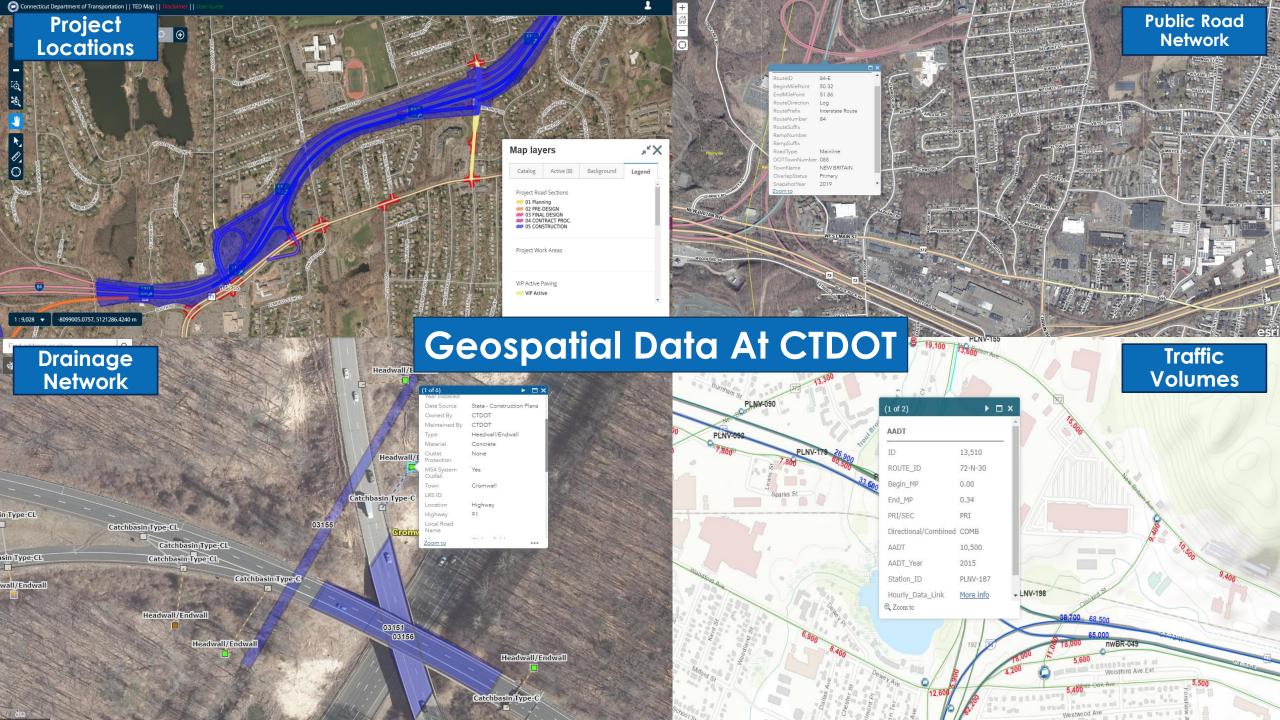*Creating Great Communities for All*

- Identifying Gaps Between Existing Conditions and Goals

- Bringing Together Stakeholders and Subject-Matter Experts
    – Who Should be at the Table?

- Finding CHAMPIONS ⟶ GIS WORKING GROUP

- Translating Complex Concepts into Actionable Steps
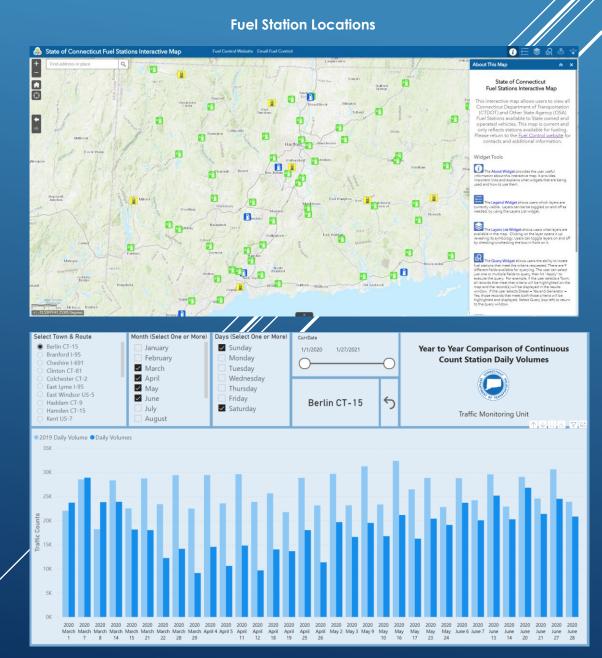
Overview of GIS at CTDOT

- **Over 400 Credentialed Users across various environments & growing fast**

  - **Filling various roles in data lifecycle**

    - **Office Editing – Desktop or Web-Based Applications**

    - **Field Workers with Mobile Devices/Applications**

    - **Automated Systems Integration**

- **Strategic investment in utilizing GIS to connect existing data siloes**

- **Enterprise approach to data management – collect once, use many**

Project Locations

Public Road Network

Geospatial Data At CTDOT

Drainage Network

Traffic Volumes

Connecticut Department of Transportation | | TED Map | | Disclaimer | | User Guide

Map layers

Catalog | Active (8) | Background | **Legend**

Project Road Sections
- 01 Planning
- 02 PRE-DESIGN
- 03 FINAL DESIGN
- 04 CONTRACT PROC.
- 05 CONSTRUCTION

Project Work Areas

VIP Active Paving
- VIP Active

RouteID 84-E
BeginMilePoint 50.32
EndMilePoint 51.86
RouteDirection Log
RoutePrefix Interstate Route
RouteNumber 84
RouteSuffix
RampNumber
RampSuffix
RoadType Mainline
DOTTownNumber 088
TownName NEW BRITAIN
OverlapStatus Primary
SnapshotYear 2019
Zoom to

(1 of 6)
Year Installed
Data Source State - Construction Plans
Owned By CTDOT
Maintained By CTDOT
Type Headwall/Endwall
Material Concrete
Outlet Protection None
MS4 System Outfall Yes
Town Cromwell
LRS ID
Location Highway
Highway 91
Local Road Name
Zoom to

(1 of 2)

AADT

ID 13,510
ROUTE_ID 72-N-30
Begin_MP 0.00
End_MP 0.34
PRI/SEC PRI
Directional/Combined COMB
AADT 10,500
AADT_Year 2015
Station_ID PLNV-187
Hourly_Data_Link More info
Zoom to

GIS At CTDOT

- *Project Planning & Prioritization*
  - Harvesting data from authoritative sources to easily incorporate into the planning process

- *Asset Management*
  - Inspecting capital assets and monitoring their lifecycle – more cost effective to keep assets in good condition

- *Data Driven Safety Analysis*
  - Helping to choose the right countermeasures at the right locations at the right times

- *Performance/Resource Analysis*

- *State & Federal Reporting*
  - Data-driven decision making is a requirement of recent Federal funding authorization

- *Increased transparency with critical partners*
  - Web-based tools/dashboards

Fuel Station Locations
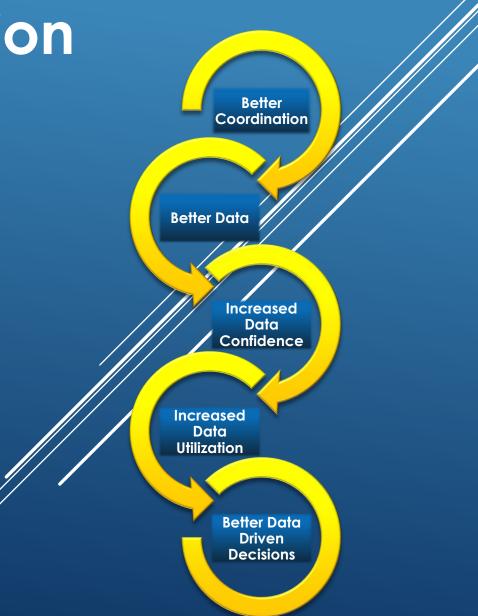
Berlin Turnpike Weekend Volumes

Benefits of GIS Coordination

A coordinated approach to GIS offers a significant benefit to all users related to:

- Timeliness
- Accuracy
- Completeness
- Uniformity
- Integration
- Accessibility
- Authoritative Stewardship

Better Coordination

Better Data

Increased Data Confidence

Increased Data Utilization

Better Data Driven Decisions

Overview of GIS at DEEP

- 800~ employees, 400 concurrent agency GIS users

- Agency-wide GIS infrastructure in place for over 30 years

- DEEP produces and maintains over 280 primary source GIS datasets including Aquifer Protection Areas, Bedrock Geology, Drainage Basins, and Critical Habitats

- DEEP shares geospatial information with federal, state, and municipal agencies as well as higher education, and public entities

Connecticut Department of
ENERGY &
ENVIRONMENTAL
PROTECTION

GIS Uses at DEEP

- Spatial Analysis is integral to multiple Divisions' workflow in the agency from Wildlife, to Remediation, to State Parks

- Visualization of agency assets, natural geographic features, human development, and raw field data allow for streamlined project decision-making

- Web-based GIS servers and cloud storage increase interagency and public access while maintaining a secure platform for data creation and maintenance

- GIS mobile field data collection modernizes legacy programs, standardizing records for review and retention.

Department of Public Health

GIS Informational Forum

Committee on Planning and Development

February 4, 2021

Current GIS Capacity

❖ DPH Enterprise ArcGIS Environment

❖ Multiple GIS users
    ❖ Desktop (ArcGIS Pro & ArcMap)

❖ GIS Use
    ❖ Mapping or Visualization Tool
    ❖ Decision Support Tool
    ❖ Spatial Analyses

❖ GIS Services
    ❖ Geocoding (DPH Custom Composite Locator (Parcel/Street based)
    ❖ DPH ArcGIS Portal – Publicly Accessible Maps &Dashboards

Current Work
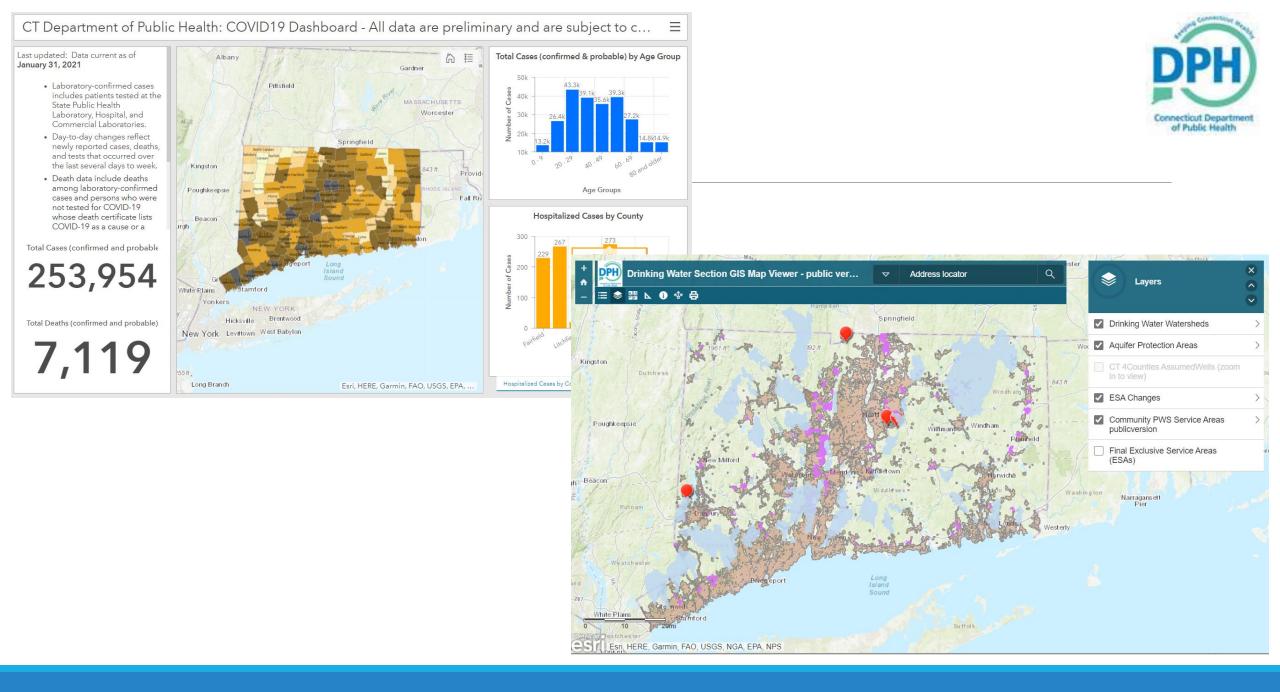
❖DPH Enterprise ArcGIS Environment (https://maps.ct.gov/)
  ❖Maintained by Program Staff
  ❖No Dedicated GIS Staff

❖GIS Work Varies by Program
  ❖Most create "simple" maps based on business needs
  ❖Some create spatial data (Drinking Water/Private Well)
  ❖Geocoding of Public Health Data

❖Spatial Analyses Limited to Key Staff
  ❖Based on Program Needs
  ❖Drinking Water and Environmental Health

Future Needs, Future Direction

- ❖ DPH GIS is 100% funded with federal grants
  - ❖ Need state resources and support

- ❖ Develop Additional GIS Capability
  - ❖ GIS-Based Applications and Workflows
  - ❖ Staff expertise

- ❖ Add GIS functionality to Enterprise Licensing Application
  - ❖ Daycare/Health Care Facilities/Provider
  - ❖ More Timely Response in Emergencies

- ❖ Ensuring DPH Data Systems are Spatially Enabled
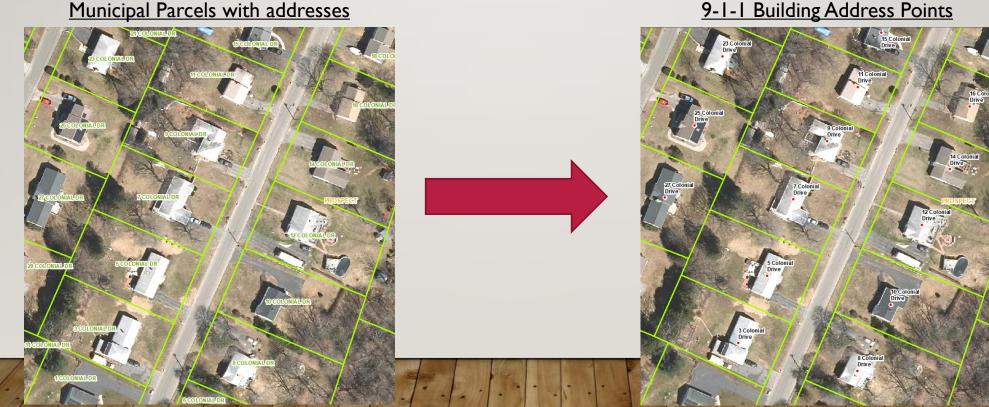
DEPARTMENT OF EMERGENCY SERVICES AND PUBLIC PROTECTION (DESPP)

Within DESPP, the Division of Statewide Emergency Telecommunications (DSET/9-1-1), the Division of Emergency Management and Homeland Security (DEMHS), and the Division of State Police (CSP) all use GIS for their operations

DSET
9-1-1 Call Routing
& Mapping

DEMHS
State Emergency Operations
Center

CSP
Dispatch and Crimes Analysis

DEPARTMENT OF EMERGENCY SERVICES AND PUBLIC PROTECTION (DESPP)

These operations all rely on access to accurate and detailed statewide GIS data. Better State GIS coordination would make this job easier, especially for creating statewide datasets from Municipal and Regional GIS data.

Municipal Parcels with addresses

9-1-1 Building Address Points

Some Facts about COGs and GIS

- COGs support economic development and transportation planning, public safety and cooperative purchasing functions all of which require mapping and geographic analysis.

- COG member towns have wide range of in-house GIS capabilities – from highly developed systems to none at all. COGS work to provide value to all of them.

- COGs depend on current base data such as orthophotography and lidar to develop and maintain regional datasets required for their services.

- Orthophotography and lidar data acquisitions realize tremendous economies of scale when performed at a statewide level. Due to the lack to reliable state coordination and funding many COGs and individual municipalities purchase this data on their own, **missing out** on massive cost savings as much as 2-5x.

Some applications of Orthoimagery and Lidar

- Parcel Mapping & Property Assessment
- Asset Management
- Environmental Monitoring & Planning
- Emergency Dispatch
- Municipal Growth Planning
- Development of datasets needed for scenario planning and travel demand modeling (building footprints and heights, demographics)

(Graphics below from a presentation explaining the need for dependable statewide Ortho Acquisition over 10 years ago)
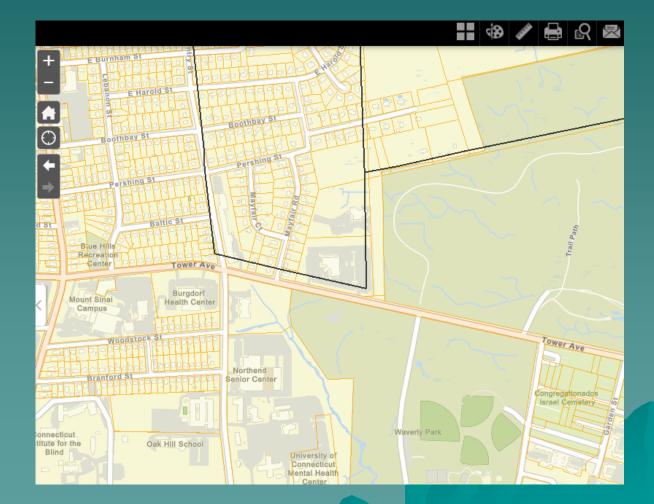
Address Points & Parcels

Street Center Lines & Roads

Contours, Drainage Basins & Outlets

CRCOG Regional Parcels and GIS Viewer

◆ CRCOG maintains a region-wide parcel dataset and viewer for 38 member municipalities.

◆ 38 different parcel line dataset, 38 different schemas, 38 different levels of accuracy

◆ CRCOG maintains a link between the parcel dataset and 38 sets of CAMA (assessor) data.

◆ At least 5 different CAMA vendors; towns with same vendor (Vision is common) have different schemas = 38 different sets of CAMA fields
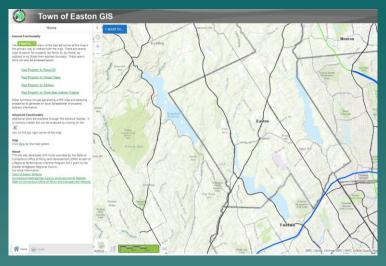
MetroCOG GIS
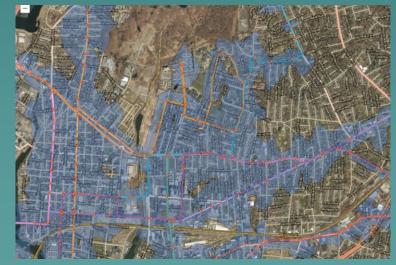
- **2013 RPIP grant to establish regional GIS**
  - Orthoimagery, LiDAR, Planimetrics (building footprints etc.), Oblique Imagery, Parcel Development
    - 214 K – Orthoimagery & Lidar
    - Would cost 7.1M for state at equal rate
      - **Actual 2016 statewide flight 2.2M**

- **Successful implementation resulted in buy in from all 6 member municipalities.**

MetroCOG GIS

Public Parcel Viewers

Base Map Data
(Building footprints, sidewalks
Roadways, parking lots, contours etc.)
Saves $$$ for construction projects

Economic Development

Multi-Modal Transportation
Modeling

Assessment

Emergency Services

MetroCOG GIS

◆ Success of GIS program depends on updated data that could be provided by a Statewide GIS Center

- ◆ Imagery
- ◆ LiDAR
  - – **Have utilized state-wide flights (2016, 2019, ???)**

◆ Lack of statewide coordination has resulted in **underutilized datasets**

- – Parcels have become stand-alone municipal-specific products
  - ◆ Lack of standardized assessor attribution
  - ◆ Lack of town boundary datasets
    - -results in gaps or overlapping parcels
- – Regionalized data stops at COG boundary
  - ◆ Datasets are not often coordinated between COGs
  - ◆ COGs have different levels of GIS expertise to support municipalities
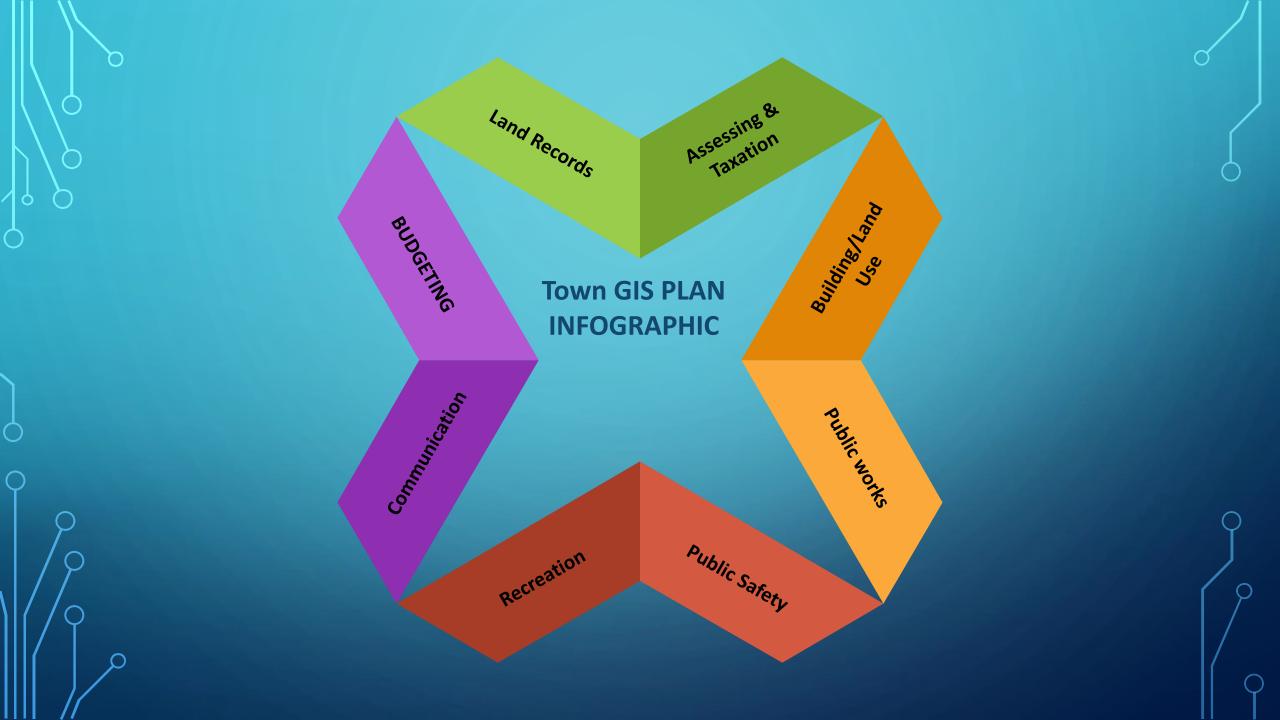
TOWN GIS

TRANSFORMING **G**OBS OF **I**NTERESTING **S**TUFF

INTO A **G**EOGRAPHIC **I**NFORMATION **S**YSTEM

ON BEHALF OF CCM

JOHN ELSESSER, TOWN MANAGER, COVENTRY CT

MY BACKGROUND

40 years of serving CT Towns in Manager's offices – 4 towns

Chair of E-911 Commission & PSDN Committee

Member of ACIR

Board member & past officer of CCM, CIRMA, COST,

CRCOG policy Board, Eastern Highland Health District (VC)

Served on MORE commissions

Member of CT TAX Panel for duration

Former president/chair of CTCMA, PRIMA, WINCOG, WRMOA

Former Member of State Emergency Response Commission

ICMA

USE TABLE

Examples of town department uses of GIS

	ASPECT 1	ASPECT 2	ASPECT 3	ASPECT 4	ASPECT 5	ASPECT 6	ASPECT 7	ASPECT 8	ASPECT 9
Town Clerk	Land records	Map files	Vital stats	Dogs	voters				
Assessing & taxation	Property card	House sketch/photo	Tax maps	Motor vehicle	exemptions	Billing	Payment	State credits	Comps
Building/land use	Building/zoning permits	Abutter notices	Proof of tax payment	Open space	Inland wetland/ fema & flood	Zoning/wetland setbacks	Water/sewer district	Inspection routing	Septic/ well locations
Public works	Plow routes	Vehicle tracking	Sign inventory	MS4 & drainage	Road maintenance	Tree inventory	Construction Layout	Road Salt issues	Capital planning
Public safety	Police cad	E 911	Fire/ems	Community right to know	Geo location	Special records e.g autistic kids, restraint orders	Cameras geo coding	Crime analysis	Fire inspections
Recreation	Trail maps	Neighborhood activities	Park Planning	Special events Parades , races					
Communications	E-911	Everbridge	Meeting notices for neiahborhoods	311 e.g see click fix	Road closure alerts				
Education	School districting	Bus routes							

GIS Operations - CT

February 2021

Planning & Development Committee –
United Illuminating GIS

Part of the AVANGRID Family
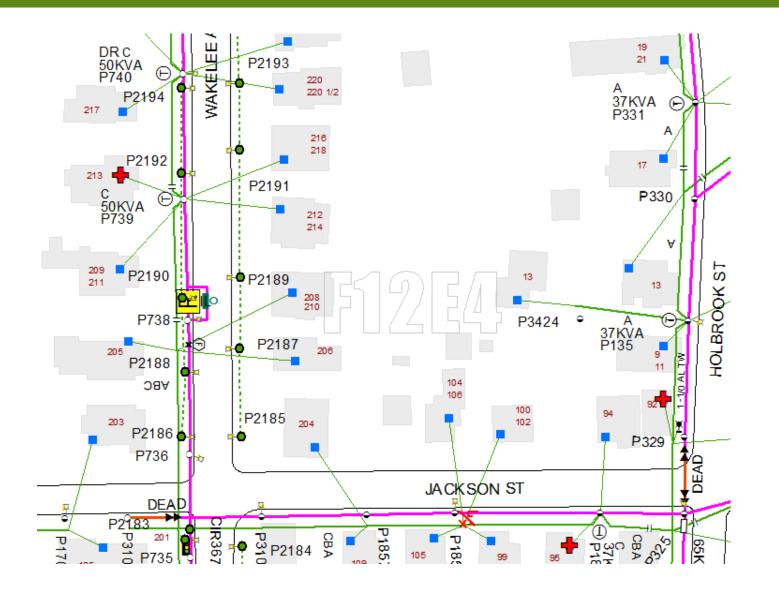
UI uses GIS:

- To design new infrastructure

- To update existing infrastructure

- To feed data to our OMS (Outage Management System) for storm restoration work

- To create special maps for use during storm restoration

- To provide Underground as-builts to engineering firms and other utilities (Record Requests)

- To share data with our municipalities upon request (limited to Poles, Streetlights, and Service Points w/medical info)

UI reached an agreement with some of our municipalities to share some of our non-secure data with them.
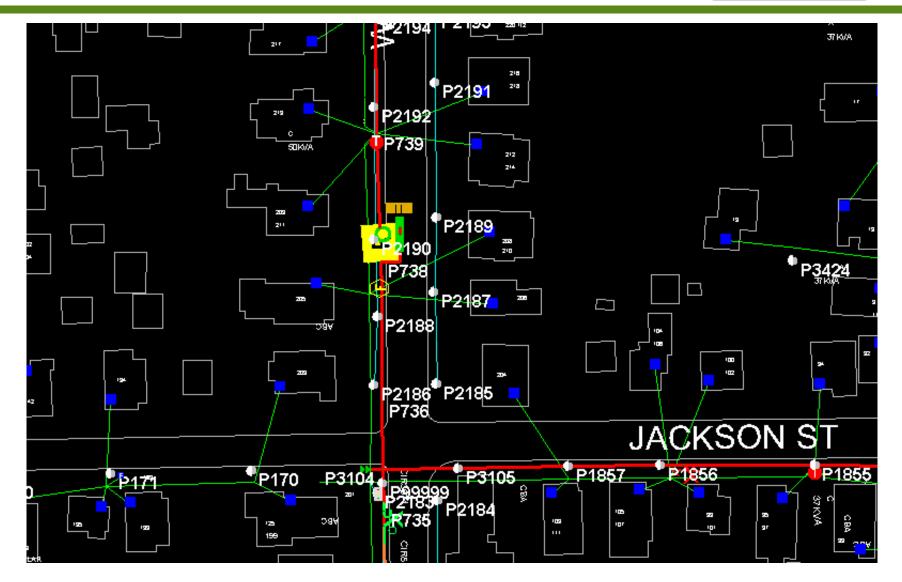
- We will provide our Pole, Streetlight, and Service Point data (with medical tags), when requested, and update it quarterly if requested.
- The data is intended to assist Police, Fire, and EMS personnel when responding to emergencies.

While some of our data cannot be shared due to NERC regulations, we believe that what can be shared can be beneficial on state and municipal levels.

- The data can help police departments assess high crime areas, and areas with a high occurrence of traffic accidents.

- It can help emergency planners identify who is most at risk, from a medical perspective.

- It can also help when these agencies have to contact UI if an event occurs.

Meghan McGaffin – SLR Consulting (formerly Milone & MacBroom)

- Engineering, Construction & Planning
- Thousands of projects in Connecticut and New England
- Data drives decision making, vast differences in data available between states
- CT resources are varied, some are outdated, many critical data sets are not available
- Despite constraints, CT has worked around roadblocks and institutions have done their best to fill gaps

Conservation & Development Policy and Planning

CGS Secs. 16a-24 — 16a-35j

Reliable, accessible, and well-maintained GIS data enable the development of quality mapping tools for economic development and conservation planning purposes (e.g. brownfields inventory; parcel & zoning maps).

OPM's Locational Guide Map delineates priority funding areas under CGS Sec. 16a-35c and is a consulting tool for state agency staff.

- It relies upon GIS layers such as public transit routes, sewer & water service, core forest areas, flood zones, open space, wildlife habitats, and local conservation areas, to name a few.

State Data Policy

CGS Sec. 4-67n-p,z

- Chief Data Officer and Data and Policy Analytics unit responsible for development and implementation of:
  - State Data Plan – includes improved coordination for GIS data
    - Submitted to CT Data Analysis and Technology Advisory (DATA) Board
  - Open Data Portal – hosts GIS and other datasets
  - P20 WIN - the State's integrated data system for education, workforce and supportive services data
- Agency guidance and support includes:
  - Shared software and tools
    - Daily COVID-19 updates with DPH, CSDE school learning model metrics
    - 4m views, 2.1 m downloads since start of pandemic
  - Development and adoption of data standards
  - Cross-agency coordination
    - Network of Agency Data Officers
    - Support to GIS interagency working group
  - Technical assistance to agencies upon request

GIS Coordination

CGS Sec. 4d-90

As part of its GIS coordination efforts, OPM:

- Leads a working group of executive branch agency GIS staff
- Provides technical assistance to agencies upon request
- Functions as a liaison to COG and municipal staff, federal agencies, and other GIS professionals
- Participates in the CT GIS Network
- Facilitates the development and adoption of GIS data standards
- Administers contracts to acquire and host basemapping data
- Assembles regional and municipal parcel datasets, as authorized by CGS Sec. 7-100l
- Works with staff from other agencies on planning efforts and special mapping projects

University of Connecticut

CT ECO is
Connecticut Environmental Conditions Online

- a website containing Connecticut's statewide, natural resource, geospatial information

- a partnership between CT Dept. of Energy and Environmental Protection and the University of Connecticut

- designed for users of varying technical sophistication

cteco.uconn.edu
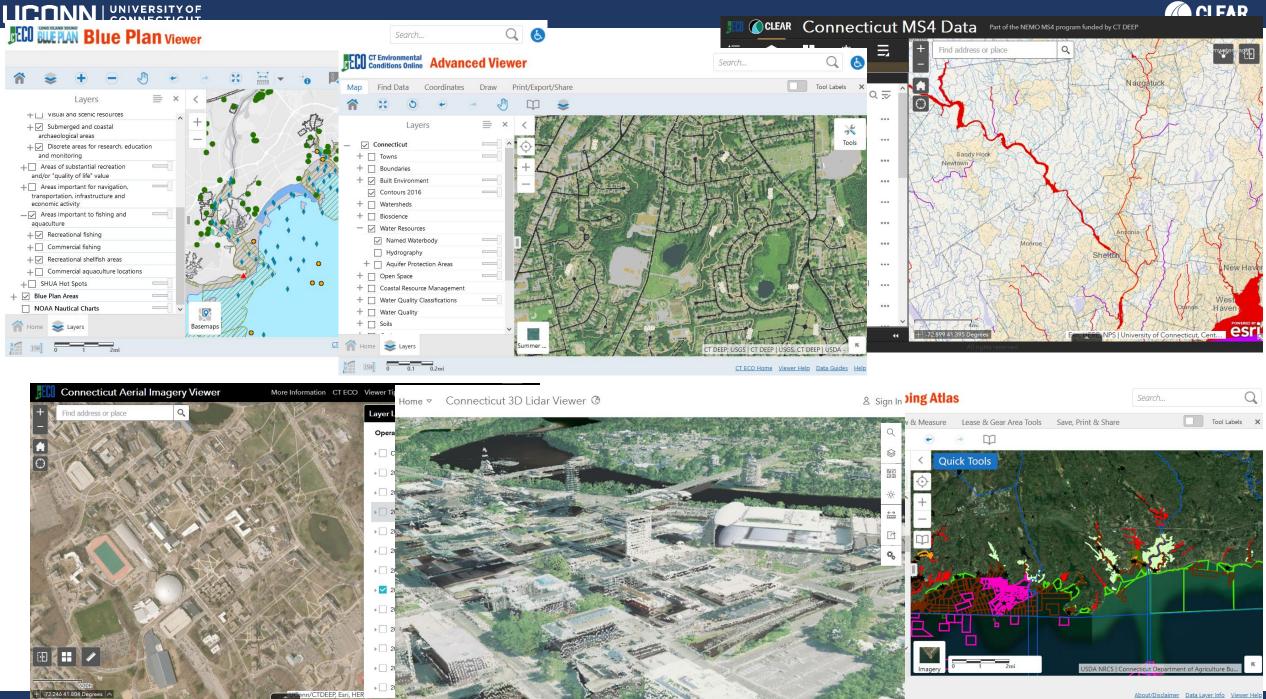
Making GIS data and maps accessible

Lots of questions

Me

"That analysis is tough because Connecticut doesn't have _____"

"Sorry, that layer hasn't been updated for years and no, there are no plans to."

"No, sorry, that agency doesn't make that layer available to the public."

"Yes, you will have to contact each town separately and see if they will give you what they have. No, it will not be consistent between towns."

Someone else

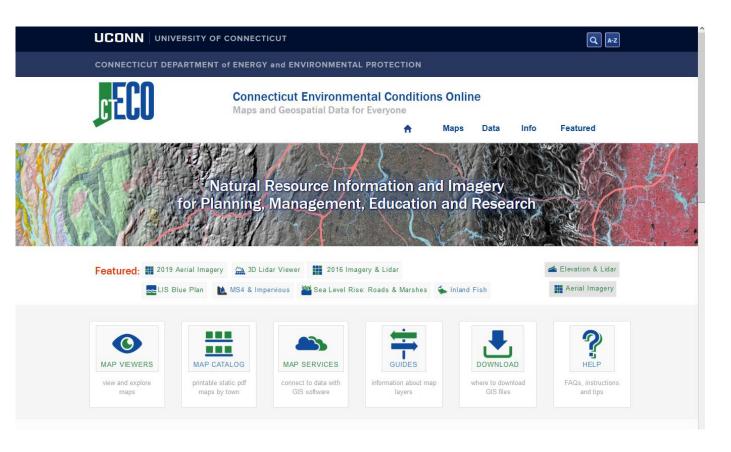"You should look at what other states do cause they do a lot more than you."

Thank you

Emily H. Wilson,
emily.wilson@uconn.edu

`https://cteco.uconn.edu`