



[Newsletter Archive](#)

In This Issue

1. [Topic 1: Trolley App](#)
2. [Topic 2: Time-Lapse Solar](#)
3. [Topic 3: Welcome Neill Fotheringham!](#)
4. [Map/App Gallery](#)
5. [Topic 5: Topobathy](#)

[Back to Top](#)

1. Trolley App

The [July Newsletter](#) mentioned development of a map for a proposed Trolley route, with seven stops in Concord Center and the surrounding historic area. The Trolley is now in service, and its [website](#) includes a lovely [Route Map](#)! Its route has also been expanded to include an occasional trip to the West Concord train station.



In anticipation of the Trolley's inauguration, I developed a [webmap](#) displaying the trolley route. Once Erin Stevens saw it, she asked if I could add information about historic locations visitors may wish to explore in the vicinity of each of the trolley stops. Not a problem! Erin put together a spreadsheet with the information she wanted to appear, and I built it all into a new Points of Interest data layer (purple stars) on the web map.



Finally, I created a [Trolley Phone App](#) with pop-ups to display Erin’s information – including photos, descriptions, and URLs for additional information. I also created a QR code for trolley riders to scan for access to the new app. Once they do, they can connect it to their phone’s GPS, and their current location will display on the app as well. Pretty spiffy!



Anyone can ride the trolley for free so if you try it out, consider also trying out the app – I’d love your feedback!

[Back to Top](#)

2. Time-Lapse Solar

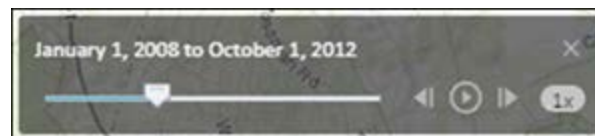
Pamela Cady asked, “Would it be possible to make a map showing how solar is being adopted over time in Concord?” Answer: “Yes!” (otherwise, this article would be quite short...)

To do so, I used an ArcGIS capability called Time Slider. For data layers that are “time aware” – that is, those with date and/or time attributes for each record, Time Slider lets you visualize the layer at various points in time.

The resulting [webmap](#) shows solar installations by month and year. To see it in action, click on the little clock symbol, upper left:



The Time Slider itself will appear:



- I recommend clicking on the 1x (lower right) and changing it to 2X to speed things up
- Then click Play and enjoy!

Do you have “time-aware” data you’d like to show in map form? I’d be happy to apply Time Slider again!

[Back to Top](#)

3. Welcome Neill!

I’m Neill Fotheringham, and I’ve just started as the GIS Program Manager for the Town of Concord. I’ve moved here from Austin, Texas, where I was the GIS Team Lead for the Texas Department of State Health Services, Center for Health Statistics. Before moving to Texas, I worked in Phoenix, Arizona for a few years – for the Arizona Department of Health Services and the Maricopa County Department of Public Health as a GIS Analyst/Geospatial Epidemiologist. And prior to my time in Phoenix, I completed my MSc GIS and BSc Hons. Geography degrees at the University of Aberdeen, in Scotland.



I'm excited to meet everyone and learn more about what work you all do for the Town! I'd like to see what opportunities there may be to expand the use of GIS – whether it be improving existing processes; disseminating our data to the public in creative new ways; or providing new ways to explore our data using spatial analyses. GIS can be used in so many different ways! I hope to meet with as many departments as possible over the next several months to see how the GIS Program can be of assistance. But in the meantime, if you know of a map or application you need, have a large project in mind that you think could be improved with GIS, or would just like to talk about how GIS might be able to help in general with your line of work, please feel free to reach out to me (nfotheringham@concordma.gov).




And for anyone wanting to know a bit about myself... I'm a big sports fan – the Bills and the Sabres are my teams! I have 2 dogs – a shepherd-mix called Taco, and a deaf husky called Toast. Once I'm settled in my office, you can expect to find plenty of pictures of them on my walls. And with being new to New England, I'm looking forward to exploring the towns/cities/states in the area – any suggestions of where to go and what to see or do would be most welcome!

[Back to Top](#)

4. Map/App Gallery

CTRL-Click on a thumbnail to view a full-size map

<p>Fire Department Trail Maps</p>		<p>Will Holden and Jane Prentiss asked to augment existing Trail Maps with Hydrants, Access Gates and other features useful to the FD, which keeps Trail Maps in their vehicles for reference.</p>																																																						
<p>Solar Customers 2022</p>	<table border="1"> <thead> <tr> <th>Year</th> <th># of Arrays</th> <th>kWh (DC)</th> </tr> </thead> <tbody> <tr><td>1999</td><td>1</td><td>1</td></tr> <tr><td>2006</td><td>1</td><td>1</td></tr> <tr><td>2009</td><td>4</td><td>7</td></tr> <tr><td>2010</td><td>2</td><td>3</td></tr> <tr><td>2011</td><td>8</td><td>14</td></tr> <tr><td>2012</td><td>19</td><td>34</td></tr> <tr><td>2013</td><td>101</td><td>183</td></tr> <tr><td>2014</td><td>83</td><td>148</td></tr> <tr><td>2015</td><td>117</td><td>213</td></tr> <tr><td>2016</td><td>43</td><td>79</td></tr> <tr><td>2017</td><td>42</td><td>76</td></tr> <tr><td>2018</td><td>29</td><td>52</td></tr> <tr><td>2019</td><td>10</td><td>18</td></tr> <tr><td>2020</td><td>24</td><td>43</td></tr> <tr><td>2021</td><td>42</td><td>76</td></tr> <tr><td>2022</td><td>24</td><td>43</td></tr> <tr><td>TOTAL</td><td>450</td><td>818</td></tr> </tbody> </table>	Year	# of Arrays	kWh (DC)	1999	1	1	2006	1	1	2009	4	7	2010	2	3	2011	8	14	2012	19	34	2013	101	183	2014	83	148	2015	117	213	2016	43	79	2017	42	76	2018	29	52	2019	10	18	2020	24	43	2021	42	76	2022	24	43	TOTAL	450	818	<p>Pamela Cady requested an updated map of solar customers, this time including a table showing annual additions to the roster.</p>
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<p>Precinct Maps</p>		<p>Developed a new, B&W version of the Voter Precinct map for Kaari Tari, to go out with a town-wide mailing for the upcoming elections, as well as a large map in color for posting in various public places.</p>																																																						

<p>Vernal Pool Buffer</p>		<p>Created a new data layer for Natural Resources, showing 100-foot protective buffer zones (green) around Certified Vernal Pool points (red dots).</p>
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[Back to Top](#)

5. Topobathy

I came across an unfamiliar term recently: **Topobathy**, which combines **Topo**graphy (land elevation) and **Bathy**metry (water depths).

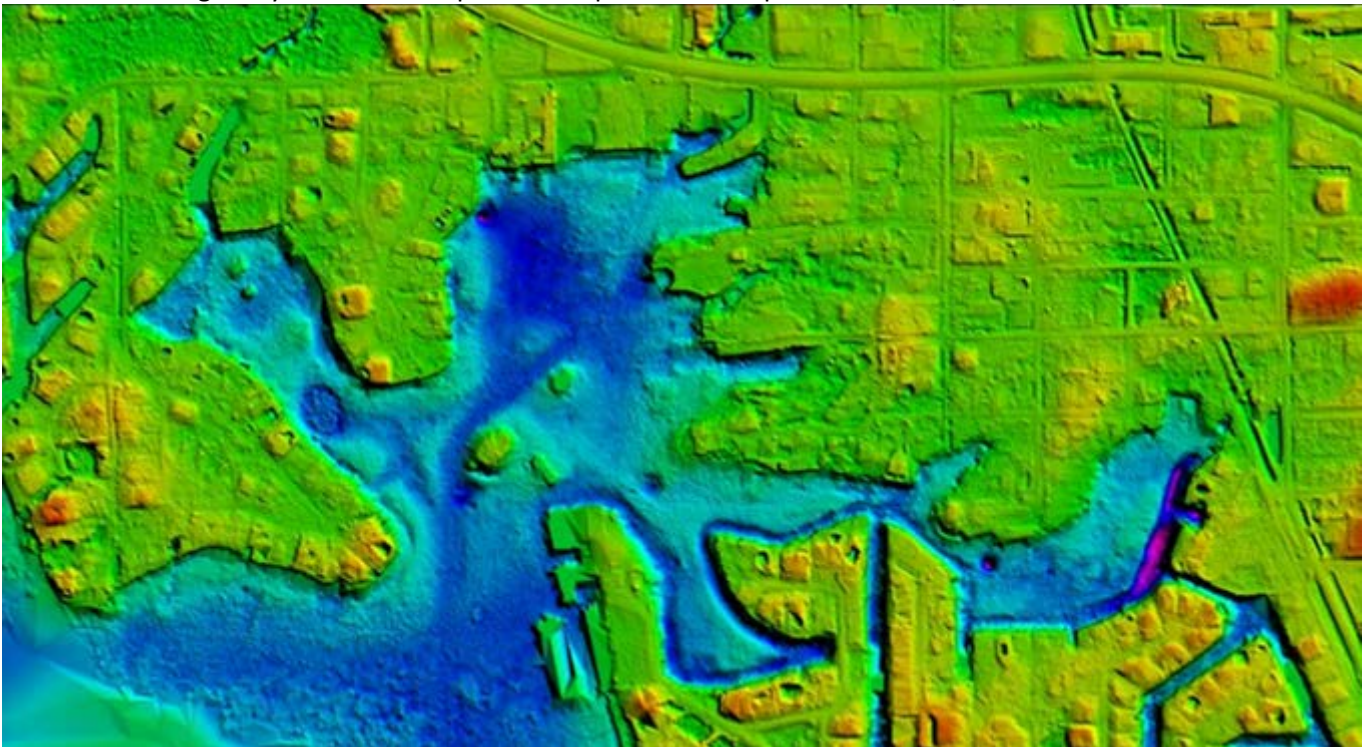
The [USGS](#) describes further:

Topobathy is a seamless surface model that contains terrestrial and river/lake/ocean-bed elevation.

- *The terrestrial elevation is a product of airborne LIDAR (Light Detection and Ranging), converted to digital elevation models (DEMs). LIDAR is a pulsed laser remote sensing method used to measure the surface of the Earth.*
- *Bathymetry, a water depth measurement collected using hydroacoustics, is used to calculate pond, lake and riverbed elevation.*

To create a seamless topobathy dataset, LIDAR and bathymetry datasets are combined.

Add elevation tinting and you have a comprehensive picture of the planet's surface, both above and below the water:



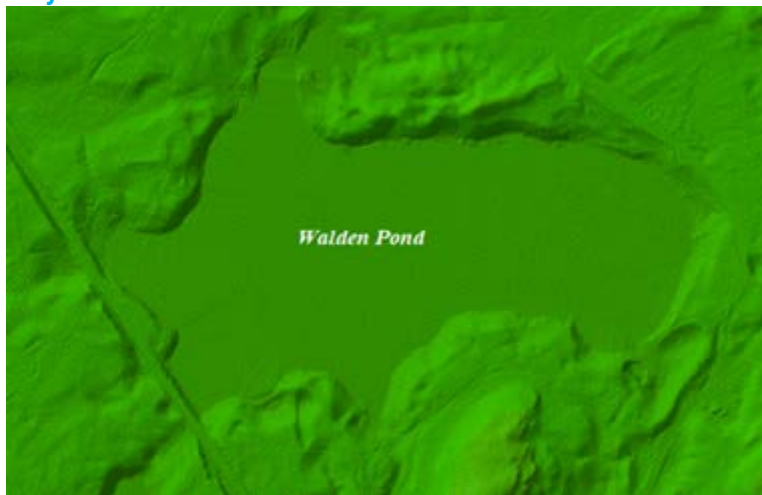
[UFL Water Institute](#) accessed 9/1/2022

You can see this in action on Google Maps, using the Terrain view. The “bathy” portion is evident for oceans and most seas, but inland just the major (e.g. Great) lakes are currently covered.



Google Maps, accessed 9/1/2022

Concord has **Topo** (based on the [Lidar data](#) discussed in the previous Newsletter) but so far our Lakes (ponds) are not Great enough yet to merit **Bathy**:



If and when they do, we'll let you know!

[Back to Top](#)