

▶ BUILDING CAPACITY



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Building Capacity With GIS

Editor's Note: A need exists within environmental health agencies to increase their capacity to perform in an environment of diminishing resources. With limited resources and increasing demands, we need to seek new approaches to the practice of environmental health. Acutely aware of these challenges, the *Journal* publishes the Building Capacity column to educate, reinforce, and build upon successes within the profession using technology to improve efficiency and extend the impact of environmental health agencies.

This column will be authored by technical advisors of the National Environmental Health Association (NEHA) data and technology section, as well as guest authors. The conclusions of this column are those of the author(s) and do not necessarily represent the views of NEHA.

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Through university classes, career development, or on-the-job training, most readers have a sense of GIS (geographic information systems) and what they can do. In my experience, environmental health does not ask enough of GIS.

What Is GIS?

It is incorrect to think of GIS as only Google Maps, making us aware of nearby restaurants and driving directions. It is superficial to think of GIS as only beautiful and colorful maps that dramatically highlight clusters of food facilities or inspector district boundaries.

GIS is a collection of data, software, and people that maintains, collects, and analyzes data that often have a geospatial

component. When you see the word “geospatial,” that means a place on Earth. Everything done in environmental health relates to a place on Earth.

The impact of GIS is far-reaching. In fact, it is universal, although often behind the scenes, informing policy and optimizing operations. And the result of it all is not a map you can look at.

Recall that the component parts are data, software, and people.

Consider this classic GIS example from one of my GIS instructors who described how a well-known chain of corporate coffee shops chooses a new store location. Naturally, the coffee chain wants a location that maximizes profit.

First, the Data

They begin with data from the corporation itself. How many customers does a comparable store serve? During what times of day do sales surge? What products are popular (and profitable)? What distance and how many turns? And yes, we are counting the number of turns to get your morning coffee. Not surprisingly, these data come from the convenient ordering app, rewards program, and point-of-sale systems from the coffee shop.

They add commercially available information about homes and businesses in the region, income, family makeup, traffic patterns, and coffee chain alternatives (i.e., the competition). They likely factor in zoning and master plans from the city.

They might add information about their own supply chain (i.e., how convenient and cost-effective it is to deliver supplies from regional distribution centers). Weather patterns can also play a role, including whether the outdoor seating receives sunlight or shade.

Finally, they add data about available real estate and the likely terms (e.g., cost, improvements required, etc.).

Next, the Software

The dominant software provider is ESRI (although there are other options used much less frequently). They have multiple related products with each doing something different.

Finally, the People

A trained GIS analyst or GIS specialist, perhaps a business analyst, is put on the job. Their job is to configure the data, build and validate a model, and produce recommendations along with projections. The model is used over and over for each new site.

One can see how the vast number of variables and geospatial elements make the problem a difficult one to get your head around. No human could do it. Yet, GIS performs these tasks all the time.

The State of GIS in Environmental Health

No GIS for Environmental Health

There are plenty of cases where a health district does not have its own GIS. The data exist, often with county GIS, but it is not obvious how to gain access.

Or, in some cases, the agency's data management system does not support GIS.

Project-Based GIS for Environmental Health

In many more departments, the need for GIS comes in fits and starts. That is, a project is proposed, the GIS is engaged, data are exported, and a one-time analysis is produced. The project ends until the next cycle. This process can still work even if the agency's data management system does not support GIS.

Always Available GIS Services

This format is most common and very doable. As the agency manages its inventory and provides services, its data system captures the location along with the transaction. GIS services can easily validate addresses, thus ensuring accurate routing and mail delivery.

Most often, location is established by geocoding (i.e., estimating location) based on address. Sometimes the field staff carry GPS

receivers capable of establishing a pinpoint location, such as the location of an onsite wastewater treatment system or water well, via satellite.

Truly Integrated GIS-Based Decision Making

When local and state environmental health begins to achieve fully integrated GIS, the data (e.g., county, third-party, agency's own inventory and services), software, and people can maintain a system where GIS is always present and factored into most decision making.

For example, GIS should inform inspector routing based on variables like fuel consumption, estimated emissions, travel time, and facility risk. The tradition of slicing cities into inspector districts would be dynamically leveled according to the ebb and flow of inventory and should immediately flex when, for example, a position remains vacant for one week or more.

Closing Thoughts

The best advice I could offer is to find your GIS department and make that contact. If you are part of a health district, that could mean reaching out to one or more counties because that is likely where the relevant GIS data live. The same challenge, although larger, exists for state health departments. The good news is that most GIS leaders are eager to see their systems be used in meaningful ways. And the modern systems are built to accommodate a "federated model," which means that the data are supposed to span departments or organizations with little friction.

Next, I advise you to come to that first meeting with some needs already in mind. Be pragmatic with a proposal that is not open-ended. You can ask to brainstorm but work toward a deliverable that is well defined.

Finally, if prompted (or tempted) to install your most tech-savvy inspector as an in-house GIS guru, resist. There is a place for embedded GIS experts in large enough agencies, but the skillset is specific and not easily picked up by self-study.

Happy mapping! 🌍

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CALL FOR SUBMISSIONS

The *Journal* seeks guest authors for the Building Capacity column. Our goal is to provide a platform to share capacity building successes occurring across the country and within different sectors of the environmental health profession, including academia, private industry, and state, local, tribal, and territorial health agencies. Submissions will be reviewed by the NEHA technical advisors for data and technology and *Journal* staff for appropriate content, relevance, and adherence to submission guidelines. To learn more about the submission process and guidelines, please visit www.neha.org/jeh/building-capacity-column.



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