

# GIS in Action | 2018

Representative Nancy Nathanson, Closing Keynote – April 24<sup>th</sup>

## Introduction

Just as much as you are geospatial wonks, I'm a data wonk, with an appreciation for location being married to data. My undergraduate work in urban geography –included making a map for the Atlas of Oregon – the *print* version - using drawing instruments and a hand-held calculator. Since then, 6 years on a city planning commission, another 12 on a city council, and now as a state legislator, one of the recurring themes in my work, has been delivery of public services: cost effective, collaborative, and continuous improvement.

I wonder how many of you who started pursuing higher ed or professions in software, engineering, and cartography realized you could be sitting here today working on childhood trauma, or city zoning and land use planning to support a future with autonomous vehicles.

Some years ago, the Association of Oregon Counties produced a chart of shared services; it shows 79 separate services: 14 are provided by the state; 19 by counties; and 46 are state and county shared services. Bureaucracy can get in the way - but you hold the key to harnessing technology to bridge the boundaries.

You work with the technology and services; I work with the policies and budgets that benefit from your work. Just a quick glance at some of the legislature's work in the past year show a number of topics we wrestled with that do – or should – have GIS data to support decisions and funding: the spread of invasive species, like Japanese beetles and Sudden Oak Death; high school graduation rates; childhood disease immunization rates; home schooling and enrollment in charter schools; day care facilities; suction dredge mining; river erosion, transporting kids to schools in urban and rural areas, cameras monitoring forests for smoke and fire; homelessness, housing cost, land prices, and rent. Those are a few of dozens of policy and budget areas that are in the current portfolio of state and local government matters of importance.

## Historical context

Maps provide a universal language and have the power to change the world— maps shape our perspective, enable us to see information in new ways, and can be used to challenge conventional wisdom or the “way we have always done things.” To illustrate the power of maps, one need look no further than the cholera map produced by Dr. John Snow in 1854, when it was widely

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believed that cholera was an airborne disease spread by so-called “miasma” or bad air. When a cholera epidemic swept through the Soho District of London in September of 1854—near, Dr. Snow’s house, mind you—Dr. Snow challenged the prevailing theory of disease, contending that cholera was spread via contaminated water.

After examining water samples from the 13 public wells in the area and confirming the presence of an unknown bacterium, Dr. Snow managed to convince skeptical local authorities to remove a pump handle on Broad Street. The cholera outbreak quickly subsided thereafter. Dr. Snow then went on to map the epidemic—marking the 578 cholera deaths on his hand drawn map by home address with small black bars. Even a casual observer would note the clustering of deaths around the public well on Broad Street—in effect, it was a rudimentary heat map. Dr. Snow would later go on to publish this map in support of his theory water-borne disease transmission, providing the intellectual foundation for modern epidemiology and saving countless lives.

## The current challenge

The threat of water borne disease here is far less now, but it is not zero. And we are no longer limited to the hand drawn maps of Dr. Snow’s day. Maps are critical for confronting today’s increasingly complex and cross-jurisdictional policy problems. Without **spatial context**, and a **common framework for data sharing**, it is impossible to make sense of much of the data that surrounds us. The public sector is **drowning amid vast troves of data**, and yet we continue to operate within silos and lack core insights into program effectiveness, service delivery, and the root-causes of the problems we face. This is true for policymakers and for program administrators alike—at the state-, the county-, the city- even the neighborhood-level. The difficulty we have **deriving insights from public data and providing spatial context** hampers our ability to make the best decisions – whether it’s programmatic or operational choices, or budgets. It hampers our ability to meaningfully engage the public and further erodes trust in our public institutions.

Here’s a brief illustration of just one slice of the problem in my own area:

There are 35 types of taxing districts that can be formed under Oregon law, such as parks, libraries, schools, utilities, fire, hospital, ambulance, irrigation, soil and water conservation, drainage, diking, vector control, mass transit, and cemetery maintenance. Lane County has about 107 individual districts that fit into 18 of those 35 types.

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The Administrative Boundaries Framework Implementation Team of Oregon GIS Council was set up with the objective to “create a maintainable administrative boundary data layer containing all high priority administrative boundaries in the state of Oregon. Moving from the present in which no two jurisdictions share common digital layer nomenclature, attributes, geospatial registration, or resources to ensure a common state of currentness to a statewide framework is a significant, but worthwhile, undertaking. Issues relevant to such an undertaking include: common high-quality georeferencing and data compilation scales; stakeholder coordination; standards for data content, data processing, documentation, and maintenance.”

In 2006 Lane Council of Governments was invited to submit a proposal to the boundaries framework implementation team for a pilot project for all those different taxing districts in Lane and Douglas counties. Included in the project scope was delivery of selected digital data files, and documenting “the processes, issues, and general resource requirements associated with providing and maintaining a complete set of digital GIS taxing district boundaries for the two counties.”

In the intervening decade technology has changed, the need has grown, and the problems are even more complex; the stakes are higher; the potential benefit is enormous. Since that time, there *are* some counties submitting tax code area information, and there *are* some state agencies that have created statewide datasets, like city limits at ODOT and school districts at DHS and OHA. These are important steps – yet it’s uneven. Patchwork trials and pilot programs help work out the kinks, and then we should be able to set an ambitious goal and move the dial. I’m counting on YOU to help us get there.

## **The role of the state: policy (legislation) and resources (budget)**

As a Legislator, I have worked to support smarter government, accountability, and increased collaboration among jurisdictions—particularly, given the critical role that cities and counties play in implementing state policies and programs. For example, in 2011, I convened a task force of state and local officials to talk about operational efficiencies in several program areas that are shared or delivered by both the state and county government, including public safety - particularly jails and jail populations, assessment and taxation, human services, and elections. We passed some bills to eliminate redundancy or outdated practices; it was just a start. Much more needs to be done. In the summer of 2014 I was energized by the University of Oregon conference on Big Data. Here’s what I said to the faculty, students, and industry leaders:

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All these things are inter-related: school attendance, poverty, children going without breakfast or dinner, dental health, poor eyesight or diminished hearing or other acute and chronic disease, ability to learn and succeed in school, graduating from high school, and incarceration in county jails or state prison. *(these are all very important issues we're dealing with as policy and budget makers)* So, where should we invest our dollars? Which programs work? Which geographic areas need different help, and which publicly funded programs make a difference? We have TONS of data residing in silo'd computer systems that don't talk to each other.

So now, fast forward a couple of legislative terms: I have sponsored and worked to ensure the passage of legislation that removes barriers for data sharing and cross-jurisdictional collaboration.

The 2017 House Bill 3361 or the **Open Data law**, positioned the state to unlock the value of public data through open data standards that enable the public to search, extract, organize and analyze high-value datasets—enhancing transparency through proactive releases of data and providing the foundation for shared insight and innovation. That bill passed both chambers without a single Nay vote.

HB 2906, also signed into law last year, established the **Oregon Geographic Information Council** within statute, re-balanced the Council's membership by increasing local government representation, provided for the appointment of a State Geographic Information Officer and – here comes the big deal you've heard about -- required the sharing of certain geospatial data elements (or "framework data") between public bodies beginning in 2020. \*\* Increasingly, high-value datasets with locational elements, such as addresses, or tax lot IDs provide the essential component of the business of government. In testimony on that bill last year, this simple statement from one of your peers packs a punch: "Sharing is not working." \*\* The example put forward during the hearings on that bill – the potential for aligning separate projects mapping culverts by agencies working on transportation, fish, and water – really brings to light the immediate positive impact of a formalized approach. That bill recognized your work, and puts a spotlight on it because it's so terribly important.

While **Open Data and the trusted elements that comprise framework data** will not in-and-of-themselves provide answers to the policy problems we collectively face, they **provide a common foundation for shared inquiry, policy design and evaluation**. In short, we as policymakers, need your help. We need your help in leveraging the capabilities that GIS affords,

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along with big data, machine learning, and the internet of things (IoT)—applying them to the wicked policy problems we are facing.

## Put into practice

The Deloitte Center for Government Insights recently addressed these themes within the context of healthcare in its report, *“Smart Medicaid: Leveraging Cognitive Technologies to Improve Health and Program Efficiencies.”* While many of the potential healthcare innovations outlined in the report are premised on the implementation of modular and interoperable Medicaid platforms, the emphasis on the use of GIS for evaluating healthcare access (or network adequacy) and for targeted interventions is noteworthy. In the case of healthcare access, states could employ GIS to identify so-called “hot spots” where the healthcare needs of members exceed the capacity of managed care organizations (MCOs) within the network—much like what has been done within public health and law enforcement. (And this would fit neatly alongside my efforts through the 2015 House Bill 3396 at bringing a more rational approach to investing general fund dollars in addressing the shortage of health care professionals ... like doctors and nurses and physician assistants and dentists.) **Data and location.**

Beyond ensuring access to care, GIS has also been used to inform targeted interventions for areas of “super-utilizers”—the 5% of Medicaid recipients that account for nearly half of all program spending. Typically, these individuals suffer from three or more chronic conditions, typically diabetes and various mental health issues, and make recurring trips to the Emergency Department (ED). With GIS, states have the ability to identify hot spots by particular health conditions and make early interventions. While this is not a new idea, having been popularized by a 2011 New Yorker article by Atul Gawande, states have been slow to deploy GIS and scale targeted interventions and stem the healthcare costs associated with super utilizers.

At the University of Florida Family Data Center, they are also using GIS to address healthcare disparities and some of the ACEs – ACEs being Adverse Childhood Events used as indicators of trauma and long-term health and education implications—developing hot spot maps that consider teen births, babies with low birth weights, incidences of domestic violence, reports of child maltreatment, school absenteeism, along with referrals to the juvenile justice system. Ultimately, their analysis lead to the building of a family resource center within the area of greatest need and deployment of a mobile clinic staffed by volunteers and clinicians. Again, **data and location.**

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And here in Oregon, right now: What are the connections between school absence and disease- like asthma – and industrial activity, diesel truck and train routes, availability and affordability of primary care providers, and family income? The politics are hot, but let's at least get grounded with facts: numbers and maps.

Outside of the context of healthcare, there are innumerable opportunities to bring GIS capabilities and advanced analytics to the fore of policy development and program design. While attention has recently centered on the designation of Opportunity Zones—areas intended to encourage long-term private investment within low-income communities—there are opportunities to see GIS in action within the context of ecology and air toxics. Recently, the Department of Environmental Quality (DEQ) conducted a Portland Air Toxics Modeling Study. The DEQ study provides annual estimates for the concentration of 19 pollutants for 2017. The data and its visualization are of inherent interest in their own right—particularly, for Portland residents, yet the DEQ study only scratches the surface. Who knows what insights may emerge when this air toxic data is combined with community demographics, health and education data.

## **Closing**

We live in an increasingly complex and messy world. The policy problems that confront us neither acknowledge nor respect the jurisdictional boundaries that separate us. A “problem” is often the result of multiple variables, from different disciplines, with funding and decision authorities in separate jurisdictions. Solutions may involve several strategies, each with intended – and potentially some unintended – consequences. To solve these problems, we need collaboration and a cross-disciplinary approach to problem-solving—we also need the common language that maps provide. We need your talent and your courage to question conventional wisdom.

And for you: Then going beyond simply Analyze and Report – how exciting it is to **discover** patterns, and to be able to run simulations to project outcomes under various scenarios and solutions.

**You will be explorers and innovators. You will help us make a better Oregon.**

**You and the maps and charts you create have the power to change the world.**

Thank you!