

State Capitol at Olympia, Washington

News From and For the Washington GIS Community

THE SUMMIT

President's Column

Stephen Beimborn, City of Seattle

As the end of my term as President nears, I look back what an eventful two years it has been for our organization. And for the world! But given that there are hundreds of places you can read about our world; I will focus this column on WAURISA. Or now, WAGISA.

Yes, WAGISA. We are now the Washington Geographic Information Systems Association, having ended our long-term relationship with the International organization known as the Urban and Regional Information Systems Association, or URISA. Elsewhere in The Summit we are printing a letter sent recently from the Board of Directors to our membership explaining this change and the reasons behind it.

Suffice it to say, this change has been a long time coming. When I started my term in May of 2019, it seemed likely. After attending the International URISA conference the following September, it seemed inevitable. As I write this, it just seems right.

This is our third incarnation. Before affiliating with URISA, our organization was called the Northwest Computer Aided Mapping Association, or NWCAMA. It was an informal group, open to all who were interested in Geographic Information Systems, whether GIS professionals, vendors of software or data or services, public sector managers trying to build their GIS programs, academics, students, or counterparts practicing in related fields. We have held close to our roots, and despite the changes, intend to remain open and inclusive and relevant to the needs of the GIS community in Washington State.



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2021 Virtual Washington GIS Conference May 24-27

See pages 9-10 for a preview of workshops, presentations, competitions and the keynote address. Don't forget to register!

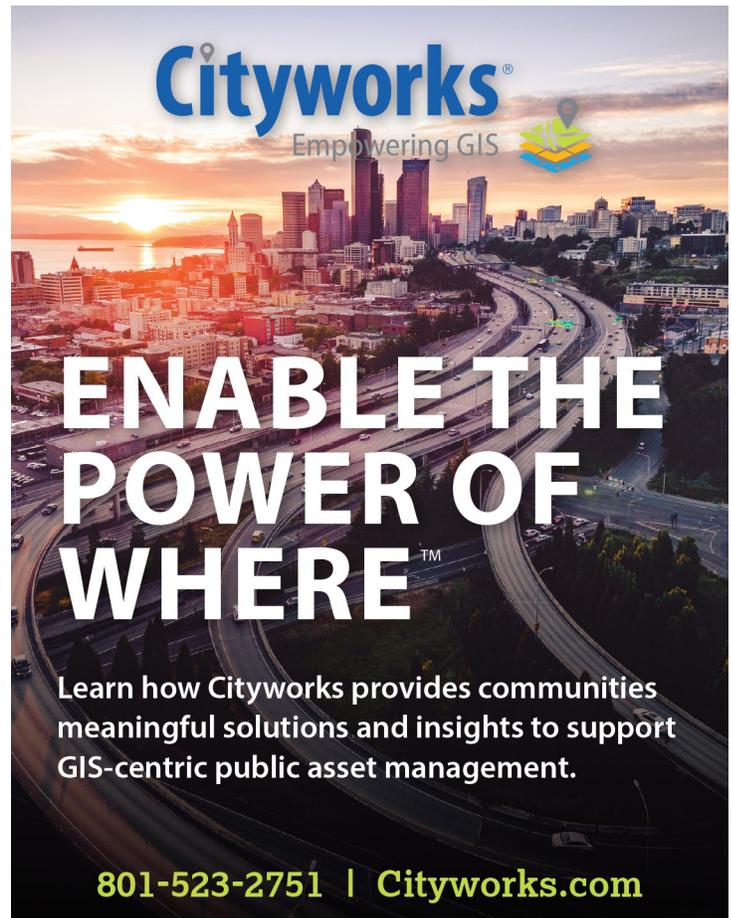
Registration \$40 waurisa.org/events



(President's Column; [continued](#) from page 1)

To see that, while we have changed our name, we remain very much the same, we hope you will join us for the upcoming Washington GIS Conference, to be held on-line or “virtually” from May 25 – 27, with presentations each morning and afternoon. Visit www.wagisa.org to register for the very low price of \$40. What a value, especially given that it includes an annual membership to WAGISA! Providing value at a reasonable cost is another tradition that we do not intend to change.

I cannot say enough about the dedication of our Board or Directors, supplemented by dozens of hardworking volunteers and committee members, all of us energized by the vibrant and dynamic GIS community in Washington State. WAGISA is in good hands! I foresee us remaining strong and relevant far into the future. 🌀



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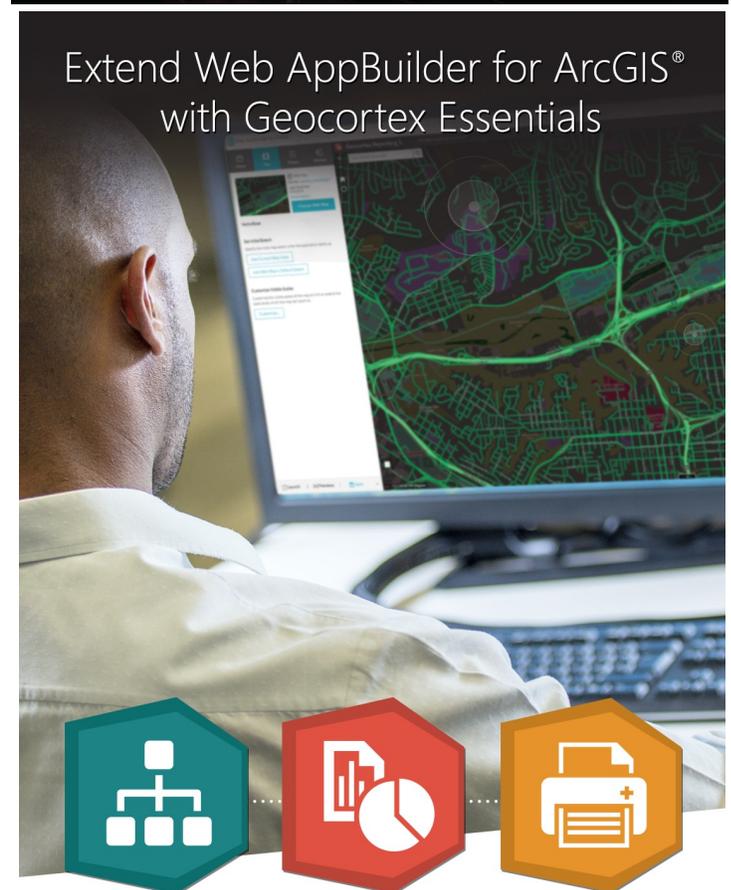
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Mike Mohrman: 2020 Government-Helping-Government

GIS Recognition Award Winner

By: Joanne Markert, Washington State GIS Coordinator

Every fall, the Washington Office of the Chief Information Officer and the Washington GIS Association solicit nominations for the Government-Helping-Government GIS Recognition Award. Though only two years strong, this GIS award has become a signal of respect and appreciation amongst Washington state, county and local government communities. The award is given to someone who goes over and above normal job duties, assisting others with technical issues, and contributing extra time for phone calls and answering endless questions. It is an opportunity for the GIS community to recognize extraordinary individuals, and the winner is announced at the Washington Joint Agency GIS Day Event, held each year during National Geography Week and GIS Day (always the third week in November).

The 2020 winner is Mike Mohrman, State Demographer with the Washington State Office of Financial Management Forecasting and Research Division, for his work uncovering anomalies with the 2020 U.S. Census' new Differential Privacy algorithms.



Mike Mohrman, State Demographer, Washington State Office of Financial Management

All Washington State Agencies and local governments are dependent on the annual population forecasts developed by the Washington State Office of Financial Management (OFM) including Washington Department of Transportation, Department of Social and Human Services, Department of Ecology, Secretary of State, Office of the Superintendent of Public Instruction and the Department of Health. These data are used as initial evaluation tools to assess equity and to understand demographics when developing policy and program implementation. More broadly, every municipality, county, and state in the United States is affected by the accuracy of U.S. Census data. The decadal Census results in one of the foundational data sets used in GIS that guides the fair and equitable annual distribution of approximately \$1.5 trillion dollars of spending across 316 federal programs within the United States.

Most states have demographers and departments similar to Washington State's OFM. Where Mike really shines is with the time he spent to document significant concerns regarding the usability of the 2020 U.S. Census, which rolled out new algorithms to keep personally identifiable information confidential. OFM's work included detailed review of specific areas of Washington state that produced unusual results due to the new privacy algorithm. For example, it resulted in census tracts with only people under 14 years old with no adults attributed with living in the census tract. Mike notes: "With simple analyses we have demonstrated biases and shown illogical values across a wide variety of circumstances. These biases are not randomly distributed and will harm many communities. My agency alone has hundreds of thousands of dollars invested in data systems that use federal census counts as core inputs. We believe that the equitable distribution of funds based on population will be harmed if the accuracy of the data is not markedly improved." Mike and his team's review of these concerning anomalies was comprehensive, detailed and

(Continued on page 4)

"With simple analyses we have demonstrated biases and shown illogical values across a wide variety of circumstances. These biases are not randomly distributed and will harm many communities. My agency alone has hundreds of thousands of dollars invested in data systems that use federal census counts as core inputs. We believe that the equitable distribution of funds based on population will be harmed if the accuracy of the data is not markedly improved."

-Mike Mohrman

(Mike Mohrman: GIS Recognition Award; [continued](#) from page 3)

shared in a way so others could use the information. Mike and his team worked tirelessly to coordinate with the Census Bureau to research ways to identify and correct the problems. You can learn more about Mike's work on this issue by reading the [background document](#) he published and his [letter](#) to the Census Bureau's Disclosure Avoidance System team. These documents and more on the topic can be found at OFM's State Data Center Program website: <https://ofm.wa.gov/washington-data-research/population-demographics/decennial-census/2020-census-everyone-counts/2020-census-what-you-need-know/2020-census-data-quality-and-accuracy> (go to 'Impacts of privacy protections' dropdown).



2020 Government-Helping-Government GIS Recognition Award

Only a handful of states performed similar internal analyses on the Census 2020 disclosure avoidance algorithms, and even fewer published their work. The Washington State's OFM report is the most comprehensive on the consequences of the US Census's Bureau's implementation of Differential Privacy, and is the most cited in national circles like the National States GIS Council (NSGIC). Other states (notably Oregon and Arizona) would refer to Mike's work as the standard and recommended other states use it. ∞

Washington GIS Association Special Interest Groups

Washington Local Government GIS Leaders (WGGL)

Are you in GIS leadership for a Washington city, county, or tribe? If so, the Washington Local Government GIS Leader (WGGL) special interest group is for you! The WGGL group was formed to provide a forum specifically for GIS leaders in local government. Membership of WGGL is comprised of GIS Supervisors (Managers, Coordinators, Directors, and Department Heads) working at City, County and Tribal organizations in Washington State. The group acknowledges that leadership is not conferred by (nor constrained to) a job title, but comes from all across the GIS and government enterprises. The WGGL group promotes: open collaboration to help solve uniquely government problems, active participation, sharing insights and resources, growing leadership skills, and improving overall communication among GIS leaders across the State of Washington. Currently, the group puts on regular educational Lunch and Learn events covering a wide variety of relevant topics, and when need puts on occasional workshops to cover topics more in depth. In April, the group learned about the Slingim Maturity model and how to apply that to local GIS departments. The next WGGL event is May 26, in conjunction with the 2021 Washington GIS Conference and will include some really exciting talks and a panel discussion including leaders from across the state. To learn more about the group and its upcoming meetings, visit the [WGGL page](#) and email wggl@waurisa.org to gain access to the WGGL resources and events.

Remotely Piloted Aircraft System (RPAS) Special Interest Group

Drone usage and program development are a significant area of growth for geospatial professionals. If you're trying to get your head wrapped around the topic, the Remotely Piloted Aircraft System (RPAS) special interest group is for you! The purpose of RPAS is to increase and share technical knowledge for participating members, to create and understand strong workflow integration with RPAS data and to leverage geospatial analysis to solve problems. Meetings are held every third Thursday of the month via Zoom, and all are welcome. To learn more about RPAS and upcoming meetings, visit the [RPAS page](#) or email peter.keum@kingcounty.gov.

Announcing the Washington GIS Association (WAGISA)!

By: The WAGISA Board of Directors

On April 8, 2021, members of the Washington Chapter of URISA (WAURISA) received an email announcing our new identity.

We are reprinting that letter here in its entirety.

Dear WAURISA Members;

With mixed emotions we are announcing that our Washington GIS organization will be disaffiliating from URISA and will become the Washington GIS Association (WAGISA). This change will not have any direct impact on our members.

Our Washington members have always signed up and paid for WAURISA and URISA individually. URISA through their OneURISA initiative have changed this approach to combine those memberships and costs. We have found that the vast majority of our members are not willing to pay the extra dues to join URISA. In order to provide the same level of membership to the majority of our members we have opted to continue with the current system where people choose which organization they want to join (saving most of our members a \$200/year expense).

We will continue to provide our WAGISA members all the benefits they have been experiencing, and we also encourage people to join URISA (but we don't require it). The choice is up to our members.

We want to take this opportunity to explain why we made this decision and the historical facts that led to it. In addition we want to let you know how you can learn more through upcoming opportunities to discuss this with board members.

Background and Historical Context

OneURISA began as an effort to grow International URISA with a very inclusive model. It involved a reasonable individual membership cost and allowed our organization to continue to do what we have done successfully, since we were Northwest CAMA before associating ourselves with International URISA and changing our name to WAURISA. Funds raised by our organization would continue to be controlled by our Board and our board would be elected by us and remain focused on the needs of Washington State GIS professionals.

WAURISA has long been involved with the creation of the OneURISA plan and had representation on the Chapter Advisory Board (CAB). The early OneURISA plan that was created by Chapter leaders took into account many of the concerns brought forward by URISA Chapters. Our best interests were no longer being met

when the URISA Board took over the process and changed and finalized the OneURISA plan. URISA increased the individual membership dues. Those Washington GIS users not willing or able to pay the dues, would no longer remain in our organization as members. We are concerned this would change the control of our local organization away from the current involved GIS users.

WAURISA has always been an inclusive organization with very reasonable membership dues. Attendance at our annual conference conferred membership and all attendees elected the Board. This made the Board very responsive to a membership that represented a large number of people in Washington State who worked as GIS Professionals and in related fields. We believe that the proposed changes will inhibit our ability to function independently and to focus on the needs of all GIS Professionals in Washington.

We, your Board, have tried to see if we could make this model work for us. We have provided an easy opportunity to have our members sign up for membership with International URISA at the same time as they registered for the Washington GIS Conference. Those costs were very similar to what the dues would be for membership under the One URISA model. Out of over 200 attendees, only 4 signed up for membership and only one of those was a full professional membership.

We have sent two letters to International URISA expressing concerns with the OneURISA initiative. The responses we received did not answer any of our questions, address any of our concerns, or indicate any willingness to consider alternative forms of affiliation. In an effort to work toward a compromise, in September 2019 our chapter sent four Board members to the International URISA conference in New Orleans. While there, we found that quite a few other chapters held similar concerns. However, despite these efforts, no changes were made to the proposed Chapter Affiliation Agreement to meet the needs of our members. We are not the only organization to express those concerns either. However, none of that changed the outcome.

In January 2021, the WAURISA Board voted to end our affiliation with International URISA. After much discussion, we felt that the

(Continued on page 7)

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International URISA membership model would no longer work for WAURISA. This change will be effective as soon as all the paperwork and forms are accepted.

We bear no ill-will to the organization in any form. We no longer feel that their membership model will work for our organization and that is the only reason this decision has been reached.

Organizational Changes

Some of the steps we are/have taken as a result of this decision are:

Name Change: We have renamed our organization the Washington State GIS Association. The acronym will be WAGISA.

Web sites: We have purchased the domains of wagisa.org and wagisa.com to align with our new name.

Non-profit status: We are registering our organization under the new name with the IRS for tax purposes and with the State of Washington. We will work to keep that registration with the State of Washington current on an annual basis.

Annual Conference: Our conference has been called the Washington GIS Conference for a long time and will continue with that name.

Notification: We will be notifying International URISA of our decision by their June 1 deadline and will not renew our chapter affiliation dues.

Bylaws: We are updating our bylaws to remove all references to International URISA and to use our new name.

Coordination with Other Chapters: We are sharing information with other state chapters of URISA where there is a reasonable overlap of concerns. We can benefit from learning about what they are doing.

Communication: We are communicating with all of you via this letter. We will also set aside time to discuss these changes at the upcoming Washington GIS Conference, to be conducted online May 25 – 27.

For members of International URISA: We are considering formation of a Special Interest Group (SIG) for WAGISA members who are also members of International URISA.

Membership Changes

These changes will have minimal impact for individuals in terms of what you currently do. If you are currently a member of WAURISA, you will automatically become a member of WAGISA. If you are currently a member of International URISA, this change will have no impact on the benefits you receive from URISA. We will continue to support people joining both organizations but ultimately feel the choice is yours.

Moving Forward

Our virtual conference will be held May 25-27, with a session on Thursday, May 27 at 1:00 p.m. where the Board will address this change further and provide opportunities for you to discuss this with the Board. In the interim if you have questions, concerns or comments regarding these changes please submit them here:

[COMMENT FORM](#)

We are very grateful to all of our members and we are also grateful to International URISA for the many constructive years as an affiliated organization. We look forward to continuing to serve the Washington State GIS (and related fields) Community going forward, no matter our name or affiliation.

-The Board

[Washington State GIS Association \(WAGISA\)](#)

Stephen Beimborn, President
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Emily Pitman, Treasurer
Ian Von Essen, Immediate Past President
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Jason Eklund, Member at Large
Maria Sevier, Member at Large
Gregory Lund, Member at Large
Taylor Dixon, Member at Large

Not sure if you are a WAGISA member? Visit www.waurisa.org. If you are a current member, you'll be able to log in and see the additional "Member Resources" tab. If you have questions or troubles logging in, please [email](#) the membership committee for assistance.



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2021 Washington State GIS Conference Highlights

By: The Conference Planning Committee

It's almost here... wherever "here" is for you - the 2021 Virtual Washington GIS Conference kicks off on May 24th with a day of workshops, followed by 3 days of concurrent presentation tracks, meetings, and a not-to-be-missed keynote presentation by Esri's Chief Scientist, Dawn Wright. Registration

is just \$40 for the conference, which includes an annual membership with the newly minted Washington GIS Association (see page 5 for details). Here are a few highlights to inspire you to register, if you haven't already.



May 24—Pre-Conference Workshops

1. Migrating to ArcGIS Pro (full day, \$200) with instructor Tripp Corbin
2. Editing in ArcGIS Pro (full day, \$200), instructed by Nathaneal Keith
3. Remote Sensing with Free and Open-Source Software (FOSS): Land Cover Analysis' (half day \$100) with Karsten Venneman

For more information and to register, check the workshop page at <https://waurisa.org/Workshops>

Poster Contest

Are you interested in sharing your work to inspire others and winning a prize too? Join us for the 2021 Virtual GIS Conference and submit your work to our Poster, Map, or Web Application contest! We want to highlight your skills in the following award categories: Cartographic Design, Data Integration, Interactive Experience, Innovative Scripting or Geoprocessing Tool, Social or Environmental Justice (NEW in 2021), and Student.

Show us your favorite project, script, or app - don't let them sit on a hard drive! For more information visit <https://www.waurisa.org/Poster-Contest> [waurisa.org]. Submission deadline is May 10th, 2021.

May 27—Special Membership Meeting

1:00-2:30 p.m. Be sure to join the membership meeting this year as we announce our new board members and discuss our transformation from the Washington Chapter of URISA into the Washington GIS Association (WAGISA).

May 25—Keynote Speaker "Why the World Needs Geospatial Now More than Ever"

Dawn Wright, Chief Scientist, Esri



It is a huge understatement to say that our human footprint upon planet Earth is creating a host of challenges for all of us, as individuals, organizations, broader societies, species of all kinds. We're losing biodiversity at a rapid rate. Our destruction of habitat is becoming more closely linked to the appearance of disease pandemics. We're facing the challenges of water and food shortages. Unconstrained development as projected into the near future, is just not sustainable. The clock is against us on the climate change front. Hence, it is under the rubric of "use-inspired" that many of us undertake science today, believing in the mandate of science to assist in solving the world's biggest problems, fostering resilience along the way. At the same time, our digital technologies are enabling us as humans, to make huge advancements in science, in communication, and in being connected, accelerating everything, reshaping our very existence. This talk will focus on various geospatial technologies as an enabler of science as it serves local and state government, providing continually better frameworks for measurement, visualization, predictive mapping, and interpretation, but also of intelligent planning, systematic decision making and collaborative action.

More Conference Highlights on Page 10...

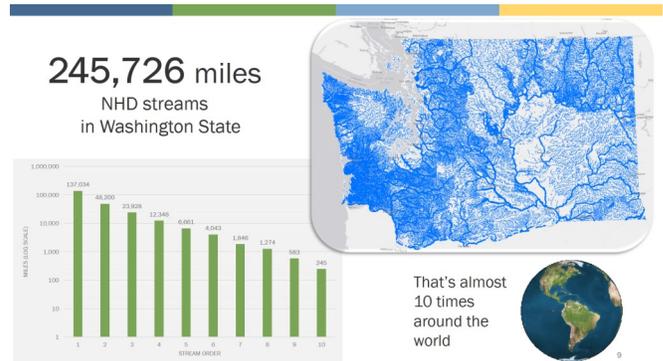
...More 2021 Washington GIS Conference Highlights

A preview of some of our track presentations—we have over 40 presentations in all!

Washington State National Hydrography Dataset (NHD) and How You Can be Involved

Presenters: Josh Greenberg and Christina Kellum, Washington State Department of Ecology

Josh Greenberg, who recently joined the Washington State Department of Ecology to manage Washington state's work on the USGS National Hydrography Dataset (NHD), along with his colleague Christina Kellum, will discuss the importance of this essential GIS layer for the state, local governments and non-profit organizations. In his presentation Josh and Christina will outline both the data structure and functionality of the NHD and demonstrate its value by providing examples of how the data has been successfully used in Washington State.



How GIS responded to our most critical issues in 2020 and where we go next

Presenter: Joanne Markert, Washington State GIS Coordinator

Joanne will be speaking on how GIS made an impact on the various disasters and issues that showed up in 2020. Joanne will cover the pandemic, wildfires and of course, the murder hornets. She will also take time to discuss what is going on at the State level – initiatives for moving forward including equity, a very important topic that impacts all levels of GIS right now.

How to Start and Fund an Asset Management Program from Scratch

Presenter: Arnab Bhowmick, Aakavs

Arnab will share how in the last few years GIS based Asset Management systems have transformed from a luxury to a necessity, and how during the pandemic asset management tools transformed to provide continuous citizen services. Now, more than ever, it is imperative that the right tools, technologies, business processes, and best practices are provided to operations and maintenance staff. As the economy reopens and many pending projects will kick-off, come to this presentation to gear-up with the latest and greatest trends and technologies.

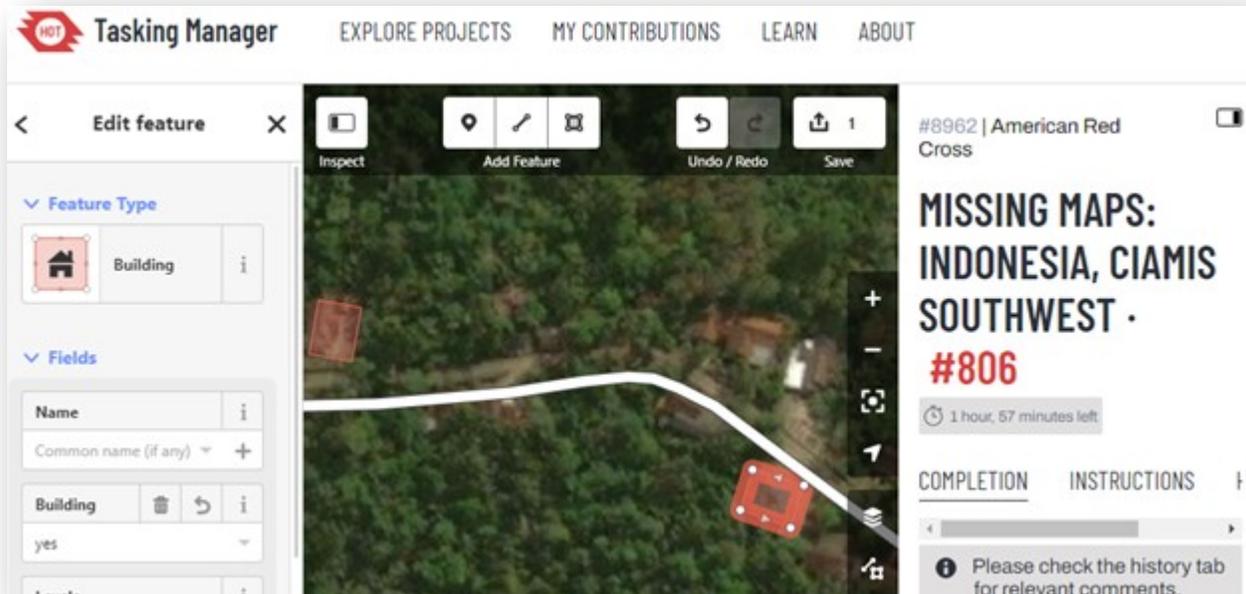


Pacific Northwest Mappers Contribute to Missing Maps Effort

By: Eadie Kaltenbacher, Kitsap 911

Can you imagine the U.S. moving the capital from DC to Omaha? It would be extremely expensive, and encompass huge logistical and political challenges. Indonesia has decided to make such a drastic decision. The current capital, Jakarta, is located on Java island which is suffering the effects of rising sea levels due to climate change. At a price tag estimated at

rived at the site of the disaster, a lack of GIS data (such as locations of roads, shelters, and utilities) hampered their response. Volunteers around the world stepped up to rapidly digitize this data from aerial imagery. The American Red Cross, in partnership with other agencies, harnessed this energy to transition from emergency response to emergency preparedness. Today, the



The Missing Maps user interface is easy to use. Free training is provided.

\$33 billion, the new capital will be established on the island of Borneo, hundreds of miles away.

This is one of the stories I recently learned as I joined a group of volunteers with the [Missing Maps](#) program to digitize rural buildings in Indonesia. Volunteers from across the Pacific Northwest connected to a Zoom call to chat, and simultaneously created data in Open Street Maps that will be used by many NGO's for humanitarian purposes. The Open Street Maps interface is simple to use, although I recommend attending a meetup at first to get a good understanding of the workflow and some of the nuances of working with the tools.

The Missing Maps program was launched as a response to the Haiti earthquake six years ago. When humanitarian agencies ar-

Missing Maps program consists of 18 non-governmental organizations including various Red Cross locations throughout the world, Doctors Without Borders, and more.

In addition to the Indonesia project, there are several other ongoing projects. One timely activity is a Pandemic and Epidemic Preparedness project taking place in Kenya, Democratic Republic of Congo, and Uganda. This initiative aims to map missing data vital to sanitation, such as locations of washing stations and supply sites.

AlexAnne Pitts is based in Seattle, and she is the volunteer Pacific Northwest region coordinator. She first heard about the Missing Maps effort through a "Recruiting for Good" initiative on LinkedIn, and quickly came to appreciate how creating this data

(Continued on page 13)

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(Missing Maps; [continued](#) from page 11)

makes a real difference in peoples’ lives. Over a year into her volunteer role, she emphasized that the program fosters connec-

Leaderboard					
RANK	NAME	TEAM	TOTAL EDITS ↑	BUILDING EDITS ↓	KM OF ROAD ↓
1	Sawan Shariar	missingmaps	663,916	626,589	2,431.8 km
2	mmahmud	missingmaps	637,878	581,416	5,936.4 km
3	mhrana98	missingmaps	609,155	574,275	7,150.2 km

Missing Maps Leaderboard shows the hard work of some very impressive volunteers!

tions, appreciation, and a sense of global community.

AlexAnne hosts a monthly Missing Maps meetup, which begins with an introduction to the program and a tutorial on how to get started. While these meetups target beginning mappers for sim-

ple tasks such as digitizing buildings, there is also a need for more advanced skills in the validation process. Any of these tasks can be performed from any computer with an internet connection. Any contribution is valuable, whether done individually

or through an event, and whether you contribute an hour or a week. Missing Maps even has a leaderboard for those of you with a competitive streak!

Contributing to the Missing Maps is a great way to make a difference from your own home, and even earn some GISP points along the way. Make sure to track your time: each

hour of volunteer work counts as 0.05 points in the “Contributions to the Profession” section.

The next PNW Community mapathon will be on Wednesday, May 19th at 5:30pm. [Register](#) in advanced on Eventbrite. [↪](#)

Share Your Story in The Summit Newsletter

Do you have an idea for a worthwhile article, but you don’t want to be in charge of writing it? Let us know and we’ll investigate it—we have willing writers that can turn your lead into a great story for the newsletter!

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July 2, 2021



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In Memoriam

This year Washington lost two incredible contributors to our geospatial community—Gene Hoerauf and Nancy Hultquist, both passionate GIS professors at Washington’s higher education institutions. Friends and colleagues remember them here.

Nancy Hultquist

September 1, 1943—March 30, 2021

Nancy B. Hultquist, retired professor of geography at Central Washington University, died March 30th, 2021.

Nancy was born in 1943 and grew up in Atlanta, GA on Piedmont Road near a 32-lane bowling alley. There she worked and became good at the sport. She completed college in 1965. Graduate school called and she left for the University of Cincinnati. With two years there, she returned to Georgia State University and the geography department, her undergraduate academic home. After marrying John in 1969 they were at the University of Iowa. From the farming country of Iowa came the first bird dog, a Brittany. Then the University of Idaho beckoned (1974), and the three headed toward the Pacific Northwest (PNW).



Nancy on graduation day at the University of Cincinnati June 15, 1967

The University of Idaho position was a split position, so there was extra time to expand the dog population to two, then three, and then many, and next a horse. Nancy enjoyed the Brittany’s and the comradery and competition of shows and field trials. Along the way she was gaining knowledge and teaching about using computers to make detailed maps. The field is now called Geographic Information Systems, GIS. She was most happy working with students and watching their careers develop.

The PNW is home to great fiddlers, and after a move to Central Washington University (1988) for a full-time position, the bowling and bird dogging ceased. The Washington Old Time Fiddlers Association provided expert string instrument instructors in summer camp, in the school at Kittitas. She first played at age 4. The county also had a group called the Kittitas Valley Fiddlers and Friends. Nancy found a new outlet for her non-academic energies.

Then, heart issues from a childhood case of Rheumatic fever ended her academic career, but only interrupted her fiddle playing. Endocarditis, artery blockage, and an open-heart valve replacement came in 2009. As she recovered and gained stamina, Nancy began to take a larger role in the music of the Kittitas Valley Fiddlers and Friends. They played at the elder care facilities in Ellensburg and other venues in the area. She considered the entertainment provided to the residents of the valley in these facilities one of her best experiences.

Amanda Taub, a former student of Nancy’s, remembers much about her: “I met Dr. Nancy Hultquist in the late 1990s at Central Washington University when I was a Geology major looking for practical skills for after graduation. I took her Introduction to GIS class and was quickly hooked on GIS. Nancy was instrumental in arranging for many of my internships and I would not be in my current position as a GIS Analyst at Douglas County Transportation & Land Services without those early internships. Nancy was a great friend. I loved the many conversations and emails we had; sharing about GIS, Geology, her students, our mutual interests of music, wine, and central Washington geography. She always encouraged me to be active in the GIS community and to pursue my career goals, including my GISP. Nancy was a very special person who touched the lives of thousands of people through her teaching, music, and friendship.”



Nancy had many talents, including a love for playing the fiddle.

Nancy was known as a great teacher and an even greater supporter of student success. She maintained a jobs list that covered employment opportunities across the Pacific Northwest. It currently has over 800 subscribers, and many alumni credit her tireless work to helping them launch their career. The list will continue (send job and other GIS-related announcements to CWUGeography@gmail.com), and we hope it serves as a living memorial to her impact. ∞

In Memoriam

This year Washington lost two incredible contributors to our geospatial community — Gene Hoerauf and Nancy Hultquist, both passionate GIS professors at Washington’s higher education institutions. Friends and colleagues remember them here.

Gene Hoerauf

November 3, 1939—January 4, 2021

Eugene “Gene” Hoerauf taught at Western Washington University for 35 years, retiring in 2005. To say that Gene was foundational in bringing GIS to WWU and to Whatcom County would be an understatement, according to colleague Stefan Freelan, a GIS Specialist and Instructor at the University. Many in the state learned cartography and GIS skills under his kind tutelage. But more than that, his students learned about humility, hard work and friendship. Over the course of his career, an astounding



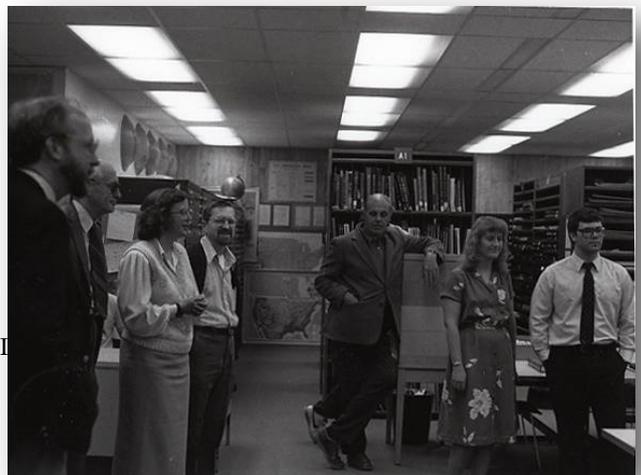
Gene dedicated his career to advancing the use of spatial technologies.

amount of industry change took place, and Gene’s position gradually shifted from cartographer to computer programmer to IT support and data steward. In 1971 he began teaching computer mapping exercises and eventually took over as the instructor for computer mapping which became an IDRISI-based GIS course in the late 1980’s. Upon his retirement, Stefan, himself a student of Gene’s, wrote an article for The Summit newsletter, sharing this about Gene’s career: Largely self-taught in GIS and computer administration, Gene was integral to the establishment of the first GIS in Whatcom County in 1991 (a joint WWU – Whatcom County Planning Department project). Whatcom County’s GIS operations were housed at WWU for the first two years of its existence as Gene and a small staff of County Employees (former student’s of Gene’s) forged the initial data layers and explored the possibilities.

As GIS grew in its potential and popularity, WWU’s cartography lab was transformed into a GIS computer lab. GIS Course offerings increased, a minor was added, and GIS faculty and staff were hired. Throughout it all, Gene continued to work untold hours (far more than 40 per week), helping students and faculty alike to further their spatial knowledge and ability. His work has been published in numerous books, journals, and atlases.

Gene was also involved with the Northwest WA GIS Users Group since it began its quarterly meetings in 1992. He was instrumental in setting up the Bellingham Breakfast Users Group (monthly meetings since 1994) and has facilitated the use of WWU as a teleconference site for the state WAGIC meetings.

Katie Heim, GIS Manager for the City of Arlington, WA, remembers Gene’s generosity: As I travel back in memory to my days at Western Washington University (MS in 2006), I realize that I could not be doing what I am doing now without Gene. I spent countless hours in the Spatial Lab and anyone who took a GIS class knew ‘Gene in the Spatial Lab.’ I think that was his official title. Did you have a GIS related question? See ‘Gene in the Spatial Lab’ - he can help you. I enjoyed his classes and the Spatial Lab was my second home for about 2 years. In that time, I didn’t just learn the software, I learned the ‘GIS Personality’ from Gene. I don’t think GIS Personality is described in psychology books but you all know what I am talking about. The GIS Personality is friendly, open, willing to share, willing to learn and will talk about GIS until the cows come home. Gene was always friendly, patient, and if I wanted to know more, he was willing to take all the time needed for me to understand the concept. Through his classes and his guidance, I got an understanding of GIS history and the dramatic changes to the technology over the years and the tremendous possibilities in GIS. All these moments linger in my head and I will forever be grateful to know I started my GIS career with a true leader. May he rest in peace. 🙏



Gene, fourth from left, could be found nearly ‘round the clock in the basement of Arntzen Hall, the campus building that housed the geography program.

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Performing a Tree Canopy Cover Analysis using Spatial Analyst Toolbox in ArcGIS Pro 2.6

By: *Georgianna Strobin, City of Tumwater*

Fall 2020 brought crunchy leaves and crisp air to Washington. To Tumwater, it also brought a new challenge of completing an urban tree canopy cover analysis. The City of Tumwater has canopy cover goals that are a part of the new Urban Forestry Plan, and needed accurate baseline information and a clear, repeatable methodology in order to track progress in the future.

A consultant had completed a tree canopy cover analysis for Tumwater. They utilized 3-meter NAIP leaf-on imagery from 2011 and 2017, and LiDAR captured during leaf-off conditions in 2018. The City tasked the GIS Team with replicating the consultant’s analysis. The exact method of the analysis was unclear, but it appeared that the consultant had used the Maximum Likelihood (ML) classification method from ArcGIS Pro’s Spatial Analyst toolbox to calculate canopy cover.

We began our attempt to replicate the consultant’s assumed process by analyzing LiDAR from 2018, as well as performing ML classification on 2018, 3-inch aerials. The LiDAR and the aerial photo were captured during the same flight during leaf-off conditions. Later, we discovered that the consultant had used LiDAR exclusively to QC their image classification. In addition, we excluded all vegetation under 5 feet from our analysis; the consultant included all vegetation from 0 feet on.

We were unable to come close to the consultant’s results, and the process was very time and resource intensive. Some tools took several days to run. If we had not split the file into small enough pieces, the process would crash after a few days and we would have to start over.

We found that the ML classification produced too many errors and inaccuracies, and the LiDAR, while much higher in accuracy, was not a feasible option due to the expense of obtaining the data. We needed a way to classify tree canopy that used aerial photos, did not produce an obscene amount of errors, and was not a large time cost. Our answer came in the form of Support Vector Machines (SVM) classification.

Our Solution

We decided to classify both the 2018 3-inch leaf-off imagery from the previous classification attempts and 2019 1-foot leaf-on imagery. We performed SVM classification using the Image Classification Wizard. To begin, we created a segmented raster using the following settings:

Spectral Detail	Spatial Detail	Minimum Segment Size (Pixels)
18.5	19	20

We chose 18.5 for our spectral detail to allow for adequate distinction between grass and deciduous trees, shadows and evergreen trees, and shadows and water. Pixel values for these classes were extremely similar at times. Spatial detail was set at 19 to account for the clustering of trees around roads and other features in the imagery. A higher spatial detail value is used when features are close together. The minimum segment size was 20 pixels, which allowed the segmentation process to group segments that are smaller than 20 with the best-fitting neighboring segment.

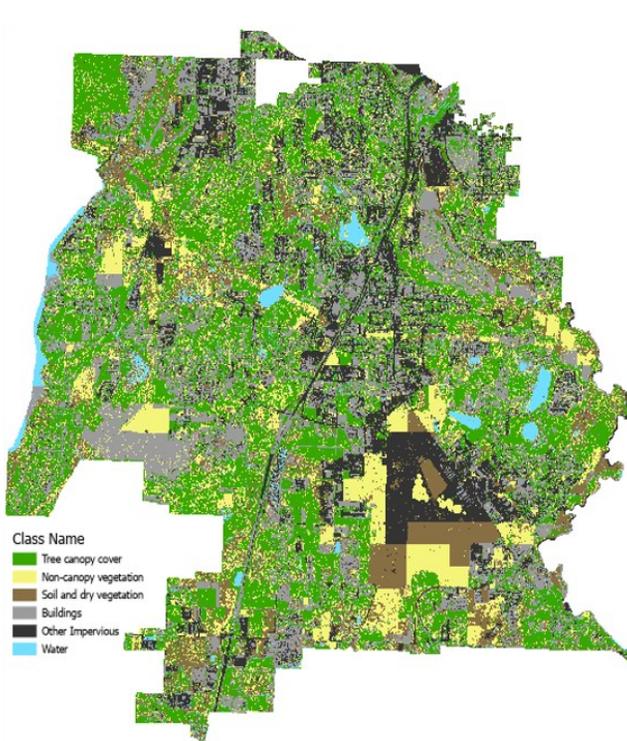
Using the same six land-cover classes used by the consultant--tree canopy cover, non-canopy vegetation, soil and dry vegetation, buildings, other impervious, and water--we created at least 50 (often more) training samples per class, with tree canopy cover containing the highest amount of training samples. The minimum number of samples was set at 50 in order to provide us with adequate statistical significance when running the classifier.

(Continued on page 18)

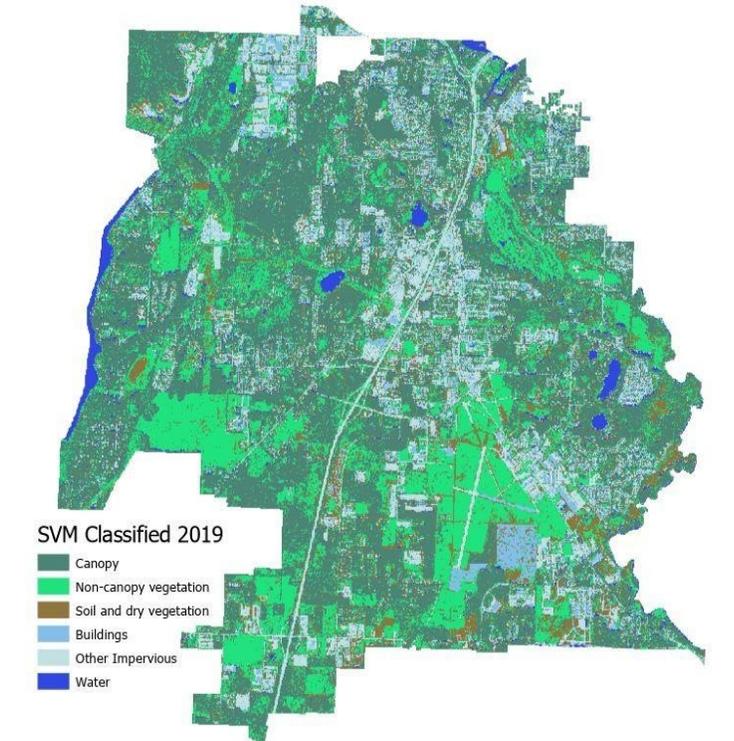


Section of the 2018 aerial segmented raster

We trained the classifier using supervised, object-based classification. We chose to use the “supervised” method in order to produce our own training samples. Additionally, we used object-based classification to group pixels and avoid a “salt and pepper” effect on our output raster. We generated our classification schema from our training samples, used our segmented raster, and added the aerial photo as the final input to the trainer. Due to time constraints, we trained our classifier twice per image. Higher accuracy results can be obtained with more training cycles. After training, we ran the classifier and produced our classified raster.



Classified 2018 SVM



Classified 2019 SVM

Prior to converting the raster to polygons and calculating canopy cover by zoning designation, we wanted to check the overall accuracy of our classified raster, as well as the accuracy of just the tree canopy. To do this, we created a confusion matrix by hand, though this process could also be completed using the tools in ArcPro.

First, we created a set of 250 equalized stratified random accuracy assessment points. Accuracy assessment points determine the accuracy of the classified raster by comparing the classified value with the ground-truth value. We used “equalized stratified random” to create equal numbers of randomly generated points for each class. We populated the attribute table of the accuracy assessment points feature class with the ground-truth value by using the Swipe function to compare the classified raster with the aerial photo rather than performing actual ground-truth due to time constraints.

Next, we performed a selection on the point feature class to find all points that had been classified as tree canopy and ground-truthed as tree canopy. The resulting number of points was input into the first cell of the confusion matrix, which is highlighted orange. The selection was repeated for all points classified as tree canopy and ground-truthed as non-canopy vegetation, and this value was input into the first row, second cell of the confusion matrix. We repeated the selection pattern until all cells were filled.

Row	Class,GrndTrth 1	Class,GrndTrth 2	Class,GrndTrth 3	Class,GrndTrth 4	Class,GrndTrth 5	Class,GrndTrth 6
1	(1,1)	(1,2)	(1,3)	(1,4)	(1,5)	(1,6)
2	(2,1)	(2,2)	(2,3)	(2,4)	(2,5)	(2,6)
3	(3,1)	(3,2)	(3,3)	(3,4)	(3,5)	(3,6)
4	(4,1)	(4,2)	(4,3)	(4,4)	(4,5)	(4,6)
5	(5,1)	(5,2)	(5,3)	(5,4)	(5,5)	(5,6)
6	(6,1)	(6,2)	(6,3)	(6,4)	(6,5)	(6,6)

Confusion matrix selection pattern

We used our confusion matrix to calculate precision, commission, recall, omission, overall accuracy, and Kappa. For our purposes, we were concerned with overall accuracy and tree canopy cover accuracy but still computed the additional validation metrics. We found that for 2018, the classifier was 83% accurate at identifying tree canopy cover. For 2019, the classifier was 97% accurate. The Kappa value of 46.8% in the 2018 matrix indicates medium agreement between classified values and actual values.

		Ground Truth						#	Precision	Commission
		Tree Canopy	Non-canopy Vegetation	Soil and Dry Vegetation	Buildings	Other Impervious	Water			
Classification	Tree Canopy	35	3	4	0	0	0	42	0.83	0.17
	Non-canopy Vegetation	8	13	20	0	1	0	42	0.31	0.69
	Soil and Dry Vegetation	7	0	33	0	2	0	42	0.79	0.21
	Buildings	3	10	11	4	13	1	42	0.10	
	Other Impervious	1	0	9	9	23	0	33	0.70	0.30
	Water	1	2	13	4	1	21	29	0.72	0.28
#		55	28	90	17	40	22	162		
Recall		0.64	0.46	0.37	0.00	0.58	0.95			
Omission		0.36	0.54	0.63	1.00	0.43	0.05			
Accuracy		0.7962963								
Kappa		0.46894326								
TCC Accuracy		0.83333333								

2018 SVM confusion matrix (Contact gstrobin@ci.tumwater.wa.us for the file, formulas, and additional information)

[\(Continued on page 20\)](#)

		Ground Truth						#	Precision	Commission
		Tree Canopy	Non-canopy Vegetation	Soil and Dry Vegetation	Buildings	Other Impervious	Water			
Classification	Tree Canopy	32	1	0	0	0	0	33	0.97	0.03
	Non-canopy Vegetation	3	39	0	0	0	0	42	0.93	0.07
	Soil and Dry Vegetation	4	4	26	0	7	1	42	0.62	0.38
	Buildings	0	1	4	19	16	2	42	0.45	
	Other Impervious	0	0	1	9	32	0	41	0.78	0.22
	Water	1	12	0	1	6	22	42	0.52	0.48
#		40	57	31	29	61	25	212		
Recall		0.80	0.68	0.84	0.00	0.52	0.88			
Omission		0.20	0.32	0.16	1.00	0.48	0.12			
Accuracy		0.80188679								
Kappa		0.17638984								
TCC Accuracy		0.96969697								

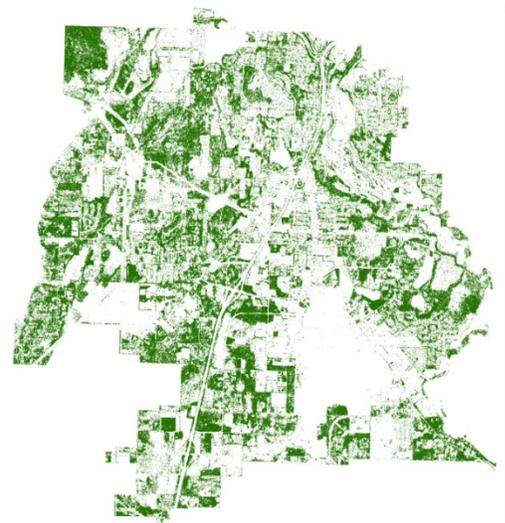
2019 SVM confusion matrix

When the confusion matrix was complete and accuracy was determined, we felt confident in continuing with our process. We converted the classified raster to polygons, exported the tree canopy polygons out, and unioned them with zoning polygons to compute acres of canopy per zone.

Conclusions

For Tumwater, the best method for calculating tree canopy cover is Support Vector Machines. The accuracy was high, even in leaf-off conditions. The entire analysis process took roughly 12-18 hours to complete, a marked contrast to the Maximum Likelihood classifier. Depending on the resources available to your organization, we would recommend LiDAR, SVM, or a combination of the two to produce the highest accuracy tree canopy cover estimate.

We found that there were important differences between our SVM analyses and the consultant’s MLC and LiDAR analysis, summarized in the table below.



2018 tree canopy cover identified using SVM

Total Acres of Canopy and % of Canopy Cover			
	Consultant	2019 1-ft Aerials: SVM	2018 3-in Aerials: SVM
Imagery Conditions	Leaf-on and off	Leaf-on	Leaf-off
Acres of Canopy	10,457.1	5,887.53	4,278.99
Percentage of Canopy Cover	75.06%	42.26%	30.71%
Accuracy	N/A	97%	83%

As evidenced in the table, it is clear that different classification methods produce different results. Our 97% accurate SVM for 2019 aerials produced the best estimate for tree canopy cover within the City, at 42%. Additionally, many of our street trees are deciduous which accounts for the large discrepancy between the leaf-on and leaf-off estimates. In the future, we will continue to use SVM object-based supervised classification to calculate our tree canopy cover and use leaf-on imagery if available.

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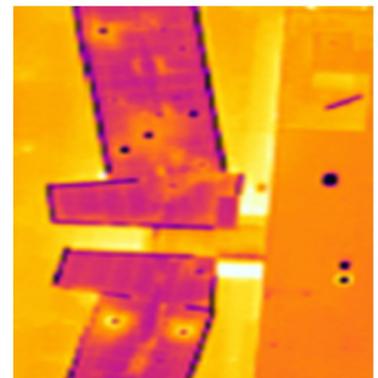
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Washington Women in GIS & Technology

By: Tonya Kauhi, Port of Tacoma

The Washington Women in GIS and Technology (WWGT) group started 2021 by planning for the year ahead. In January we asked our members to provide feedback on meeting topics, potential group activities, preferred communication methods and more. The group met in March and started outlining the meetings topics for the year by focusing on member feedback. Based on the survey and our meeting, here are the

leader has less to do with your job title and more to do about having the courage to step up and put yourself out there.

At our April meeting, we offered a session on Geospatial Data Management. Valerie Bright (GIS Coordinator for USGS) led the discussion on geospatial data management best practices. There is no “one size fits all” solution for successful data management, so we wanted to hear from our members on what geospatial management structure works best

for your organization and what things would be recommended to an organization just getting started.

We will continue to meet virtually and look forward to the day when we can be together in person. We are determined to continue to provide opportunities to connect and share knowledge with our amazing members.

To view upcoming WWGT events refer to our website: <https://www.wawomeningis.com>. For more information and to be added to our email list contact Tonya Kauhi



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meeting topics members would like to focus on this year:

- Geospatial Data Management
- Essential Negotiation Skills
- Information Dashboards (Examples of geospatial dashboards from Power BI, Tableau Ops Dashboard, ArcGIS Insights)
- What makes a good student project?
- GISP Study skills
- Essential Mentor/Mentoring Skills

We also will continue our book club and our next book is [Dare to Lead](#) by Brené Brown. This book describes how being a great

(wawomeningis@gmail.com) or follow us on Facebook: <https://www.facebook.com/WashingtonWomeninGISandTechnology/>

The WWGT group was created for women working in GIS and technology to meet, network, brainstorm and learn from one another. The group includes GIS students and professionals across all skills levels and disciplines. We meet monthly around Puget Sound to network and share ideas, industry information, experience, and advice. The group is open to join, and we welcome new faces. 🌊

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Meets the 2nd Wednesday of each month.

Contact [Amanda Taub](#)

Cowlitz-Wahkiakum GIS User Group

Meets the first Wednesday of each month at 3:00 pm at the Cowlitz County Administration Annex Building, CWCOG meeting room, 207 North 4th Ave, Kelso WA (*unless other location is announced*).

Contact [Ken Pearrow](#)

King County GIS User Group

www.kingcounty.gov/operations/GIS/UserGroups.aspx

Meets 1st Wednesday every other month at 11:00am at the KCGIS Center, 201 S. Jackson Street, Seattle WA, Conf Room 7044/7045.

Northwest Washington GIS User Group

www.wvu.edu/huxley/spatial/nwwgis/nwwgis_mtgs.htm

Snohomish County GIS User Group

<https://snoco-gis.maps.arcgis.com/apps/Shortlist/index.html?appid=d9ee08e6b1c648db8cd077fc8bb5f27c>

Southeast Washington/Northwest Oregon GIS User Group

<http://gisgroup.wordpress.com>

Washington Geographic Information Council (WAGIC)

<http://ocio.wa.gov/boards-and-committees/washington-state-geographic-information-council-wagic-0>

Join Listserve [here](#)

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