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THE SUMMIT

News From and For the Washington GIS Community

Interview with Summit Award Winner: Dr. Sabah Jabbouri

By: Michelle Lortz

Congratulations to Dr. Sabah Jabbouri, GIS educator and recipient of the 2014 Summit Award.

Summit: Tell us about your formative years and how they led to the study of forestry, watershed science and hydrology.

Dr. Jabbouri: Thank you so much Michelle. I am pleased to have received this award because it not only honors my dedication, but also the hard work of my students and the advisory committee members who support the GIS program at Green River Community College. When I graduated from high school, my parents wanted me to go to medical school. Even though I was not interested in medicine, I applied to the Health Institute in Baghdad to fulfill my parents' wish. After attending classes the first two days of the academic year, I couldn't continue, so I returned to my village Bartella (near Mosul, Iraq).

Of course my family was not happy with my decision. I had to choose another field, so applied to the College of Agriculture and Forestry at Mosul University and was accepted. My preference was the Soil Department, but I didn't get in. My second choice was the Forestry Department, and in 1971 I earned my Bachelor's degree in Forestry. Upon graduation, I was hired as a teaching assistant at the same college helping professors in the lab and the field.

After a year, I was appointed director of the college and responsible for all the agriculture field workers as well as the Safety Department. I was happy with my job and enjoyed working there very much. Then, one day, the college dean came to me and told me that he sent my name among others to the Ministry of Higher Education for a government scholarship to attend graduate school.

To be honest, I was not interested in the offer, but didn't say anything because I didn't think the Ministry would approve the request. To my surprise, in the fall of 1974 I was granted a scholarship to the Soviet Union to complete a Master's and Ph.D. in Watershed Management. I was not excited at all, but my family was very happy except my brother, who was a

(Continued on page 3)

Also In This Issue:

President's Column

By: Heather Glock

Hello and welcome to the Autumn 2014 edition of *The Summit* newsletter. You are in for a treat as you read this issue's features. Your colleagues are engaged in interesting work; their articles will most certainly be of benefit for you to read about. If you do find inspiration in this edition's stories, I encourage you to consider contributing an article sharing your work for the next issue of *The Summit*. None of us improve very well in a vacuum – it's the effort we make to connect and share with others that offers the most opportunity for growth. To that end, the WAURISA board is so grateful to have Eadie Kaltenbacher as *The Summit*'s editor. Her tireless efforts have paid off in a newsletter that is truly educational and enjoyable to read.

(Continued on page 24)

Fishbones for Address Verification

By: Miranda Brewer, GISP and Donna Wendt

Editor's Note: In the first part of this story, Miranda covers the "how-to" of fishbone creation, and next Donna covers the analysis of the outputs and how to resolve some of the errors identified.

Part 1: Fishbone Creation

Accurate addresses are critical for timely emergency response. If the first responder is dispatched to the wrong address, precious minutes are lost and could be the difference between life and death. Addressing accuracy also plays a key role in property assessment, utility repair, election jurisdiction, and every department in the public sector where location is a part of the business process. There are many methods for verifying addresses, but in a large jurisdiction the method used must be able to accommodate a very large database. King County, for instance, has 660,000 residential and commercial parcels according to the Assessor's Office.

I first learned about one particular address verification technique at the 2011 WAURISA Conference in Lynnwood. Donna Wendt was the presenter, and gave credit to Richard K. Allen as the original developer of the technique. It was nicknamed "fishbones" and had been around for several years. Basically, a fishbone is created when you connect an address point (X1, Y1) to the spot it geocodes along the street centerline (X2, Y2). When data is accurate, the lines resemble the bone structure of a fish, and provides an excellent visual tool (Figure 1).

When the data has errors, you might see other shapes such as sunbursts or implosions, which makes this slightly more interesting than other forms of analysis. In order for the analysis to take place, you need two important datasets: authoritative address points and street center lines. You also need an updated locator file in order to do the geocoding piece. It's possible to automate the line creation using a Python script, which would save the analyst a lot of time. This method sounded useful to me, but obviously a speaker at a conference cannot get in depth with the step-by-step procedure during a 30-45 minute presentation. Once I was back at the office I searched the internet for technical documentation, or at least a blog entry or forum discussion about the steps involved, but didn't come up with anything. I was determined to figure out how to do this so I could see how it worked and check the quality of my jurisdiction's data. It turns out that it was fairly straightforward.

Typically when you are working within the Esri suite of products, there are multiple ways to accomplish one goal. The following procedure worked for me and was performed in ArcMap version 10.0 with Service Pack 4. I'm listing the steps for explanatory purposes but they could be tweaked

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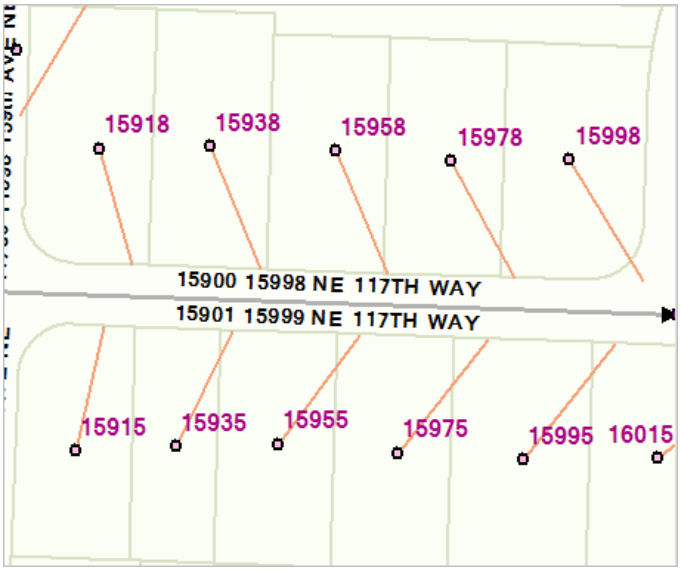


Figure 1. In an ideal addressing situation, fishbones (brown) resemble the bone structure of a fish. Illustration by Donna Wendt.

Interview with Summit Award Winner: Dr. Sabah Jabbouri

(Continued from page 1)

priest.

He said to me, "You are not going to a communist country for education. We don't send our sons to be educated in a communist culture. You must either request a different destination in the West or decline the offer." He kept encouraging me to go to the Ministry of Higher Education in Baghdad to request a different destination. I was told at the ministry that as long as I bring a letter of acceptance from any university in Western Europe or the U.S. within 6 months, they would grant me the scholarship.

In 1975 I was accepted into Utah State University in Logan. With the help of my friend who was completing his Ph.D. and familiar with the processes and procedures, I started in English as a Second Language and then went on to take academic classes. In 1978, I earned my M.Sc. in Watershed Science, returned home and got married. Returning to Seattle I completed my Ph.D. in Watershed Forest Hydrology at the University of Washington. In 1984, my studies were finished so I went back home.

Summit: What was the connection between GIS and your academics?

Dr. Jabbouri: During my graduate studies, I was introduced to remote sensing, programming and mapping as required curriculum, but we didn't learn much about GIS analysis. When I came back to the U.S. in 1999 with my family as a refugee, I applied for more than 300 different jobs. I either got no response or was overqualified. Some of the positions required some GIS knowledge, which encouraged me to research and explore the topic. I started volunteering at the GRCC Natural Resources Department, helping instructors in the lab and field as well as writing new assignments. The instructor, Rob Sjogren, introduced me to the GIS instructor at that time, Bob Vincent, who allowed me to sit in on his classes. I became more interested and shortly after that decided to start taking classes myself. I was able to get a loan to earn a GIS certificate in 2002.

Summit: What inspired you to teach GIS?

Dr. Jabbouri: From the first time I observed a GIS class I fell in love and knew it would benefit my field of study. While I was looking for a job, the Technology Division Chair, Jeff McCauley, called me three days before fall quarter began and told me that the GIS Instructor Bob Vincent, was in a car accident. He told me that he had asked Bob, during a phone call, who he would nominate to cover for him a couple of weeks while he was recuperating in the hospital; he had nominated me. I agreed, knowing it was going to be a challenge, especially with only the weekend to prepare for three classes. I was able accomplish this due to my teaching experience.

Those two weeks turned into an entire year because Bob did not return to the college. At the end of the school year, the job was advertised and another instructor was hired. He had an M.Sc. in GIS, and therefore, more experience. I was right back to where I had started a year ago, looking for a job. I applied everywhere, but with no luck. I volunteered for the Mercy Corps Tsunami GIS project from March to June 2005 working with Glen Brooks, Dick Thomas, and dozens of other GIS volunteers. At that time, I also started working in construction to put food on the table. The GIS instructor position at GRCC was posted again, at the same time another position opened at Grays Harbor Community College. I applied and got offered both jobs. I chose GRCC to be near my children's schools.

(Continued on page 6)

Dr. Sabah Jabbouri accepts the Summit Award.

Fishbones for Address Verification

(Continued from page 2)

depending on if you're using a geodatabase, Python, ModelBuilder, other software, etc.

1. Make sure the address point layer has a unique ID field and geocode it using the street locator file. In the geocoding options, a good rule of thumb is 15 feet side offset and 5 percent end offset.
2. Within the resulting geocoded table, add a field for X and Y and calculate the values accordingly.
3. Within the address point table, add a field for X and Y and calculate the values accordingly.
4. Join the geocoded table to the address point table based on the unique ID field.
5. Export the newly joined data as a shapefile so that all fields and attributes are retained. Note – only export Matched or Tied records. Unmatched records can be analyzed separately.
6. Save the .dbf to a table.
7. In Data Management Tools > Features use the *XY To Line* tool. The Input Table is the table saved in the previous step. Give the Output Feature Class a descriptive name. Start X Field is AddressPointX, Start Y Field is AddressPointY, End X Field is GeocodeX and End Y Field is GeocodeY. Leave the defaults.

Take a look at the results when they appear in your map document (Figure 2). What do you notice? Depending on the size of the area you're working with, you might be able to spot errors right away. If not, you can use other tools to find errors. Lines shouldn't cross streets, each other, or be too long, so select by location, intersection, and measuring tools come in handy to classify the errors. Additionally, any address that didn't geocode will result in an error as well.

If the lines look like a sunburst, the direction of the street segment needs to be reversed. If the lines implode, there are many address points with a single address (this is not necessarily an error, as with a condo complex). If one line extends far across an empty valley or just across to the next block, it means the street segment(s) have incorrect range assignments and need to be revised. Please see the chart (Figure 3) for a more in-depth look at common errors.

The process described in this article will help you identify errors in your data. The subsequent corrections can take some time, but are well worth the effort. Highly accurate and precise data will not only benefit emergency response departments, but those throughout your agency.

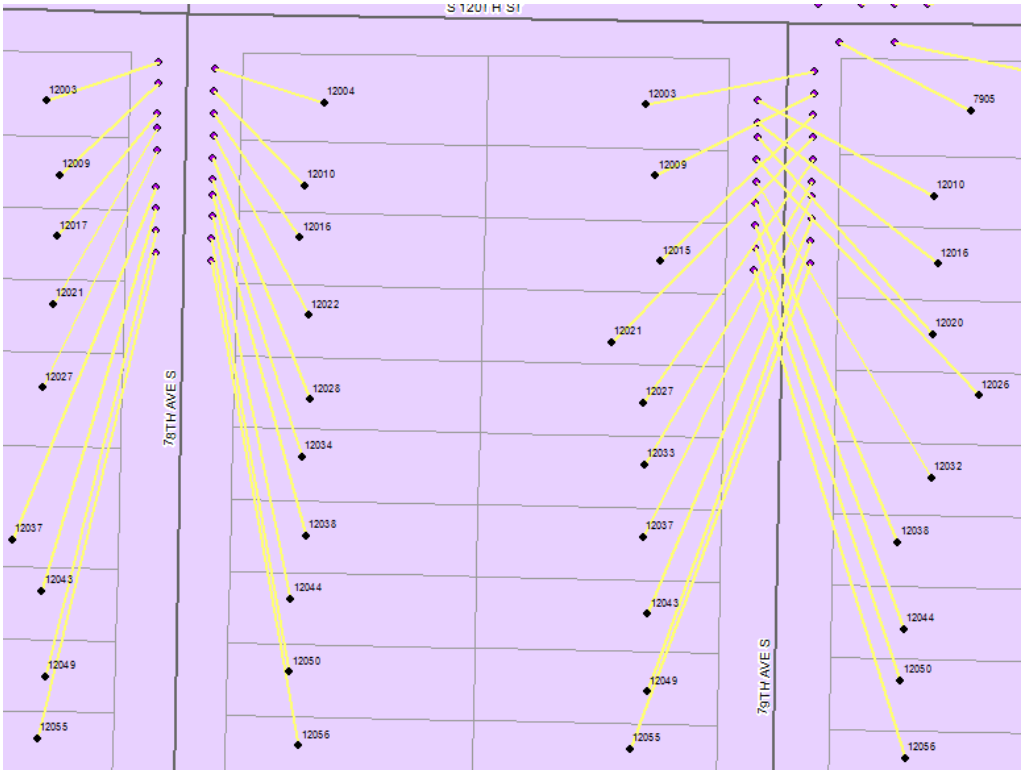


Figure 2. The lines on the left indicate correct addressing; the lines on the right indicate that even and odd ranges need to be swapped in the street centerline file. Illustration by Miranda Brewer.

Part 2: Fishbone Analysis (Get the Weeds out of Your Addresses)

Over the summer, I decided to reclaim a feral garden and bring it back to civilization. This gave me a lot of time to think about GIS, and in particular Miranda's article about fishbones, an address quality control tool for streets and address points. These are lines connecting address points to the street centerline where they geocoded.

Back in the garden, with the surface

(Continued on page 18)

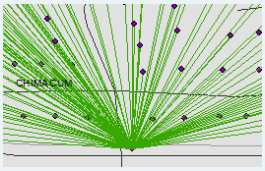
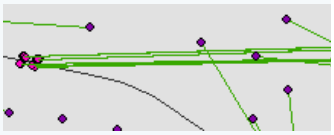
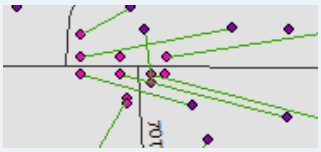
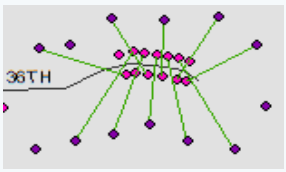
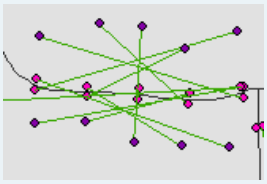
Illustration	Visually...	Problem	Potential Resolution
	Lines look like they explode	There is one geographic coordinate for several addresses	Opportunity for improvement
	Lines look like they implode	There are many points with a single address	Correct "Address Line 2" (Suite, Unit) information if possible
	Lines extend to another street segment	Lines jump over an unaddressed area, such as a valley	Correct street range assignments
	Lines cross another street segment	Street segment stretches to next block	Correct street range assignments; could be a duplicate address
	Lines have their direction reversed	Odd and even sides are switched	Switch left and right ranges
	Lines intersect each other and cluster in the middle	Range assignments are flipped either by low/high or street direction	Flip street direction
	Lines could be several feet long without a noticeable pattern	Addresses from one street are pulled to another	Check that street names and directionals are correct; geocoding options may need revision
	Lines cross a corner	The street range is off by just a few house numbers	Correct street range assignments
	Lines are very long and clustered	Line flies well beyond the typical distance	Check directional, catch range error (Example: 31400 to 41498 is too big and should be 31400 to 31498)

Figure 3. Error Troubleshooting Guide. Illustration by Miranda Brewer.

Interview with Summit Award Winner: Dr. Sabah Jabbouri

(Continued from page 3)

Summit: What is your greatest challenge keeping up with GIS technologies?

Dr. Jabbouri: The lack of textbooks for new software releases. It is my job to teach what the industry demands so that our graduates can be competitive when vying for employment opportunities. Therefore, I want to teach the new software as soon as it is released, challenging myself and my students by integrating the new technology into the classes immediately. However, what has helped me is the fact that understanding the concepts of GIS, its tools and functionality, makes it less difficult to find the way.

Spatial thinking skills deepen students' understanding of the relationships that exist in the world.

Summit: How do you train students to adapt to rapid technology changes?

Dr. Jabbouri: My students are told that GIS software is frequently and inevitably updated. There is no way around it. We must accept the challenge to learn the new software so we do not fall behind. The most up-to-date version of ArcGIS is introduced in my classes and the differences between the new release and the previous ones are discussed in lectures. Students are encouraged to use the GIS skills learned in my classes, internet resources and their astuteness to find the necessary data needed for their projects.

I try my best to inform students which steps need to be adjusted when the new assignments are handed out. They are told it is going to be very challenging, but at the same time a good experience for them. They get a chance to practice working with the updated software, which they will have to do on their own when they are employed.

Additionally, I tell them to take advantage of the GIS help section that comes with the software, and if needed, they can use online sources for further help. I also use textbooks that teach the fundamentals of GIS even though they are not the most recent, because again, if you understand the underlying concepts of GIS, learning the new software will be much easier. Being patient is extremely important when working on practical tasks from the textbooks which reference many websites to explore and download data. Sometimes the URLs do not work. It may be the websites have been changed or removed; situations we deal with on a case by case basis.

Summit: Do you have any favorite GIS projects you would like to share with our readers?

Dr. Jabbouri: In fall of 2009, my students completed a project titled Green River Flood Mapbook for the Green River Community College Emergency Operations Center, in only one month. There were many other organizations working on the same project, but we were among the first to publish our final product which is featured on the GRCC GIS website.

Summit: Please articulate your thoughts on the future of GIS instruction.

Dr. Jabbouri: I strongly believe that GIS is going to be used in many disciplines and fields of study. It will be integrated and used to support instruction, learning, and discussion on even more topics. It is going to be used much like we use Microsoft Office today. There is no instructor out there that does not use at least one of its components, (Word, PowerPoint, Excel, Access or Publisher), in their classes. I believe the day GIS becomes an integral component of teaching is not far away. GIS will be used to promote critical spatial thinking, to explain an event or show analysis of both

small and large scale problems. Analyzing relationships and attributes in a GIS map is a great way to explore an area and visualize the results.

Summit: What advice do you have for those considering or beginning a career in GIS?

Dr. Jabbouri: In my opinion everyone needs GIS in their curriculum, so my advice to new GIS students is to be patient and not give up. It might be frustrating at first because they are learning new software. It is like learning a totally new language with new vocabulary, but as soon as they understand the tools and functionality of the software, they will enjoy it. The first time new students are introduced to GIS, they are encouraged to enhance their critical thinking skills, learn to explore, develop, and analyze data regardless of their field of study. Spatial thinking skills deepen students' understanding of the relationships that exist in the world and the use of GIS to solve complex problems facing society. Students also learn technical skills, all which will help them with their future employment.

I advise my students who have a degree and are seeking a career change to choose the certificate program option and apply the GIS skills learned in their area of expertise. For those without a degree, I advise them to choose one of the three AAS GIS degree options we offer at this time: GIS AAS degree, GIS Natural Resources AAS degree, and GIS-IT AAS degree.

Summit: What can the GIS community do to support your endeavors?

Dr. Jabbouri: It is unfortunate to say that many community colleges have closed their GIS departments because of low enrollment. We at GRCC are experiencing low enrollment in our GIS classes and this will affect our program. I appeal to the GIS community to help address this issue. The problem of low enrollment does not make sense to me because geospatial technology is the technology of the 21st century, and everyone should be learning it. We should also work together to push for colleges across our state to recognize one of the introductory GIS classes as a core requirement for degree completion regardless of major, exactly as we do with English and math.

What I understand from my students is that most stay away from GIS because they hear "geographic," and think they will study geography. As a community we need to have an open discussion about whether to change Geographic Information System to Geospatial Information System or Geospatial Information Science. Another thing I need help with is addressing the demands of the job market for our graduates. As you know, most of the jobs advertised in 2013 and 2014 require a minimum of a bachelor's degree. This puts graduates of a 2 year program at a disadvantage. Therefore, we need to start working toward developing a four year degree program at GRCC.

Summit: Do you have any closing comments?

Dr. Jabbouri: I am grateful to WAURISA for this recognition and appreciative of the support I am getting from the Division Chair, the Advisory Committee, and the Natural Resources instructors. I would also like to thank you, Michelle for taking the time to do the interview. Let us all do our part to vigorously advocate for GIS. Thank you and GIS is FUN!

Venturing into Open Source GIS: A Global Conference Lands on Our Doorstep

By: David A. Howes, Ph.D. of David Howes LLC (www.dhowes.com) and Matt Stevenson of CORE GIS (www.coregis.net)

In early September, the GIS community of the Pacific Northwest was fortunate to have the largest global gathering focused on open source (OS) geospatial software close at hand as the tenth annual international FOSS4G (Free and Open Source Software for Geospatial) conference took place in Portland, Oregon. Since it was last in our vicinity in Victoria, BC in 2007, the conference has moved as far away as Cape Town, South Africa; Sydney, Australia; and Nottingham, England: an indication of the truly international nature of the event and the supporting organization. Not surprisingly, therefore, of the 870 attendees who gathered together this year, 23% came from 36 countries outside of North America and many of those overseas visitors were key figures in the worldwide effort to develop new and innovative open source GIS capabilities.

Seattle's Open Source GIS Community

The Seattle area is home to an active open source GIS community who assemble frequently as Cascadia Users of Geospatial Open Source or CUGOS (www.cugos.org). Matt and I have often attended their meetings, typically coming away impressed by the nature of the projects and the interactions of the members. At first, we tended to focus on the clever technological accomplishments, but the way the community operates soon revealed itself as being just as important, if not more so, when compared to the technical output. With their colleagues around the world, this isn't a group that's trying

(Continued on page 22)

State Releases Updated GIS Strategic Plan: Executive Summary

Editor's Note: The 2014 GIS Strategic Plan was announced by Joy Paulus, State GIS Coordinator & Program Manager, Washington State Geospatial Program Office. The Plan was recently adopted by the Geographic Information Technology Committee (GIT) and the Washington Geographic Information Council (WAGIC). This is the Executive Summary.

This Plan builds off Washington State's 2010 Geographic Information Systems (GIS) Strategic Plan. It addresses new needs, opportunities, and challenges that have emerged in geospatial technology. This Plan also supports the State Spatial Data Infrastructure (SSDI) by developing goals and strategies to facilitate the coordination of geospatial programs, policies, and technologies at all levels of government.

The Plan lays out each of the strategic goals in more detail, defines implementation objectives for each goal; outlines the action steps that can be accomplished in short- and long-term timeframe, and defines the desired outcomes to be achieved for each goal.

Strategic Planning Process

The strategic planning update process was conducted under the auspices of the GIT Committee and coordinated by the WAGIC Executive Committee. GIT and WAGIC members have been involved in the development of the draft plan by participating in a discussion around potential themes and priorities for the strategic plan. The State GIS Coordinator and Program Manager has been responsible for the management of outreach efforts; development of the draft plan; and interfacing with the GIT and WAGIC.

Statewide stakeholders were also engaged during the strategic planning update process. There were two regional listening sessions: one in Olympia, attended by representatives of state and local agencies from western Washington, and one in George that drew good representation from mostly local jurisdictions from central and eastern Washington. Representatives from the private sector also attended these discussions. A total of 65 people attended, representing 24 agencies and organizations.

The input from these forums shaped the goals and strategic actions included in this plan.

Vision and Mission

The vision and mission of the State's GIS community emphasizes using geospatial information to benefit the public through improved decision making at multi-jurisdictional levels and through the development of geospatial solutions. This Plan aligns with the recent state and federal efforts around open and transparent government.

Vision: Utilize geospatial technology to facilitate decision-making to benefit Washington State citizens.

Mission: Work in partnership with the public and private sectors statewide to provide accurate, consistent, accessible, and authoritative geospatial resources for decision-makers and the public.

Strategic Goals

The strategic goals and objectives implement the following concepts to fulfill the mission and vision of this Plan:

- Implement open data concepts that support wide sharing of Washington's geospatial data
- Enhance data development, sharing, and access through common standards and guidelines
- Facilitate coordination and communication across the geospatial community, at all levels of government and the public at-large
- Demonstrate the value of employing geospatial resources in decision-making

Based on these strategies which are the product of statewide outreach efforts, four goals and corresponding objectives have been established, which are described in detail below.

Goal 1: Pursue Open Data Initiatives to Facilitate Sharing of Washington State's Geospatial Data

A. Establish authoritative statewide datasets, including metadata on ownership, frequency of updates, file types, contacts, and others.

B. Foster widespread use of statewide data standards and guidelines.

C. Develop and provide access to a shared geospatial infrastructure for smaller state agencies with limited GIS capabilities, including server space and software licenses.

D. Coordinate Next Generation 9-1-1 data requirements at the state level with input and support from local governments.

Goal 2: Increase Understanding and Support for Geospatial Resources through Education and Outreach

A. Define target groups of users, analysts, and decision-makers and develop a communication strategy for each group.

B. Widely publicize existing map and data portals, data standards, and other relevant geospatial efforts in Washington State.

C. Redesign WAGIC's web site to make it more accessible, user-friendly, and informative (include existing documentation).

D. Conduct a Return on Investment case study to make the business case for GIS investments.

E. Encourage the use of WAGIC list-serve or similar resources across the state and local government levels to promote relevant GIS news and opportunities (including conferences, trainings, and other).

Goal 3: Fully Staff Washington State Geospatial Program Office and Establish the Program Office within the OCIO's Enabling Act

A. Fully staff the Washington State Geospatial Program Office.

B. Develop dedicated funding for Washington State Geospatial Program Office.

C. Establish clear legislative language for the Washington State Geospatial Program Office within the Office of the Chief Information Officer.

Goal 4: Strengthen Coordination across Jurisdictions and Agencies

A. Coordinate statewide GIS efforts, including data acquisition, development, and stewardship, to promote collaboration and data fidelity.

B. Address the digital divide issues that exist in Washington where mutually needed data is non-existent or poorly maintained due to resource issues.

C. Engage in partnerships with state higher education institutions and community and technical colleges.

Links for more information:

Full Text of the Strategic Plan

Geospatial Program Office

WAGIC's Updated Website

Community Engagement Committee Launches New Website

By: Anna Yost

The WAURISA Community Engagement Committee (CEC) was formed to promote awareness of geospatial technology, and to facilitate engagement with communities interested in participating in GIS. One of the CEC's initial tasks was to compile a list of resources for GIS information and engagement, which led to the creation of the new CEC webpage on the WAURISA site: http://www.waurisa.org/Community_Engagement/Community_Engagement.php. This page provides a brief synopsis of the CEC goals and also contains resource links grouped by engagement focus areas: GIS Day, K-12 Education, GIS Community Groups, and GIS Mentoring.

GIS Day is a great opportunity to promote GIS awareness – this year GIS Day is November 19th. The new CEC page has links to GIS Day goals and activities for different ages, and a link to the site where you can register your GIS Day event or find an event near you.

Many of the CEC members are interested in promoting GIS in K-12 education because spatial data and analysis tools are powerful ways to present information about our world and engage students in thinking critically and developing their technology skills. The K-12 Education section of the CEC page has information for students and educators about using GIS, including information on the free Esri licenses available for Washington State schools.

The Summit newsletter does list the GIS Community Groups at the end of every issue, but we also wanted to make that list available here in the GIS Community Groups section as another means to extend the invitation to those interested in participating in the GIS community.

The vision for the final section, GIS Mentoring, is still evolving, but currently has a link to the Esri GEO Mentor resource where people can use the mentor map to locate a mentor or register as a mentor. The site also provides additional resources for GIS in education.

Please check out our new page and let us know if you have any comments or suggestions (annayost88@gmail.com). If you are interested in becoming involved in GIS community engagement, please send me an e-mail and I can add you to the monthly meeting invite (the CEC currently meets the first Tuesday of each month).

Legislative Corner

By: Effie Moody and Josh Greenberg, Ph.D.

Introducing the NEW Legislative Corner of *The Summit* Newsletter!

WAURISA would like to keep you informed of potential GIS issues or pending legislation that could affect GIS members in the State of Washington and also keep up-to-date with future national interests.

This Legislative Section was precipitated by WA State proposed CR-102, WSR 14-06-104, WAC 196-29-105 in regard to the practice of Land Survey. International URISA advocacy group wrote a letter to WA State Board of Registration for Professional Engineers and Land Surveyors at the WA State Department of Licensing opposing the rulemaking stating its particular reasons. Click here to see the letter.

WA State Department of Licensing INT Engineers, George Twiss replied to our inquiry saying:

"The rule proposals under WSR 14-06-104 were withdrawn by Board motion at the June annual meeting. This action was taken due to the strong opposition expressed during the rule comment period. The Board has initiated a renewed effort to engage stakeholders with an eye to achieving revised language that is more acceptable.

Currently, this is being done without a specific plan to reopen rulemaking on these proposals. However, if this collaboration does result in broader agreement the Board will consider reopening the rule making process later this year or early next. The current new language proposals are attached. You are encouraged to provide any input on these concepts as you wish." Contact GTWISS@DOL.WA.GOV for more information.

Click here to see the Proposed WAC 196-29-105 called "Practice of land surveying". Click here to see the Proposed WAC 196-29-205 called "What topographic measurements may a professional engineer perform?"

Heather Glock, President of WAURISA, forwarded these new proposed rules to URISA Advocacy group and WAURISA has not received any further concern regarding the original issues at this time.

STAY TUNED: National GIS NEWS next issue

CONTACT : Summit@waurisa.org with 'legislative' in the subject line for your questions or concerns

Master of GIS & GIS Workshop Programs at UW

By: Robert Aguirre, Ph.D.

The Master of GIS for Sustainability Management Program in the Department of Geography at the University of Washington, is a part-time, two-year program designed for early and mid-career professionals. The program focuses on how to use GIS to develop sustainable solutions for a variety of complex problems ranging from land use and affordable housing development to transportation and water quality improvements.

MASTER OF GIS
for SUSTAINABILITY MANAGEMENT
UNIVERSITY of WASHINGTON

The curriculum of the MGIS for Sustainability Management program aims at integrating three knowledge domains - sustainability science, sustainability information science, and sustainability management. So as students learn about sustainability science, they demonstrate literacy with sustainability science concepts like ecosystem services, common pool resources, and the resilience of social-ecological systems. As students learn sustainability information methods, they demonstrate application development skills in various units and topics from the Geographic Information Science and Technology (GIS&T) Body of Knowledge. Finally, as students learn to become sustainability management practitioners in a rapidly growing geospatial industry, they demonstrate their mastery in integrating different knowledge areas across geospatial industry-specific as well as other competency areas as elaborated in the Geospatial Technology Competency Model and Geospatial Management Competency Model.

The program is a coursework-only professional degree and a thesis is not required. Most of the courses are delivered through distance learning technologies. However, each summer students spend three days of intensive study on the university's campus in Seattle, meeting fellow students to develop project ideas, undertake advanced GIS work, and deliver presentations. This hybrid model combines the flexibility of online learning with the richness of social learning through face-to-face interaction—and, of course, summer in Seattle is wonderful.

The three knowledge domains of sustainability.

The GIS Workshop Course

The capstone course, or GIS Workshop, gives students an opportunity to demonstrate and practice skills learned, refined, and mastered within earlier courses in the program and then apply those skills to a sustainability-related project sponsored by a community partner within the Puget Sound region. The capstone experience immerses students in the full range of competencies associated with the use of GIS for sustainability management.

Working in small teams, students define project goals with the partner, perform database design, acquire and analyze data, model sustainable solutions, and recommend a course of action. Students in the workshop often recognize the importance of personal effectiveness and workplace competencies like time management. Students also realize how difficult it is to scope out an organization's core business process; design, test, and implement a geospatial information product; and then make the business case for its implementation within the organization. Last but certainly not least, student working groups come to realize that much of their work is about deciphering an organization's workflow and understanding what makes things tick. Once that is accomplished, they are in a much better position to make a business case for changing some aspect of that core business process, inspired by the three domains of sustainability: science, information science, and management.

On August 20-22, 2014, eight 2-3 person graduate student groups working with eight different workshop project sponsors met on the UW Seattle campus for three days. On the final day each group presented a recommended course of action to their workshop project partners, followed by a memorable graduation reception at the UW Botanic Gardens

(Continued on page 21)

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GIS Modeling of Elk Habitat Suitability in the North Cascades

By: Anna Yost

Editor's Note: This paper is a summary of Anna's work toward her Master's thesis. It was the first place winner of the 2014 WAURISA Dick Thomas Memorial Student Presentation Competition & Award.

Effective wildlife management aims to balance the competing needs of wildlife populations, ecological systems, and the varying needs of the human communities. Elk management in Washington State is a great example of how spatial data and GIS tools can be used to understand and evaluate wildlife issues, and develop management solutions. The following is a brief overview of my thesis research which I presented for the Dick Thomas student presentation competition at the 2014 WAURISA conference. This work will be submitted to the Journal of Wildlife Management for review in the near future.

Introduction

Efforts to recover the North Cascades elk *(Cervus elaphus)* herd appear to have been effective, with the population rebounding from a low of 425 in 2002 to a current population of 1,200-1,450 elk (Washington State Department of Fish and Wildlife (WDFW) 2002, WDFW 2012). However, the current distribution is not entirely desirable because elk in certain areas (e.g. Skagit River floodplain and farmed areas near Acme) are an increasing source of damage to agricultural enterprises and small forest landowners. Therefore, there is interest in evaluating a variety of potential strategies that could improve the current distribution of elk as WDFW works to update the North Cascades elk herd management plan (WDFW 2012. These strategies may involve landscape management treatments (e.g. food plots, forage enhancement, forest manipulations), addressing vehicle access, and/or implementing hunts where elk are not desired.

Evaluation of different management scenarios will involve communication with state and federal agencies, Native American tribes, project partners, conservation groups, and other landowners. This modeling process is the first step in developing scenarios that will promote these discussions, and this effort focuses on identifying potential elk forage enhancement areas outside of current elk-human conflict areas.

Study Area

The total study area is approximately 8,600 km^2 within the North Cascades physiographic region in northwestern Washington State. The boundary for the total study area is based on the boundaries of the WDFW's North Cascade elk Game Management Units (GMUs) (Fig. 1).

The Westside Models

I used the Westside Elk Habitat and Nutrition Models (The Westside Models) to model elk habitat suitability across the study area. The Westside Models were developed by researchers at the U.S. Forest Service's Pacific Northwest Research Station in LaGrande, Oregon, and are designed predict habitat suitability for female elk in the summer months (June, July, and August) (Rowland et al. 2013). The Westside Models are ArcGIS models composed of 4 separate toolboxes: an Elk Nutrition Toolbox, an Elk Covariate Toolbox, an Elk Use Toolbox, and an Update Base Vegetation Toolbox (Rowland et al. 2013). The three main GIS data inputs used by these toolboxes are vegetation, elevation, and roads. The final output is a predicted habitat suitability coverage raster which ranks the study area landscape from low to high suitability. If vegetation conditions change, or different habitat management scenarios need to be evaluated, then the base data can be changed and the model re-run.

Synthesis of Elk Location Data

WDFW collected elk location data as part of a study on elk movements in the North Cascades (Danilson, personal com-

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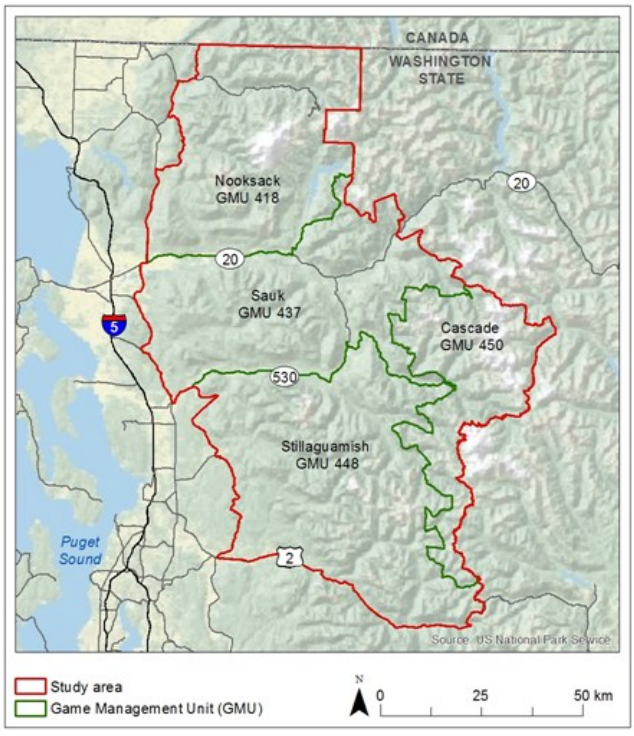

Figure 1: Game Management Units (GMU) define the study area boundary.

GIS Modeling of Elk Habitat Suitability in the North Cascades

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munication.). I used this GPS data to create elk home range areas so that I could locate areas to run vegetation verification transects to ground-check the digital vegetation data prior to using it in the models. With the GPS points grouped by year and summer season, it was evident that the summer of 2009 had the most total points and so this data subset was selected to create elk home ranges for vegetation sampling and model calibration (Fig. 2).

I created these home ranges using the Kernel Density Estimation (KDE) technique with a Likelihood Cross-Validation (CVh) smoothing factor and a 95% isopleth (Cresswell and Harris 1988, Anderson et al. 2005). I selected this home range estimate approach because the KDE function identifies the utilization distribution of an individual (Worton 1989), which helps identify the areas the elk spend most of their time. The CVh smoothing factor has a relatively narrow bandwidth smoothing factor compared to the other selections (Fig. 3), but I wanted to ensure that the vegetation transects for the vegetation verification step occurred in the specific areas that had been utilized by elk. I created the kernel density home ranges using the KDE function in the Geospatial Modeling Environment (GME) in conjunction with the statistical analysis software R and ArcGIS 10.1. The resulting 95% isopleth polygons defined the boundaries within which I ran the vegetation verification sampling transects.

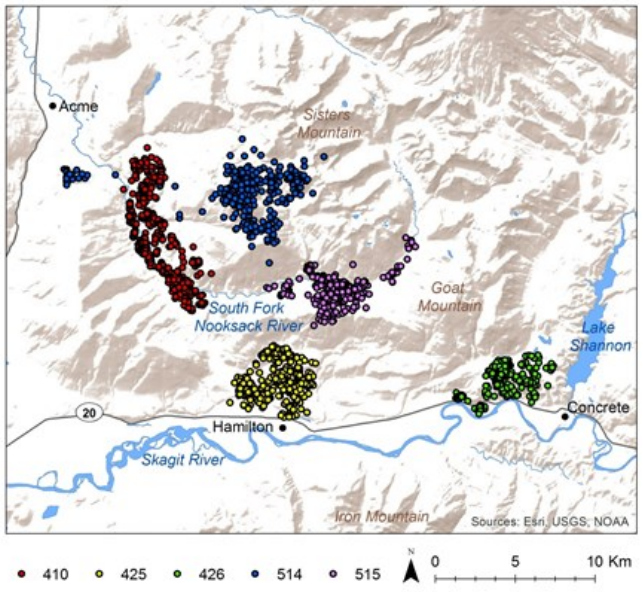

Figure 2: Elk GPS point locations from summer 2009.

Verifying Vegetation Data

The vegetation data required to run the Westside Models, the gradient nearest neighbor (GNN) data, was created at a landscape level, so I wanted to verify that the data accurately reflected conditions on the ground. I achieved this verification by conducting a small number of vegetation transects in the study area focusing on woody vegetation. The attributes of the GNN data that are utilized in the Westside Models are hardwood percentage, canopy cover, and stand height.

I conducted vegetation transects in at 8 sites within the elk home range areas. I then compared the transect data with the GNN base data for the same location. The results of this comparison demonstrated that the field work measurements for canopy cover, stand height, and proportion of hardwood are similar to the measurements recorded in the GNN data. Some of the variation between the PCQ data and the GNN data can likely be attributed to the fact that there has been 7 years between when the vegetation data used for the GNN data was surveyed (2006) and when the transects were conducted (2013). Overall, for the GNN data having been created at a landscape level, it appears to have generally captured the vegetation community in the Vegetation Verification Study Area. As a result of the similarity between the field data and

GNN digital data, I concluded that the GNN digital data is reliable as the base input vegetation data for Westside Models in the study area.

Model Calibration

The PNWRS spent considerable time and effort developing and testing the Westside Models, however, before I could confidently use the Westside Models to create elk habitat suitability maps, I wanted to compare the output from the Westside Models with known elk point location data. The majority of the available elk point location data was from summer 2009, but the vegetation input data for the Westside Models is based on conditions from 2006. In order to effectively compare the elk location data with the output from the Westside Models it was necessary to update the vegetation data using the Vegetation Update tool and acquire suitable road status data that reflected conditions in 2009.

I used satellite image data (Landsat TM) to update the base vegetation data using spectral analysis and supervised classification with Erdas Imagine software (Thomas 1976, Cook et al. 2014 in press, Rowland personal communication). One of the goals for developing this method was to create a method that was easily repeatable and which could be shared with other users of the Westside Models and GIS professionals.

The Westside Models require that the input polyline road data is classified as either open or closed, which is a proxy for usage (Rowland et al. 2013). Unfortunately the majority of road data has incomplete road status information, so I developed a series of queries to classify BLM county road datasets as open or closed based on: location within city boundaries, route type, class, surface type, active status, maintenance status, and access. After the series of selection steps and classifications were completed, I reviewed the resulting road status map and verified that it generally classified main arterial roads as open and lower use rural roads as closed.

Once the vegetation and roads data had been updated, I ran the Westside Models. The intermediate outputs from the models are the habitat covariates which show how DDE, distance to cover/forage edge, distance to public roads, and slope are evaluated by the modeling process (Figure 4).

The final 2009 predicted habitat use output was overlaid with elk GPS point locations from summer 2009 in order to determine if there was a relationship (Fig. 5 shows 2009 summer home range areas instead of GPS point locations so that predicted use values are visible).The Pearson product-moment correlation coefficient test for cow elk exhibited a significant correlation ($r = 0.947$, $p = 0.014$) with the predicted levels of habitat use (Fig. 6). This significant correlation provides support for the ability of the Westside Models to effectively predict cow elk habitat suitability. In contrast, the bull elk locations did not have a significant correlation ($r = 0.458$, $p = 0.437$) with the predicted levels of habitat use. The Westside Models were designed to target summer nutritional requirements for cow elk so it is appropriate that the cow elk locations are more strongly correlated with the outputs from these models than bull elk locations.

Synthesis of Elk Habitat Management Landscape

The identification of potential elk habitat management scenarios evolved through a series of discussions with WDFW and the Elk Management Working Group Forage Enhancement Committee (FEC). The FEC is composed of representatives of the following groups who are interested in elk forage enhancement efforts in the North Cascades: agricultural landowners, Department of Natural Resources, Puget Sound Energy, Skagit Land Trust, Stillaguamish Tribe of Indians, Swinomish Indian Tribal Community, Tulalip Tribes, Upper Skagit Indian Tribe, U.S. Forest Service, WDFW, and local citizens. I presented the 2013 baseline habitat suitability map to WDFW and the FEC, and this map served as a starting point for a dialogue regarding where to create focal Forage Enhancement Areas (FEAs). Through these discus-

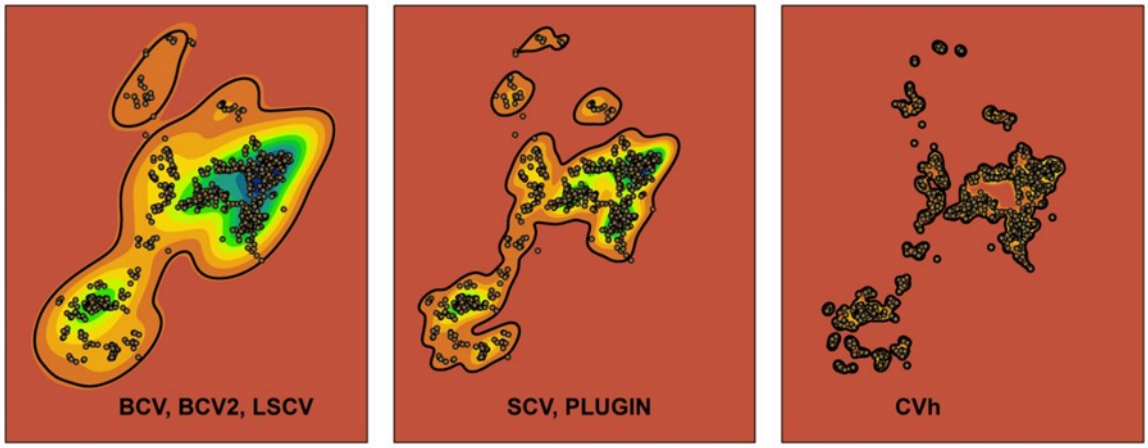

Figure 3: Kernel Density Estimate (KDE) (with 95% isopleth) of home range for elk ID # 413 using six smoothing factors grouped by KDE output. Wide bandwidth (BCV, BCV2, LSCV), medium bandwidth (SCV, PLUGIN), and narrow bandwidth (CVh).

(Continued on page 16)

GIS Modeling of Elk Habitat Suitability in the North Cascades

(Continued from page 15)

sions a number of important factors were identified that needed to be considered when selecting locations for forage enhancement.

In order to optimize vegetation growing potential and provide a viable forage site throughout the year, the FEAs needed to be below 2,000 ft in elevation. Additionally, in order to minimize conflict with agriculture areas, the FEAs should not be located within 0.5 miles from agriculture parcels. When these constraints were overlaid on the suitability map, it was possible to identify 6 general landscape zones (Fig. 7). During the discussions with stakeholders it became clear that 4 of the zones were unsuitable for forage enhancement (A, D, E, and F), and 2 of the zones were designated by WDFW as suitable for consideration for forage enhancement (B and C).

Within each of these areas I created a set of potential forage enhancement sites using current habitat suitability, local topography, hydrology, and neighboring landscape characteristics as guiding factors. I ran these potential sites through the Westside Models and produced the predicted elk habitat suitability for each FEA. The results from this modeling exercise are not a recommendation to cut forest patches exactly where I have drawn them, but are to be used as a starting point for evaluating possible locations, patterns, site sizes, and impacts of forage enhancement areas.

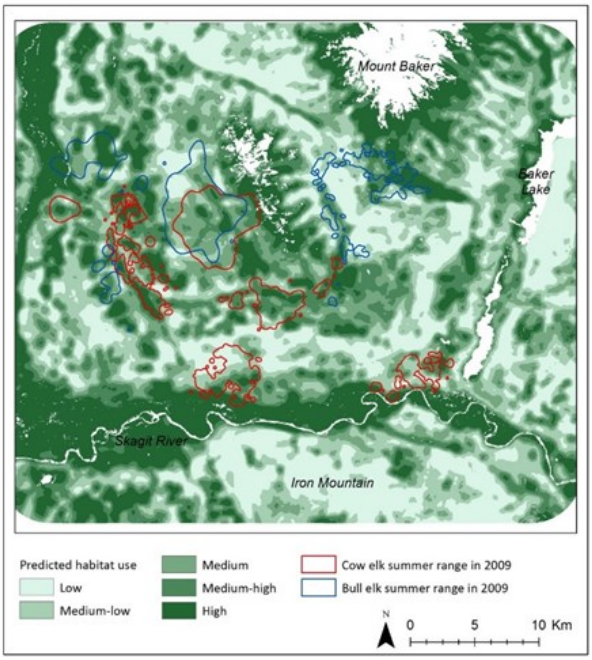

Figure 5: Predicted habitat suitability based on 2009 vegetation data overlaid with summer elk range areas (2009 GPS data).

As an example, In FEA B I created 25 sites totaling 278 acres of enhancement and when I ran these sites through the Westside Models, this produced an improvement in habitat suitability for 816 acres; 1 acre of improvement yielded and additional 1.98 acres of improved habitat (Fig. 8).

From a management perspective it is useful to understand that according to the Westside Models, forage enhancement efforts have the potential for improving habitat suitability beyond just the areas that are enhanced. This effect is a function of how the Westside Models calculate habitat suitability of an area by including the suitability of the surrounding sites (Rowland et al. 2013). This functionality produces the phenomena where an increase in 1 acre of enhancement can produce a greater than 1 acre total increase in habitat suitability.

This exercise demonstrated that the Westside Models are effective at guiding selection of forage enhancement sites. The scenarios suggested by this research provide a baseline for WDFW in evaluating how potential forage site

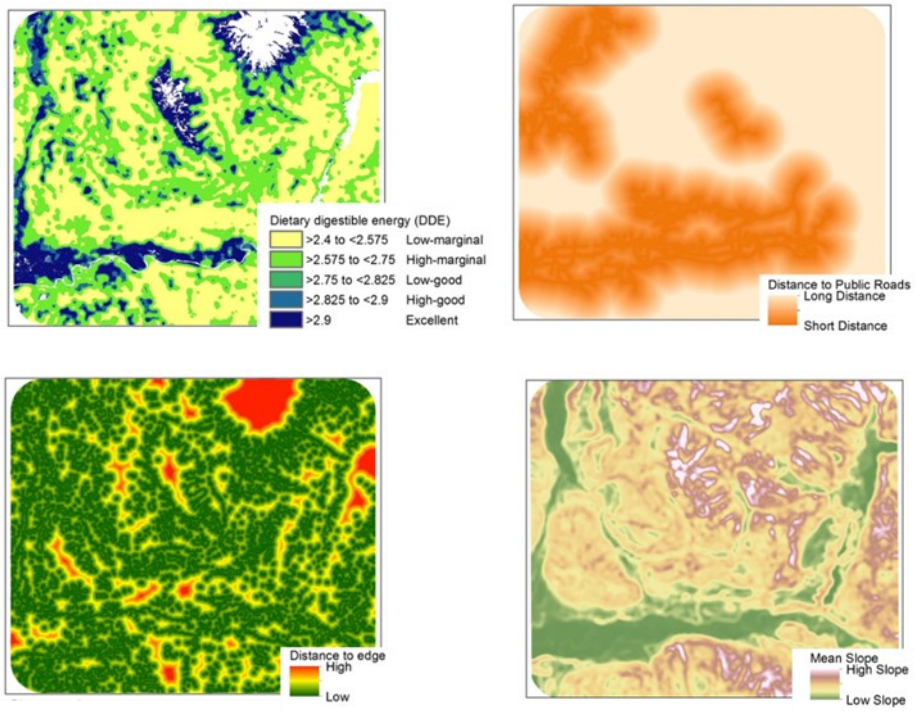

Figure 4: Habitat covariate output from the Westside Models.

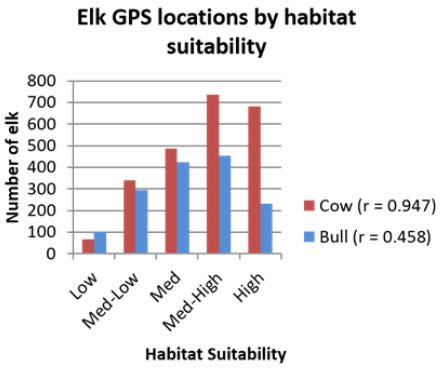

Figure 6: Correlation between predicted habitat suitability based on 2009 data and summer 2009 elk GPS locations.

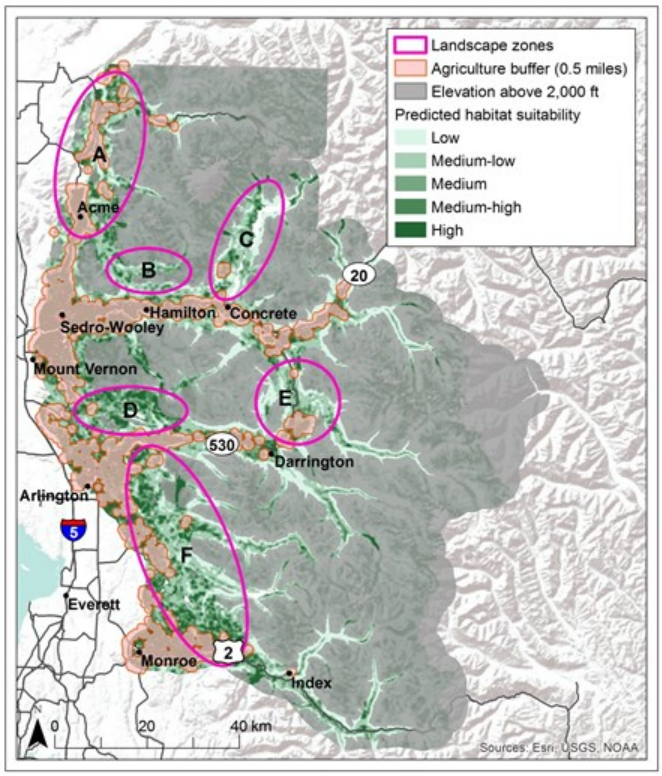

Figure 7: Site location constraints and general landscape zones.

locations may impact patterns of elk habitat suitability. As the elk management dialogue evolves land ownership and landuse restrictions will also be considered when determining forage enhancement site selection.

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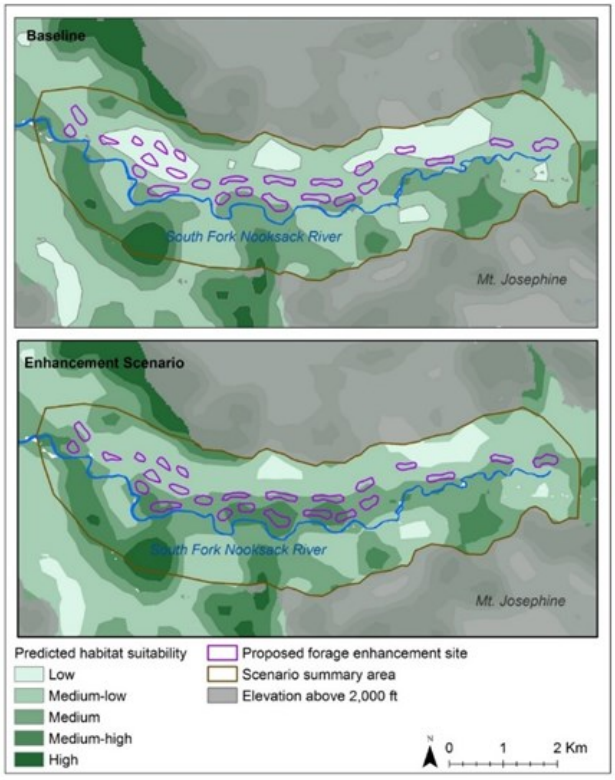


Figure 8: Proposed forage enhancement sites (25 sites, 278 acres) and resulting impact on habitat suitability in FEA B.

Fishbones for Address Verification

(Continued from page 4)

weeds removed, it was beginning to look like a good place to plant the veggies. There was budding potential similar to a blank new map waiting for features to be added. But wait, trouble was hiding below.

Crab grass runners were tangled in all directions, looking like fishbone errors. Until the problems are dug up and uncovered, they are not obvious. Fishbone maps make the data quality visual, and address errors that can be seen can be fixed. Another great use of fishbones is to illustrate to managers the need for an address correction project. GIS is all about making data come alive on a map.

Before getting into the fishbone process, it is important to know the basics of street center lines and addresses. Street centerlines have a direction, described by their from- and to-nodes. The direction is important to make geocoding work correctly. Street arcs should point in the direction of increasing address numbers. Using a line symbol with an arrow at the end shows the direction of the arcs (Figure 4).

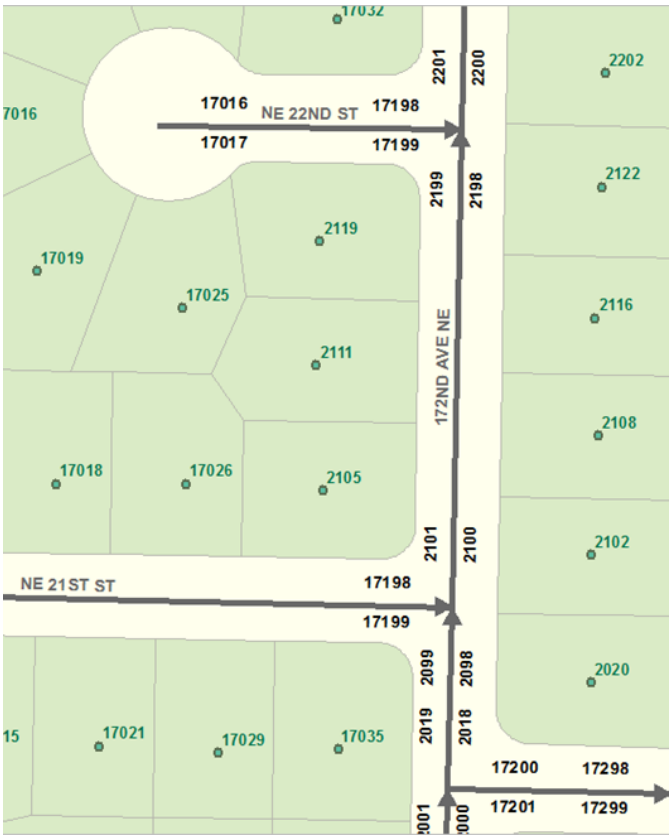
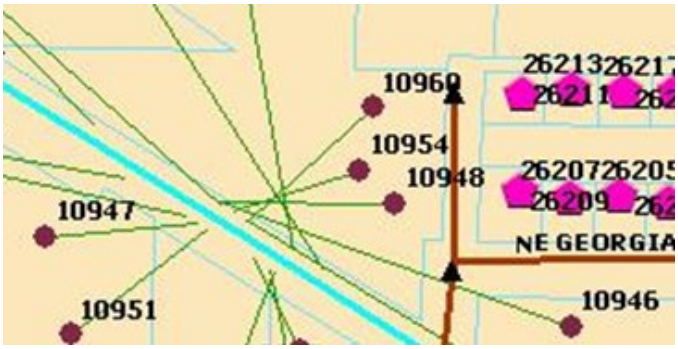


Figure 4. Symbolizing road directionality and ranges.

The first time I saw fishbones was at a 2002 address seminar taught by Richard K. Allen in Cincinnati, and it is a tool I have taught and used for several clients. In 2002, the lines were constructed using ArcView and Avenue. The next version of fishbones used a Python program for constructing the lines, and now in ArcGIS 10x there is the XY to Line tool. There is opportunity to automate Miranda's steps 1 through 7 and incorporate them into a fishbone tool, which would save time doing QC for addresses. Outputs of this tool could include sets of address points that matched, points that were unmatched, and points with tied matches. Symbolize the unmatched points with something you can really see, like hot pink pentagons.



The unmatched addresses seen visually can point out an obvious missing street in the street centerline layer. Other reasons points won't match are missing address ranges or street spelling and format errors. If you are looking for tight spelling consistency between streets and address points, set the geocoding tolerances up close to 100. As each error is fixed, update a status code on the unmatched address points that it has been corrected, and symbolized them in a different color and symbol, maybe a gold star, as being fixed. That way, you never lose your place while working through the error set. The counts by status code can be used for a status report if it is a large project.

The tied matches are very often caused by address range overlaps. A useful technique when hunting for range overlaps is to sort the attribute table by street name, then the left low address number. Look for huge ranges that might include arcs with smaller ranges, or duplicate sets of street ranges. That can happen when streets are split, but their range attributes didn't get updated at the same time.

After you have conquered the unmatched addresses and the ties, open the fishbone attribute table and sort it descending by length. Start at the longest fishbone and work down

through the list until you start to get diminishing returns. How long is too long for a fishbone depends on the lay of the land for your area.

One of Miranda's illustrations showed fishbones crossing a corner. A good spatial query is for fishbones intersecting streets or other fishbones. I have discovered, however, that every rule written about addresses can be broken. On very curvy streets, or for addresses at the end of long curvy driveways, a fishbone that intersects a street or another fishbone might be valid.

Sometimes the use of fishbones unearths bigger problems. There are some situations that are not a data error; they illustrate that re-addressing of house numbers and/or street names is needed. In the following example, there are duplicate streets with the same hundred block ranges, but a quarter of a mile apart.

What should be re-addressed? A good rule of thumb is that the premise is hard to find, and there is potential for a delayed emergency response. Imagine the above situation on a dark and rainy night, and the emergency vehicle is on the wrong street. There is quite a long drive-around to get to the other duplicate street with the same ranges, if they even know about its location.

Outputs of this tool include sets of address points that matched, points that were unmatched, and points with tied matches.

Re-addressing is a whole new can of worms. There will be public push-back when people are asked to change their address, even for public safety reasons. Should the responsibility for re-addressing fall on the shoulders of the map updater? No, please don't shoot the messenger, but there is a need to report these situations. It is helpful to have an official addresser, an address standard ordinance, support from department heads and top management, and a defined work flow for dealing with re-addressing. One good person to involve is the risk manager. Perhaps one lawsuit over a delayed emergency response would cost more than funding your address update program. Worse than that, what is the cost of a potential loss of life? Liability should be looked at from a lawyer's point of view. If your agency knew about dangerous addresses, but didn't communicate them or do anything about them, it is liable.

These articles have focused on fishbones as an address QC tool. There are other QC checks not covered here, such as the use of a standardized ordinance street name table, topology checks, theoretical range gap finder, and network connectivity checks. All of these QC checks should be performed each time a batch of address updates is completed. A documented work flow should include the street sign shop, the post office, as well as consumers of address data.

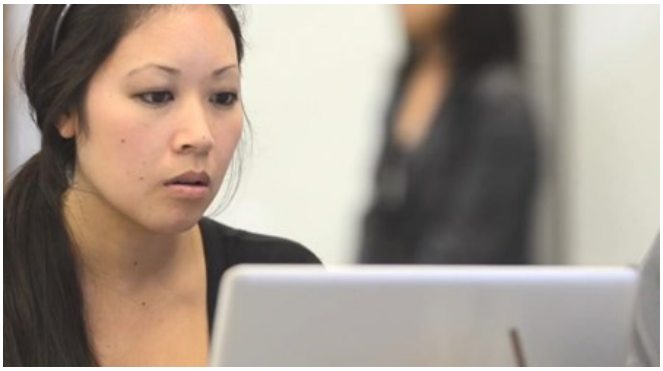
Proactive, timely address updates will save time in the long run, and they will reduce wasted time from address error incidents that result in inquisitions. At the very least, end users of the street centerline and address point data will have better outcomes for their projects, saving them time as well. Don't wait until the weeds have taken over your address data. Update and QC early and often.

Donna and Bob Wendt, owners of Wendt Consulting and GIS Services, specialize in addressing and travel network databases, QC tools, and customized classes.

Master of GIS & GIS Workshop Programs at UW

(Continued from page 11)

with friends and family. Based on their results from design and testing over just eight weeks, graduate student professionals were able to prepare a business case to a potential project sponsor or senior manager about why the organization should support the implementation of the group's idea, including how it will improve the organization's current work activities and core processes aimed at turning an existing situation (i.e., social-ecological system) into a more sustainable and resilient one.



MGIS alumna Alyssa Tanahara works on her final project during the GIS Workshop course.

Suzanne Davies Withers, who co-teaches the GIS Workshop course with Robert Aguirre, believes the knowledge that students get in the program allows them to move into other lines of work in the same field, often in the same companies. But for others, she says, "They really weren't aware that they would really be able to be in the driver's seat when it comes to taking on tasks or research, or making a difference in the various fields. I hope the students take away from this program an understanding of themselves as change makers."

GIS Workshop Project Reports

The main deliverable of the workshop course, the final report, was presented in brief to workshop project sponsors, along with any results, proof-of-concept examples, or prototypes developed during design and testing. The final reports of the 2014 GIS Workshop were published as part of a continuing *Master of GIS for Sustainability Management Occasional Papers Series,* August 2014 and are available online through the UW ResearchWorks archive here.

Final Reports of the 2014 GIS Workshop	
A Comparison of the Old and the New: A Case Study About Rebuilding the Nationwide Rivers Inventory	
Authors: Neil Shetty, Scott Schlueter & Emily Zvolanek	Sponsor: National Park Service
Calibrating the Huff Model for Outdoor Recreation Market Share Prediction: Ski Industry in Washington State	
Authors: Chelsey Gilman & Brenden Mclane	Sponsor: Earth Economics
Equitable Park Access in King County: An Analysis for King County Department of Natural Resources and Parks	
Authors: Matt Ringel & Devin Tokizawa	Sponsor: King County Dept. of Natural Resources and Parks
Seattle City Light - Trimming Trees and Its Impacts on the Urban Forest	
Ben Hillam, Sahar Pesaran Afsharian & Wally Koli	Sponsor: Seattle City Light
Identifying Wintering Marine Bird Hotspots in the U.S. Salish Sea	
Authors: Caleb Anderson & Chris Domschke	Sponsor: Audubon Washington
Depave the Duwamish: A Site Suitability Analysis Using Multiple Criteria Evaluation & Public Participatory GIS	
Authors: Rebecca Richards Steed, Becca Blackman, Nicole Frankenfield	Sponsor: Sustainable Seattle
The Nature Conservancy: Assessment of Scenario Modeling for Best Management Practices on Agricultural Lands	
Authors: Jessica Hashagen, Shawn Friang & Ben West	Sponsor: The Nature Conservancy
The Regional Open Space Strategy (ROSS): Analyzing Actions in the Lower Puyallup Green Heart	
Authors: Christy Heaton, Sarah Bengston & Jake Hearen	Sponsor: UW Green Futures Research & Design Lab

Venturing into Open Source GIS: A Global Conference Lands on Our Doorstep

(Continued from page 7)

to sell you something, it's a group that's interested in making the world a better place by working together to come up with alternative solutions to problems that many of us have grown accustomed to for many years. These solutions are maturing to the point where they can now serve as the basis for GIS operations at all levels from the individual to the enterprise. As solo consultants witnessing the striking developments in the open source geospatial world, it makes perfect sense for us to take every opportunity to learn more, to enhance our capabilities and better serve our clients and to do our part to support the open source GIS community, hence our interest in FOSS4G.

Open source-based geospatial solutions can compete with those from the proprietary world and, in many cases, win.

Our Contribution to the Community

As keen as we were to just go to Portland and learn something new, we were also aware of our duty to support the community. We decided to begin by arranging a session for the 2014 Northwest GIS Conference entitled "Opening the Door to Open Source GIS," with the idea of exploring the individual, organizational and cultural facets of the open source GIS world as compared to the proprietary GIS world. If we could shed light on some of these facets, we could help GIS professionals make better decisions with respect to their adoption of technology, help them communicate better and help drive technological innovation. Of course, we can only do so much ourselves, but every little bit helps and, if nothing else, we can promote consideration of the sorts of wider issues that can impact our effectiveness as GIS professionals in ways that are often profound and far-reaching. The level of enthusiasm we saw at the recent Washington GIS Conference in Tacoma seemed to be indicative of a strong appetite for professional development activities of this nature and FOSS4G gave us a perfect opportunity to do some research to assess the value of our endeavor, gather input from a global community and build on our findings at the local level.

The FOSS4G Conference

Overall, this was one of the best conferences that either of us has attended, for the quality of the presentations and activities, and the nature of the subject matter and the attendees. We came away thoroughly impressed and intellectually invigorated.

A total of 42 workshops over two days run by many of the world's leading experts in their respective subject matter was an impressive start to a volunteer-run conference of this nature and our attendance focused on administering PostGIS databases, QGIS plugin development using Python and designing beautiful maps with TileMill/Mapbox, Leaflet.js and CartoDB. Following the workshops, the main part of the conference spanned three days with a keynote presentation, an invited presentation, and eight session tracks each day. Most of the presentations are available for viewing via the FOSS4G website (https://2014.foss4g.org/) and are well worth watching. Here we focus on two of the keynotes and discuss some general observations from other sessions.

Mike Bostock, New York Times and D3.js

In the first keynote presentation, Mike Bostock of the New York Times and author of the D3 JavaScript library for visualization combined an extensive and quite academic discussion

on addressing projection representation issues with valuable advice for toolmakers. For example, it's easy to overlook the fact that people don't always use the tools we develop in the way we intended them to, but we can try to reduce the likelihood of unintended use cases by focusing on the smallest interesting problem. That involves breaking large problems into small ones, and developing and communicating tools in a focused and explicit manner. The more clearly we can express what a tool is meant to do, the more likely it is that we can make the tool do exactly that. Furthermore, the less likely it is that a user will find themselves doing things that we didn't intend them to do and that they didn't necessarily expect to be able to do. This sort of advice may seem obvious, but it's not hard at all to find many tools--in the GIS world and beyond--that could be improved significantly. In light of these comments, it makes sense that the most common enhancement requests and suggestions for GeoServer (an open source server for geospatial data) pertain to clarity and simplicity. Since they're not bound by the sort of release cycles we see in the proprietary world, developers can move quickly to address such feedback, and thus heed Mike Bostock's advice.

Integrating techniques and capabilities from many sources is key to the open source geospatial community.

Sarah Novotny, NGNIX

Sarah Novotny of NGNIX provided a heartwarming focus on the community aspects of the open source world. As she pointed out, developers of sophisticated software often find it much easier working with computers than with people, which can reveal itself, perhaps unpleasantly, in interactions on chatrooms and forums. For many, the idea of posting questions to an audience scattered around the world is rather intimidating. But, there's no doubt that learning how to operate in such environments is well worth the effort. For your part, you have to develop a thick skin and establish yourself by helping others as much as possible (answering questions, providing bug reports, developing documentation and so on).

Sarah characterized a FOSS4G project as consisting of three main parts: (1) source code, (2) a license and (3) humility, respect and trust. It's worth thinking about that for a moment. In the proprietary world we don't have the source code (although changes are starting to happen), the license is something that's often associated with large amounts of money, and the latter is generally not considered. And yet, as we discussed at the Washington GIS conference, problems with communication (for which humility, respect and trust are critically important alleviators) can do far greater damage to a project than the technology ever could. If we don't consider them at our professional conferences, where else will we consider them in ways that can have a dramatic impact on the success of our efforts as a GIS community?

Sarah also encouraged us to think carefully about how we go about developing open source solutions. "Build it and they will come" doesn't really work. "Collectively deciding on a problem to be addressed and then addressing it together" is likely to be a much more successful approach because of the community buy-in from the start, further valuable advice for any situation, not just for open source projects.

Observations from the General Presentations

As one would expect, the topics of the general sessions at the conference varied widely from highly focused technical explanations to descriptions of practical applications and consideration of implementation issues. With respect to the latter, a number of presenters touched on the barriers to open source geospatial adoption, acknowledging that there is still a way to go in allaying typical concerns, such as the lack of a number to call if things go wrong or the resident expert moves on. The continued growth and success of companies like Boundless and AppGeo is, however, serving to lessen this type of concern and demonstrate that open source-based geospatial solutions can often compete with those from the proprietary world and, in many cases, win.

On the technical front, this really is the era of JavaScript, with ever-increasing interest in libraries such as Leaflet.js for web

(Continued on page 24)

Venturing into Open Source GIS: A Global Conference Lands on Our Doorstep

(Continued from page 23)

map development, D3.js for visualization and Node.js for server-side processing and networking applications. Geospatial JavaScript Object Notation, or GeoJSON, a format for encoding a variety of geographic data structures, is starting to be particularly widely used and is especially predominant as the basis for GitHub's growth into the GIS world. GitHub's platform for collaboration, code review and code management has become the industry standard for version control and publishing to support web applications. It follows, therefore, that GIS professionals are taking note of the ability to store geospatial data in easily understood open formats, to maintain versions of that data and to easily consume it through simple and efficient applications.

Aaron Racicot, a geospatial open source pioneer in our local GIS community, showed the value of a GitHub-based approach through a voluntary project for his home town of Langley on Whidbey Island. In short order, he was able to dramatically improve support for spatial thinking and analysis at very little cost. In front of a sizeable and enthusiastic crowd, he demonstrated how he could use a point-and-shoot camera, a quadcopter and a variety of different software packages to produce quite impressive aerial photos and models of the town center, all for around $700.

Pulling together techniques and capabilities from many different sources, rather than buying into a single platform, is a key characteristic of the way the open source geospatial community operates and it is this sort of agility that explains, in part, the increasing interest from practitioners with more traditional proprietary GIS-based backgrounds. It's perhaps not surprising that as packages such as GeoServer continue to evolve, they're being implemented as an alternative to Esri's ArcGIS Server, often in association with established spatial data storage and manipulation technology from PostGIS, which adds spatial capabilities to the PostgreSQL database. Two primary reasons seem to have emerged for this situation, one being the high cost of the proprietary option(s) and the other being dissatisfaction over quality issues and the time it takes for problems to be remedied. At this point, hybrid approaches, such as using proprietary desktop options and open source server options seem to be increasingly viable, as Ben Sainsbury of Oregon Metro demonstrated quite convincingly.

In Conclusion

For those of us with traditional and proprietary-based GIS backgrounds, going to a conference like FOSS4G is like stepping into a whole new world. It really changes your way of thinking about things and offers many new alternatives to the capabilities that you've become accustomed to and somewhat comfortable with. The trick, of course, is figuring out the best approaches for the tasks at hand, wherever they may come from. It's easy to think of these best approaches in purely technical terms, but as we've expressed here and on other occasions, the open source world offers alternative perspectives on how we can work together and potentially enhance our effectiveness as GIS professionals, which is an admirable goal regardless of the specific technological solutions we choose to embrace.

President's Column

(Continued from page 1)

I write this column after spending three days at the NW GIS User's Conference in Lynnwood, WA. I consider this conference a sister event to the state URISA chapter conferences in the Pacific Northwest. With the sleek Lynnwood Convention Center as the backdrop (this facility makes conference coordination a breeze!) this conference featured well-selected, engaging keynote speakers and quality breakout sessions, with presenters earnestly sharing their experiences and gaining thoughtful feedback from the audience. It's exactly what we strive for with our annual WAURISA conference. I'd love to see the state URISA chapters collaborate with the NW GIS User Group to host combined conferences and other professional development opportunities in the future. Seeing these organizations operate separately seems unsustainable, and sometimes forces attendees to choose between two annual GIS conferences in their state. I will be reaching out to this group shortly to see if we can collaborate in the future.

Are there other ideas WAURISA should pursue in 2015? Are there things we're doing well, should be doing, or doing wrong? We can improve and become more relevant to you and your geospatial career only if you provide us with feedback – good and bad. Please don't hesitate to drop me a line with your ideas at president@waurisa.org

Thank you for reading my column and I wish you a wonderful holiday season!

WAURISA Leadership Attends URISA GIS-Pro Conference

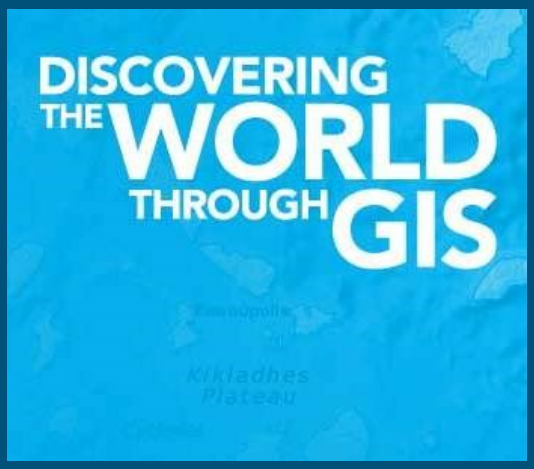
By: Heather Glock and Josh Greenberg, Ph.D.

WAURISA board members Heather Glock, Josh Greenberg, and Sarah Myers attended the 52nd annual URISA GIS-Pro conference in New Orleans from September 8-11. The conference format consisted of a day of workshops followed by 2 ½ days of conference activities including breakout sessions, keynotes, award ceremonies, and panel discussions. The keynote speaker was Catherine Bracy, Director of Code for America. This community organization helps make government efficient and helpful by providing open source solutions. Highlights of these sessions included an excellent workshop on data privacy and access laws that could make for a solid URISA workshop to bring to WAURISA membership. Several sessions were dedicated to studying resiliency in the face of natural disasters, using New Orleans as a powerful case study. An interesting session called "It's About the Data" had a panel discussion exploring the differences in the practices of GIS professionals and licensed surveyors. While this is a heated topic and very relevant to Washington State at this time (see the new Advocacy section of the Summit in this issue), the bottom line is we all need to build better lines of communication between our organizations.

The WAURISA board met with other chapters during the Leadership Meeting, where chapters received an update of URISA's plans to move to a unified membership model. This model will bring URISA International members and local chapter members all together into one organization. While the cost of URISA International in the past was considered high for some members, they hope to transition to a single payment of around $75 that would cover both URISA International and local Chapter dues. This plan will be slowly implemented over the next couple of years, and WAURISA will keep you informed of its progress and development. The Leadership Meeting also featured an exchange of best-practices ideas, and a round-table discussion among chapters where we shared what is working best for our local groups. WAURISA is considering several new features to our membership based on successes achieved in other chapters including a mentorship module, new social events such as "Mappy Hours" and virtual training opportunities.

The closing session was presented by Steve Ressler with GovLoop.com. One of his take-home messages was that although government often receives negative press, there are many excellent examples of success. By learning from each others' success stories, government employees can help make their own organizations more successful. He recommended the book "Brick by Brick" by David Robertson. This book follows the approach taken by the failing Lego company to transform into a powerhouse. Capturing innovation and looking for creative solutions is inspiration for us all.

GIS-Pro 2015 will be in Spokane next fall, and we highly suggest that you attend this conference. Although similar in many ways to our own Washington GIS conference, GIS-Pro can provide a big-picture perspective of GIS practices, innovations and change. More information will be released soon, but in the meantime mark Oct. 18-22, 2015 on your calendar.



GIS DAY 2014

Celebrate GIS Day on November 19, 2014. GIS Day is an opportunity to educate others in your community and workplace about the amazing things that can be accomplished with GIS.

Share your GIS Day photos and stories with *The Summit* by January 16, 2015 to be included in the Winter issue.

Editorial

By: Eadie Kaltenbacher, GISP

This issue's theme jumps right out at me: "Striving for Excellence". Clearly, GIS has developed into a mature discipline here in Washington, while at the same time its practitioners have retained their enthusiasm for learning and professional development. What incredible stories we have right in our own community.

Beginning with education, our lead story features Summit Award winner Dr. Sabah Jabbouri, who has been a tireless advocate for his GIS program and students. We also have a story about the Master of GIS program and workshop at the University of Washington (p. 11). Others are continuing their education via conferences: FOSS 4G (p. 7) and GIS-Pro (p. 25).

I was very interested to learn about the State's GIS Strategic Plan (p. 8). GIS practitioners usually want to share their work to help others with theirs, and the State is in an excellent position to facilitate this exchange. I have also offered *The Summit* as a tool to help with the communication and outreach components of the Strategic Plan.

How about concrete examples of using GIS to solve a problem or improve decision making? Sure, we've got that: see GIS Modeling of Elk Habitat Suitability (p. 13) and Fishbones for Address Verification (p. 2).

I am also pleased to announce the new "Legislative Corner" by Effie Moody and Josh Greenberg (p. 10). This is a new segment that is planned as a regular feature of *The Summit* to keep us up-to-date on legislative issues that could affect the GIS community.

And of course, the new Community Engagement Committee headed up by Anna Yost is bringing it all together by promoting GIS to the greater community (p. 9).

I hope you all have a happy GIS Day and continue to strive for excellence. And when you do, make sure you send your success stories to *The Summit*!

Public Maps in Washington

Photo submitted by Paul Andrews.

Literary Corner

"**A map was a fine thing to study** when you were disposed to think of something else, being made up of names that would turn into a chime if you went back upon them."

-from Middlemarch, by George Eliot

UPCOMING DEADLINES

Submit articles to *The Summit* for publication by:

	Winter Issue	Spring Issue
First Draft (optional)	**12/16/2014**	**3/10/2015**
Final Draft	**1/16/2015**	**4/10/2015**

The Summit is the newsletter of WAURISA. To encourage the discussion of issues and ideas of importance to the Washington GIS community, we welcome letters to the editor or opinion essays. Letters should be a maximum of 100 words and essays should be limited to 500 words.

Chief Editor: Eadie Kaltenbacher

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ACSM – Washington State Section
www.wss-acsm.org

Cascadia Users of Geospatial Open Source
groups.google.com/group/cugos
Contact Karsten Venneman

Central Puget Sound GIS User Group
Join Listserve here

Central Washington GIS User Group
Meets the 2nd Wednesday of each month.
Contact Amanda Taub

Cowlitz-Wahkiakum GIS User Group
Meets the last Wednesday of each month at 3:00 pm at the Cowlitz-Wahkiakum Council of Governments meeting room, 207 North 4th Ave, Kelso WA.
Contact TJ Keiran

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.wwu.edu/huxley/spatial/nwwgis/nwwgis_mtgs.htm

Southeast Washington/Northwest Oregon GIS User Group
http://gisgroup.wordpress.com

Washington Geographic Information Council (WAGIC)
geography.wa.gov/wagic
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Washington Hazus Users Group
http://www.usehazus.com/wahug
Contact Kelly Stone

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