CENTERLINE

A NCDOT Environmental Newsletter

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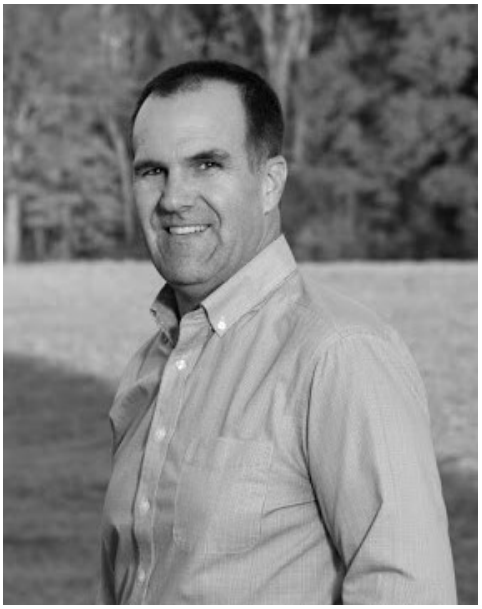
Planting A North Carolina Legacy

By: David B. Harris, P.E., NCDOT State Roadside Environmental Engineer

View Point



It was 1985, Governor James Martin is sworn in for his first term as Governor of North Carolina. First Lady Dottie Martin reads an article in the Wall Street Journal showcasing the wildflowers along the Texas highways. Inspired by the article, the First Lady sends a letter over to the Department of Transportation asking, "Can we do this?"

The letter written on that fateful day found its way to the desk of Mr. Bill Johnson who was at the time the head of what is now known as the Roadside Environmental Unit. That simple letter was the beginning of a program that continues to this day as the NCDOT Wildflower Program. Consisting of only twelve acres the first year, it has evolved today to over a thousand acres planted and maintained annually along the roadsides of North Carolina using funds raised by personal license plates. It is a program that to this day sets a standard for other states to follow.

For most, the Wildflower Program is what the Roadside Environmental Unit is well known for. The men and women who over the past thirty-three years have developed a legacy for future generations to not only

(Continued on page 2)

Jamestown Bypass (U-2412A) - A Noise Wall Discussion

By*: Missy Pair, P.E., EAU Traffic Noise and Air Quality Group Leader*

Project Spotlight

NCDOT builds noise walls where noise impacts occur and where abatement is feasible and reasonable (and in the case of state projects, also practicable). To illustrate how the analysis and decision-making process regarding noise walls work, let's walk through an example project – High Point Road Improvements (Jamestown Bypass), STIP Project U-2412A.

This is the last segment of a larger project, U-2412, that has been around for a long time; in fact, U-2412 has had no fewer than three reevaluations on it, the first of which I worked on myself in the early 2000s. The project would have had numerous preliminary traffic noise studies done over the years, under changing noise policies and modeling practices. Those analyses would have identified potential noise impacts to comply with the National Environmental Policy Act. I am not talking about those here, but rather I am focusing on the final design noise analysis, done during final design; it is this final design noise analysis that actually recommends noise wall locations.

First, a few basics. In order for a noise wall to be built, there first must be impacts. Impacts occur when noise levels reach a prescribed level depending on land use, or when substantial increases occur (when compared to the existing condition). Where there are impacts, we

(Continued on page 3)

(Viewpoint continued from page 1)

live up to but to carry on. Every year the Department receives letters from citizens who are appreciative of the effort that it takes to have flowers that bloom along the highways. The NCDOT Wildflower A program is a program that everyone can enjoy who travel across our state.

As a professional, there is nothing more fulfilling then to be a part of a successful program and for the men and women who are a part of the Roadside family that success goes far beyond the wildflowers. For most in the construction world, the Roadside Environmental Unit represents something completely different. It is the unit charged with ensuring the Department's delegated Erosion and Sedimentation Control Program remains compliant with both State and Federal regulations.

The delegated program evolved from a tumultuous time in the 1990's, when environmental stewardship was not regarded as important and any expense associated with protecting a natural resource was not considered as a priority. Since that time, the Roadside Environmental Unit has worked to develop and train construction personnel both in the Department and with the contracting industry. The unit has since partnered with N.C. State University to research new methods that has allowed the Department to improve and become a leader across the nation in erosion and sediment control design and implementation.

Today the Department remains the second largest land disturbing entity in the state, and its environmental protection measures not only provide protection to the natural resources but has improved erosion control techniques to increase the efficiency in how highway projects are constructed.

To the millions who travel our highways every year, the Roadside Environmental Unit is the rest areas and welcome centers that provide for a safe and relaxing reprieve from the busy highways. The rest areas that can be found across our state have evolved from roadside picnic tables to energy efficient facilities capable of handling millions of visitors each year. If you ask most who travel through our state, the rest areas provide a glimpse at what our state has to offer. For that reason, the Roadside professionals that manage these facilities take great pride in maintaining them at the highest possible standard.

What is not always pleasant about our state is the amount of litter that is cast out onto our roadsides each year. Litter is everyone's problem and we are the source of that problem. The Roadside Environmental Unit has a group of dedicated staff that manage everything from the thousands of volunteers who pick up litter in the Adopt-A-Highway program to contractors who work to keep the litter off our interstates and primary routes.

The problem is not insignificant, the Department averages over 7.5 million pounds of litter picked up annually. That amount is equivalent to over 413 garbage trucks of litter. We continue to promote educational programs to schools and local groups to spread the word on why litter hurts us all. We can only hope that future generations will be able to solve the litter problem.

There are many other areas that the unit is involved in, such as the management of vegetation along the 80,000 miles of highway in the state, to managing stormwater runoff from the highways, to cleaning up hazardous materials and fuel spills. Roadside has been involved in the iconic highway landscaped areas across the state that were designed by the talented group of landscape architects in the unit. Roadside staff will continue to be a part of what makes North Carolina special.

So, if you have ever admired the wildflowers on a summers evening drive, driven down a Scenic Byway, helped protect the environment by making sure the erosion and sediment control devices were functioning properly, or picked up trash on the side of the road, then I would like to say you are a part of what we call the Roadside Family. Roadside is more than a unit, it is anyone who takes pride in what they call their home and for that as the State Roadside Environmental Engineer, I thank you and the Roadside employees who work hard every day across the Divisions and in the Central Unit to make this state the best it can be.

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then consider abatement (usually a noise wall). This means we model multiple iterations of noise walls. We will

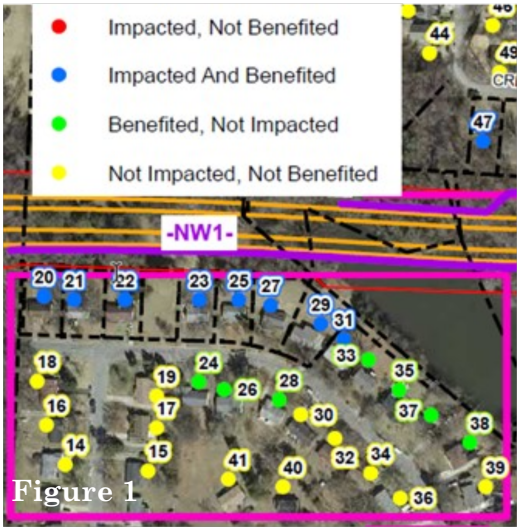

Figure 1

alter the height, length, and position of the noise wall as necessary to try to find a variation that meets feasibility and reasonableness criteria spelled out in the noise policy. Any noise wall that is feasible and reasonable, we will include in construction plans. Feasibility and reasonableness criteria are spelled out in the NCDOT noise policy, but in short, feasible and reasonable walls are acoustically effective for enough receptors; are capable of being built given access, drainage, topography, utilities, safety, and maintenance issues; are cost-effective; and are preferred by those who would benefit from them.

The final design noise analysis for U-2412A is documented in the project's Design Noise Report (DNR). (It is important to note that this DNR was prepared in compliance with the 2011 NCDOT Traffic Noise Abatement Policy, which has different feasibility and reasonableness criteria than the current 2016 Traffic Noise Policy.) The DNR looked at five noise walls. Three of them met feasibility and reasonableness criteria and are to be constructed; two did not. We will look at the three walls that met the criteria, one that did not, and one area where no wall was considered at all.

Noise Wall 1, or NW1 was found to be feasible and reasonable. The wall is shown by the purple line (Figure 1). The colored dots in the figure are the locations where noise levels were modeled -- one per house. Blue dots are those that both experience a noise impact from the project and benefit (that is, get at least a 5-decibel reduction) from the wall. Green dots are those that do not experience an impact from the project, but do get at least a 5-decibel reduction from the wall nonetheless. The yellow dots are those that are neither impacted by the project nor benefited by the wall.

Noise Wall 1 has 15 benefits (the blue and green dots). These 15 benefits factor into the cost-effectiveness calculation, and the owners and tenants of these 15 residences would get the opportunity to vote on the noise wall.

The situation with Noise Wall 2 (NW2) depicted in Figure 2 is similar – it also is feasible and reasonable, and those that are impacted and/or benefitted are color-coded. The one difference you'll notice in this figure is the X in a gray circle over one home; it is a relocation with the project and would therefore not have counted as an impact or benefit in the noise analysis.

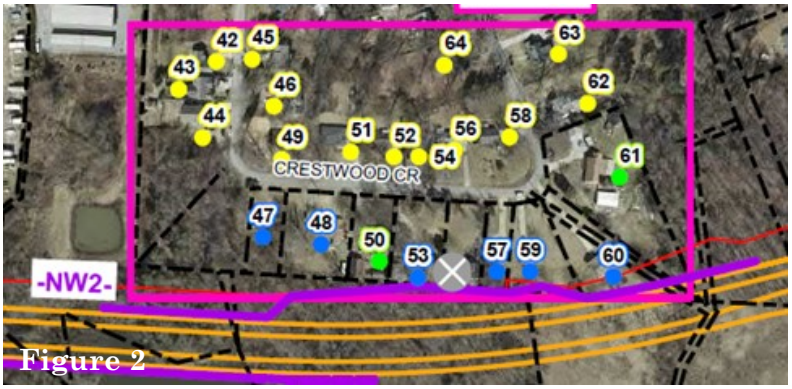

Figure 2

Our last feasible and reasonable wall is Noise Wall 7 (NW7) depicted in Figure 3. This wall has 13 benefits. Notice it's a fairly short wall for a lot of benefits because the housing density is fairly high. Density affects cost-effectiveness. While there are a lot of factors that influence noise levels and wall effectiveness, when all other things are equal, small homes on small lots, condominiums and apartment complexes are more likely to get noise walls than large homes on large lots.

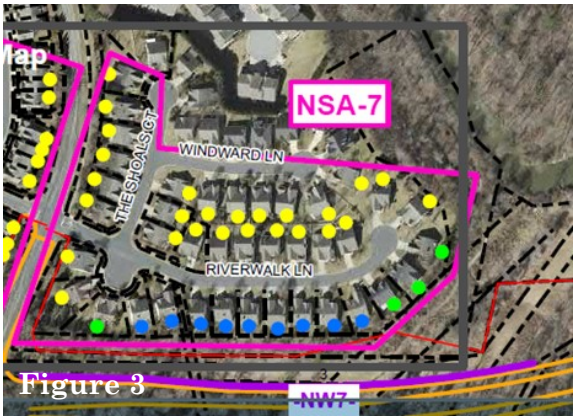

Figure 3

Now let's look at the wall modeled for Noise Study Area-4 (NSA-4) depicted in Figure 4. Because the wall was not feasible and reasonable, no wall alignment is shown on the figure but the area evaluated for the wall is. First, notice this figure has a red dot; red dots indicate receptors that are impacted by the project but not benefited from a wall. Our modeling exercises tried to benefit this red dot with a wall, but it was not possible to design a wall that met criteria. Second, notice that there are no blue or green dots. This means we could not design a wall that achieved the minimum required noise-reduction level for anyone.

Now let's look at Noise Study Area-8

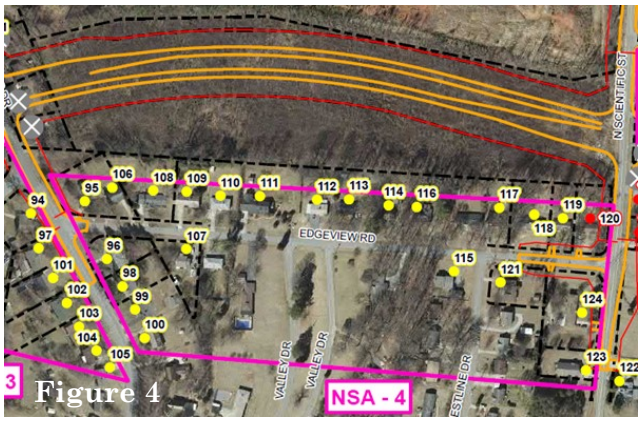

Figure 4

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NCDOT Stewardship Monitoring and Unmanned Aerial Vehicles

By: Jason Elliott & Byron Moore, P.E., EAU Monitoring & Stewardship Group

Technical Article

As a condition of state and federal environmental permitting requirements, the North Carolina Department of Transportation (NCDOT) is responsible for the long-term stewardship and protection of compensatory mitigation sites throughout the state. Currently there are nearly 350 stream, wetland, and buffer mitigation sites in the NCDOT Stewardship Program. These mitigation sites are owned in fee by NCDOT or NCDOT holds a conservation easement (CE) on the property. The mitigation properties range in size from 0.1 ac. to over 4,000 ac. As a part of stewardship and permit compliance, NCDOT is responsible for ensuring that all mitigation sites are protected in perpetuity. In order to accomplish this effort, NCDOT formed a stewardship program just prior to 2010 after many discussions with state and federal environmental regulatory agencies. Regulatory agencies often inquire regarding the status of mitigation sites in which post-construction performance monitoring has been completed and the site has been closed out. NCDOT, in conjunction with our Private Engineering Firm (PEF) partners, as constantly seeking new and innovative opportunities to assist in the vast stewardship effort.

Beginning in 2018, NCDOT, through PEF, began utilizing unmanned aerial vehicle (UAV or drone) technology to assist in stewardship monitoring for certain sites. While drones have been in use for many years, they have only recently gained significant commercial use over the past few years. Drones typically were used in military activities such as intelligence gathering but the commercial viability of drones has greatly increased, and their use has skyrocketed. According to the Federal Aviation Administration (FAA), it is predicted that over 7 million drones will be in used by 2020. The anticipated number of U.S commercial drones is expected to grow by a factor of 10 over the next half decade from 42,000 in 2016 to more than 420,000 by 2021 (Tenebruso, TMF Guardian). Photography is by far and away the top industrial use of drone technology; however, many other industrial uses such as agriculture, land surveys and asset management are expected to grow in the coming years.

For the NCDOT Stewardship Program, drones have allowed for easier visual access to many of the stream and wetland mitigation sites located through the state. The use of drone technology has allowed NCDOT to monitor certain portions of larger mitigation sites that in some cases may have not been visited in years due to heavy vegetation growth, site conditions, etc.

Annual inspections ensure that all the sites are being maintained, in a manner consistent with the terms of the permit conditions, mitigation plans, deed restrictions, and/or conservation easements. During the annual inspection, the site perimeter and points of ingress/egress are reviewed for trespass and other violations. Typical violations may include trespass (fencing/gates issues, etc.), illegal hunting or fishing, illegal dumping of trash/debris, and illegal cutting of vegetation. More serious trespass violations could include fill in wetlands or alteration of a site that is inconsistent with the mitigation plan. If violations are noted at a site, NCDOT, in accordance with the stewardship procedures, are required to identify and remediate the violations depending on the nature of the violation. Stewardship reports are generated annually and are posted on the NCDOT Connect website listed below:

https://connect.ncdot.gov/resources/Environmental/Pages/Permits-and-Mitigation.aspx

Usually, violations are readily identified by vehicle or foot at points of ingress/egress. Larger and more remote sites can be difficult and time con-

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suming to effectively monitor. The use of drones has enabled NCDOT to more easily monitor remote portions of a site. The aerial views offered by drones provide overall views of the site. Traditionally, aerial views have been provided by online resources (Google Maps, etc.) which often show dated photographs. The NCDOT Photogrammetry Unit has also been a partner in providing many of the aerial images that the Department uses today.

In order to be able to use drones for NCDOT, operators must follow FAA guidelines. The three types of operators are recreational, commercial, and government. NCDOT work falls under government operator guidelines. The majority of consultants working for NCDOT are also commercial operators.

Commercial operators can operate under 14 CFR Part 107. This rule states that a person operating a drone have a remote pilot airman certificate with a small Unmanned Aircraft Systems rating. This rule also allows operation of a drone by a person under the direct supervision of someone who has this rating. These operators must also pass NCDOT's unmanned aircraft operator's test. This is required to obtain a state permit.

Government operators can operate under 14 CFR Part 107 or as an alternative obtain a waiver from the FAA. Government operators must also pass NCDOT's unmanned aircraft operator's test.

For a full explanation of these rules see the following website:

https://www.ncdot.gov/divisions/aviation/uas/Pages/default.aspx

Based on the positive results from the first year of UAV monitoring on NCDOT stewardship sites, it is likely that the Environmental Analysis Unit will look to increase drone usage in the future. The ability to provide aerial reconnaissance adds a component for NCDOT to ensure the protection of stream and wetland mitigation sites throughout the state, in accordance with permit conditions. Also, it is anticipated that future drone usage on stewardship reporting may significantly cut costs due to the reduction of manpower and the time required to perform the site inspections. The ability to quickly review a site by drone allowed multiple sites to be reviewed in one day thereby increasing efficiency. While not applicable to all sites due to size and line of sight constraints, the use of drone technology will continue to be a valuable tool for the NCDOT Stewardship Program.

(Project Spotlight continued from page 3)

Figure 5

(NSA-8), found on Figure 5. Because there were no noise impacts (notice, no red dots), we did not need to model a noise wall. But notice there are no receptor dots on the track or the ball field. These are noise sensitive land uses, and normally recreational uses like this would be modeled. But these are associated with Jamestown Middle School, which had a building permit issued after the project's date of public knowledge, which was December 30, 2006, the date the Record of Decision was issued. Since the middle school's building permit came after the date of public knowledge, it is not eligible for noise abatement consideration. This is stipulated in both Federal regulation and NCDOT traffic noise policy. The three noise walls that were recommended in the DNR (Noise Walls 1, 2, and 7) were taken to the community for a vote. Those benefited from a wall had the chance to indicate their preference for or against the wall. Most people want noise walls, although occasionally someone may not want a wall because of a shadow effect or view obstruction it causes. But that was not the case here; all three walls were preferred by those eligible to vote, and all three will be constructed as part of the contract let in June 2018.

Employee Spotlight

On the same day the Environmental Policy Unit came into existence, NCDOT welcomed John Jamison as the Western Regional Lead for the new unit. He is working alongside Colin Mellor, Derrick Weaver, and now Mike Sanderson to help with all the fun Merger/National Environmental Policy Act (NEPA) stuff they do! John is in his 20th year in the environmental field, having spent his last 19 years working in the consulting industry, first at Law Engineering (which became Mactec, then AMEC, and is now Wood Group) and more recently at HDR Engineering for the past 14 years. John has been blessed to have worked with some great colleagues and friends that have given him some amazing work opportunities and helped form his perspective on our environmental industry.

John was born and raised in Winston-Salem and spent most of those years outdoors doing a variety of activities, including Boy Scouts, hiking, camping, soccer and golf. He came to Raleigh in 1994 to attend NC State University, where he originally thought he wanted to study engineering until second semester calculus convinced him to look for another major; he landed on Natural Resources Policy & Administration in the forestry program. While in school he spent two summers surveying for the City of Winston-Salem, one summer at Jordan Lake with NC State Parks, and another interning with US Fish and Wildlife Service at Alligator River National Wildlife Refuge (still the hardest, lowest-paying and most fun job he's probably had!). John graduated in 1999 alongside a number of familiar Environmental Analysis Unit (EAU) staff and consultants working on behalf of EAU.

Immediately after graduating, John started work at Law Engineering, with his first big project being the Cleanwater Act Sections 404/401 permitting for the Piedmont Triad International Airport expansion, new runway and FedEx facility. He continued to cut his teeth there on a wide variety of projects, including Phase I site assessments, NEPA documents, watershed planning, Geographic Information Systems analysis, wetland delineations, and

permitting. In 2004 he made the switch to HDR Engineering, where he was able to continue to work on a wide variety of assignments while also starting to manage projects. At HDR, the majority of his work centered around NCDOT, ranging from Natural Resource Technical Reports and restoration planning to design/build permitting and NEPA documentation. HDR's success in design/build gave him and his colleagues a unique opportunity to be involved in the final design and construction of some very challenging projects, while at the same time working on NEPA and early planning of other projects. He's been lucky enough to be involved in some very interesting projects, both locally and nationally, including the Replacement of Bonner Bridge, Durham-Orange Light Rail, Pebble Mine (Alaska), Route 460 Widening (Virginia), and the Greensboro Stream ID & Mapping project.

John met his wife, Jennifer, in college and they got married a few years later. They have two girls, Reya (15) and Ella (13), and they keep their parents pretty busy between school, dance, and music classes and performances (and now learning to drive too). John and Jennifer enjoy music concerts, the arts, and traveling, taking trips whenever they can find the time while trying to visit as many national parks as possible. John tries to get out and play golf when he can, and is working on getting back into camping and hiking when time and weather allows.

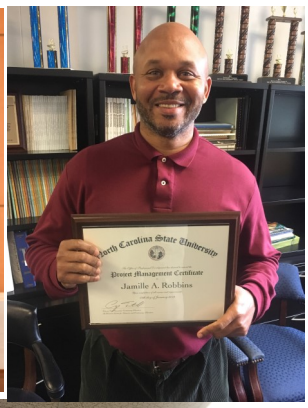
John and his family have lived in Garner for 18 years and try to stay active in their community. John has served on the town's Board of Adjustment, and Jennifer has been very active in their school Parent Teacher Association and is currently on the District 4 Board Advisory Council for the Wake County School Board vice chair. John has also been involved with the NC Association of Environmental Professionals (NCAEP) since he was in college, having served in all but one board position at one time or another. That affiliation drew him into the National Association of Environmental Professionals, where he helped chair the 2017 national conference that NCAEP hosted in Durham. In addition, he is a member of the Society of Wetland Scientists and is certified as a Professional Wetland Scientist.

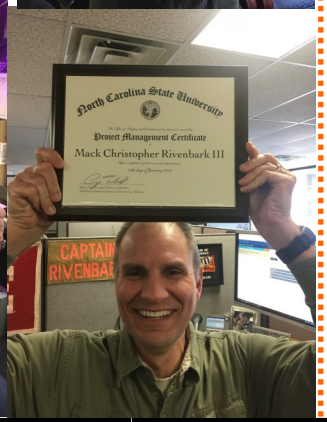
John is very excited for the opportunity to join the NCDOT family and learn from the many new colleagues he has gained.

RIBBON CUTTINGS

The Environmental Analysis Unit (EAU) recently celebrated several employees that successfully completed various training programs. Erin Cheely (EAU Environmental Coordination & Permitting (ECAP)) and Diane Wilson (EAU Public Involvement, Community Studies & Visualization (PICSViz)) both completed Level III Leading Managers which is a subset of the Legacy Leadership Program. Chris Rivenbark and Carla Dagnino (EAU ECAP), and Jamille Robbins (EAU PICSViz) received recognition for their completion of the Project Managment Program. All five of these employees graduated in a ceremony at the National Guard Armory.

Congratulations to all of you on this great achievement!!!! We look forward to you all putting in to practice the skills and techniques learned during these programs.





Congratulations to Carla Dagnino for being named EAU Environmental Coordination and Permitting (ECAP) Group Leader!!! Carla has over 27 years of state government experience and comes to the job with a vast wealth of knowledge in natural resources investigations, permitting and project management. In her previous role she served as the Western Regional Manager for the ECAP Group. Prior to that, Carla worked several years with the NC Division of Water Quality. Please offer your assistance to Carla as she transitions to her new responsibilities!!!

Please welcome Michelle Warf to the EAU Mitigation and Modeling Group. She comes to NCDOT from the Natural Heritage Program where she was a Senior Environmental Scientist/Data Manager. Prior to that she worked in the BP Command Center where she monitored subsurface movement of oil in response to the Deepwater Horizon spill. She has a wide range of GIS and modeling skills and she will be dedicated almost entirely to Project ATLAS (Advancing Transportation through Linkages, Automation and Screening.

Congratulations to Brad Chilton as he recently was promoted to an Environmental Program Consultant position within the EAU Mitigation & Modelling Group. Brad has been with the Department for almost 12 years and previously served as a Environmental Specialist II in this same group. Brad enjoys spending a majority of his free time outside, which includes fishing.

Please join me in wishing Brad much success has he begins serving in this new role!!!