

Ohio's Professional Soil Scientists

2020 Spring Newsletter Volume 47, Issue 1

Message from our president – Jeff Glanville

Greetings AOP members. Hope you all are well. I want you to know, again, that I am excited about being your president and working with executive council and our various committees.

With this issue of the Newsletter, we are expanding our reach across Ohio to all the Soil and Water Conservation Districts and Health Districts. Some of you are already members, you join us for meetings and field days and we interact with you as we search for the proper locations for on-lot septic systems. A number of you have expressed interest in learning more about soil science and other activities besides on-lot septic systems that we are involved in so we are taking this opportunity to begin this dialogue in a more formal way. More on this effort can be found in our new “Letters to the Editor” section.

During my other stint as president, I was selected for the work position I am in now, and we relocated to our current residence. Not sure any such major lifestyle changes will occur this time. One may hope not, as there's some bad stuff going on right now.

First, we need to remember that we are all critical. As soil scientists and soil professionals, we do so many things to promote agriculture and public health. From research and teaching to soil survey updates to consulting and site assessments, our work is critical to keeping our communities, our state, and our country moving forward.

My agency got the order to work at home starting on March 23. Some coworkers had been doing so for a few days already; what was official policy regarding telework was quickly modified, maybe even overlooked, as we all struggled to figure out what was going to happen.

I had never teleworked before. I've since found out that it is almost seamless. My work with the soils database, spatial data, etc. is the vast majority of my job. Unless we're in the field on land judging or soil judging preparation, resource inventory, soil survey reviews, etc., I am at my desk. I never really wanted to work at home, with just a tiny laptop screen. I found out very quickly how nice it is having 2 large monitors, which are now in my home office, along with 2 hard drives and a docking station. This setup and the communications technology we have now enable at least most of us to operate almost exactly as we do at the office. And we don't have to commute. I do miss the 1.6 mile walk to and from the bus stop every day.

Here's how my work day goes. Get up, have breakfast and 2 cups of tea, then go upstairs to the extra bedroom I made my office. I try not to wake my daughter sleeping in the next room. Forced to leave her 3 month position at a National Wildlife Refuge in Texas, she had little option but to return home. Of course we're thrilled to have her with us for a while. But as a bonus, this daughter

is the super-organized one. She quickly got bored, and started pushing us to clean up and throw out items no longer wanted. It must be a middle child thing.

It's almost unbelievable; a pandemic so widespread is something that most of our parents and even grandparents had never experienced. But there have been some wonderful things to come out of this.

We continue to talk about the links between our profession, education and training, internships, and employment. This stuff is obviously all inter-related, in a kind of feedback loop. And I know that we've been discussing this for years. I was about the last of the soil scientists hired to work in the initial soil survey program here in Ohio. That was in 1987. When the initial soil survey mapping was completed in 1992, some people thought that we were "done". In some respects, that was correct; we did kind of work ourselves out of a job. It probably wasn't warranted to have such a large field staff anymore, though most of us think that we are currently understaffed. With Ohio's 2 main government agencies no longer hiring big numbers of field soil scientists, the number of "support" positions, in the form of laboratory staff, soils professors, etc. dropped as well. This also led to the decline in the number of former agency soil scientists that were going into soils consulting.

It's not that we don't know what the answer is. We know, but like many things, there are no easy solutions. We want to elevate this discussion to where it's one of our main focus areas.

We recently lost 2 former members. Mike Patterson was a Wetland Team Leader with NRCS in northern Ohio. Prior to that, he was an RC&D coordinator, a soil conservationist and district conservationist, and before that was a soil scientist doing soil survey work in Nebraska. He fought cancer for a couple years. Here is a link to his obituary, <https://everloved.com/life-of/michael-d-patterson/obituary/>

Dr. George Hall was a long time professor of soil science at Ohio State. And I believe he was a charter member of AOP. Not sure I've ever used the word jovial, but that's how I first think of Dr. Hall. And I always thought he was a genius soil scientist and geomorphologist. Dr. Hall's obituary can be found at <https://www.schoedinger.com/obituaries/George-Hall-23/>. We have requested former colleagues, students and friends to submit memories, stories and photos and the response has been overwhelming, far too great to fit into this newsletter. We are creating a memorial tribute to Dr. Hall which will be available on our AOP website at <https://www.ohiopedologist.org/memorial.html>.

Again, I hope you all are well, and I hope everyone hasn't been too badly affected by our current situation. I hope your jobs are proceeding without significant economic impact. Let me know what's on your minds.

Winter meeting notes

The 2020 AOP Winter Meeting was held on February 27th at the Geological Survey's H. R. Collins Lab and Core Repository near Alum Creek Reservoir, north of Columbus. Thank you to our friends at ODNR for use of their meeting room and facility. Approximately 50 members, guests, and students attended the Winter Meeting. The theme of this year's meeting was Measuring and "Managing Organic Carbon for Soil Health."

President Duane Wood opened the meeting, thanking those in attendance, and introduced the first speaker Thomas Doohan. Thomas Doohan, master's student, School of Natural Resources (SENR), The Ohio State University (OSU), gave a talk entitled "Measuring Carbon Stabilization Across Ohio Soils."

Jeff Glanville (president-elect) introduced the remaining speakers, listed here with presentation topics.

Dr. Scott Demyan, assistant professor, SENR-OSU, "Long term effects of a Single Biosolid Application on Soil Organic Matter."

Dr. Christine Sprunger, assistant professor, SENR-OSU, "The Role that Roots Play in Building Soil Organic Matter and Soil Health."

Dr. Scott Demyan, assistant professor, SENR-OSU, "State of the Art in Soil Organic Matter Research and Modeling."

Dr. Brian Slater, professor, SENR-OSU, Classification and Mapping of Urban Soils at Ohio State University Columbus Campus."

Membership enjoyed socializing and a wonderful meal provided by City Barbecue. After lunch, the annual business meeting commenced. The 2019 minutes were reviewed and approved. The treasurer's report was also reviewed and approved. AOP's year-end total net worth was \$52,060 compared to \$41,653 from 2018. A fiscal review of the treasurer's books was conducted prior to the annual meeting.

The OSU Scholarship Fund was reviewed by Matt Sullivan. The fund paid out scholarships of \$2,000, \$1,500, and \$500 in 2019, leaving a balance of \$6,700. A discussion ensued concerning a recommendation that the AOP Executive Council review making a significant donation to the fund to be voted on at a future time by the membership. Larry Tornes moved that the AOP make a one-time donation of \$500 to the scholarship fund. The motion was seconded and passed.

An election of officers was held. Jerry Bigham (past-president), Mike Plunkett (newsletter editor), Jon Gerken (treasurer), and Terry Priest (member-at-large) terms have expired. Officer nominations were, Dan Michael (president-elect), Nathan Wright (member-at-large), Julie Weatherington-Rice (newsletter editor), and Rick Griffin (treasurer). This slate of officers was unanimously voted into office by those in attendance. Thank you to Jerry, Mike, Jon, and Terry for your dedicated service to AOP!

Brian Slater gave an update to the membership concerning the status of the National Collegiate Soil Judging Contest being hosted by OSU. The contest dates are April 23rd and 24th, with a banquet on the 21st. Brian requested AOP members volunteer to attend the banquet to interact with students, and also to assist on contest days as pit monitors and scorers. (This event was later cancelled.)

Jeff Glanville gave a quick overview of the past summer workshop and plans for the 2020 workshop. The Collegiate Soil Judging Contest provides great data and soil pits that are hoped to be utilized for this year's summer workshop potentially to be held in June. Details will be forthcoming. (The summer workshop has also been cancelled.)

Scott Demyan reviewed the results of the Qualtix Survey he developed and sent to membership and attendees of the 2019 workshop. Overall Scott found that responders were very positive and gave good suggestions for improvements and soil region specific topics for future workshops.

Matt Lane, Ohio Dept. of Agriculture gave an update indicating that two soil scientists left for other employment in the past year, leaving him as the only soil scientist. Jeff Glanville, Natural Resources Conservation Service, discussed personnel changes at the agency and potentially nationwide. The restructuring may include going from 12 to 7 regional offices. NRCS has hired two new employees, one in the Findley office, and Jessica Burns in the Zanesville office. Two resource soil scientist positions are vacant.

Just prior to the conclusion of the business meeting at 1:58 pm, Duane Wood passed the gavel to Jeff Glanville. Jeff expressed his appreciation for Duane's service as president, and said he would like to see the organization continue a successful summer workshop training program.



New contact information for our new treasurer

We have a new Treasurer, Rick Griffin. If you need to reach him, here is his contact information.

Rick Griffin, AOP Treasurer
937 Laurel Avenue
Zanesville, Ohio 43701
rgriffin1741@gmail.com

Future meeting announcements and cancelations

Events Cancelled

Executive council decided that we will not try to have a summer workshop this year. In addition to concerns about holding events, we also did not want workshop organizers, host landowners, or vendors to be put at risk. The idea was to have the workshop in the summer, at one of the practice locations for the national collegiate soil judging contest, which has also been cancelled. Obviously, we will need to wait to see if regional collegiate soil judging contests will be held this fall. If not, then the 2021 national contest may be postponed again as well.

It was also decided not to have the Central States Forest Soils Conference this fall. It was to have been Ohio's turn this year, but we asked Indiana if they would agree to switch with us, because of the time we needed for the collegiate contest. Indiana has decided not to have the contest this fall. It will be decided later if Ohio will host in 2021.

Journal Articles etc. of note

"The Uniformity of Nonuniform Flow"

If you have not looked through it I recommend reading the January 2020 issue of CSA News. The feature article and cover photo caught my eye, "The Uniformity of Nonuniform Flow". The Feature article by DJ McCauley discusses, at length and with wonderful photos, a topic near and dear to the



Dr. Glenn Wilson crawls out of a soil pipe into a gully, demonstrating the large size soil pipes can reach by internal erosion before they collapse.

hearts of many of us here in Ohio, secondary porosity, fracture flow and macropores. The article goes on to discuss the special section "Non-uniform Flow across Vadose Zone Scales II" in Volume 18 of Vadose Zone Journal which as of April 1, 2020 is achieved at

<https://acsess.onlinelibrary.wiley.com/>.

Since Ohio soil scientists, geologists and agricultural engineers have been studying and writing about this broader topic for more than 60 years, I was curious to see whose work from Ohio was referenced in the papers. The more

recent beginnings of Ohio publications on this topic were captured in "Till, a Symposium", Edited by Richard Goldthwait and others in 1971 (available on line at the OSU Knowledgebank at <https://kb.osu.edu/handle/1811/81923>). So I searched the references of the first eight papers, only to discover that this is all new work. The core of this work seems to postdate most of our efforts. So for those of us who have worked long and hard on this topic, here is more new information to absorb. I'm going to start by reading through the special section of the Vadose Zone Journal. I'm sure I will learn a lot and I suggest that you take the time to at least glance through it to see if there is information that may be applicable for your work as well.

"Water, Climate and Communications"

The excellent March 17, 2020 OSU Environmental Professionals Network Webinar titled "Water, Climate and Communications" is up on YouTube. As we continue to stress the importance of listening to and talking to our natural partners, this presentation gives us more guidance as to how we can reach out to others with messages that we want to promote but also to help us listen better to messages that we should be embracing. My daughter Susan and I watched this webinar on Zoom the morning it was presented. I'm pleased to see it's up and available on YouTube at <https://www.youtube.com/watch?v=Z10HRRL2uLg&feature=youtu.be>.

Rachel Warren's Thesis is on line

Modifying Ohio's DRASTIC ground water potential pollution model to account for karst limestone voids and sinkholes

If you remember from our 2019 Winter meeting, ODNR Geological Survey presented on both their DRASTIC mapping program and their sink hole inventory project. Sink holes are not included in the DRASTIC mapping but are critical components of ground water contamination because they can allow direct connection to the underlying aquifer. Rachel Warren undertook a pilot GIS mapping project for Geological Survey that took the baseline DRASTIC map for Delaware County and then superimposed the field located sink holes in the western part of the county, creating a new vulnerability rating for potential ground water contamination. I was fortunate to be part of her graduate committee and was amazed by the results of her project. We learned that most of the karst modeling systems that have traditionally worked in other parts of the world did not give us a realistic final map here in glaciated Ohio but she was able to develop her own program that created a very believable predictive screening tool. Once all of Ohio has a completed DRASTIC map and once all the karst features are documented, Geological Survey plans to create this combined coverage for all of Ohio where it applies. Rachel's work helped ODNR to vision how that mapping process could move forward with credible results. Rachel's thesis is on line and can be downloaded at https://etd.ohiolink.edu/pg_10?0::NO:10:P10_ACCESSION_NUM:osu1556987810146683.

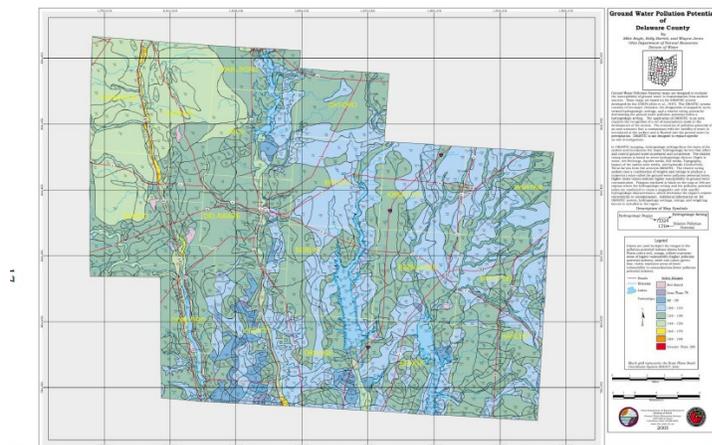


Figure 1-5: Ohio Department of Natural Resources Division of Geological Survey Groundwater Pollution Potential Map for Delaware County (Angle, Barrett, & Jones, 2005)

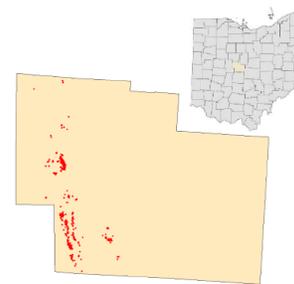


Figure 1-4: Known and Suspected Sinkholes within Delaware County, Ohio

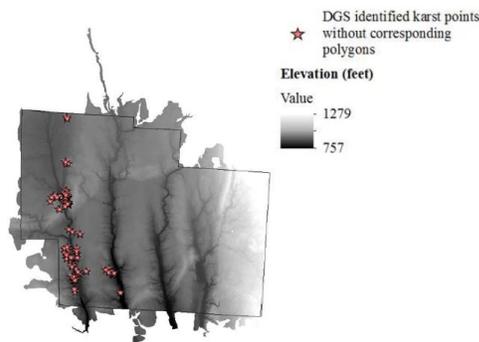


Figure 3-7: ODNR DGS identified sinkholes in Delaware County lacking manually identified extents.

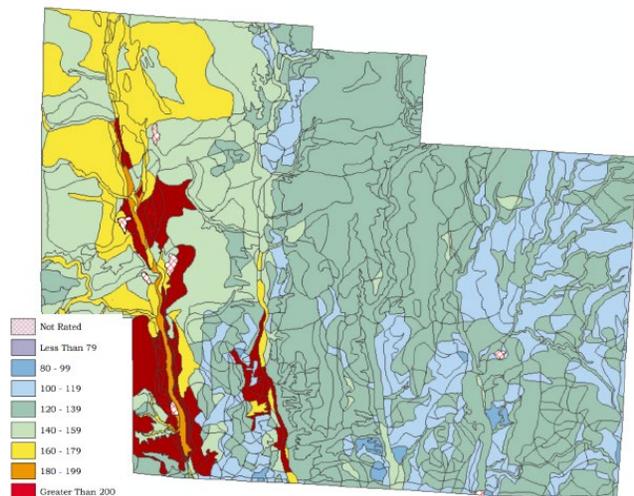


Figure 3-11: DRASTIC + K GWPP map showing increased sensitivity of both district units containing sinkholes and distinct units close to sinkholes

Letters to the Editor

With this issue of the Newsletter, we are reaching out to a much larger audience. We critically need to grow the number of Certified Professional Soil Scientists (CPSS) in Ohio if we are going to meet the needs of the state in the future. Since the typical pathway to reach Certification takes nine years (4 year undergrad in Soil Science or related field including five core courses, one year internship with a CPSS, four more years of experience with oversight from a CPSS and an examination), we are not quickly going to grow our ranks before those of us who are performing most of the work in the state decide we are too old or simply die off. Therefore, the Executive Committee has decided that it is important to reach out to you, our natural partners, staff at county soil and water conservation districts and public health districts to encourage you to cross train to take up the challenge as the older generation decides it's time to lay down our soil probes. We already have members of AOP from soil and water conservation districts and public health districts. Additional staff from those organizations comes to our annual meetings and/or field days for training. This Newsletter is being sent to each soil and water conservation district and public health district in the state, in hopes that the dialogue will be expanded.

This section of the Newsletter belongs to you, our members and future members, in the hopes that if we communicate with each other, we can find pathways to move forward to train the next generation. Please send your letters and/or responses to the Editor at AOPEditor2020@gmail.com and I will include them in upcoming issues of the Newsletter which is developed and disseminated quarterly.

Jeff Crisenbery jcrisenbery@fultoncountyoh.com **via** osu.edu
Dr. Julie Weatherington-Rice;

In March of this year I spoke with you at the Ohio Department of Health's Midwest Workshop. You shared about a plan for an outreach project through OSU and the Association of Ohio Pedologists to offer a program for Sanitarian's from Health Department's to obtain certification in order to do soils work such as is needed for onsite septic systems.

I was wondering if there is any more progress with development of this program and if there is a date that this program is set to begin? I work for the Fulton County Health Department and we currently do the soils work for septic systems in our Fulton County. My co-worker and I are very interested in such a program.

Please let me know if there is any update to this project status.

Sincerely,

Jeff Crisenbery, RS
Fulton County Health Department
PHAB Accredited Since 2018
606 S Shoop Avenue
Wauseon Oh 43567
Ph: 419-337-0915

Fax: 419-337-0561

www.fultoncountyhealthdept.com

Dr. Julie:

Thank you for the update. We will contact the Ohio Department of Health and remind them of our interest in this project and remind them that this will be a good thing for the household sewage program.

Did you mention that you are working on the curriculum for this project? Are there any classes that can be taken now that will be part of the curriculum?

Is there anything else that we can do to help move this project forward?

Thank you,

CPSS certification questions



Megan Conklin <mconklin@ccbh.net>

Hi Julie,

I saw your presentation this past March at the Ohio Department of Health's Midwest Conference. I am currently the Sewage Program Manager at the Cuyahoga County Board of Health and am interested in becoming a soil scientist. I find it to be a fascinating field and am aware of the scarcity of the profession in Ohio. I wondered if you may have some time to talk in the near future. I have reviewed requirements to become certified. I need to take perhaps 2 more related classes and need to find someone who will allow me shadow them so I can gain work experience. This will take a while for me, since I work full time.

If you are not the right person for these questions, but know of someone else I can ask, let me know.

Thank you!

Megan

Megan Conklin, BS, RS
Program Manager
Environmental Public Health Services
Cuyahoga County Board of Health
5550 Venture Drive
Parma, Ohio 44130

(p)216-201-2001 x1266

(f)216-676-1317

I subsequently had a long phone discussion with Megan who said she would be more than willing to organize a core group of staff from health districts in northeast Ohio, perhaps six counties, and try to arrange to train staff from all six districts as a team.

Julie,

Thank you, I am happy to have you share my contact. Right now, I am trying to set up the classes to take. The main problem I am seeing is the lack of soil scientist to shadow.

Megan Conklin, BS, RS
Program Manager
Environmental Public Health Services
Cuyahoga County Board of Health
5550 Venture Drive
Parma, Ohio 44130

(p)216-201-2001 x1266
(f)216-676-1317

From my graduate student, Rachel Warren. She is currently working in Virginia Beach, VA but wants to return to Ohio. She has family in the Cleveland area, the Youngstown area and a number of friends here in central Ohio so is willing to relocate to any of those three areas for training. She plans to come back this summer.

Rachel Warren <rachelpwarren@outlook.com>

My name is Rachel and I would like to begin a dialogue about mentorship for individuals interested in becoming certified soil technicians and providing septic siting services in the state of Ohio. I have a background in soil and water engineering and am intrigued by the seemingly untapped possibility of a career within the state for recent graduates and younger individuals. One of the incidents that drive my desire to start these conversations is during a conversation with a real estate agent friend of mine; a buyer found that they needed an existing septic system verification and potentially a new system siting. She asked if I had any insights into this work; knowledge of quality individuals to do the work; and expected costs or steps her buyer would need to take. This hit home for me because I had previously gone out for a day with Larry Tornes doing precisely this sort of work! When I looked into the list of individuals certified through the Department of Health who are doing this work in the state I was surprised to see that very few people were certified and their spread throughout the state was quite sparse. I recognized the importance of reaching out.

I believe it is important for individuals to fill in gaps and ask questions if they notice a potential problem. Because of this, I would like to take advantage of the vast amount of knowledge and experience of others to help find and connect people to meet a need in the state and would love to benefit from the experiences of anyone willing to speak or work with me!

So here are the first three requests for help in training. These are all highly qualified individuals who could, with training, make the next generation of first class CPSSs. If you are interested in working with them, you can contact them directly. If you are interested in helping AOP put together a training program, your letters and thoughts are welcome. This is your column.

Julie Weatherington-Rice, PhD, CPG, CPSS
AOP Newsletter Editor
AOPEditor2020@gmail.com

The Technical Corner

This is a new column open to any and all members who want to discuss technical issues, equipment, new methodologies, observations, any of the discussions that we would typically have at field days and training sessions which, because of the Covid-19 Pandemic, are not available to us at this point in time. The Executive Committee is hoping that this column will encourage the ongoing dialogue that has made AOP gatherings so very informative. As I get ready to take my Annual OSHA Refresher class....on line and Ohio begins to open up again with safety equipment and distancing, I thought I would start the column this time.

Personal Protective Equipment (PPE) for a Global Pandemic

As Ohio begins to open up, we are strongly encouraged to not intermingle with others without taking safety precautions. The Ohio Department of Health and our Governor DeWine recommend social distancing of at least six feet, face masks, gloves, hand washing and sanitizing while out in public and the field and after. As we have been researching the topics these last two months, my daughter and I have found that there is much information available on line and a significant amount of that information is not very useful and/or just plain wrong. Susan's daily read is the Centers for Disease Control and Prevention (CDC) web site, <https://www.cdc.gov/> and the Ohio counterparts at the Ohio Department of Health and the Governor's Office, <https://coronavirus.ohio.gov/wps/portal/gov/covid-19/home>. What we have learned is that we are in this for the long haul until we have either developed a herd immunity (60-70% of us have contracted and recovered from Covid-19 and/or a nationally distributed effective vaccine). In my discussion with my infectious medicine physician earlier this month I learned that they are hoping and praying for some form of a vaccine in a year but two years is probably more realistic. So we are going to be living with masks, gloves, hand washing and sanitizing for the foreseeable future. The following is a tutorial on mask, gloves, hand washing and sanitizers. It is as accurate as Rachel Warren, my daughter Susan and I can make it but we do want to stress that we are not health professionals.

Masks

N95 health grade medical masks are, for all practical purposes, not available. In addition, those that are, really are needed by health professionals and first responders. That leaves the rest of us to purchase masks, often home produced by someone's grandmother, mother, wife, daughter, etc., or make them by ourselves. Anyone can make a mask but not all masks are universally effective. We don't all have the same shaped faces. For instance, my face is very short and I have high cheekbones, so the rectangular pleated masks and those with high side pieces off the nose guard slide up under my glasses, into my eyes, and because they don't seal, push warm air up into my glasses and steam them up with each exhalation, not useful designs.

Masks are held in place by elastic over the ears, elastic around the head or by ties. Since elastic requires tension to hold the mask in place, it can create pressure points either on the ears or on your head. In addition, the over the ear design can interfere with wearing glasses and/or over the ear hearing aids. I wear both. Masks that tie behind the head are less painful and can be worn for longer periods of time without discomfort.

Masks can be made from tightly woven fabrics that do not stretch. 100% cotton is the best choice. Cotton is also the sewing thread of choice. It holds up to repeated washings (you should wash your mask after each wearing and/or dispose of it). ALL FABRICS should be washed and dried before you cut them to make your masks so they will not shrink after your mask is finished. You should

wash and dry your fabrics and your masks in the hottest water and drying temperature recommended for all the materials included in the mask. You can buy fabrics on line or in person at fabric stores, such as JoAnn Fabrics and Crafts, <https://www.joann.com/>, other craft stores and big box stores who carry fabrics, but you can also find good, strong cotton fabrics at quilting supply stores. It does not take much fabric to make a mask. The mask should be made of two layers of fabric and a filter. Susan recommends a pattern on one side and plain on the other so that if you take it on and off over the course of the day, you don't put the contaminated side on next to your mouth and nose by accident. You can cut two mask sides out of a "Fat Quarter" of fabric. A "Fat Quarter" is a piece 18 inches long by 20 or 21 inches wide, basically ½ yard of fabric cut in half down the middle. If you are going with the two-toned design from front and back, you need two "Fat Quarters" which will yield two complete masks.

It also needs a filter. The filter can be disposable, some people are recommending the cone shaped coffee filters for cone shaped masks which can be slipped in between the front and back mask covers or it can be built into the mask itself if the filter is washable. The two reusable and washable filters of choice appear to be the fusible interfacing Pellon, which tends to be as scarce as hens teeth (Susan finally found some at JoAnn) and quilt batting. Another option is Halyard medical autoclave fabric (which we have been back ordered for months). However, if you are using Halyard autoclave material, it CANNOT get wet or be ironed. It is cleaned in an autoclave or a very low oven, not a microwave, so it is best suited to a stand-alone mask or as an inserted filter that you would remove before washing. Next the mask has to be held in place with something. If you decide to use ties, you need something strong, durable and not stretchy. The best recommendations are grosgrain ribbon, twill tape or double fold seam binding. You should be able to buy these sewing notions ready-made or you can make the seam binding yourself. This is made by cutting a strip of cloth with the warp of the fabric 2.5 inches wide. You can also buy it precut, called jelly rolls or fabric rolls. You then fold the edges in at ¼ and ¾ wide into the center, press, and then fold in ½ again down the length and press again making a double fold. You need to sew the double fold seam binding shut.

The raw edges of your masks need to be finished. You can do that by sewing them together, front side to front side with an unsewn space needed to turn them. You can also finish the edges with a serger machine that some families have or by covering the edges with double fold bias tape. BIAS TAPE is not the same thing as SEAM BINDING. Bias tape is cut on the 45 degree angle across the fabric but it is also 2.5 inches wide and it is double folded. You slip it over the edges of the mask and sew it down to seal off the edges but, because it is cut on the bias, it will stretch around a curve. You can buy it premade or you can make it yourself. Because it is cut on the bias, it takes a bigger piece of fabric to make it. I would suggest starting with one yard but you can cut masks out of the two corners. There are a number of kits available to make seam bindings and bias tape. Most of them are out of stock. Susan did find a cottage industry in Texas who was printing them on a 3-D printer and she finds it works well with precut Fabric Rolls or Jelly Rolls for the seam bindings. We have not tried to make bias tapes with it yet.

Of course, you need some sort of a nose piece to hold the mask in place. The solution of choice appears to be a length of 16 gage wire that can be bought by the spool from a good hardware store. It's fitted into the mask over the bridge of the nose and sewn in place. If you use a nose wire, it's recommended that you not try to wash your finished masks in the washer and dryer but wash them by hand and air dry. If you are concerned about sanitizing the mask, if the fabric will take it, you can pour boiling water over the mask after it is washed. Never try to clean or dry your mask in the microwave, especially if it has a metal nose piece inside.

Make up some mock-ups first to see what fits you. Not all masks fit all faces. One of our young friends who wears glasses, has a full beard and plays an Irish fiddle, professionally, was on his fourth version a couple of weeks ago but still was not sure he had it right. Since these are practice masks, don't use your good fabrics. This is the time to sacrifice an old pillow case or an old plain weave dish towel. Our young friend was using the legs of his oldest blue jeans. And no, we have not solved the problem of a sweaty face behind the mask. If you come up with a solution, please let us know.

Here are some links to mask patterns and instructions. This following section is contributed to the effort by Rachel Warren and my daughter Susan Rice. This is what happens when you assign a task to two engineers who love to do research. They feel fairly comfortable with these references.



Olson



Surgical-style

Hey Mom and Rachel,

Here are the links that I promised both of you. Sorry that this was late Rachel, but I did end up finding a newer mask version the end of the list, that looks like it meets all the "requirements", be close fitting, fit the whole lower half of the face, and simple sewing.

Mom, sort through my links, Rachel's links looked great and helped explain more aspects and ways to make masks fit better.

Links from Rachel:

- ~[The materials that filter particles best in homemade masks via testing - Business Insider](#)
- ~[Face Masks For Us – A Can't Stop Columbus Project](#)
- ~[Cloth Face Masks Could Get A Boost From A Nylon Stocking Layer, Study Finds : Goats and Soda : NPR](#)
- ~[Aerosol Filtration Efficiency of Common Fabrics Used in Respiratory Cloth Masks | ACS Nano](#)

Links from Susan:

- ~[What to use to make a homemade mask for coronavirus and how to wear it - The Washington Post](#)
- ~[DIY coronavirus masks: Which pattern should you use? - The Washington Post](#)
- ~[Make your own fabric mask at home with this sewing pattern from a designer - The Washington Post](#)

[~Hard-Of-Hearing-Mask-Instructions.pdf](#)

[~41 Printable Olson & Pleated Face Mask Patterns by Hospitals](#) - Looks like a really good source.

[~Combined-Wright-Patterns.pdf](#)

[~How To Make a Denim Face Mask | JOANN](#)

[~I sewed and fit tested four different face masks... - YouTube](#)

[~Mask Alternative » Department of Anesthesiology » College of Medicine » University of Florida](#)

[~hc470-01-uk_powerguardtechnology_20152.pdf](#)

[~Second Life: Sterile Wrap Fashioned into Masks | Healthcare Packaging](#)

[~Mask DOs and DON'Ts » Department of Anesthesiology » College of Medicine » University of Florida](#)

[~Mask Tutorial](#)

[~PLEATED HALYARD Mask Tutorial/Pattern Gigis Fabric Shop FINAL](#)

This looks like the best mask to make at this point. (the PDF file labeled "DIY facemasks" here reproduced, is the research findings from Wake Forest along with crazy instructions, the Orange Dot Quilts version is the same thing and is a video tutorial.)

- Use two layers of high grade, dense weave, cotton fabric, or one layer of basic cotton material with an inner layer of flannel
- If you have access to a local quilting shop or online store, they will know what is meant by high quality "quilter's cotton"
- The light test is pretty good at determining if a given material is suitable. If held up to a bright light, it shouldn't be easy to see light coming through.
- Tie-on is better than earloops for better fit, but many are using ear loop design for easier donning and doffing
- Don't touch your face after positioning the mask!
- But don't touch the mask face when removing! Touch by straps or loops when removing, then wash or sanitize your hands
- Let the mask dry after wearing; moisture from your breath makes them less effective. Wash them in a conventional way and air or machine dry. We are hoping to test the longevity of cloth masks after multiple washings but don't have that data yet.
- No seams across the breathing area, but a pocket for insertion of additional filter material between the cloth layers is optional. We didn't find these additional materials to help, and sometimes made it harder to breathe through, but others have had some success with these designs.
- No mask is as good as staying home, socially distancing, and using good hand hygiene.

DIY Face Mask



Supplies:

- *Body of mask - 11" x 14.5" rectangle of a tightly woven fabric i.e. lawn, batik or twill seem to be the winners!
- *To make ties: if you have a serger - cut 1 ½" by width of fabric. Fold in half & serge to 3/8" - OR - cut 2" by width of fabric - fold raw edges to center then fold in half again & edge stitch entire length. Ties should be about 30" long
- *4" Twist tie (from bread or garbage bags) or coated wire i.e. floral wire or pipe cleaners

Fold rectangle in half, bringing short end together. Stitch or serge 3/8" seam. You have formed a tube. Mark with a pin, the fold on the opposite side. See below:



Still with right sides together, fold the tube so that the seam just stitched ends up in the middle of the tube & matches where you marked with pins, and press seam open or to one side if serged. See pic:



With seam still in the middle, draw a mark 2" in from each side and from the bottom & top; join the two marks with a line that forms a 45* angle across corner. Do this in all 4 corners, stitch on and press again. Turn the mask right side out below:



Add wire to the around the entire



middle edge of



top of the mask and top stitch the mask.

DIY Face Mask

Pg 2

Bring the bottom & top edges of mask to middle, overlapping the top over the bottom & press. Fold each of these sections in half & then manipulate the corners to form a 90* angle. Do this on all 4 corners. See below:



Fold each side inward twice to form a casing for the ties. Pin or clip then stitch through all layers, backstitching at edges. See below:



Insert ties into casing & secure at midpoint.



[~Testing Shows Type of Cloth Used in Homemade Masks Makes a Difference, Doctors Say | Wake Forest Baptist Medical Center](#)

[~BEST FIT MASK | DOCTOR APPROVED | EASY DIY face mask designed by ENGINEER. Simple Mask by Dora Cary. - YouTube](#)

[~FREE Simple Mask Pattern — Orange Dot Quilts](#)

Cheers,
Susan Rice

PDF and YouTube Links from Susan

<https://eunoiapatterns.com/product/better-together-mask/>

<https://www.youtube.com/watch?v=DZBbkn-g-vE&t=1232s>

https://www.youtube.com/watch?v=UaZBm_V8Flg

Gloves

While some basic masks are beginning to be available as cottage industries open up, medical grade disposable gloves are still as scarce as hen's teeth. In addition, once you have taken them off, they are almost impossible to put back on and usually your hands are so sweaty that you can't get a new pair on either. We have found several work arounds that have proved to be not only satisfactory but also available. Our gloves of choice are the knitted work and gardening gloves that have some form of vinyl, neoprene or nitrile covering on the palms and fingers, making them waterproof and virus proof on the parts of your hands that will hold on to things like door knobs, shopping carts, etc., but are possible to not only take off but put back on over the course of the day. Not only that, they are washable and reusable. We have found them at stores wherever gardening, hardware or construction materials are sold. Generally they are less than \$10.00 a pair. Sometimes they are sold in bundles.

Another option is the "Playtex" cotton knit lined vinyl gloves that your mother used to wash dishes and clean up the kitchen. These are still available wherever cleaning supplies are sold and come in a variety of sizes. They also have the advantage of being washable and reusable. All of these gloves should be washed by hand and air dried.

Hand washing stations

Because of social distancing, we find that we need the ability to wash our hands in the field. We always did but we usually just rinsed the mud off with our water bottle, shook our hands and wiped them on our pant legs. Now we have to be concerned with the Coronavirus which takes soap and water. A handy hand washing station can be created from the following items:

A plastic 1-2 gallon utility bucket

A grocery plastic shopping bag without holes

Repurposed ½ and 1 gallon milk jugs, 2-liter pop bottles, 1 quart screw top ½ and ½ bottles, etc. to hold water.

Something to hold the water jugs in, like a milk crate, so they will not spill

A container of soft liquid soap, either hand soap or dish washing soap

Something to dry your hands on

Line the bucket with the plastic bag. Add enough water to wet your hands. Add the soap and wash your hands for 20 seconds. I usually sing the chorus to “Country Roads” because it makes me smile but many song choruses work. Pour out the wash water. Add fresh water to rinse, poring over your now clean hands. Dump that water. There should be no problems with disposing of the wash water on the ground as those soaps are environmentally friendly. That may not be the case with antibacterial soaps. You need to read the labels. Wipe your hands and if using a reusable cloth, put that into the plastic bag to take home to launder. Add a new plastic bag for the next washing event.

Hand sanitizers are also an option but they continue to be hard to find. In addition, they are predominately alcohol or hydrogen peroxide based and the alcohol based ones are flammable, both can dry out your hands, causing skin cracks.

Wiping clothes

Paper towels are still in short supply. In addition, they have to be disposed of because they cannot be recycled. For hand washing stations away from home, we recommend cloth because it does a better job of drying and you can launder it and reuse it. The cloth does not have to be large; it just needs to be absorbent. The microfiber cleaning cloths sold at auto parts and hardware stores work well. Old or inexpensive wash clothes, hand towels, dish rags and kitchen towels also work well. These can usually be picked up from dollar stores or thrift shops. Since they will probably get muddy, you don’t want anything good. My favorite wiping cloth is an old cloth baby diaper. They are just the right size, they are absorbent, they can be laundered in hot water and bleach and they last forever. While we stocked up again when we were caring for my husband Ed, I have cloth diapers that I repurposed 35 years ago that are still the best cleaning rags I have even found.

Disinfectants

The CDC tells us there are four major reliable disinfectants. They are soap and water, bleach, isopropyl alcohol and hydrogen peroxide. Only soap and water are safe to put directly on your skin. Bleach should be reserved for laundry and for diluting to clean surfaces. If using for surface cleaning, read all the instructions before using and wipe after with plain water. Bleach is hazardous and toxic. While isopropyl alcohol and hydrogen peroxide are slightly less dangerous than bleach, they are still hazardous and toxic and need to be used carefully, following all instructions.

When I come home from being in public, I head directly to a bathroom to wash my hands with soap and warm water for 20 seconds and then fill the sink basin with warm water and squirts of soft hand soap or dish washing liquid soap and wash my mask and gloves, again singing my 20 second chorus, rinse them out and hang to drip dry so they will be ready when I need them next. I generally have several sets going at one time.

Additional warnings

This is summer heat already. Make sure you have plenty of fluids to stay hydrated. Water is best. Your field supplies should include a tube of hand lotion because all this washing and glove wearing is going to dry out your skin. You also need sun screen, and with tick and mosquito season upon us, you need a good insecticide. You don’t want to dodge Covid-19 only to come down with Lyme’s Disease or St. Louis encephalitis. Remember a hat, protective shoes; watch out for snakes, spiders,

ants and bees. If you have allergic reactions to ant bites and bee stings, carry medication with you. Stay safe in the field. Partner if you can.