NHWC Transmission

Summer 2021

A well-placed gauge on the "safe side" of the bridge with a sidewalk reduces risk to personal safety during maintenance

1 BEST PRACTICES FOR MEASURING STAGE

Best practices for the effective placement and selection of stage sensors based on Brian Iserman's (Transmission Co-Editor and Hydrologist at JE Fuller) experience in the American Southwest.

9 INTERVIEW: EES, INC. NON-PROFIT FLOOD WARNING SERVICE

We interview the President of EES, Inc., a not-for-profit corporation built from volunteers to serve rural New York communities since 1982.

17 NEWS, WEATHER AND EVENTS

The NHWC webinar series is a success and the Texas Workshop continues as planned. Drought continues in the West while Texas sees a wetter than normal summer. Transmission articles and NHWC volunteers are needed!

BEST PRACTICES FOR MEASURING STAGE

by Brian Iserman, P.E., CFM / NHWC Transmission Co-Editor / JE Fuller

Figure 1 - Streamgauge sited on the "safe side" of the bridge with access via sidewalk

The purpose of this article is to document some principles I have learned for effective selection and placement of stage sensors. It is assumed that the best geographic location to collect stage data based on the flooding source and impacted areas has been selected. The location will come with its own set of limitations which will drive the stage measuring station design and sensor selection.

Stage can be measured with two categories of sensors – contact and non-contact sensors. Contact sensors include those that contacts the water. These include pressure transducers, bubblers, acoustic doppler sensors, and shaft encoders. Non-contact sensors, as the name implies, include sensors that measures from a distance (usually directly overhead) using radar and ultrasonic technologies. Cameras can now be added to the list of non-contact sensors, with some pioneering work being done to use software to translate between imagery and stage. This discussion is limited to the sensors that I personally have experience with, which excludes acoustic doppler and cameras.

Contact Sensors

Contact sensors are usually needed when there is no existing infrastructure such as a bridge to support a non-contact sensor, or for cases where constructing a support structure is not feasible or practical.

Shaft encoders, and their predecessor chart recorders, are the oldest technology used to automatically collect stage data and are often referred to as float gauges. These are the classic gauges that require a stilling well with a float, chain, and pully mechanism (see Figures 2a and 2b).

Float gauges seem to have gone out of style, but are still a valid solution for certain situations, including those in which ice is expected (see Figure 2c). These long-lasting, relatively inexpensive sensors provide plenty of accuracy and resolution where precision is needed, and they do not require periodic recalibration. Once installed, they either work or they do not work.

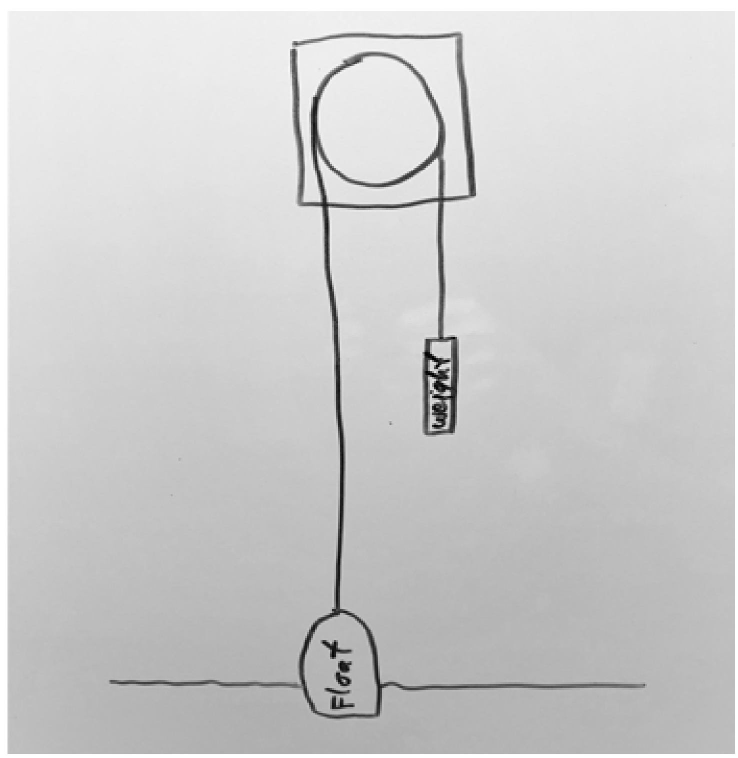

Figure 2a - Simplified drawing of a shaft encoder "float gauge"

Figure 2b - A modern shaft encoder kit

Figure 2c - A float gauge with stilling well at a dam seepage monitoring station – Black Canyon Dam, Arizona

The next category of contact sensors measure the weight of the water over the sensor orifice – these include pressure transducers placed in the water, and bubbler gauges which have the pressure sensor located out of the water.

Pressure transducers have sealed wiring and electronics that are submerged in the water (see Figure 3a). These sensors require a tough, submersible signal cable which allows the data logger to supply power to the sensor and to read the sensor output. If the sensor is vented to the atmosphere, the submersible wire bundle also includes a very small vent tube, which keeps the sensor referenced to atmospheric pressure, so the sensor value reports only the pressure due to the depth of water over the sensor without the weight

Figure 3a - A vented pressure transducer

of the atmosphere.

Non-vented pressure transducers require a post-processing step involving a second external barometric pressure sensor input to account for the weight of the atmosphere over the sensor. Vented pressure transducers generally seem to have higher reported accuracy and precision than do non-vented transducers. There are non-vented pressure transducers which do not need a signal cable because their logger and battery are housed in one compact unit (see Figure 3b). The advantage to these is that installation is very simple compared to cabled pressure transducers. The disadvantage is that these do not lend themselves to telemetry – which is central to flood warning systems.

Bubblers employ a non-submerged pressure sensor to measure water depth over the sensor's orifice (see Figure 4a). The orifice is simply the end of the bubbler line. This type of sensor relies on constant airflow supplied to the bubbler line. The pressure sensor measures the pressure of the air in the line. A bubbler tube which is out of the water, simply returns atmospheric pressure, and a water stage of zero. However, as water depth over the end of the bubbler tube increases, the pressure inside the tube increases. Early bubbler gauges relied on airflow supplied by bulky (and heavy) pressurized air tanks which needed to be replaced periodically (see Figure 4b). Systems in use today employ compact electric pumps coupled to very small air tanks to supply the constant air flow (see Figure 4c).

Figure 3b - A non-vented pressure transducer without submersible signal cable

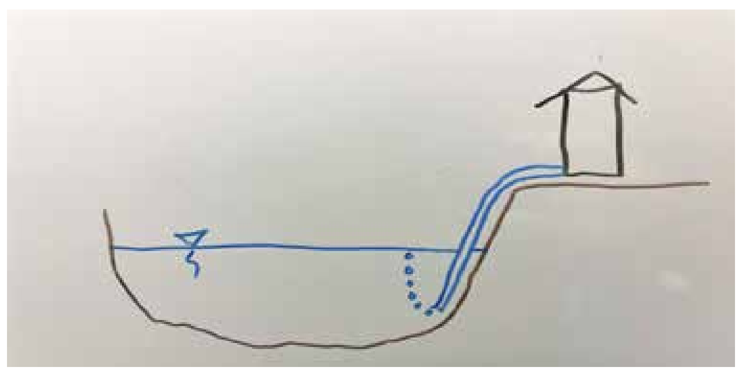

Figure 4a - Bubbler Schematic

Figure 4b - Old style bubbler with air cylinders

Figure 4c - New-style self-contained bubbler with built-in pump and air chamber

Which of these two pressure sensors you specify will depend on your site constraints, budget, and personal preference as the cost and power requirements of the bubbler systems come down. Both systems require conduit to protect the submersible signal cable and bubbler tubing, and both systems are impacted by sedimentation to some degree.

The bubbler systems are relatively more expensive than submersible pressure transducer systems, but they do better in areas subject to periodic sediment deposition. Additionally, because of their design, bubbler systems are easier to maintain and repair since the sensor is easier to access. Pressure transducers are still a very good option, especially as their durability and sensor stability have increased, and considering their very low power requirements and relatively low cost.

Non-contact Sensors

Radar sensors (see Figures 5a and 5b) have come of age in terms of accuracy, stability, range, power consumption, and cost. While the sensor cost is generally more than a pressure transducer, the installation costs are generally less at bridge locations than for most traditional contact sensors. Often when looking for stage measurement locations within a certain watershed, we will first identify bridge locations that are closest to the watershed concentration points of interest. We are sometimes willing to give up a little warning lead time in favor of the reliability and lower long-term maintenance costs of radar sensors over contact sensors.

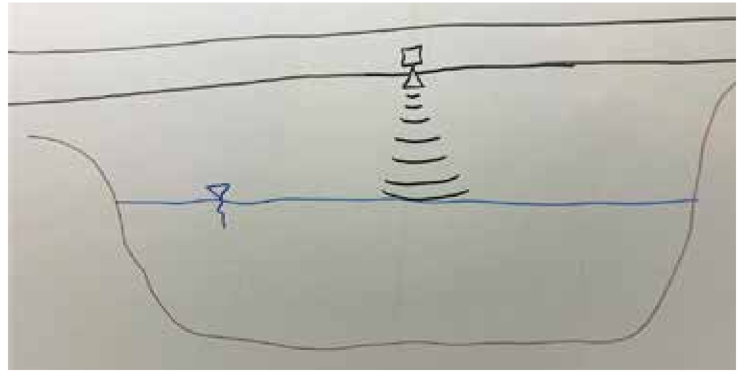

Figure 5a - Radar Sensor Schematic

Figure 5b - 3 different radar sensors

Ultrasonic sensors were popular before radar sensors became more widely available. They have since become less commonly used in my experience, due to their relatively lower reliability and performance compared to radar sensors.

Sensor Placement

Finally, a note on sensor placement, which I think is as important as the sensor selection. The most important factors to consider, once the location and sensor has been selected, include hydraulic control, safe access, and sensor protection.

Hydraulic control is important to consider if a stage and/or discharge rating curve is going to be established. I plan to write a follow-up article on the topic of rating curves, but I would emphasize that the value of a stream gauge for flood warning purposes is much greater for communicating the downstream flood threat if a stage and/or discharge rating curve can be established. And once established, discharge information will be much more valuable information than stage only.

Hydraulic control is established by stable features or channel reaches that provide predictable hydraulic behavior through a wide range of discharges. For example, weirs, flumes, and lined channels are common features which support good hydraulic control. For flood warning purposes, we do not often have easy access to weirs and flumes, so we rely on the most easily predicted hydraulic characteristics associated with open channels, bridges, and culverts. Simply put, the best placement of a sensor in or near the hydraulic control feature or channel reach is where the discharge is most easily predicted (see Figure 6a)

Figure 6a - Hydraulic control for flood warning includes straight natural and constructed channels, at-grade road crossings, bridge sections, and even rock outcrops and sills

We will often rate safe access to the sensor for purposes of installation and maintenance higher than hydraulic control. For example, if the best hydraulic control for a bridge section is the upstream side of the bridge, but there is a nice wide sidewalk on the downstream side only, it is an easy decision to place the sensor on the downstream side of the bridge (see Figures 1 and 6b). The principle to impart is that in the long-term, you will probably end up with a higher value stream gauge (and long-term data record) if it is easy to access for maintenance (not to mention the immeasurable value of keeping maintenance personnel safe).

Figure 6b - The safe side of a bridge

Figure 6c - Rigid conduit provides long-term protection for submersible signal cables and bubbler lines and easy access for maintenance

Protecting the sensor is as important as the other two factors noted here for obvious reasons – we want the sensor to survive to send us stage data. To keep this article short, below are some things we do to keep stage sensors from damage attributable to the environment. The environmental threats include vandalism, exposure to sun, heat and cold, and exposure to the forces due to high flood stages and the sediment and debris that are carried along by the current (see Figure 6c for a good example).

Each of these factors will carry a different weight for a given location. In general, here are some things that can be done to best mitigate these factors:

- Use rigid conduit instead of flexible conduit,
- Route conduit out of site and on the lea side of rock and obstructions,
- Keep conduit tight against its supporting substrate,
- Secure conduit and housings with concrete anchors and heavy tower rigging strap (light strap can be used for conduit not subject to high stages and velocities,

- Unistrut driven to refusal can be used to anchor conduit in sand-bed channels and banks,
- Avoid using caps at the end of conduit where a pressure transducer is placed – caps trap sediment (instead use a bolt through the end of the conduit to block the end of the conduit), and
- Mount radar sensors inside a sturdy, vented housing (even though they can be mounted directly outside).

For more information on these, please email the author at: brian@jefuller.com

CALL FOR ARTICLES

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practices, technologies, and tools used to gather and disseminate real-time hydro-meteorological data

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practices, technologies, and tools used to get the right real-time data and information to the right people for the right response

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practices, technologies, and tools used to model, predict, and analyze hydro-meteorological events and to support decision making for emergency response and floodplain management

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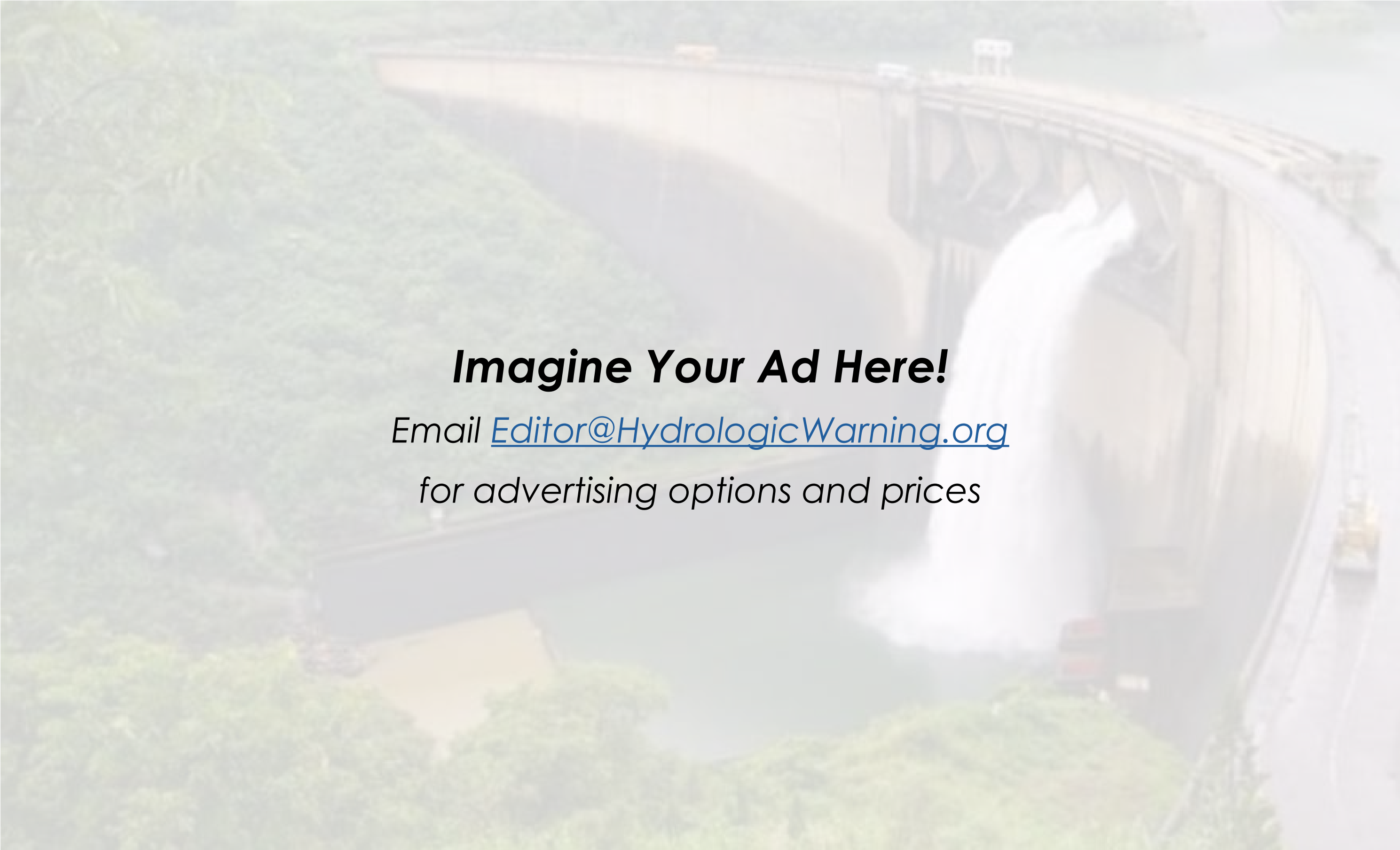
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INTERVIEW: ENVIRONMENTAL EMERGENCY SERVICES

with Tim Marshall / Director of Public Safety, Steuben County / President of EES, Inc.

by Lee von Gynz-Guethle, P.E., CFM / NHWC Transmission Co-Editor / WEST Consultants

Environmental Emergency Services, Inc. (EES) is a not-for-profit corporation with a mission to collect rainfall, climate and river data and to use this information to assist Emergency Management Offices in determining areas of concern for potential high water or drought problems in Chemung, Schuyler and Steuben Counties. These counties are located in the Chemung River Watershed in New York State (See Figure 1 on the following page).

You've been with Steuben County Emergency Management since 1997 and are also the President of Environmental Emergency Services Inc. Can you share your background and discuss your roles?

I started as a junior firefighter at the age of 14. I took training classes and while I was in the fire service, I graduated with an Associate's degree from the local community college in Fire Protection Technology. I went to the SUNY Empire State College, was hired at Emergency Management, and got my Bachelor's in Human and Community Services with a focus in Emergency Management.

I started as the Deputy Director of Emergency Management in 1997 and become Director in 2012. I currently serve as the Director of Public Safety, which includes Emergency Management and 911. I'm also the President of Environmental Emergency Services, Inc. (EES), the not-for-profit corporation that runs the regional flood warning service. EES includes emergency management from three counties, fire agencies, the NY Department of Environmental Conservation, National Weather Service, Army Corps of Engineers, and other interested agencies. My roles at each organization tend to blend.

Tim Marshall, Director of Public Safety, Steuben County and President of Environmental Emergency Services, Inc.

Can you give an overview of the region?

Steuben County is the 10th largest county in NY. It's just over 1,400 square miles with a population of 98,900 people. Our elevation ranges from 913 ft MSL in Corning, to over 2,300 feet west in Allegany Plateau. Corning and Hornell have advanced industrial manufacturers, while beyond those towns it is very rural and often impoverished.

Do the other counties (Chemung and Schuyler) that are part of the network have similar geographies and demographics?

Yes. Chemung is smaller than Steuben, but about the same population mostly based in Elmira. Schuyler County is one of the smallest counties in NY and very rural, with their main city being Watkins Glen. Watkins includes the Watkins Glen International, which is part of NASCAR. On one weekend every year they have up to 100,000 visitors.

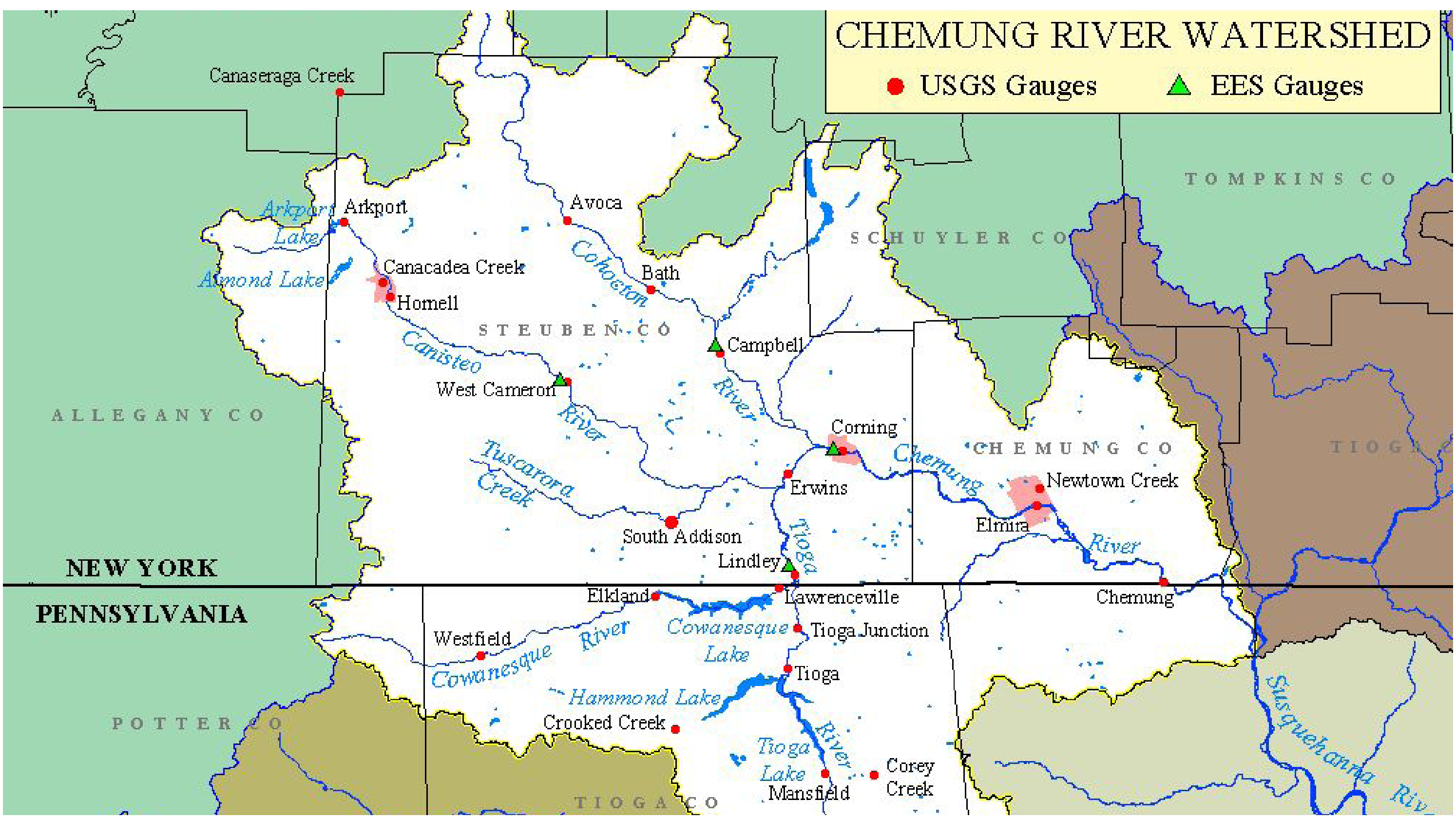

Figure 1 - Chemung River Watershed

So you have a few cities with digitally connected populations and rural areas where the population may not have internet or cell service?

Exactly. In the cities there's strong fiber connected Internet. Rural, mountainous areas where flash flooding dominates may not have Internet service. They get their information via cell phone, television, or radio. Many of these areas struggle for cell coverage.

What prompted the creation of EES and why did you choose a volunteer, not-for-profit approach?

Hurricane Agnes and Eloise in 1972 and 1975 got EES started. The Counties and manufacturers had minimal warning of impending floods from the National Weather Service because communications and technology wasn't great back then. Phone lines went down, etc. and there was loss of communication. In response, an engineer with the NY State Department of Environmental Conservation Division of Flood Engineering, engineers at Corning Incorporated (a glass manufacturer), the school district Superintendent, and members from the Emergency Management District designed a system and submitted a grant in the late 1970's early 1980 through the Appalachian Regional Commission and in 1982 EES became a Corporation. They installed six or eight stream sensors, wrote code, and used the ALERT system for data transmission. They had a central collection point with a computer and modem that collected the data and printed it out.

At that time, they needed volunteers to go and check the computer periodically. As for forming a 501c3 organization, it was probably the simplest path and allowed them to apply for grants that a government entity couldn't receive. With a government entity, it would have depended entirely on revenue and taxes. Over the years, we've been able to receive consistent funding from the Counties and Local Municipalities while leveraging grants to enhance and expand our network.

Can you talk more about funding?

The organization's base costs are funded through municipal contracts to provide flood warning services to their community. We get the most funding from counties, then cities, and finally a bit of funding from the larger towns. From the small, rural communities we get $500 to $1,000 per year. It's not a lot of money,

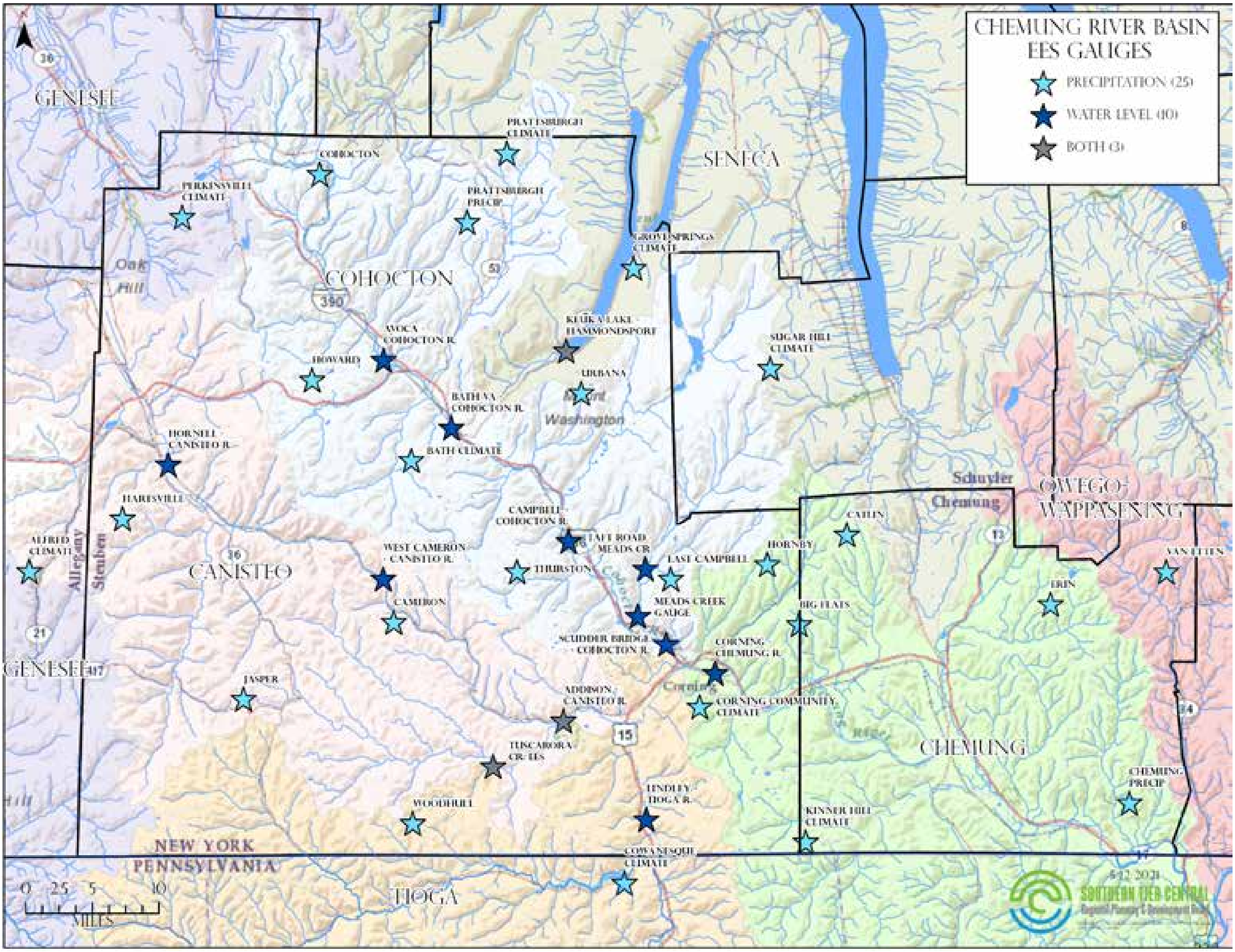

Figure 2 - EES Gauge Network

but we run 35 Precipitation Gauges, 12 stream sensors and 10 full climate stations for a total of 167 sensors on a budget of approximately $30,000 a year. Then we have supplemental grants to fund expansion or unique projects. For example, we've had success receiving funding to add stations through FEMA's Hazard Mitigation Grant programs in the past.

What does that base cost include?

That includes labor, materials, internet, and licensing costs associated with operations, maintenance, and equipment upgrades. Everything. Most of our costs are data transmission (Data Wise) and radar rainfall (Telvent / DTN) software licenses.

How do you use the radar product? Do you have quality issues in the mountains?

The radar product is a national product (i.e., not locally gauge-adjusted) we use it to monitor and check against the gauging network. Having that radar product is important because it could be raining on one side of the hill and not on the other side, entirely missing our gauge network. That said, we sit between the Binghamton NWS Office, Buffalo NWS Office, and State college NWS Office. So sometimes we don't see rainfall on the Binghamton radar but it shows up on the Buffalo or State College radar. So you have to juggle that information sometimes.

What were the initial components of the system and why?

We started with adding redundant gauges at existing USGS sites. The idea was to ensure that locally we had information available immediately versus having to wait for it to go through the USGS and NWS and back. We also had rating curves at those locations and they were accessible, so it was fairly simple to start there. Given technology today, that approach maybe wouldn't be necessary now.

We also built a radio network using the NY State Department of Environmental Conservation's (DEC) radio network to tie into the U.S. Army Corp of Engineers and provide backup communication between DEC, NWC, and EES. Today this system is not as important with the enhancements of communications, but it does serve as a backup in the event of communications system failures.

Volunteers are a key component of your system. Can you share how that works?

Our volunteer needs have changed over the years. When we built the system, we needed people in a physical location to collect, review, and transmit data. We no longer need people to physically staff an operation center since we can monitor it at our desk. We used to have individual rain and stream gauge readers in the community that would report daily, even if there was no precipitation. Often these individuals owned their own gauges at their home or business.

With our current network, we don't really need that data, though we do still use CoCoRaHS to collect information from some gauges for historic purposes. Years ago, we had on average 60 volunteers between the Board, operations, and field. Now we're at around 30 volunteers.

Is maintenance handled by volunteers?

Yes. Our maintenance guy is a retired manufacturing engineer. He had taken a job driving school buses after he retired and in between his morning and afternoon runs, he did gauge maintenance. Now he's fully retired and at minimum, he goes out twice a year in Spring and Fall, checks all the gauges, and winterizes them.

Maintenance is critical. It means making sure that somebody is going out a couple of times a year and checking the system, cleaning the system, making sure the components are working correctly, and calibrating those systems for accuracy. Some of our equipment has been in place for a long time and as I say, we started out with the old Alert stuff, and we've kind of migrated a little bit, but I bet you we've still got Alert components that are out there that are part of the original system.

How is the information you collect used to communicate with the public?

Our system was built to first provide information to the Emergency Management offices of each county. It's crucial to the emergency managers because it allows us to have that information immediately so we can make decisions on whether to alert the public. We use social media and a proprietary product called Code Red to notify the public via cell phone.

Secondly, the system provides information to the DEC, the USACE, and the NWS to assist them in making decisions on regional warnings and alerts. There were times in the past where we saw things on our system that triggered us to call the NWS and ask if they're aware, only to find out they were not because they missed it or it didn't show up on the USGS gauge. Now that we have our data feeding into the NWS system, it's become crucial to them as a backup and to provide more information in some areas. Interoperability is key, so that we maximize the value of the system.

Presumably, because each of the County emergency managers are also volunteers for EES, they understand the data, warnings, etc. very well. Does that help streamline the warning process and make communication more effective?

Absolutely. We can sit in meetings, share data, and communicate very effectively across the region.

EES can also issue their own forecasts. Can you talk about how that is accomplished?

Years ago, the DEC flood engineer developed formulas for us to estimate flow and stage within our system based on a particular upstream stage and time for the point of interest downstream. Almost every time we've used that method, we've nailed it. In 1996, they were looking to evacuate the city of Elmira because they thought that water was going to come over the flood protection system. They had the data and forecast in front of them, and the County Executive made the decision not to evacuate. It hit exactly where the forecast said it was going to go and then it dropped off and went down. Having a history of using this tool in our region, together at the same table with everybody, is very beneficial. We also have the capability of running a flood model, but we haven't plugged all that information together because our Excel-based tool has worked great for years.

Our flooding history has changed over the years. We have seen more damage caused from flash flood events than the riverine events of the past. This has been due to local storms off the mountains or remnants from tropical depressions. Because of that and our geography, it is relatively straight forward to estimate conditions from basic routing and rating curves.

"Maintenance is critical. It means making sure that somebody is going out a couple of times a year and checking the system, cleaning the system, making sure the components are working correctly, and calibrating those systems for accuracy. "

Tim Marshall, President, Environmental Emergency Services

Also, for flash flooding, time is important. I'm more interested in what's going on at the precipitation stations than the stage and flow gauges, because I can correlate precipitation to where flash flood threats are going to be. For example, if we've had three inches of rain in the last hour at a particular gauge, I can send a warning to a particular area to be prepared for flooding within 20 minutes. If I've got a series of thunderstorms moving through, I'm watching precipitation gauges. Once our gauge network hits an inch an hour it sends me alerts via text message so I'm aware and can make decisions ahead of time. When we have more than an inch an hour we call the local fire and highway departments and put them on standby. We can also notify residents.

For a community that is just getting started, let's say they don't have a flood warning system. What would be their first step in developing one? Obviously that answer will vary somewhat on their characteristics, but what are your first thoughts?

Don't reinvent the wheel. If there are existing resources like the USGS, can you leverage those? Can you partner with them to add sensors if useful? Start small. Technology is so good now that between bubblers, sonic, and radar, you've got a lot of capabilities. Consider whether local amateur radio operators (ham radio) can build the receiving system and then all you have to do is place a sensor with a radio transmitter. Our system is built off the amateur radio network. We have three tower sites in our region that receive the data and then that data is transmitted to a central collection point where the computer collects it and transmits it to the internet while being backed up on a computer in Corning and Bath and then by DataWise.

So, start small and leverage existing resources, and don't discount volunteer resources?

Start small and use the resources you have. Consider your Emergency Management and Environmental agencies. Bring in locals that have a vested interest like amateur radio operators, farmers, and manufacturers. We have a lot of farms that we've partnered with and many of our gauges are on private farmland because they appreciate the precipitation data just as much as we do.

"Start small and use the resources you have. Consider your Emergency Management and Environmental agencies. Bring in locals that have a vested interest like amateur radio operators, farmers, and manufacturers. "

Tim Marshall, President,
Environmental Emergency Services

So broadening your user base is key? Get as many people using it for as many purposes, because that's going to drive support and increase the number of people telling local leaders that they want and need this?

Absolutely. Also, consider operating as a non-for-profit so you can go after those grant funds and later contract with local municipalities. Start small with a grant and then once you get interest, request support from the municipalities. Make sure that everybody who's got an interest is involved.

Environmental Emergency Services

For More Information Visit:
https://www.highwater.org/

CALL FOR VOLUNTEERS

Help Make the NHWC a Success!

The NHWC is looking for new members to become active in the organization at all levels. Regardless of your experience, we encourage you to get involved!

We are in immediate need of help with:

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Newsletter Editing & Layout

Training & Professional Development Committee

Conference Planning

To learn more, contact the Vice President at:

brad.heilwagen@woodplc.com

NEWS & EVENTS

2021 Texas Workshop

The Texas workshop is currently planned to be in-person. Given that our annual conference was canceled this year, we hope to see a large turnout in Texas. While we realize some agencies still can not travel, we hope that those that can will consider doing so.

NHWC Transmission - Articles Needed!

The Transmission face-lift and a lack of articles submitted to the editors has led to delays this year, including a tough call to skip the Spring issue. However, we now have a editorial process in place with three new volunteers to help Brian and Lee with editing and layout. We also have several new corporate sponsors. This demonstrates the value industry sees in the Transmission and helps NHWC in our funding needs. So many thanks to our Transmission volunteers and our corporate sponsors!

Our challenge now is content. We need members to contribute articles and spread the word to make the newsletter a success. The newsletter is a great way to offer value to existing members and to attract new members, but it won't work without consistent, informative content. Our goal is two articles and one interview per issue. Please help us get there!

NHWC Calendar

August 25, 2021	FWS Webinar - Transmitting Data / Hydrolynx
September 29, 2021	FWS Webinar - Data Evaluation / Fenstermaker
October 27, 2021	FWS Webinar - Upgrading & Installing / TDB
October 13-14, 2021	Texas Workshop, San Marcos, Texas
November 24, 2021	FWS Webinar - Flood Modeling & Forecasting / HCFCD & RFC
December 29, 2021	FWS Webinar - Communicating Data / TDB

General Interest Calendar

October 28, 2021	ALERT Users Group Fall Meeting & Workshop

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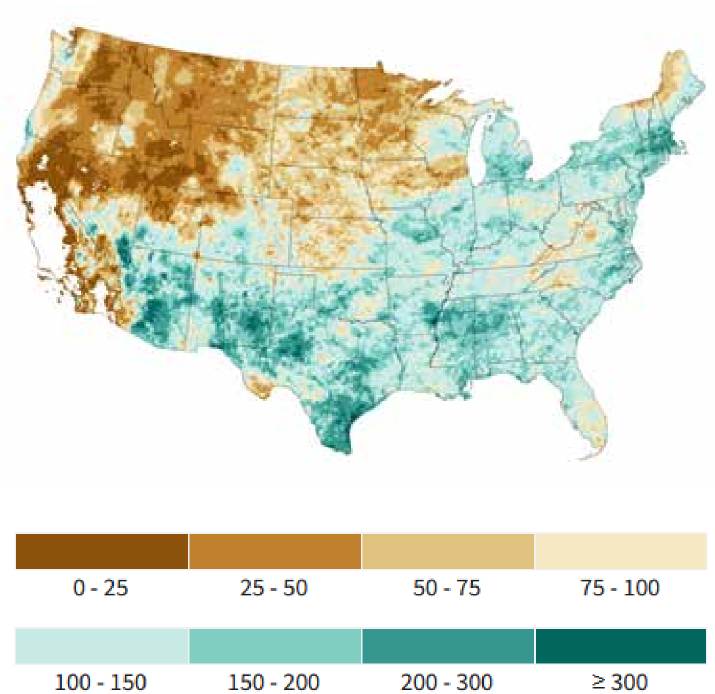
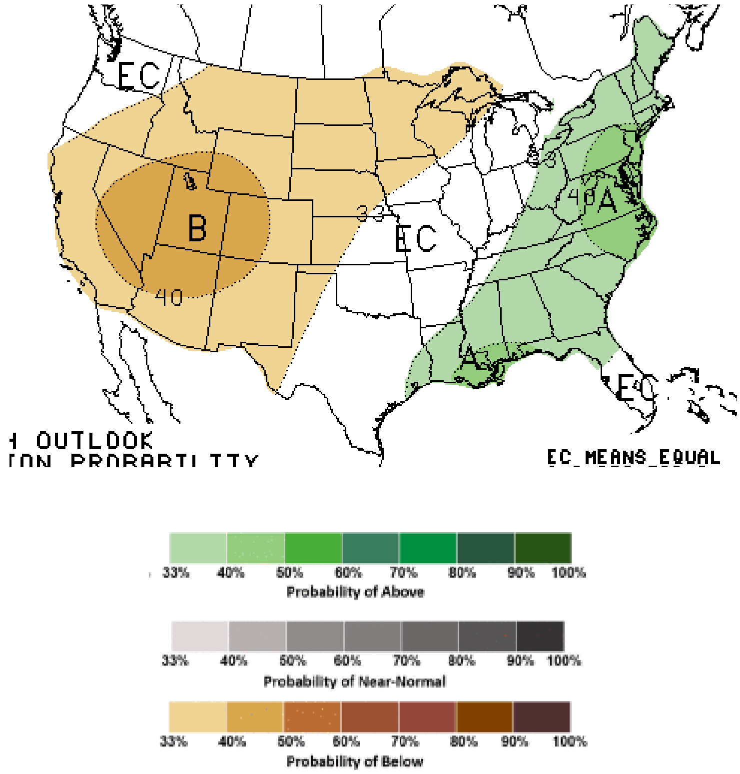
AMBASSADOR WRN WEATHER-READY NATION

HYDROLOGIC CONDITIONS

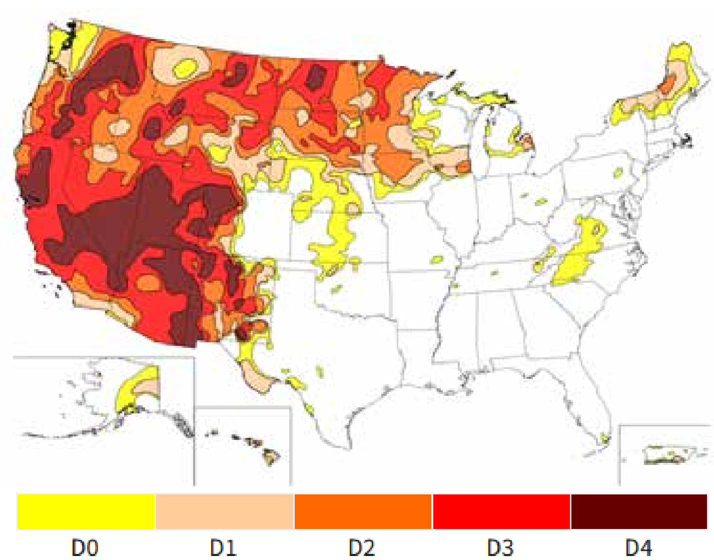
60-day % of Normal Precipitation
Last Updated 07/23/21



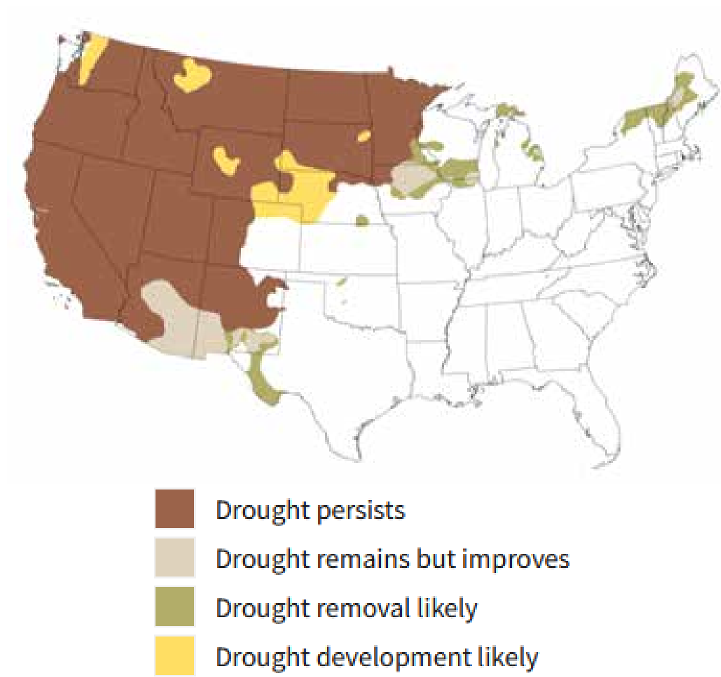
3-mo Precipitation Outlook
Last Updated 07/15/21



Current Drought Conditions
Last Updated 07/20/21



3-mo Drought Outlook
Last Updated 07/15/21



Sources: https://www.drought.gov/forecasts
https://www.drought.gov/current-conditions
https://www.cpc.ncep.noaa.gov/

TEXAS WORKSHOP

OCTOBER 13-14, 2021 / **EMBASSY SUITES** / San Marcos, Texas

CONFERENCE TOPICS

- Field Maintenance and Procedures
- Lessons Learned from Flood Events
- ALERT, ALERT2, Radio & Satellite Telemetry
- Advances in Hydrologic Technology
- Modeling and Flood Forecasting
- Inundation Mapping
- Communication Before, During, and After Weather Events
- Dam Safety

Call for Abstracts - September 13, 2021 Deadline

The National Hydrologic Warning Council invites engineers, meteorologists, and hydrologic staff to submit abstracts for presentation at our 2021 Texas workshop in San Marcos, TX. This workshop will feature a range of exciting talks, discussions, and networking opportunities with experts, vendors, and up-and-coming leaders to assist managers and operators of hydrologic warning systems. The workshop is not limited to Texas folks! Out-of-state members are encouraged to attend!

> *"I recognized a surge of energy ... in the jam-packed technical agenda, the networking, the conversations in the hallway, ... and the enthusiasm of attendees. Our conference ... provided all attendees ample opportunity to learn and grow as professionals."*
>
> *Ben Pratt / NHWC Treasurer*
>
> *2019 National Conference Committee Member*

Conference Abstract Submission

Abstracts and biographies must be submitted by September 13, 2021.

Presentations are 30 minutes, including a Q&A period.

[More information here]

TRAINING AND PROFESSIONAL DEVELOPMENT COMMITTEE

WEBINAR TOPICS

- Overview of Flood Warning Systems
- Basic Hydrology
- Collecting Rainfall
- Collecting Stage
- Other Data Collection
- Batteries and Solar Panels
- Transmitting Data
- Data Evaluation
- Upgrades & Installation
- Flood Modeling & Forecasting
- Communicating Data

The Training & Professional Development Committee is hosting a monthly webinar series to provide an overview of Flood Warning Systems and the topics that are fundamental to planning, operating, and maintaining those systems. The Committee is also planning for potential workshops, training courses, and a Flood Warning System certification program.

A big thank you is in order for our outgoing Committee Chair, Josh Herbert! He did a great job kicking off the Committee and we wish him luck at his new role with Calcasieu Parish. We also welcome Mark Moore, who will be taking over as the Committee Chair.

Interested in Volunteering?

We need volunteers! If you are interested in the topics mentioned above, regardless of your experience, contact Josh Herbert, Training and Professional Development Committee Chair at: mark.moore@distinctiveafwsdesigns.com. Consider sending around a request for volunteers within your organization as well.

Flood Warning System Webinar Series

We've successfully held five webinars with attendance ranging from 50 to 100 viewers. **All webinars are FREE!** Past webinars are also available on our website here. Our goal is to offer a library of videos covering flood warning systems and make these available to the industry. Of course, we hope viewers will become members, volunteers, and conference attendees!

Interested in Speaking?

We are currently planning the 2022 webinar schedule, so contact the Committee Chair if you are interested in speaking at our webinar series.

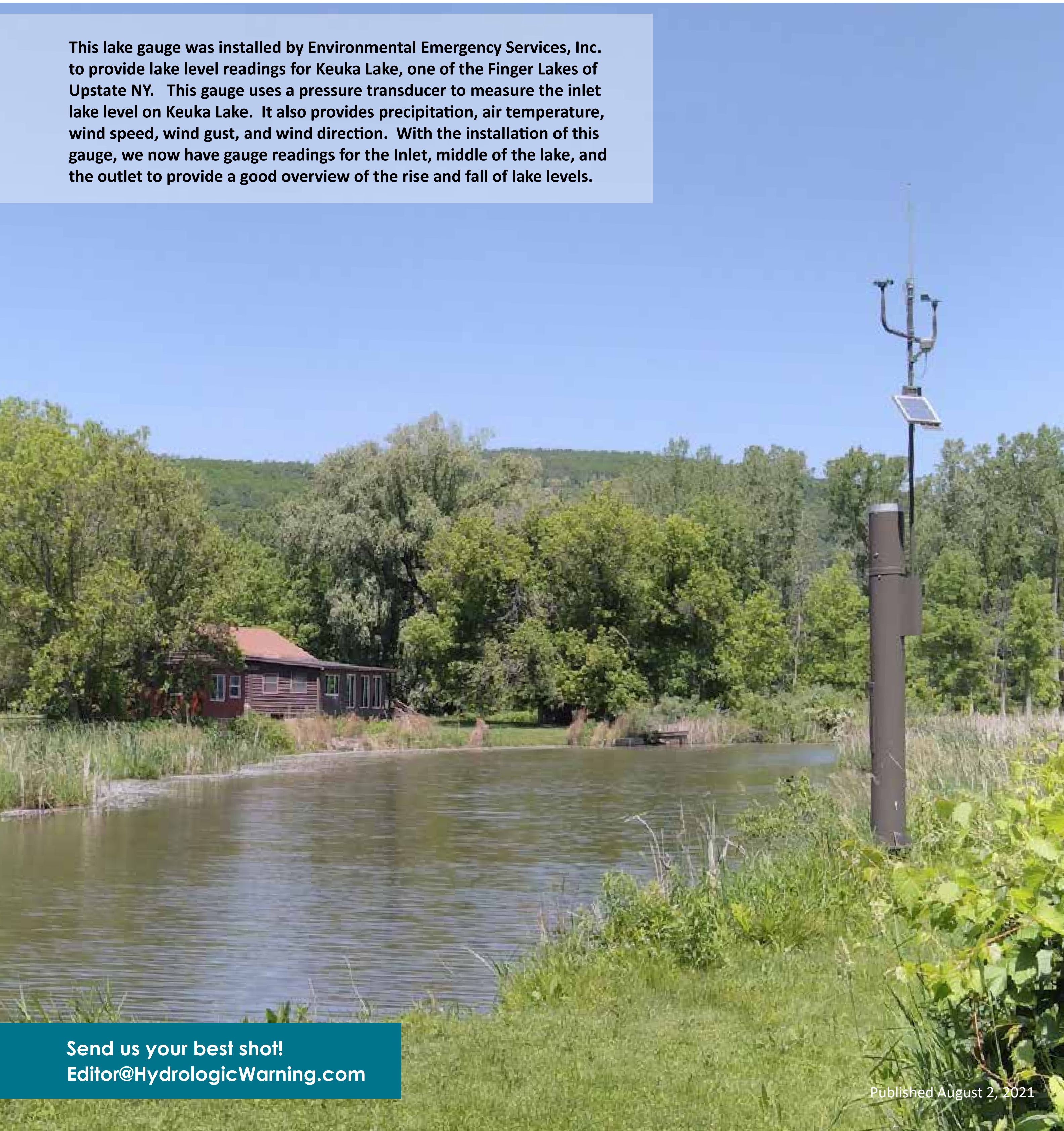
More information on the webinar schedule and registration is here.

PARTING SHOT

JUNE 10, 2021 / LAKE LEVEL / Keuka Lake, Hammondsport, NY / 42.40° , -77.21° / 717.9 MSL

by Timothy Marshall / Director of Public Safety / Steuben County, NY

This lake gauge was installed by Environmental Emergency Services, Inc. to provide lake level readings for Keuka Lake, one of the Finger Lakes of Upstate NY. This gauge uses a pressure transducer to measure the inlet lake level on Keuka Lake. It also provides precipitation, air temperature, wind speed, wind gust, and wind direction. With the installation of this gauge, we now have gauge readings for the Inlet, middle of the lake, and the outlet to provide a good overview of the rise and fall of lake levels.



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