Nutrient Sensor Action Challenge

FREQUENTLY ASKED QUESTIONS
and Supplemental Resources

Last revised: September 7, 2017

*Note: View the 9/2/2017 Webinar and Transcript (found on page 5) *
Please direct any requests for clarifications and additional information about this challenge to NutrientSensorActionChallenge@erg.com.

FAQs

- **What is the Challenge?**

  The **Nutrient Sensor Action Challenge** builds upon the 2014 Nutrient Sensor Challenge, which helped accelerate the development of next-generation in situ nutrient sensors and analyzers. The Nutrient Sensors Action Challenge aims to help integrate affordable, high-performing, and real-time nutrient sensors into existing water monitoring efforts to pilot use of continuous sensors and associated data.

- **Why this challenge?**

  Nutrient pollution management is costly and complex. The diverse crowd of solvers reached through this challenge will provide important information, feedback and experience pertaining to the use of sensors and resulting information. This challenge also provides a mechanism for connecting organizations in the nutrient space with partners from other disciplines such as data management and communication.

  Why are next generation sensors important to managing nutrient pollution?

  Nutrients exist in a variety of forms and vary with space and time in aquatic ecosystems. Current methods for detecting and measuring nutrients do not capture this complexity and are expensive.

More spatial and temporal data are needed to inform decisions to reduce nutrient loads on land, in the air, and in waterways. Affordable, accurate, and reliable sensors will help improve measurement; expand monitoring and forecasting of nutrients in lakes, rivers, streams, estuaries and coastlines; and track progress.

- **How long is the Challenge open?**

  Stage 1: 8 weeks (Opens July 26th 2017. Closes September 20th 2017)
  Stage 2: March 2018 - October 2018; participants have flexibility to determine the 6-month window during which they will participate.

- **What are the stages of the Challenge?**
  Stage 1: The Action Plan!
  Stage 2: Sensors in Action!

- **What is the prize / how many prizes?**

  Stage 1: Up to 5 winning applications will win $10,000 each. Winners will also have opportunities for recognition and participation in workshops and webinars.

  Stage 2: $100,000 is available for prizes in Stage 2. Prizes may be awarded to 1st, 2nd, and 3rd place.

- **How is the prize winner determined?**
  Stage 1: Submissions will be judged based on the action plan requirements (see challenge description).

  Stage 2: Winners will be selected based on demonstrated success in monitoring and data collection over 6 months as well as demonstrating the potential use of the continuous data.

- **Who will determine the winner(s)? How many judges will be there? Who are they (generally)**
  The judging panel will consist of 6-8 experts representing the partner agencies and other experts and stakeholders.

- **What is a decision-maker or representative?**
  A decision-maker can be anyone who can demonstrate use of the information to make decisions that will improve water quality with respect to nutrients. This may include individuals or groups at the local, regional, state, or national level.

- **Which nutrients are within the scope of the challenge?**
  Nitrates and Phosphorous

- **What are the price constraints for the sensors?**
  The purchase price of each sensor should not exceed $15,000.

- **Who is eligible to participate?**
  The challenge is open to companies, organizations, and/or communities interested in deploying two or more low cost (priced at less than $15k per device) continuous nutrient monitoring sensors to address an important nutrient-related topic or problem. Groups should be currently engaged in

water quality monitoring and already have some level of sophistication with water monitoring, data management, and communication. Team leads must be a United States citizen.

- **When will awards be made?**
  Stage 1 awards - Fall of 2017
  Stage 2 awards - Fall of 2018

- **Who can I contact if I have questions?**
  Please direct any requests for clarifications and additional information about this challenge to NutrientSensorActionChallenge@erg.com.

Who are the partners in the challenge?

U.S. Environmental Protection Agency (EPA)
U.S. Geological Survey (USGS)
NOAA-directed U.S. Integrated Ocean Observing System (IOOS)
Alliance for Coastal Technologies (ACT)
U.S. Department of Agriculture (USDA)
National Institute of Science and Technology (NIST)

- **Where can I find additional informational resources?**
  An informational webinar for the Nutrient Sensor Action Challenge was held on August 2, 2017. A recording is available to view at: http://epawebconferencing.acms.com/p5cu3fezyus/

  View Supplemental Resources (see below FAQs)

- **Is participation in Stage 1 a prerequisite for participating in Stage 2**
  No, although it is recommended

- **Is there a minimum/maximum requirement regarding the number of sensors?**
  Solvers must submit plans to deploy 2 or more sensors
  There is no maximum limit of sensors.

- **How long should the submission be for Stage 1?**
  8 - 10 pages not including images or photos

- **Can funding be allocated directly to government agencies and organizations?**
  Awards and prizes can be paid to employees working at state or local organizations, non-profit organizations, universities or private companies.

- **What brand of nutrient sensor does this program recommend or endorse?**
  This challenge does not recommend or endorse any brand of nutrient sensor. Information about sensors that were evaluated as part of the 2014 Nutrient Sensor Challenge can be found at http://www.act-us.info/evaluations.php . Additionally, a list of sensor developers from the 2014 Challenge can be found at: http://www.act-us.info/nutrients-challenge/Participants.php . Participants in this challenge are not limited to the sensor brands/developers mentioned above.

- **Do sensors need to be acquired from U.S.-based organizations/companies?**
  No.

Supplemental Resources

1) Manual for Real-Time Quality Control of Dissolved Nutrients Observations (QARTOD)
   - Provides real-time quality control (QC) of DN measurements
   - Describes tests that operators can incorporate into practices and procedures for real-time QC of in situ DN measurements in coastal environments

2) Optical techniques for the determination of nitrate in environmental waters: Guidelines for instrument selection, operation, deployment, maintenance, quality assurance, and data reporting
   - Provides information on the selection and use of UV nitrate sensors
   - The report includes operating principles, key features, and sensor design and approaches for sensor deployment

3) Ocean Data Standards and Best Practices Project (ODSBP)
   - To achieve broad agreement to adopt a number of best practices related to ocean data management
   - Maintain an online catalogue of best practices

4) Handbook of Automated Data Quality Control Checks and Procedures
   - Describes the automated quality control
   - Describes the data flow, processing, real-time quality control checks and flags

5) Data Elements for Reporting Water Quality Monitoring Results for Chemical, Biological, Toxicological, and Microbiological Analytes
   - Describes a set of data elements which the NWQMC believes are the minimum elements
   - Lists these data elements as modules in a framework that addresses who, where, when, why, and how data are collected

6) NEMI.gov
   - Index of useful environmental methods
   - Information on populations, toxicity, and statistical data

7) Nutrient Sensor Challenge participants
   - Nutrient Sensor challenge participants
   - Info on participants, awards, and reports

8) Protocols for the operation of nutrient sensors and QA of sensor data
   - Protocols for the operation of nutrient sensors
   - Evaluation of continuous water quality monitoring nutrient analyzers

Nutrient Sensor Action Challenge: Informational Webinar
August 2, 2017 at 2:00PM EST

Recording: http://epawebconferencing.acms.com/p5cu3fezyus/

Speakers

Grant Strauss: Eastern Research Group
Denice Shaw: U.S. Environmental Protection Agency
Adriana Felix Salagado: U.S. Environmental Protection Agency
Dave Holbrook: National Institute of Standards and Technology
Sharif Branham: U.S. Department of Agriculture, Natural Resources Conservation Service
Brian Pellerin: U.S. Geological Survey
Jennifer Bosch: National Oceanic and Atmospheric Administration, Integrated Ocean Observing System
Mario Tamburri: Alliance for Coastal Technologies
Tammy White: General Services Administration
Lauren McAllister: U.S. Environmental Protection Agency

Description

The Nutrient Sensor Action Challenge aims to help address nutrient pollution monitoring and data management for local nutrient management decision-making. The challenge is a collaboration between U.S. Environmental Protection Agency, the United States Geological Survey (USGS), the United States Department of Agriculture (USDA), the National Institute of Standards and Technology (NIST) and the National Oceanic and Atmospheric Administration (NOAA)-led U.S. Integrated Ocean Observing System (U.S. IOOS®), and Alliance for Coastal Technologies (ACT).

The Nutrient Sensor Action Challenge builds on the 2014 Nutrient Sensor Challenge, which helped accelerate the development of affordable, high-performing, continuous nutrient sensors and analyzers. In this challenge, solver teams will compete for $150K in cash prizes by proving successful strategies for incorporating continuous nutrient sensors into existing water monitoring efforts. The Challenge encourages innovative partnerships with sensor manufacturers and others to pilot the nutrient sensors, manage the data, and demonstrate how resulting data and information can be used to inform decisions. Stage 1 of the Nutrient Sensor Action Challenge closes on September 20, 2017.

Webinar Transcript

Speaker Grant:
Today's presentation will begin with background and origins on the Nutrient Sensor Action Challenge, then we'll move into objectives for the challenge. And followed by that there are a number of agencies and organizations that are working together on this challenge, and a representative from each group will talk briefly about their organization's background and motivation regarding the challenge. The challenge timeline rules will be discussed as well, followed by questions and answers and we will also discuss a short introduction to the challenge.gov platform. Thank you.

Speaker Denice Shaw:
Great, Grant thank you very much. I hope everyone can hear me. Good afternoon thanks again for joining us. My name is Denice Shaw I'm with EPA's Office of Research and Development and I'm going to be talking you through the Nutrient Sensor Action Challenge, and I'm speaking on behalf of a whole host of folks - a whole host of agencies and organizations who are working together on this challenge. You can see the logos on our first slide, we've got the Environmental Protection Agency, the National Institute of Standards and Technology, the United States Department of Agriculture, US Geological Survey, the National Oceanographic and Atmospheric Administration, and the NOAA IOOS program International Ocean Observing System, as well as ACT (the Alliance for Coastal Technology).
[SLIDE CHANGE]

Speaker Denice Shaw:
All of us have been working together with a number of other organizations over the past four or five years to address the really attractable problem of nutrient pollution in the United States. Nutrient Pollution is a very costly problem for the U.S. economy, as well as having serious implications for social health and environmental issues across the country. And it's a problem that has needed a lot of attention for a long time, and for which there have been lots of efforts and we are still faced with some of the big challenges in front of us about nutrient pollution. And so the organizations got together, these organizations and others, got together a number of years ago to start seeing how we could pull our resources together and work collaboratively to address the nutrient issue.

One of the first steps was to bring together a group of experts working in the nutrient pollution space from all different sorts of sectors that included, industry, academia, and research, government, states, local organizations, foundations. And we brought a bunch of folks together and we agreed, there was agreement, that we have a real serious problem with nutrient pollution, and that we needed to set some priorities identify and set some priorities and start working on them. And while there was lots of discussion and lots of recommendations about really important things that need to be done to address the nutrient issue, there was an agreement that one of the first things we need to address was our ability to monitor and measure what was going on with nutrients. And that led to a recommendation that we develop a suite of sensors for monitoring nutrients.

And that direction, that guidance, sent us in the direction of the previous challenge that we worked on together; the Nutrient Sensor Challenge. If you're not familiar with that, the Nutrient Sensor Challenge set out to accelerate the development of lower cost nutrient sensors, and it was done in conjunction with extensive user analysis where we reached out to many stakeholders, many users, many folks who were going to be - who had need for - that kind of information and talked with them about their requirements, and their needs, and their priorities, and their economic concerns, and their uses, and a whole lot of information we got from them. We also had a market analysis, and then we set out in a challenge where we had a number of sensors that were developed and they went through extensive testing and evaluation at the Alliance for Coastal Technology, and we will hear more about that capability later.
But that was really the foundation for where we are now. This next challenge that we are going to talk about today has launched earlier this week is the Nutrient Sensor Action Challenge and the intention of the Nutrient Sensor Action Challenge is to get sensors into the field - get sensors into the hands of the users and start figuring out - start piloting start piloting them in different environments - start piloting them for different strategies for data management for communications and also for - start piloting different applications for the use of continuous data coming off of these sensors. And so that is really the nature of the Nutrient Sensor in Action Challenge – the Nutrient Sensor Action Challenge excuse me. I'm going to step through the really the high level objective of the challenge and what we're trying to achieve and what we're looking forward to working with you on. So here they are: to demonstrate the effective use of low cost sensors, and when I say low cost sensors we're talking in the range of 10-20k and we have a threshold of 15k for this challenge for what we're looking for low cost sensors. We understand that there's a lot of interest and need for even lower cost sensors for lots of groups but that's really not our - below 100 dollars - but that's really not our focus, we're really looking at sensors in the range of about 10 to 20k somewhere in that in that price range. We are encouraging innovative partnerships to pilot the sensors because what we've recognized in talking to a lot of folks is that you may have a sensor and that may be well and good but there's a lot more involved to be able to being able to effectively use the sensor manage the information from the sensor, share the data from the sensor, and figure out how you're going to use continuous monitoring data in the context of addressing concerns about nutrient pollution.

This is an opportunity for teams to form around innovative partnerships with lots of different skills and expertise to work together to pull this project off. And then, what a lot of folks said was really important at this point in time is to demonstrate how collected data and information can be used in decision-making. Having access to continuous monitoring information is what a lot of folks are asking for and what we're really challenging the teams to do is to show us how those data can be used effectively for decision making, and how that information can be effectively communicated to people. So those are the really high level objectives for moving forward on the nutrient sensor challenge.

[SLIDE CHANGE]
Speaker Denice Shaw:
Going back to the first slide in terms of the partners, think back on that first slide and those logos down on the bottom of that first slide. There we recognized several years ago that despite agencies and organizations having different missions, different charges, different programs, there was a shared intention - a shared need - a shared vision of where we need to go together in terms of nutrient monitoring. And I'm going to read to you the shared vision from across each that the agencies have agreed to the organizations the partners have agreed to, and then we're going to hear from each one of the agency and partner groups on their own perspective and their own sense of priority for this kind of work. But it is very exciting that we do have a shared vision, and that vision is: "A desire to accelerate the widespread use of affordable, high-performing, real-time nutrient sensors; demonstrate the value of information from these sensors in decision making; and promote sharing and integration of data into existing water monitoring efforts". It's a bold vision, but it's one that with everyone's help and with participation from teams and folks who will join the challenge we hope that we can make real progress on.
[SLIDE CHANGE]
Speaker Denice Shaw:
And so with that, the next couple of slides are going to be presented by representatives from those organizations and they're going to talk about their - a little bit about the background and the motivation going forward with respect to this challenge and the bigger vision of nutrient monitoring. So with that I'm going to ask each of the speakers from the agencies to press #6 and then you can mute yourself after that, and I'll check in with Adriana are you there?
Speaker Adriana Felix Salagado:
Yeah, hi Denice this is Adriana. Can you hear me ok?
Speaker Denice Shaw:
Yes, we can hear you fine. Thank you.
Speaker Adriana Felix-Salagado:
Perfect, so thanks Denice and everyone that's joined us this afternoon. So my name is Adrian Felix-Salagado, I am part of the Office of Water's technology and innovation team and we're very excited about the Nutrient Sensor Action Challenge. As Denice mentioned, nutrient pollution is a widespread national problem and is one of the most serious issues facing the nation and our water quality. And so as the office of water, we're very excited to be participating and supporting this challenge to help ensure the clean and safe water of the country and its importance and impact on public health, and ensuring swimmable and fishable waters.

So really our vision and our goal for this challenge is to be able to help empower local and state governments to improve their knowledge and management of nutrient conditions and their water

qualities by integrating these sensors in water monitoring, as well as assessment efforts. And we're very excited by the fact that we're able to not only engage the public, but also the private sector in helping us conquer these challenges. So with that I'll turn it back to Denice thank you.
[SLIDE CHANGE]

Speaker Denice Shaw:
Thank you very much Adriana. Next, I'm going to turn it over to David Holbrook he is the - he is with NIST, the National Institute for Standards and Technology. Dave are you on?
Speaker Dave Holbrook:
I'm on hi Denice. Hi can you hear me?
Speaker Denice Shaw:
Yes, we can hear you. Thank you.
Speaker Dave Holbrook:
Ok good, alright so again, my name is Dave Holbrook. I'm a group leader in Material Measurement Lab at NIST our - this mission is focused on promoting innovation in US by advancing technology and measurement that enhance economic security and improve quality of life. And I think that anyone who has either been involved with, personally involved with or read the newspaper about when we have these harmful algal blooms, realize that it affects both the economic security and quality life for those communities that are hit hardest.

As part of that mission, NIST has developed extensive experience with in situ water monitoring, including the use of real time measurements data quality and assurance and field deployments of monitoring equipment. And the picture, the small picture on the upper left hand side, is a buoy that is stationed in Hawaii and has been there for a long time. And that helps calibrate these satellites that fly over, and they're NOAA satellites I believe, that fly over and measure ocean color and so that relationship, or collaboration, has been going on for a long long time. Sort of what we have in the back of our mind I guess, and more in the front of our mind, as we keep talking about it is that we would like to provide more municipalities with affordable sensors so that they can be provided with better data at the local level, resulting in more cost effective management in nutrient levels in aquatic systems. We're also hoping that it empowers local managers to make data-based decisions tailored to their community needs and parameters and lead to improved environmental health for larger number of communities in the US. And I will turn it back over to you Denice.

Speaker Denice Shaw:
Well thank you David, I appreciate that.

[SLIDE CHANGE]
Speaker Denice Shaw:
Next up we have Sharif Branham from USDA. Are you on Sharif?
Speaker Sharif Branham:
I'm on. I'm on can you hear me?
Speaker Denice Shaw:
Yes, we can thank you.
Speaker Sharif Branham:
Alright. So again, my name is Sharif Branham with the Natural Resource Conservation Service. We are part of the US Department of Agriculture, and our interest in this challenge is basically to support our farmers and ranchers. Our work as an agency is primarily focused on providing technical assistance to farmers and ranchers who grow our food and fiber and have a significant impact on our natural resources. NRCS has worked with other agencies in a project called a Conservation Effect Assessment Project, which is a long-term study of the environmental effects of conservation practices and programs on the landscape on improving environmental quality.

We work a lot with nutrient sensors in that regard, but a lot of them are high end sensors and this opportunity to encourage development and testing of lower cost sensors will help the agency in a number of ways as we seek to provide good customer service to our farmers and ranchers. Being able to get high quality data from these sensors to help in doing studies at the watershed level, but also having the science to back up the conservation practices that we recommend to our land managers and knowing that these practices will in fact actually have the environmental outcomes we expect, is something we're really hoping to promote.
And so being able to be part of this project has helped in that regard because to lower the cost will heighten probability of adoption. Being able to have this data associated with our conservation practices that are planned or applied will be very helpful in that regard. So that's primarily the NRCS and I think the USDA interest is how do we take these technologies and get them out into those who need them out there in the landscape who are managing the land on a daily basis but also have it available to us in government to make sound science-based decisions. And with that Denice I will turn it back to you.

Speaker Denice Shaw:
Thanks Sharif that was great.
[SLIDE CHANGE]
Speaker Denice Shaw:
Next up is US Geologic Survey and Brian Pellerin on you on?

Speaker Brian Pellerin:
Great thank you. As a government science agency in the Department of Interior the USGS mission is to provide reliable and partial timely information that helps the nation understand our water resources. So as part of that, we offer networks of instruments including nutrient sensors at a large number of sites across the country using consistent protocols and methods. But as we look across the nation we see large gaps in rivers, and lakes, and wetlands, and groundwater, and recognize that coordinated monitoring across all of our organizations and sharing data will really help us better understand both the spatial and the temporal gaps and help us develop a more robust perspective on the status and trends and drivers of water quality across the country. So we welcome those efforts, like the earlier Nutrient Sensor Challenge, focused on the instrumentation. And this effort which really focuses as Denice has highlighted on getting the instrumentation in the hands of users and getting user experiences that allow us all to produce better data.

Speaker Denice Shaw:
Thank you, Brian.
[SLIDE CHANGE]
Speaker Denice Shaw:
Next is Jennifer Bosch from NOAA IOOS. Jen are you on?
Speaker Jennifer Bosch:
Yeah, yes Denice I'm here. Can you hear me?
Speaker Denice Shaw:
Yes, we can thank you.
Speaker Jennifer **Bosch**:
Ok great. So the US Integrated Ocean Observing System is an interagency program that is led by NOAA. And some of our partners in this interagency program include folks from the EPA, USGS, USDA, and others. So for us this nutrient sensor challenge is right in line with our mission to make sure that timely, accurate, coastal and ocean data are available to decision-makers. And that includes businesses, communities, and individuals that can then ultimately use this information to benefit the safety, health, and economy of the United States.

Building new technology into ocean observations is a key priority for IOOS. We work with regional and functional associations, like ACT, to gather observations and develop refined data management and added value products. We also work with them to research and develop broad-faced technologies and observing tools. This challenge not only encourages the adoption of these new generation sensors, but enables and enhances water quality monitoring. And that expands on the success of the Nutrient Sensor Challenge, which was run by ACT and IOOS also supported that last project. So we are thrilled to be part of this next effort. Back to you Denice.

Speaker Denice Shaw:
Great thank you so much Jen.
[SLIDE CHANGE]
Speaker Denice Shaw:
Okay, next we have Mario Tamburri who is with the Alliance for Coastal Technology. Mario are you there?
Speaker Mario Tamburri:
I am, yes. Thanks Denice, and it's great to follow the IOOS brief because ACT is part of IOOS. We were created about 15-16 years ago to sort of help facilitate the development and adoption of reliable and accurate sensors, and sensor platforms technologies really, to monitor and study aquatic environments from freshwater lakes, and rivers, and streams, to coastal environments in the open ocean. And we really do that through three fundamental services that are shown on this slide. We are an independent third-party testbed for evaluating technologies. This is both for mature instrumentation that's been used for a while - off the shelf kind of things where we run verifications of their performance, but also for new emerging technologies, like the next generation nutrient sensors and demonstrating their potential and their capabilities. And that image there on the right is us applying some instruments in the Chesapeake Bay for some of that type of testing. But we're also a forum for capacity and consensus-building. We do that through workshops and training exercises around these technologies with the different stakeholders. And finally, we're also an information clearinghouse on a variety of environmental technologies so all of the reports from the workshop and the evaluations are available on our website, but so is a database of different instrumentation that could be used for again studying and monitoring aquatic environment.

Because of that expertise we became part of the original first step of this whole process, the Nutrient Sensor Challenge, and helped guide that process along and as we've mentioned we were the independent evaluators of those instruments. In the final phase of testing, those verification reports were then used by the independent judging panel to pick the winners of that Nutrient Sensor Challenge. But we didn't want to stop there, we really want to support these next steps of transitioning these new next generation nutrient sensors into operations into the hands of the users that need these tools and to help support their integration into existing monitoring programs ultimately to help solve the bigger problem nutrient pollution in general. And with that Denice I'll hand it back to you.

Speaker Denice Shaw:
Great thank you very much Mario and thanks to all of the speakers.
[SLIDE CHANGE]

Speaker Denice Shaw:
I hope you heard sort of along the lines of what I heard, that despite with different organizations, different agencies, and with different missions and different responsibilities there's still an opportunity for collaborating and for working together in some really of the primary components that if we are effective with your help working together then we're going to be able to support each of these agencies address their own perspectives on nutrient monitoring. So again thank you all.

I'm now going to talk about the challenge itself, and I'm going to cover that in a couple of slides - and I see a couple of questions coming in and we'll get to those later I'll try to address them as I go through the slides if I can. First off, the challenge is divided into two stages and this this is a representation of the timeline for stage one. So here we are the informational webinar in August 2017 the submissions, which I'm going to talk about in a minute, are due on September 20th that's about six - seven weeks now ahead we'll have a judging process that will go until October. Sometime in October we'll announce the semi-finalists and then there is a stretch of time between October and March that we're going to be working with the semi-finalists and having a workshop and a number of webinars to talk about different aspects of the project and provide tools and opportunities for those folks. And then beginning in the Spring of 2018 is when the window of deployment is going to begin for stage 2 and we'll talk more about that in just a second.

[SLIDE CHANGE]
Speaker Denice Shaw:
So here's a little more information about the challenge overall. At this point there are - we have 150,000 dollars in prize money. There's a chance that we could have more, but we know that we have the 150,000 dollars and so that's great and that is divided up across two stages. Stage one as I just said is open from July 26 to September 20, and the requirement is to submit a plan and we'll talk about that plan in just a minute, but the plan will describe the use of the sensors and how they will meet the goals of the challenge. Up to 5 winning applicants will be selected and each of those five winning applicants will get ten thousand dollars for a total of fifty thousand dollars in prizes for stage 1. Going on to stage two, stage two we won't provide - we won't spend a lot of time on the details of stage two but that will kick off in spring of next year and go until probably the end of October next year. Teams the winning semi-finalists from stage one will be deploying the sensors and collecting data and there's one hundred thousand dollars in prize cash prize awards for stage two. Going on…sorry…
[SLIDE CHANGE]

Speaker Denice Shaw:
Going on to eligibility. This is directly from the Challenge.gov site, which I hope you've been to and if you haven't at the end of these slides we're going to have Tammy White from Challenge.gov to talk you through a little bit about how to use Challenge.gov, so you'll want to stand by for that. But eligibility the action challenge is open to communities and organizations interested in deploying two or more low-cost (less than $15k) continuous nutrient sensors to address an important water quality problem. That

problem can be inland or it can be coastal either is fine. Teams should be currently engaged in water quality monitoring and have some level of experience and as well as sophistication with data management and communication.
So this isn't - this challenge is probably not optimal for folks who have never been involved in water monitoring before and just want to start up because we really want to see how these sensors can fit in with existing monitoring efforts and hoping to have expertise in some of these enabling technology areas. The challenge is open to communities and organizations in the United States the team lead needs to be from the United States. If you are interested in partnering with folks outside the United States that's fine completely open and your prerogative but the team lead the main contact needs to be living needs to have an address and be monitoring in the United States.
[SLIDE CHANGE]

Speaker Denice Shaw:
Here's a little bit of more detail on the action plan which is what you need to turn in for stage one. Again, it's due September 20, 2017. You will submit the plans on Challenge.gov and you'll hear more about that in just a minute from Tammy White. No longer than eight pages although we are would like to see if you want to have any links to photos or relevant information. And as you will see on the Challenge.gov website the action plan needs to describe needs to include a number of elements. It needs to describe the problem statement and the problem statement has got to be a description of the nutrient issue or topic that you are addressing so some characterization of that and how the data from continuous sensors will be able to be incorporated into your current monitoring efforts, and how it will augment or improve your ability to make decisions.

The next thing you need to include is information about the team members the Challenge.gov description describes the kind of expertise that we hope you will engage that you will be working with. Folks who have experience in water quality monitoring, perhaps data analytics someone who understands continuous monitoring data management, etcetera that's laid out in Challenge.gov. Another thing we want to hear about is the current water characterizing current water monitoring efforts what kind of assets what kind of capabilities and provide any links to websites or other relevant information. Data - sorry sensors and monitoring we also want to hear about the kind of sensors you're going to use how you're going to accommodate them how you're going to deploy them any strategies for sampling regime in time and space telemetry etcetera.

Data moving on to next data management is a is an important component to this project because what we have all learned and perhaps you've been you've seen yourself is that if you have a lot of different organizations collecting data without some kind of unification some kind of agreement those data can use of those data subsequently by other users can be challenging and difficult. So we're trying to standardize the data portion of this as much as we can while keeping the expectations reasonable, and so we've asked you to lay out a couple of things about data QA/QC data sharing metadata and a brief description of the solution the solution architecture for the data.

Just real quickly going through the last two analytics and interpretation describe any plans that you have for how you would analyze or any kind of statistical tools that you have to make use of the continuous

monitoring data and then communication and use the final thing is to describe your plans for communicating the information in a way that's effective for decision-makers and how the data and information can be sort of - there's a little bit of overlap with the first thing about the problem the first requirement but how would these data be useful how would the addition of continuous data be useful to your current monitoring regime and how will that help you make decisions and what decisions might be better made with the use of continuous data?
[SLIDE CHANGE]
Speaker Denice Shaw:
One thing that I wanted to include is that - I'm going to turn this over to Mario Tamburri from the Alliance of Coastal Technologies to talk about a tool we're hoping you will find useful with respect to putting together teams.
Speaker Mario Tamburri:
Yeah, thanks Denice and I think everybody has seen the main website for the sensor action challenge through Challenge.gov. We just added another resource as part of the older Nutrient Sensor Challenge website to maybe help some of the team building going on, and you see the web link there. At the bottom of the description there is a link that says "Looking to build a team?" and what we've done here is the first step in helping potential participants identify collaborators. When we went through the Nutrient Sensor Challenge we had lots of groups expressing interest and excitement about that, and they said "how can we get involved in piloting or testing some of these instruments" as well.
We also - as we started developing the sensor action challenge there were a lot of groups that said we'd be interested in being a you know a testbed or a piloting partner in this. So we tried to capture some of that - those conversations in a list that's on there of organizations or monitoring programs that have expressed interest in participating. It's by no means a comprehensive list and we want to be inclusive so if you want your name added here so others see that you're interested please just let us know by the link at the bottom of that page, we're happy to add more names. Right now it's just a list of organizations or institutions there is no point of contact or web link. We are going to be contacting each of these groups individually and asking if we can list more details of who particular or an email address to contact. At this point at least it gives people a place to start.
In addition to the organizations and monitoring programs that are interested in partnering there are other resources available as well. The Nutrient Sensor Challenge had about thirty participants register and we also went through final selection and testing of five different companies or teams. Those are also listed on the Nutrient Sensor Challenge website, and there's a link available at the bottom of the page that just describes building teams. There's also a link to the verification reports for the instruments that ACT has tested, and then there's finally a link as well to the ACT database that has all of the commercially available nutrient sensors listed there. So we're hoping to build a resource to help again, all of you identify partners and team members. The last part, we haven't added yet, is on potentially partners for data management data display those sorts of things. If you're interested in that - if that's where your area of expertise is and you want to be listed again, please just let us know. And Denice I'll turn it back to you now.

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Speaker Denice Shaw:
I'd like to wrap up my part of this by pointing to two additional resources. One of them is here, there will be frequently asked questions archived on the - that you can get to from Challenge.gov. they're also going to be available on the ACT site and we will be adding to those questions. The FAQs based on input from this webinar as well as - if any other questions come to us and please keep in mind that all questions the responses to all questions that any of us get will be shared with the group on Challenge.gov or you can get to them from Challenge.gov to get to the ACT website. Additionally, there is a discussion board that is available for you on Challenge.gov and that's a really great Segway to turn it over to Tammy White from GSA and Challenge.gov and Tammy are you on?
[SLIDE CHANGE]
Speaker Tammy White:
I am here. Can you hear me?
Speaker Denice Shaw:
Yes we can, I'll turn it over to you. Thank you Tammy.
Speaker Tammy White:
Great. Alright so thanks for inviting me to participate today I'd like to say welcome to everyone on the line. From the team here at Challenge.gov just a couple of notes about our program and our site. Challenge.gov is the official listing of all federally sponsored crowdsourcing competitions across government. So, we're happy to provide the platform for the Environmental Protection Agency and its partners to accept your submissions. When you come to Challenge.gov you will see as I mentioned a listing of prize competitions and you'll have a variety of different ways to search for challenges and topics of interest to you.

If you go today, the Nutrient Sensor Challenge Action Challenge is near the top of the page, but as additional challenges are added and published to the site it will move down the page. So we've got that handy search box in the upper right hand corner you can always search for the challenge to get to that page. Again, I mentioned that there are a variety of different ways to search for other topics and competitions by type and prize amount. If you're looking at this, you'll notice that just under the search box the there is a "Log in and register" link. If you're interested in just browsing Challenge.gov you're not required to log in and register, but if you want to submit a solution you'll have to log in and create an account so for all of you planning to submit to the nutrient sensor action challenge you will need to create an account. And all that's required for your participation is an email address, and along with that email address you'll need to create a username and password that's specific for your Challenge.gov account. We ask for an email address so we have a way of notifying you if you win a prize or if the challenge management team needs to ask you a question or clarify a point on your submission. If you want to flip to the next slide here…

[SLIDE CHANGE]
Speaker Tammy White:
So this is what a challenge details page looks like. There's a little key that I put down there in the left hand corner and I can talk to you a little bit about what you're seeing. So running down the center of the page, after some of the key dates and skills and interests, you'll find the main body of challenge details and this is where EPA will outline its problem statement and there ask to you. But let's just skip through these numbers really quickly. So along with the challenge details you'll have number one the discussion board. And members of the public, participants, or solvers as we like to call them can come to the discussion board to connect with each other, to ask questions of the agency challenge management team. This is really a place for you to interact with this particular challenge's community.
Just under the discussion box you'll see a solutions tab. And you'll notice that here it says solutions seventeen and this is an important point to clarify. This is the number, the seventeen here on this solutions tab, shows those solutions that have been made publicly available or visible by the participant. You will have the option of making your challenge details public or to hide them and to keep them private so that only the challenge management team can review them and I will tell you about that in a minute.

Three there's a rules tab and every challenge outlines its rules of engagement so that's definitely an area that you're going to want to make sure that you read through carefully. Four, so I've mentioned that skills and interests every challenge sort of outlines a primary skill or interest area. It's not all inclusive but it gives you a sense of what this challenge might pertain to. At the time that you register to use Challenge.gov you'll have the ability to specify skills and interests that you have and so when challenges launch in the future you'll receive alerts when challenges match your skills and interests. Key dates - so submission dates, judging dates, anticipated winner announcement dates, that's where you'll find information on dates. And then, as I mentioned earlier, the challenge details which will flow down the length of the page and then on the right information about prizes or incentives that are offered. If you hit the next slide, I can tell you a little bit about what you'll see when you want to submit a solution.

[SLIDE CHANGE]
Speaker Tammy White:
So from that main challenge details page there is a tab that says submit solution and again you have to be logged in, you have to have an account, and you have to be logged in to submit your solution. So once you're logged in, and you navigate to this challenge and you're ready to submit, you click "submit solution" you'll see something that looks like this. So this page will have several fields that you'll need to update, or you'll have the ability to update.

First is the title, what is the title of your submission? Number two is the image or logo. This is not mandatory, but perhaps you have an image or logo that conveys your university, or your club, or your team, or your company, or just something that you like. You should feel free to upload that image here. Three, an external URL. If you were including as part of your submission a link to your LinkedIn page, or a university website, or a company website, or a GitHub repository this is where you would include it.

Four, solution files. So this is where you can include additional documents, and I think I saw that the proposals that you are submitting are no more than eight pages and so maybe that's a word document or a PDF. This is where you would upload that file. So right now there's no files selected but you would click the "upload file" button and then you would be able to find the file on your computer and select a file and it would be attached. And then, just below "solution files", is the description. So this is where you can give a little bit of an abstract or a little bit of information before getting into the deeper details that are detailed in your solution files. So if we can skip to the next slide just a couple of final details here.

[SLIDE CHANGE]

Speaker Tammy White:
At the bottom of the submission page again, you have the option to either make your solution public or to keep it private. If you want to hide the contents of your submission from all others on Challenge.gov you'll click the top box. And by default that box will be clicked so if you want to make - if you want to make them public you'll want to uncheck that box. Now, you do have the option of showing of making available your brief description or abstract but hiding any additional solution files that you have attached. So if you would like to make your description visible, but hide your files then you would uncheck the top box and then down below where it says "show associated solution files" you would leave this box unchecked.

If you wanted to show your description but you wanted to hide your associated solution files this is pretty much what your options would look like. And then just below that importantly you'll see "I accept the challenge terms and conditions" you'll be required to check that box before you can submit. You can see that "submit solution" is greyed out right now its inactive once you click that check box the button will become active it will turn orange and you will be able to submit. Once you submit the browser page will update you will get a message in the center of your window that congratulates you for submitting your challenge. You will not receive a confirmation email so just make sure you see that yellow congratulatory message in the browser window and then you'll know that your challenge submission has been received.

If at any time you need to come back and edit your challenge you can do that, you would just log back into Challenge.gov once you're logged in you will see your username where it previously had "Log in/Register". You'll click your username, select the option for "my profile", and you can scroll all the way down to the bottom to see any submissions that you previously uploaded. And you'll have the ability to edit your submission until the submission window closes.

With that, I would say again - feel free to use the discussion board to talk amongst yourselves or to ask questions of the agency challenge management team. If you have questions about the challenge.gov application or you're having difficulty, you've forgotten your password or you know you're having another technical issue, at the top of the Challenge.gov webpage you will see a "contact" option and you can click that. Fill out an email an in-browser email and it will come to us so that we can help you. And with that, I will pass it back to the EPA team with best wishes to all of you participants and for your success.

[SLIDE CHANGE]
Speaker Denice Shaw:
Well thank you, Tammy, that was that was really excellent. I appreciate that and I don't think I appreciated all of the of the nice features of Challenge.gov, so I look forward to seeing your submissions on Challenge.gov. So with that, we've got a few minutes - we've got thirteen minutes for questions. And so let's go ahead and look at some of the questions that have been sent in. Lauren do you want to - would you mind reading them?
Speaker Lauren McAllister:
Yeah sure, there's a question from Ed. It says: are sensors provided from outside of the thirty participants allowed for this stage?
Speaker Denice Shaw:
Are sensors provided from outside…I don't think…
[BRIEF NOISE INTERRUPTION]
Speaker Mario Tamburri:
Denice this is Mario. I think they're referring to the registered participants in the Nutrient Sensor Challenge. It's my understanding, but please Denice correct me if I'm wrong, is that any sensor, nutrient sensor, that is low cost can qualify for this.
Speaker Denice Shaw:
Yes, absolutely I'm sorry I didn't understand that. Mario thank you very much, yes. You can get your sensors anywhere that you can find them, yeah.
Speaker Lauren McAllister:
Another question is to define low cost sensors.
Speaker Denice Shaw:
Yes, we have defined low cost sensors as we set a threshold of 15k. I appreciate that there are different ways of describing the cost of the sensor. That could include: some enabling technology, or some add ons, or peripherals. But we'll leave it up to you to describe the sensors, but we're looking at 15k or less.
[BRIEF PAUSE]
Speaker Denice Shaw:
Any other questions?
Speaker Mario Tamburri:

Denice I this is Mario again sorry. I saw one about is freshwater included - again my understanding is that monitoring of freshwater systems, or coastal, or oceans, is that they're all included as part of participants being able to apply for this challenge.

Speaker Denice Shaw:

Yes, thank you for clarifying that Mario.

Speaker Lauren McAllister:

Another question is: do manufacturers provide sensors or is the cost of the sensors to come out of the grant money provided?

Speaker Denice Shaw:

That's an excellent question. First off, let me make the point that this is not grant money. This is a challenge. This is a different kind of grant money - it's not a grant. The money that is awarded to the recipient at prizes - at the end of stage one does not have strings attached to it. You can drop out of the challenge at that point and you're happy to use the resources any way you want.

This is, again, this is the whole context - the whole strategy for challenges and I encourage you to look at some of the other challenges on challenge.gov to get a flavor for that. When you're participating in a challenge you get awarded for the results so it is not a grant. So those funds can be used in any way you see fit and whatever kind of arrangement you might have with a sensor manufacturer or a sensor provider.

[BRIEF PAUSE]

Speaker Denice Shaw:

While we're waiting for any other questions are there any of the do any of the speakers want to add anything at this point, or clarify anything I might've said that they'd like to - or add anything?

Speaker Lauren McAllister:

Okay we have another question. Is the award for the proposal, not the execution?

Speaker Denice Shaw:

Yes, and again, these are really plans not proposals in the sense of a grant, it's not a grant. So the award is for the plan - for the action plan that is submitted. It is not - it can be used for the execution, if that is your prerogative.

Speaker Lauren McAllister:

Would a university without a company partner be considered?

Speaker Denice Shaw:

Yes, absolutely. It doesn't matter where the sensors are from…absolutely.

Speaker Lauren McAllister:
So if someone bought a sensor with existing grant money, could they use the challenge money for staff hours?
Speaker Denice Shaw:
Yes, yes there are no expectations for where the sensors come from or how - what arrangements you had to get them, so yeah. And again let me be really clear that there are - you can - for the folks who are semifinalists who come through stage one and get an award. That award is a prize. It has not got strings attached to it for how you can or cannot use that money - it's a prize. And so however you choose to spend that money is entirely up to you. You can go to Hawaii with it if you want. That's the nature of challenges and prizes.
Speaker Lauren McAllister:
Please clarify if state organizations are eligible. And if so, how have states handled the possibility of appropriate receipt of cash prizes in past for other challenges?
Speaker Denice Shaw:
That's a really great question, and that has been done. It is an individual - the team lead is identified and the ability to take in that money is negotiated between the team lead and their employer. And we can be involved and help with that, but basically it is a check and the check can be made to the state, the check can be made to the individual, it's entirely up to the team lead and how they want to make that happen. And addition extending that question just a little further, the team - the award can be provided to one person and then they can share it with other people. Again it's a prize. We have had experience with making prize payments to different organizations and we will work with you on that.
Speaker Lauren McAllister:
There is a question regarding the prize money being impacted by EPA budget cuts.
Speaker Denice Shaw:
That's a very good question. The funds have been set aside, and they have been set aside for this project.
Speaker Denice Shaw:
And again, I'll say again that the winner - the name of the team lead who will be getting the award needs to be a resident of the United States. And so that is part of the requirements under the authority for which we're conducting this challenge.
Speaker Lauren McAllister:
There's another question. If the Challenge.gov website shows each of the agency and sponsor leads and their contacts.
Speaker Denice Shaw:
It just lists the agencies.

[BRIEF PAUSE]
Speaker Denice Shaw:
And again, any questions that come into us we will - that come in on challenge.gov or any other mechanism - any other way that they might come in to us will be shared either on Challenge.gov or the FAQs. So that all the information is made public. These are great questions thank you.
[BRIEF PAUSE]
Speaker Denice Shaw: Well I don't see anyone else typing now so I think - Grant did you have any - can I turn it back over to you?
Speaker Grant Strauss: Yeah, I think pending any other questions, although I'm not seeing any further typing into the chat box. So I think that pretty much concludes our presentation today. Just before we signed out - I just wanted to again thank everyone so much for taking the time out of your day to join us this afternoon. Just wanted to note that our intention is to post the archive of this presentation on the Nutrient Sensor Action Challenge website and that slides will be available online. So again thank you so much and have a great rest of your day. Thank you all.

[END OF WEBINAR]