

NPS-USGS Water
Quality
Partnership
Program

2021

Work Group
Comments –
Proposals for
New Projects
Commencing
FY2021

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Filling a data gap in the NGWOS study in the Delaware River Basin by assessing climate's effects on water quantity and quality in palustrine wetlands of the Delaware Water Gap National Recreation Area

CATEGORY: Intensive

PARK: Delaware Water Gap National Recreation Area (DEWA)

USGS Upper Midwest Environmental Sciences Center

Comments:

Interesting inclusion of amphibian calls to NGWOS to assess ecological health. Had concerns with the ability to easily transfer this to another park and the software/algorithms for assessing the calls. Also, cost-effectiveness was a concern.

The Introduction seems to address collecting data on long-term temperature and precipitation, water quality, biodiversity, wetlands, and amphibians in the Delaware River Basin and the primary reason offered is that the data is not part of the NGWOS program. The indication of urgency is that collecting the data now "likely would be most efficient". The proposal is not concise and was a little hard to follow.

This is a synoptic study presenting as an intensive study. In summary, the proposal will generate measurements of 4 WQ parameters, 12 times (48 total WQ measures) in 20 wetlands (960 total), continuous water depth, temp, and air temp, and lots of amphibian sound data. Of the \$294K total, less than 10K is equipment. The rest is salary, travel and overhead. It is also not clear what the "problem" is, or whether the proposal will address it. It is only stated as a data deficiency of an already funded project.

The stated title is "assessing climate's effects on water quantity and quality in palustrine wetlands". However, there is little data to be collected on either, and most of the data will be focused on amphibian presence/absence. The scope of this study is rather narrow, and how the three years of mostly qualitative amphibian data, and water depth and the few seasonal WQ variables will be used in combination with the historic data to assess the impact of future climate change is not identified, but it does not appear adequate to even look for possible relationships, let alone the basis of predictive models. It is also a lot of money. I suspect that this study will collect not much data, and even less "information".

Has it also been shown that wetland depth changes with water availability? What about flow through and what is the actual control of depth?

Well written proposal and identifies critical eco-hydrological needs. While I think the study is important, the water quality connection is not there for me, and is limited. This program is about addressing water quality issues and the chloride and nitrate data to be collected is limited. The work is well thought out and technically sound and the work would be great for looking at climate impacts on the park, but I don't see the direct link to what will be resolved with this study or how the park

would use the data to make decisions. However, with the data being collected, could this be made into a 2-year synoptic study, to look at the data need for the park?
This study would initiate a long-term study with no known or expected support past Year 3.
Nitrate and chloride can move through water bodies in pulses when related to sources such as deicing rather than septic/sewer. The proposed water quality approach has a high likelihood of missing these patterns. Are these constituents in elevated concentration such that the ecosystem is being impacted in flowing sections of water?
If this study is linked to climate change, shouldn't there be a section of study looking at the historical climate data and comparing it to predicted changes?
This study simply will not provide the density of water quality data necessary for the park to make meaningful status and trend decisions on nitrate and chloride concentrations in their wetlands.
"Severe threat exists from increased storm-event frequency and intensity, which may be changing water quantity and quality": the proposal would need event-scale QW monitoring to elucidate that, not seasonal sonde measurements. This level of water level and temperature is proposed, QW should be to match. I would prefer to see this over the acoustic monitoring if it were one or the other.
Seems that a great deal of time will be dedicated to writing manuscripts (3 proposed). Perhaps there will be enough data to produce three manuscripts (expansion on potential ideas would be welcome), but is it the best use of WQPP money to fund so much writing time?
This proposal seems as though it is simply supporting an ongoing USGS research priority by using an NPS park unit as a sampling location.
This project theoretically sets up a data collection framework for staff at DEWA to understand changes in water quality and quantity over time. Does DEWA have the required staff and time needed to continue the effort beyond this project timeline, or will data collection occur for 3 years and then stop?
Was there a reason that these wetland-upland landscapes were initially excluded from the NGWOS? Was it a lack of understanding, a lack of money, a lack of importance?
In "Severity of Resource Threat, Problem, or Need," the importance of understanding changes in nitrate and chloride concentrations is emphasized, yet this is arguably the portion of the project with the least attention and funding. The proposal indicated that it is not affordable to study these variables with high frequency, but it likely IS possible if funding for another project focus is reduced. Four discrete measurements of these variables is likely insufficient for any real conclusion. This project would benefit from more funding to water quantity/quality and less to amphibian tracking.
Project has strong background concept to show "Technical Soundness." Methodology is established and has been used by primary USGS researcher (Dr. Sadinsky) in other areas of the US. This does not, however, represent a new or innovative approach that would boost the score for "Scientific Merit."
"Transferability" section describes project importance by emphasizing the willingness of past partners to leverage their own funding to support this effort, however NPS (specifically DEWA) is NOT contributing matching funds of any kind to this project.

Assessment of physical and nutrient instantaneous fluxes through the floodplain surface waters in the Congaree National Park (PMIS #248772)

CATEGORY: Intensive

PARK: Congaree National Park (CONG)

USGS South Atlantic Water Science Center

Comments:

Solid approach to filling this data gap in the park. Did not seem to implement any new or unique techniques, methods or instruments. Some concerns with the web-story product.

Despite a long history of USGS research associated with the CONG, there still appears to be limited information regarding net budgets for nutrients and water. Although this is submitted as an "intensive" study, the authors repeatedly use phrases including "baseline data" and "synoptic" to describe the study. Determination of net budgets would be important to the CONG but the transferability to other parks would seem to be somewhat limited. The discussion of total suspended solids was confusing given that later the proposal mentions suspended sediment concentration. Are there any existing data from southern bottomland hardwood swamps that could be mined that could provide supportive information? The in-kind matching support was relatively low.

The study does not appear to fully characterize the export/import of sources of nutrients associated with the floodplain

The objective of the proposal is an "assessment of water and nutrient instantaneous flux within the floodplain ecosystem during baseflow and high-flow conditions". However, the proposal calls for sampling at baseflow and high flow, sub bankfull. Almost by definition, a high flow is one that would at least start to inundate the floodplain, which this proposal does not intend to sample. I'm not understanding how you propose to study flux of nutrients associated with the floodplain, without sampling at flows that inundate the floodplain. If this proposal were to sample baseflow, sub-bankfull, and a series of higher flow events to inundate the floodplain to differing degrees it would be a much more complete and stronger proposal.

Similarly, there is no sampling for large sources of organic nutrients such as leaves/detritus which may be removed/deposited by suspended in the water column and are likely a major source of import/export of nutrients.

Like this project but left with a few questions. There is a mention of RSIL in the proposal but not what they will do? I could see nitrogen isotopes analysis being useful in this study. Is it an omission isotopes analysis not discussed or an accidental inclusion of RSIL in the proposal? Consider adding the isotope work. The study will provide valuable data to the park, but seems some of the impacts come from outside of the park, what can the park do to control activity outside the park unit? I would like to see the problem resolution expanded to more what impact can this study help solve or manage. Really like the outreach component, this is win for all involved, and can be a key component to the problem resolution, is the communication of the work in the story board.

Seemingly not a top priority topic per the 5-year strategic plan.
I have a difficult time understanding how representative this approach is going to model actual conditions of such a dynamic system. Would rather see a more compact group of parameters sampled more regularly than a larger suite a couple baseflow and events per year.
Intro stated that researchers would collect water, N, P, and C data in the channel; background emphasizes floodplain connectivity, storage, and nutrient cycling/processing. The discussion includes theory of how these are related, but not a description of how the data will be analyzed/processes to tie channel data to floodplain performance.
Sampling will be performed at baseflow and at sub-bankfull stormflows, but this data is intended to provide insight to the backwater effects and floodplain fluxes of water, N, P, and C. How are sub-bankfull flows creating any kind of fluxes between the trib and main channel? By definition, sub-bankfull means contained within the channel.
What data analysis will be performed? The study will result in discrete measurements of channel flow and instantaneous fluxes of nutrients; will these be built into some type of rating curve, or simply maintained as discrete data points? Seems too few to build a strong rating curve and too "raw" if simply left as standalone points.

Restoration of Redwood Creek Estuary: a degraded habitat essential for ESA listed salmonids

CATEGORY: Intensive

PARK: Redwood National Park (REDW)

USGS California Cooperative Fish and Wildlife Research Unit

Comments:

Very comprehensive and interesting approach to this issue and possibly providing the final piece to issue resolution. Slight concern with transferability to other parks. Would benefit to have additional in-kind services.

Restoration of habitat to support ESA listed salmonids is critically important. Though the title and parts of the proposal suggest more inclusively ESA listed salmonids, the study is focused specifically on Chinook salmon. As the authors describe in the proposal, there are various stakeholders and competing stakeholder interests. Though the problem is defined scientifically, the real underlying problem may be more political than scientific. Considerable work seems to have already been done, including fish recruitment models, hydrodynamic models, and sediment transport models. Unfortunately, these previous efforts did not include or address landowner stakeholder concerns. The authors indicate that they have engaged landowners and are “likely to get commitment to a restoration scenario” that they select as a result of the study. The authors admit that “The ultimate goal of this project is to convince landowners”.

I am fully supportive of all efforts to restore Redwood Creek, but I am not convinced that there is a need to conduct this study, as it appears that previous modeling efforts should have provided more than enough information to inform a decision (Chen, Bond, Moffat and Nichol, Humboldt County). While the proposal is interesting, and a different approach to past approaches, and sure to produce some new and useful information, will it provide any information that is fundamentally different than previous efforts; i.e. which restoration approach is relatively better for the fish? Or this another study to overcome some public relation missteps in previous efforts?

There is no discussion of the accuracy, and precision of the data that will be collected or that expected from this model, or of past uses of the model. If it can only provide an estimate of relative benefit, is this different than past efforts.

There is no discussion of the specific restoration designs, how they differ from one another, and whether they are the same or different than those analyzed in the past. It should also be discussed what the opportunities and constraints for restoration approaches may be. It is often the case that the while you want to do good things for the fish, the final restoration approach is determined by other considerations. Is the relative benefit to the fish the primary determinant of the restoration design as long as it is positive?

It would appear that before another modeling effort is funded, someone should summarize all the past efforts and their results, conclusions and recommendation, identify why the past studies were

insufficient, and how this study is fundamentally different and will lead to a different outcome, before another \$300K is committed to another modeling effort. \$300K could be used to conduct the restoration.
Proposal is more on geomorphology than water quality. The water quality component is minimal in the project. I can see how they would be used to help model the changes in sediment and improve the fish habitat, but water quality data, such as sediment concentration or other constituents are not be collected at this stage to assess the changes through modelling. This work looks like it is strongly needed, but the water quality component that ties to this program is lacking to me.
I am confused in many places when "we" is used to describe specific tasks. Are they being done by NPS, USGS, University partners, grad students?
While all good science, the water quality aspect is tangential to the project focus.
It seems VERY ambitious that two graduate students will carry out most of this project over the given timeline. There is a very large amount of work and a relatively low budget for oversight from either USGS or NPS scientists.
If flooding is primarily on adjacent agricultural fields, the potential threat to human health and safety is generally low. I would not consider this as a reason to increase score for ranking criteria 3.

Evaluating the effects of infrastructure on stream water quality and benthic community composition in Catoctin Mountain Park

CATEGORY: Intensive

PARK: Catoctin Mountain Park (CATO)

USGS MD/DE/DC Water Science Center

Comments:

Project support was low. Concerns that even with the data and information this study would provide what are the alternatives to this issue? Did not seem that the issue could be easily resolved or mitigated.

The first line of the proposal states, "maintaining pristine habitat in National Parks is a high priority" and begs the question that pristine habitat exists in National Parks, especially parks near urban areas. As the authors later explain, pristine habitat does not exist in the CATO. The title suggests that the effect of infrastructure on water quality is the focus of the study. However, this study is really about linking road salts to benthic communities and thus the effects of infrastructure are inferred. This proposal would seem better focused (as per a title) on intensive assessment of occurrence and distribution of desalinization salts on stream benthic macroinvertebrates. Existing studies suggest that increasing chloride concentrations as a result of road deicing is a significant issue. What is needed is a better understanding of the distribution and persistence of road salts in the ecosystem. Road salts can seep into groundwater and can remain in surface water into spring and summer. They can also travel considerably downstream and thus can occur far from distributional "infrastructure" sources.

I'm not fully understanding the need for this study, or why the USGS would conduct work that should be done by the NPS National Capital Region I&M program or the State (5-year intensive WQ survey). Additionally, it seems that many of the stressors and their sources are already known and for those that can be addressed, actions being implemented to correct them. It seems like a periodic study to monitor the response of benthic insects to management actions would be helpful, but I'm not convinced for the need for an intensive \$300K study to study specific causes and effects that are supposedly already known. The park should talk to the I&M program to do the regular monitoring. I realize that the I&M program may have some other larger questions, but if a sample design cannot also incorporate some of the specific needs of individual parks, then there is a larger problem that needs to be resolved.

Need more information on the project support and cost effectiveness. It states other in kind may include, but no estimate of the savings or benefits of the potential in-kind services. I do like this work and think it is timely. Takes advantage of existing data and compilation of the previous data, to which seems an abundance of prior data/information. Consider adding another year of high-frequency data collection. What if the one period is not representative/ Two years of data of high frequency would be better. Any near surface water body ground water wells that may be under the

influence of the SW? Could they be instrumented to look at the potential on GW and to compare to the previous work?
I believe the proposal means to look at both lotic and lentic environments, not lotic and lotic.
Problem definition: Won't increasing temperatures reduce road salt usage (fewer freeze days), and it was mentioned in the intro and background section that infrastructure improvements are ongoing. How do these contribute to the assessment that impacts "are likely to increase over time"?
Transferability: It is more difficult to transfer methods and results if a publication or other product is not going to be developed.
Project support: Very small amount of in-kind support.
Unclear as to whether the Brook Trout are a protected species. Significantly changes the importance of the project

Using water level management to reduce cyanobacterial bloom toxicity

CATEGORY: Intensive

**PARK: Voyageurs National Park
(VOYA)**

USGS Upper Midwest Environmental Sciences Center

Comments:

Interesting proposal with a unique approach. Scored low on the transferability to other parks, methods may not work with different park sediments and concentrations. Also, would have benefitted with additional in-kind support.

There is a need to develop effective tools to reduce toxicity of cyanobacterial blooms and there is evidence that water-level management could be one of those effective tools. The proposal is relatively well-written, and the study includes an important experimental component to assess desiccating sediments under water-level manipulation. Collaboration with water science centers and other on-going research activities is commendable.

This proposal would have been a lot stronger, and its relevance and importance more easily understood if you had referenced the International Lake of the Woods Basin Water Quality Plan of Study, and noted that this study was not identified in the plan, but it is now realized that it may be a significant factor driving blooms and important for understanding the overall nutrient budget of the lake system. It would also have helped if you had provided some more details of the specific processes that lead to increased P availability via wetting and drying. It is a little counter intuitive because it argues that aerobic conditions/processes lead to increased P availability which is quite different to internal P loading under anoxic conditions. But I did find a good explanation (<https://www.sciencedirect.com/science/article/pii/S0048969712008406?via%3Dihub>).

I'm now convinced that this is an important study if VOYA is to fully understand the mechanism driving nutrient availability, create an accurate nutrient budget, and understand its possible relationship to HAB's. But I don't know what you can really do about it. Who would have thought a few feet of water, and the ensuing erosion of the lake shoreline could cause such a mess? If the solution is to further regulate and stabilize lake levels, is it time to consider taking out the control structures at Kettle and Squirrel Falls to restore some semblance of natural lake function.

In these experiments, is there any way to tease out the relative contribution of existing sediment nutrients becoming available via wetting and drying, and the increase in total availability of sediment nutrients that are derived from recent shoreline erosion? Seems like the ultimate source of increased nutrients could be erosion, but it also becomes more available through wetting and drying.

Consider adding dark bottle field experiment to estimate respiration/BOD in Objective 1. Add monitoring of DO.

Monitor DO concentration in 48 hour phytoplankton incubation experiment (objective 2). Since we don't know the evolutionary role of toxins (see <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3736421/>), or the specific trigger for toxin

production, it may be that night time high respiration/BOD, and low DO could be a trigger. I don't know, but it should be easy to measure, but it wasn't identified I don't think.
Well written proposal that addresses a critical need and can be potentially useful in similar environments. Project is timely and appears to coincide with existing research increasing the cost effectiveness
I understand this is mentioned in the proposal, but still seems that an approach to modulate N and P by reducing mobility but remaining in the system, is lacking without some identification and mitigation of the initial loading into the system.
Is this lake a source of drinking water? Are exceedances over drinking water standards relevant? How should a project like this be ranked in comparison to sites with documented severe impairments to aquatic and human health?
If blooms have been occurring "for at least several decades", are there data to quantify whether they are getting worse or becoming more toxic?
Have previous cyanotoxin sample results been back-compared to the lake level at that time? Seems like some low-hanging fruit to investigate.
Unfortunately, hydropower is demand-driven and unlikely to be heavily modified to meet the lake level needs to reduce bloom potential, even if the relationship is shown to be quite direct. Do not want to appear pessimistic but blooms may take a back seat to a "clean" energy source.
Although this research has significant implications for VOYA and for managed lakes everywhere, it was not extensively discussed how the management of cyanobacteria/toxins in this Lake system would be beneficial. For instance, cyanotoxins do not impact the use of these lakes for hydropower, and the recreational uses of the lake system were barely mentioned.
The threats caused by the cyanotoxins are not well defined herein. I found myself having to search many more questions and articles to get the appropriate background to understand the severity of the threat. For instance, the "700,000 hours of angling" is mentioned multiple times, but there is no discussion of the threat that arises in this scenario. Is the threat from direct contact by the fisherman? Is it bioaccumulation in the angled fish? WHY/HOW is there a threat to anglers?
The Problem Resolution is oversimplified herein. Although this information will indeed directly contribute to lake management decisions, it is not the sole factor in determining lake level management (as described in this proposal). If higher/lower lake levels show decreases in cyanotoxins, lake levels will not immediately be changed accordingly, but rather cyanotoxins may be more explicitly considered in the next round of negotiations for the IJC.

Vulnerability of stream water quality to road construction in Gates of the Arctic National Park, Alaska

CATEGORY: Intensive

PARK: Gates of the Arctic National Park and Preserve (GAAR)

USGS Alaska Science Center

Comments:

Great opportunity to collect baseline data before construction begins and determine impacts over time. Concerns with transferability and how this data would benefit other parks since it is using established techniques and methods. Also would benefit from additional in-kind support.

In the methods section there is discussion of stream webs that include analyses of macroinvertebrate species richness. Stating that macroinvertebrates will be taxonomically identified to species provides an unrealistic expectation of benthic macroinvertebrate taxonomic identification accuracy. This should be indicated as "taxa richness" as many macroinvertebrate taxa cannot be accurately identified to species without significant effort and cost in a laboratory. I expected to find how biological sampling will be conducted described in the Methods section. It was not but was included on page 11 under Responses to the Nine Criteria. Understandably, given that the focus of the study is based on road construction and permafrost issues this study may have limited transferability beyond Alaska. The problem resolution seems to be challenging in that though the information may allow for slight adjustments to road alignments, it seems that roads and associated impacts will occur regardless of this study.

ANILCA, PL 96-487 §201(4) authorizes the Ambler Mine Road, in accordance with the provisions of the Act. While the construction of the road (Alternative A), if not prevented, will have impacts to the GAAR Preserve, the types and locations of impacts are already identified, and mitigation measures identified to limit them (Appendix N of EIS). Ultimately, the key to protecting the habitat is identifying BMPs, and impact thresholds as part of the permitting process and ensuring that they adhere to them. It is then the permittees responsibility to pay for and conduct this monitoring and the federal agencies to conduct oversight and enforcement.

Much of this proposal seems very high level and research based, compared to basic issues that will need to be monitored and overseen.

Very timely proposal and see this proposal addressing issues of other parks in the AK region, not just with road construction. Proposal can be modified to address climate change impacts on changing permafrost conditions and the water quality impacts to the streams and biota. I see a lot of transferability within the AK region. Timing is right and concur that delaying the project is data lost, and limits future data acquisition utility. Establishing the continuous sites now during the baseline opportunity will allow to re-install and evaluate conditions after roads and bridges are completed. This study will provide a valuable dataset.

Could the source of maintenance road base material be from the Ambler mining district itself (waste rock), in which case metals loading may occur from other pathways beyond dust?

Methods: shallow geophysics (electrical resistivity) would be a valuable addition to field collaborate with cores and look at surface features indicative of certain permafrost conditions.

The vulnerability map with recommendations on road alignment is a good tangible product that NPS will use.

Initial thought is that a) NPS/USGS would be paying for 'compliance' for a BLM and State of AK project, and that b) there is an option for this connector road that does not go through NPS property. Between these two factors, it seems as though this project is not a great fit here.

Eventually becomes clear that there is a separate EIS that is due to be completed within the 2020 calendar year. This project is therefore a way to collect baseline data to evaluate future roadway impacts.

Two years of hydrologic data is not enough for a true rating curve. Thaw will be measured using borings, but is there expected to be significant thaw to measure PRIOR to the roadway construction?

Regional identification of water quality opportunities through wetland and stream restoration

CATEGORY: Intensive

**PARK: Rock Creek Park (ROCR),
MANA, NACE, WOTR**

USGS MD/DE/DC Water Science Center

Comments:

The proposal would benefit from more in-kind support and scored low in the cost effectiveness and transfer-ability criteria.

The introduction and problem identification were not very concise or clear and thus a little confusing. I don't think the transferability potential was given due credit as transferability would seem to be relatively high. The approach could be a template for other parks to help resource managers with stream and wetland restoration priorities.

This proposal seems like a Rolls when you can make do with a Civic. There are apparently 42 projects involving 50 acres and 4 stream miles. Thus, many of these projects are small. If none of them are clearly the worst "low hanging fruit" then just pick a project and move forward. Spend the \$300K on getting something done.

There seems to be a little tie to water quality issues and I would like to see it stronger. While this is a worthwhile project, I am wondering if a smaller scoped (1 -2 parks) project as a synoptic to develop the model would be beneficial as the proof of concept. Second, take the results of the synoptic proof of concept, and work into an intensive study to implement and monitor the change, therefore validating the GIS model and make it a widespread concept to the other parks. With the water quality limited on this as written, not sure these fits within the funding requirements for the program. Increase the water quality connection, or consider reducing to one or 2 parks as a 2-year synoptic (proof of concept) for improving nutrient loads

The proposal is almost all salary and overhead.

This is a worthwhile endeavor, but I wonder if this is the ideal funding mechanism.

It does not seem as though this product would "age" well. If restorations are not completed within a couple/few years of the WRAP, it may be necessary to re-evaluate and re-prioritize sites to obtain funding to conduct restorations.

Is it necessary to produce an entirely new model? This does not seem terribly novel, so I am wondering if an existing model could be used or modified, saving time and money, and keeping a consistent methodology which increases the transferability.

Impacts of water quality on submerged aquatic vegetation at Jean Lafitte National Historical Park and Preserve, Louisiana

CATEGORY: Intensive

**PARK: Jean Lafitte National
Historical Park and Preserve (JELA)**

USGS Lower Mississippi-Gulf Water Science Center

Comments:

Project support and cost-effectiveness were low and limited on transferability to other parks. This proposal utilized established methods and would have benefitted from an innovative component.

SAVs in coastal Louisiana endure numerous stressors including diversions and sedimentation, saltwater intrusion, nutrient enrichment, herbicides, mechanical removal, etc. There is a growing body of research conducted on SAVs in the proposed study area and the proposed study builds on that research. The methods suggest that pH and turbidity are recorded at the gage at Lake Cataouatche (2951190901217). There is no indication from the data records that pH and turbidity are recorded at this gage. The methods also indicate that the gage at the David Pond Diversion will be used for “historical” reference. Given that the data records begin in the year 2002, perhaps “historical” should be defined. In 2011 at the time of a fishing tournament, Lake Cataouatche was nearly 100% covered with hydrilla. The ensuing public debate among bass fishing groups, the LDWF, and the Corps focused on the lake, fishing, diversions, spraying herbicides, and mechanical removal of SAVs that engendered a great deal of public attention but that information doesn’t appear to be mentioned in the introduction.

The proposal intends to identify the major WQ drivers affecting SAV in Lake Cataouatche. Many researchers have been working on these issues for a considerable time and have already proposed mechanism that drive SAV and FAV. While some new and interesting information might be found, I am not convinced that this short-term proposal will lead to a significantly greater understanding of the hypothesized cause and effect relationships between SAV, FAV, and controlling variables that play out over decades.

The issue seems critical to the park, and seems to have been bad and improved, then seems to be on the decline again, so possibly a recurring problem, and would recommend as part of this study is to incorporate some type of retrospective analysis at the previous time period when conditions improved. Maybe the data is not there but looking at the other factors, beyond the WWTP improvements, should be considered. It is unclear to me if new remote sensing work will be done. In the body of the proposal it appears a look at historical imagery will be included, but in the answering of 9 elements, it seemed new data was to be collected. Drone work could be a valuable asset to this study, however, that may be limited with DOI grounding of unmanned flights. Consider adding more drone work or clearly stating what drone work will be done.

This proposal seems as though it is simply supporting an ongoing USGS research priority by using an NPS park unit as a sampling location.

End of page 3 and top of page 4, it is stated that the most recent study pushes exposure as a primary driver of SAV presence/absence (with interaction of other factors) and then immediately states (next sentence) that exposure was identified as "not directly responsible" for SAV loss. Which is it?

Page 8: Water quality will only be collected twice, winter 2021 and spring 2021?

It is continually referenced that factors X, Y, and Z determine the presence/absence and distribution of SAV (with literature references included). To be clear, the La Peyre study determined that this was NOT true in Lake Cat? Can existing data not be reanalyzed to look for covariant causes?

Utilization and method development of non-native Quagga mussels (*Dreissena bugensis*) as a monitoring tool for polycyclic aromatic hydrocarbons affecting water quality and biota in the Lake Powell reservoir system

CATEGORY: Intensive

PARK: Glen Canyon National Recreation Area (GLCA)

USGS Arizona Water Science Center

Comments:

<p>Interesting approach to determine impact of PAH's in the ecosystem. Scored low in transferability and cost effectiveness.</p>
<p>The proposal is well written, and the authors are experienced in the area of research. Five million gallons of gas sold annually is a great statistic to indicate the extent of the problem, but it could be taken further. If the average car gas tank is 12 gallons, that's enough gas to fill up about 1.25 million cars. Although the cost-effectiveness of the study may be uncertain, the point of the research is to develop a more cost-effective method of monitoring PAHs based on use of the quagga mussel.</p>
<p>Table 6 of Coes et al 2019, which presents the results of the 2016-2017 PAH survey on Lake Powell, shows that while numerous PAH's are present, the maximum concentration of any of them was generally many orders of magnitude less than EPA/AZ state water quality standards.</p>
<p>While PAH's in the water are unlikely to be a public health concern, they may pose an ecological or human health risk, as quagga and zebra mussels are already known to take up PAH's and so may be available to other receptors such as ducks and fish. But the primary intent is to provide an alternative to the current method.</p>
<p>My primary concern is the focus of and need for an intensive study at this time. The park already has a method using SPMD's to monitor PAH's in the water column. They already know they are there in low concentrations. If they believe that PAH's may eventually bioaccumulate in recreationally important predatory fish, then I would recommend an initial synoptic study to get some preliminary data on the body burden of specific organisms which can be compared to already developed thresholds to see if there is the potential for a problem.</p>
<p>If there is a potential problem, I would then recommend an intensive study that results in an ecological, human health assessment of PAH's from fish. If it exceeds state consumption standards then the park could issue a consumption advisory. But in reality, a lot of money could be spent to better understand a problem with no solution; the park is really going to restrict the use of engines? But understanding the ecological and human health effects through a risk assessment would be important if it results in actions to limit the consumption of fish for example (just like we do for mercury).</p>
<p>Good proposal, taking advantage of previous work to address improvements of water quality. The approach is solid and would provide the park with a more efficient monitoring program, and not only this park, similar work can be undertaken in other parks with similar concerns. The focus is on PAHs,</p>

<p>but is there any benefit to basic chemistry, like major ions? Is Ca a concern in shell development or life development? If Ca were to change can that impact or limit the findings?</p>
<p>The toxicological profile for Phenol, as the PAH with the highest concentration found, states a 2 mg/L lifetime exposure level for drinking water. A concentration of 5902 nanograms per liter equates to 0.0059 mg/L. Besides being "present", what are the ecological or human health issues at play here? They may exist, it is just not presented.</p>
<p>I like this proposal but am having difficulty grasping the severity of an issue that is concerned with "detectable level" concentrations of a contaminant. Making the argument that there are 40 million water users downstream, why not focus on other "detectable" contaminants that are likely present in lake water such as selenium or lead? While good science, I don't see the severity/need presented very strongly.</p>
<p>Page 3: If mussel larvae are the source of food moving up the food chain, have they yet had a chance to bioaccumulate any of the harmful PAH's?</p>
<p>Is there a limit on the ability of a single mussel to bioaccumulate PAH's based on the volume of water filtered in a day? For instance, if mussel populations started to drop, would it artificially look like PAH concentrations are rising because the remaining mussels have more PAHs available?</p>
<p>Could deploying the SPMD devices "side-by-side" with the artificial substrate in any way lead to faulty readings due to filtration by mussels in immediate proximity to the measuring device, or vice versa (capturing of PAHs by the SPMD before reaching the mussels)?</p>
<p>Budget on Page 11 does not identify any overhead costs. Are they somehow incorporated into the costs for all other line items (other than equipment)?</p>

Rapid response strategy for potential toxin exposures from HABs in coastal and shoreline areas of National Parks

CATEGORY: Intensive

PARK: Multiple

USGS New York Water Science Center

Comments:

Could be beneficial to several parks as this issue increases across the country. Significant project support so obviously an interest from multiple groups.

This is a multi-agency, multi-organization effort, building on existing tools across organizations and combining their strengths to develop a national approach to developing protocols for testing toxins from algal blooms. HABs are a critically important issue nationally, across freshwater and coastal areas and thus effect many parks within the NPS system. The proposed effort is a move toward a more national approach to address the issue. There is an impressive collaborative effort of researchers and staff guiding the effort. There are 11 letters of support from various agencies, parks, and organizations and significant (70%) in-kind project support. Utilizing efforts that incorporate citizen volunteers helps to increase cost-effectiveness.

This is a synoptic study presented as an intensive study. In sum, the proposal will generate 80 FW and 80 SW toxin profiles that may, or not be rapid response, and an unknown number of questionable presence/absence algal identifications through citizen science. Of the \$300K, all but \$53K going to salaries and overhead.

While I agree that there is a need to develop a national program to better understand and report potential HAB's in an effort to protect the public, I am not convinced that this proposal will produce reliable and useful information.

Some key issues:

- The intent is to provide "low cost" toxin sampling. \$550 per sample is not low cost. If I have understood the budget, there is only enough money for 80 FW toxin characterizations, and 80 marine samples over 3 years (5 sites per year, 4 times). This is not adequate to meet EPA's guidelines for every 10 days.
- The intent is to also use the data to establish management actions thresholds. The use of this data cannot do this. The actions threshold is determined by other means. Action thresholds for some algae have been determined by EPA, and are the threshold to which samples will be compared. How long does it take to get a sample back in order to initiate a rapid response recommendation? Is this really rapid response?
- What information will be used to initiate a rapid response?
- Discrete sampling and SPATTS will need a quick turnaround time if they are to be relevant to the parks decision to close recreation
- Citizen science is not adequate to do this type of work. IDing BG algae to species is very difficult. The Cyanoscope effort is likely not sufficient. Most ID's in inaturalist are only to genera or are the

<p>easy ones. Really need to go to species. Monitoring needs to be intensive and accurate. Citizen science is unlikely to be able to do this.</p> <ul style="list-style-type: none"> - There is no money for field collection of samples or ID other than \$5000 for training. This will all be done by volunteers and park staff. None of this is trivial and will take considerable time and resources. I would expect most of the data and ID's to be questionable. - Does not appear to be enough money for equipment. Need a decent microscope to accurately ID algae. \$2000 total?? - The sampling protocol will include experiments on length of deployment, location depth. With so few samples, how do they intend to conduct a multi-factorial experiment to assess this? -48% overhead! - In summary, this proposal will actually collect very little data and it is uncertain. It also does not seem to be sufficient to adequately assess even a few parks, and it is certainly not enough to study cause and effect, or to identify thresholds for action. It's a lot of money for a little bit of questionable data which will be difficult to use to initiate a rapid response.
<p>This proposal builds a good relationship with multiple partners/agencies. Targeted work and potential outcomes is reaching beyond just the NPS units, can be broadened to other DOI entities that manage water resources, as well as the potential to expand the toolkit of citizen science. Most of the technology to be used has been around and is applicable to the work, the incorporation of SPATT is interesting and like the idea of this being brought into the work. This can provide valuable information but is my current understanding that SPATT samplers can be difficult to interpret without supporting information. How will this be addressed?</p>
<p>The approach of this proposal appears too diluted (marine/lake/riverine, multiple individual protocols, wide range of data sources and quality, etc.) I fear the results and products would be equally dilute.</p>
<p>The "fundamental issue" that is referenced is what exactly? How blooms are forming, how prevalent they are, how persistent they are, how they are avoided? It is not clear what the "issue" is that the Toolbox will resolve.</p>
<p>How will citizen science data be quality assured? And how about the remainder of the data for that matter? And how are these disparate sources and types of data planned on being assimilated and analyzed? There is little to no detail provided on these fundamental aspects of a successful study.</p>

Integrating existing models to understand links between watershed activities, streamflow, water-quality impairments, and biological responses in the St. Croix National Scenic Riverway

CATEGORY: Intensive

PARK: St. Croix National Scenic Riverway

USGS Upper Midwest Water Science Center

Comments:

<p>Proposal could have benefited from additional project support and transferability.</p>
<p>The proposed use of existing data from multiple sources in order to build models, including flow data and biological data provides the opportunity to forecast future scenarios and thereby prioritize resource management activities. Not sure about using costs of previous studies to estimate in-kind project support; park in-kind support of 4.2% of the total project cost seems more accurate.</p>
<p>This modeling effort could be useful as a tool to educate managers and to consider the relative benefits of management actions. These models can also be extended to better understand hydraulic impacts on other resources and threats. As such, it's worth continuing to support these efforts, but the proposal would have been a lot more convincing if it had details on how the model was going to be constructed and then calibrated, what the accuracy and precision of past models has been, and some estimate of the expected accuracy and precision of this model. For example, while you might be able to compute a number but is the model really able to accurately quantify the impact of a proposed development action on a mussel species population/community variable with any reasonable certainty? I doubt it (see efforts currently under way in OBED to try to do something similar with fish).</p>
<p>Comments: Good concept of bringing the model into use and would provide a valuable tool to the park. I am concerned about the data compilation effort required. So much outside data, and historically while it always seems useful to bring together data from multiple entities, reporting units, reporting levels, and methods can be problematic and take a light of resources to address. The bringing together of so many entities to work on the project is nice, will be needed. This would be a major undertaking. Is there some type of outreach product such a model would be good for the Park? Could the model be run back in time to show the past to current, as part of an outreach approach.</p>
<p>Even for a 7.7 river mile length project, 1.75 years for the development of a HEC-RAS model seems excessive.</p>
<p>Page 6: Proposed results suggest that model can be continually updated in the future. Who is going to do that? Not many folks in NPS have a background in HEC-RAS modeling, and if the initial effort requires almost 2 years of time, not many in NPS will have the time required to make updates.</p>
<p>Many references to how the HEC-RAS model "could be linked" or could help explain, but very little expansion on how any of that would occur. A 1D HEC-RAS model is essentially a compilation of cross-sections. It is not incredibly dynamic.</p>

Products state that the HEC-RAS model can inform a Use Attainability Analysis. Although newer versions of HEC-RAS include some minor water quality capabilities, it is not likely the most appropriate tool to assess the detailed water quality criteria that would determine a water use designation.

It was not addressed if the upcoming infrastructure upgrades would be built into the first round of the HEC-RAS model, or if all of these upgrades would have to be added after the fact (e.g. Osceola bridge).

Combining water-quality data with remote sensing to improve detection and monitoring of algal blooms in Blue Mesa Reservoir Curecanti National Recreation Area, Colorado

CATEGORY: Intensive

PARK: Curecanti National Recreation Area (CURE)

USGS Colorado Water Science Center

Comments:

Significant resource to local area that has been and could be further impacted by HABs. This proposal will assist further development of the use of remote sensing to address HABs.

There is no question that additional information is needed regarding processes causing algal blooms in order to protect human health. The information provided regarding the \$12 million annual economic benefits of the fisheries of Blue Mesa Reservoir highlight the potential for economic impacts of algal blooms. The leveraging of existing web visualization technology enhances the usability and transferability of the results. There were several typos in the document, and it could have benefited from one more proofread before submission.

I think this is a worthy proposal and will be important in CURE's efforts to protect people from HAB exposure, though I am unclear what the "problem" is. Is it monitoring and communication about HAB events, or is it identifying cause and effect in the hope of preventing the problem? The former is attainable, the latter likely not without additional WQ monitoring.

The proposal, as written, has three objectives. It appears that objectives and tasks of 1 and 2 are attainable. However, I am doubtful that objective/tasks 3 will be fully met without some increased sampling. The general variables that can lead to HAB are fairly well understood and mitigation strategies have been developed. However, if the park is to better understand the ecological processes and WQ conditions leading to algal blooms at BMR, and perhaps develop mitigation, I believe that they will need to conduct additional WQ monitoring to understand the site-specific factors. The sampling in Objective 1 and 2 will define the current conditions, and identify HAB's to inform the public, but not perhaps the root cause of the problem.

If the park is ultimately interested in exploring ways to address the problem, I would recommend winter/spring depth profiles of DO, pH, temp, and conduct depth specific WQ sampling to understand the depth specific redox chemistry, involving ferric, ferrous iron and its relationship to P availability). At a minimum I would do this in mid-winter (Feb during max anoxia), prior to ice-off, just after the lake has turned, and perhaps in early summer when initial algal growth occurs. If you wait until the mid-summer, important information that can explain internal P availability will be missed. I would also be looking more closely at the hydrology and lake elevation/depth profile data. It is clear that HAB's are more severe in dry years when the lake drops, and when there is likely robust stratification for a greater length of time. If this is shown to be the case, then at least in principle, it would suggest clear mitigation strategies, though they will be very difficult to implement in a large Colorado River reservoir.

Comments: Timely proposal and fills a need. I am wondering about the event-based sampling as it relates to determinations of events. It is a little unclear of how the events will actually be determined. What I would like to see would be a chlorophyll sensor deployed in a location that is accessible, in area of expected HABs to form, and in high use (swimming, fishing, etc.) transmitted and used as a potential indicator of when to sample for event work. A relative change in in CHL could be used to send the crews to the site and collect samples. The sensor could also be "truthed" back to the satellite imagery, even if for the general vicinity. Although DOI has grounded drones, drones will hopefully be able to fly again and they may provide additional information and a finer resolution to supplement the satellite imagery.

Think the term "rapid" or similar is more realistic than "near real-time" for bloom assessments at 4+days.

Lots of small typos throughout, annoying.

Who will fund/maintain the web-based tool after this project?

HABs in CURE are documented in the Multipark proposal (#10) for Rapid Response to HABs. Although this proposal is a strong one on its own, the Multipark would accomplish a good deal of the same objectives as this proposal AND would apply to more park units.

If the goal of the satellite imagery is to provide near real-time identification of potential algal blooms based on visual cues, can this same goal not be accomplished by the combination of park staff and visitors who presumably are on-site at these locations on a daily basis?

What historic water quality data is available beyond temperature and precipitation? It would seem that some of the new WQ data to be collected will be establishing a baseline after presence of cyanobacteria has already been detected.

Evaluating the water quality at springs along the South Rim of Grand Canyon National Park

CATEGORY: Synoptic

PARK: Grand Canyon National Park (GRCA)

USGS Arizona Water Science Center

Comments:

Like the use of CLAM and POCIS samplers, a lot of experience working on this project. Proposal would benefit from additional in-kind support and transferability to other parks.

Drinking water sources within the park are limited and contamination of those sources is occurring through treated wastewater and contaminated groundwater. The proposed study proports to determine baseline data as a snapshot in time of an existing problem that is likely to get worse. There is some indication that the park is in the process of modernizing waste-water infrastructure and implementing an upgrade in the next 5 years but it's not clear what that means and how proposed study recommendations could be implemented. How will modernized WTP reduce CECs? There is an indication that there are structural problems with pipelines that need to be fixed immediately to help address contamination problems. Because the proposed study leverages an existing study, the study is cost effective from the standpoint of the taking advantage of sampling trips in remote locations. The team working on the project is highly qualified and experienced.

Appears to be a well identified problem with a possible solution

Problem is well defined, and the information that can be learned from the project will fit a need to address treatment plant upgrades. Knowing what existing treatment process has potentially done to impair the water quality of this resource will give better management actions in the future. I like the use of the POCIS and CLAM samplers in this environment as well as the isotope work. I think the isotopes will provide critical information to the flow system and understanding the connection. This may be a candidate site to try the Turner Designs tryptophan sensor, or similar. Not too familiar with the sensor but seems promising.

Cool tech, great budget explanation, interesting site.

Nitrogen, though a possible indicator of wastewater is not itself a threat to human health and safety at the current levels.

Tracking trends of perchlorate and selected metals in the water resources for Mount Rushmore National Memorial

CATEGORY: Synoptic

PARK: Mount Rushmore National Memorial (MORU)

USGS Dakota Water Science Center

Comments:

Proposal would have benefited with more discussion on transferability to other parks with perchlorate issues and more in-kind support.

Perchlorate associated with fireworks is not well understood even though perchlorate in drinking water supplies is a human health issue. There is a statement that drinking water could be contaminated in the park because it was found in the area of the groundwater drinking supplies. It's not clear but was drinking water at the visitor center actually tested? The methods and products are described in only general terms. The authors have leveraged an opportunity to include an existing study for perchlorate prior to and after planned 2020 fireworks displays. Whereas two additional years of sampling will help with understanding persistence in the system, the existing study will provide substantial data. Data from previous studies indicate that perchlorate contamination from 2009 persists in the system. I'm not sure about using the existing study as a means of in-kind support for the proposed study.

Continuation of a study already funded by NPS.

Timely proposal that can address some good questions. Good to see NPS did some work in 2020 to look at concentrations prior to the 2020 fireworks display. This project can do 2 things, if the 2020 event is a one off, can see if there is a blip on the radar from the recent event, allowing the park to evaluate and allow periodic firework displays. Second thing is if this occurs again in 21 and/or 22, can look at the response in the water supplies and soils to ongoing effects of perchlorate. Without reading the prior report, identifying what metals to be analyzed would be helpful. This project can translate beyond the NPS units with fireworks and to any entity that has a long-term fireworks event that is near water considered or available for water supply. I am left a little confused on the project support, is there no in-kind work or assistance from NPS or others, equipment sharing within the Center that can be accounted for in the cost?

A ding on this is the decision not to adopt a standard on perchlorate which was just announced a couple weeks ago. Removes some of the teeth behind the potential human health issues.

Methods: What select metals are being analyzed and why? Were there indications of patterns in the initial study driving this decision?

Methods: Stable isotopes could provide valuable data for low cost, including similar/dissimilar waters, patterns of recharge and groundwater movement, seasonality of recharge, etc.

Transferability: With no planned publication or interpretive report, the ability to transfer these methods and outcomes is limited. I would prefer to see less sampling in year 2 to make budget room for some level of final product beyond briefing the park.
Transferability: Should mention applicability to research labs and military installations where perchlorate use was/is prevalent, especially those on or adjacent to fractured bedrock
Project support: SDWSC does not allow for in-kind support? This needs to be explained!
This seems as though it is a "known quantity" at this point and could/should be funded by other sources as part of the required routine operations of the park.
Perchlorate has already been linked to the fireworks display, and yet the fireworks are going to continue as of 2020. What does the park hope to gain from this study since it has already been shown that the fireworks are contributing perchlorate to nearby soils and water?

Assessing sources of bacterial contamination at Fire Island National Seashore (FIIS)

CATEGORY: Synoptic

PARK: Fire Island National Seashore (FIIS)

USGS New York Water Science Center

Comments:

Proposal would have benefited with more discussion on transferability to other parks with similar septic/bacteria issues and additional in-kind support.

The collection of data regarding fecal bacteria is critically important. However, it's not clear that the information will lead to corrective management action. The statement is made, "If this study is done, Park managers will be able to make informed decisions about updating or changing wastewater treatment....". However, a number of preliminary studies have already been conducted as indicated in the proposal, suggesting that fecal concentrations are as much as 10 times greater than the state health standard and yet the park has yet to even put up signage to indicate there is a potential health problem. The proposal further states that the park will not put up signage until there is "a full understanding" of the problem. It's not clear what a "full understanding" would include. There is mention that dogs may be an important source of fecal bacteria, in addition to wildlife. The proposal describes sampling for wildlife through surveys but gives little indication of effort to assess the population and movements of dogs. What seems to be needed most are feasibility studies to assess replacing/altering OWDS or complete replacement with a centralized waste management system.

It's an OK study. Just not going to compete with other park priorities

While this is a concern and is laid out well in design, I am not getting the urgency. When is the plan to upgrade the treatment facilities? This could have a bearing on the results. If in 2 years relevant information, in 10 years, how relevant would the study be? If there is a connection between the GW and SW and bogs, I would like to see the GW monitoring expanding. I was glad to see GW incorporated in the study, but is FIIS GW tidally effected? Would like to see some GW level monitoring and sampling based on GW level fluctuations? Do concentrations in GW go up when the levels are high and discharging into bogs or standing water areas? Does the GW already have high bacty counts and the SW increases when the GW levels are higher? Use this to make the flow path connection. The MST will give insight to the source of the contaminations, but will it identify the OWDS as a source? Can caffeine or other anthropogenic tracer be added to the sampling?

Not the top resource priority for the park.

If the bacterial issue is so prevalent, why would there be an insufficient number of FIB detections in the 2021 sampling?

Suggest expanding the budget table. Much of the information is available in the ranking criteria explanation but it is easier to evaluate in a table format rather than lines of text.

Preliminary assessment showed samples SIGNIFICANTLY exceeding the NY State Department of Health limit for E coli and conditions have since worsened. Is this not proof enough for the need for management actions? Literature and climate change data also support that the shallow OWDs are likely source of contamination to shallow groundwater lens.

Understanding the contaminants in Glorieta Creek and Pecos River related to wastewater treatment facilities near Pecos National Historical Park, New Mexico

CATEGORY: Synoptic

PARK: Pecos National Historical Park (PECO)

USGS New Mexico Water Science Center

Comments:

Was not the most significant issues at PECO. Additional information about the severity would have benefited this proposal.
Little water quality data exist for a system that can be dominated by waste-water effluent during low flow periods and a management plan is needed to protect sensitive fish species. Although the data collected from the proposed study will provide valuable information, it's not clear how potential upgrades to WWTP will help resolve problems with CECs, or problems with low flow.
It's an OK study, but just not going to reach the level of significance of other proposals that parks have just now.
Well written proposal, that is taking standard methods with newer and emerging technologies to address an important issue to the park. The data is needed to help with fish management and for the Park to make informed decisions. Would there be any benefit to 24- or 72-hour DO studies to help with the study? DO was noted as an impairment, if DO was monitored at the beginning of a sampling run and picked up a few days later may be useful. Especially if stage could be monitored in order to capture the pulse events? When pulses happen, what happens to the DO, which can affect chemical reactions and degradations.
Discharge from the Glorieta Conference Center WWTP accounts for approximately how much of total Glorieta Creek flow?
How are "pulses" of contaminants occurring if WWTP discharge is relatively constant?
\$24,000 in publication costs is extremely excessive. Does budget include overhead?
The WWTP contributions may not be the only contributor to 303(d) listing, therefore the project may not provide all information needed for PECO to develop a fish management plan.

Molecular assessment of contaminants in the Chattahoochee River National Recreation Area

CATEGORY: Synoptic

PARK: Chattahoochee River National Recreation Area (CHAT)

USGS South Atlantic Water Science Center

Comments:

<p>Good approach to an issue that could limit the parks ability to offer recreational opportunities.</p>
<p>The occurrence and distribution of contaminants is of concern in many areas, especially high visitation areas like the CHAT. The discussion of cyanobacteria and toxic blooms killing dogs was confusing given that the objectives were to assess fecal contamination and dogs as a source of fecal contamination. Leveraging the BacteriALERT program enhances the proposed study and increases transferability. I think this was the only proposal to provide a JHA.</p>
<p>Nothing wrong with study, just not going to be competitive compared to other proposed studies I thought the cost contribution from others (USGS gages?) showed imagination.</p>
<p>Interesting proposal and concept. The cyanotoxins are in the region but appears no real indication in the park, yet. While in the Chattahoochee River, it is 40 miles downstream. without some type of evidence, even anecdotal, hard to get behind the work. I wonder if a 1-year Tech Assist would help gather the baseline information on cyanotoxins in the Park? As for the bacterial work, I do like the concept, but I have concerns that the data collected will address the question(s) asked. Seems a much bigger dataset would be needed, more MST samples, more samples during baseline and event-based samples. Just afraid not enough data will be collected to answer the question.</p>
<p>Problem definition: downstream detections of cyanotoxins, were they found in actionable concentrations, and were conditions similar enough to CHAT that extrapolations could be made? A "detection" 40 miles away is not terribly compelling to assume a problem in CHAT.</p>
<p>Technical soundness: Sample collection methods are not consistent (center of channel when possible, if not than on shore). Also, why are samples being collected as grabs rather than equal distance or depth-integrated methods?</p>
<p>Project support: The USGS gages are undoubtedly being supported by other fund sources and should not be considered in-kind to this project.</p>
<p>No reported occurrence of cyanobacteria/cyanotoxins in CHAT, however reports exist downstream and testing has not yet occurred in CHAT.</p>
<p>Park management of dog activity could be stricter. Park has little control over what happens outside of park boundaries, so management inside of the park may need to be more drastic.</p>

Patterns in *Escherichia coli* (*E. coli*) concentrations in the New River, New River Gorge National River, West Virginia

CATEGORY: Synoptic

PARK: New River Gorge National River (NERI)

USGS West Virginia Water Science Center

Comments:

Solid proposal but does not utilize any significantly new technology or approaches. Transferability to other parks is not enhanced by this proposal since it utilizes established techniques and methods.

The proposal is concise and relatively well-written. The project budget information is limited compared to the more detailed in-kind support budget information. The proposal may be under-selling the transferability of the information by stating only that the data will be made available. Fecal bacteria are a national issue and the proposed study is potentially able to leverage data with other fecal bacteria studies through BacteriAlert.

Pretty standard basic monitoring effort.

Seems like a good approach and can give some basic information, but I think this proposal may benefit from expanded data collection, outreach component and that would be limited by a synoptic study. I'd like to see this as an intensive study. Either way, synoptic or intensive, the sampling seems a little light to address the issues, monthly sampling, coupled with the storm and longitudinal sampling may not be adequate to address the question, as well as make for an relevant evaluation of the results to the water quality monitor. Monthly during off-season may be adequate but can coordination with Park be done to collect weekly samples at the sites, would provide much more insight on the FIB and likely catch pulses that could be missed during monthly sampling. If the concentrations vary near-shore to mid-channel, what will the depth/width integrated sampling tell us? Maybe paired sampling of a centroid of flow and near-shore may be better to address the question. If the sampling is done and a relation with the monitor could be established to make a surrogate model and look at FIB in the park, this could be a great outreach tool for the park to have a computer screen in the visitor Center showing the surrogate output and predicted FIB concentrations. Park could make have literature available to what the concentrations mean to public health.

This is a pretty thin full proposal and budget; it does not seem much different than what was submitted for regional review.

Might be worth expanding this proposal into the Intensive category, so work can be done on identifying the sources (both geographically and biologically) of the *E. coli*. In terms of mitigating the issue, NPS would be better served knowing this rather than a report outlining how bad the problem is.

Seasonal variability is a worthwhile endeavor; cross-sectional variability is not very valuable considering that a) most patrons are not able to avoid using part of the channel, b) streams/ rivers have secondary currents that flow side to side;

Surely there is literature analyzing the correlation of E coli and/or other fecal coliform with water quality data?

Compilation and summary of post-1996 research findings in Congaree National Park, South Carolina

CATEGORY: Technical Assistance

PARK: Congaree National Park (CONG)

USGS South Atlantic Water Science Center

Comments:

Having organized and searchable literature is critical for park planning and operations, this task could most likely be completed through volunteer/intern/student program. Not sure this is the best use of USGS experience/time. Would not transfer well to other parks.

Synthesis of existing research findings is critically important to understanding what has been done and what needs to be done and will provide critical information for the development of a new management plan. As a result, the budget is very simple and straightforward. A literature review of a single park can have limited transferability. The project team is qualified and experienced given that they have a history of conducting previous research in the CONG.

Any time a park wants to take stock and understand the progress it has made of understanding its resources, as a basis of updating its management plans, I think it is an excellent endeavor. I would like this to be funded, as long as we can defend that it sufficiently meets the intent of the RFP.

Proposal provides a valuable need to the Park. Compilation of existing material to aid the park in management decisions and writing of management plans is a good use of a tech support study. I think there is more transferability to this proposal than the author lets on. A blueprint of data compilation and data documentation would be valuable to other parks, while one size does not fit it all, this would go a long way to getting parks started. The website as a product would be useful to other parks as well. Can the website be made into a public website or available at the visitor's center to give the public information on the research in the park, and access to the data?

This project might be better suited at the Synoptic level where not only is an assessment of past research and references made, but a level of effort put forth to digitize the data available in those references.

An interactive website does not seem like the most functional use of funding for this effort. Why not simply create a "OneDrive" folder (or similar repository) where papers are available rather than trying to design a webpage? NPS has MANY existing pages where info could be housed.

Though the WRMP needs to be re-written, this project is not, in fact, a re-write. This project is a synthesis predominantly of Dr. Bradley's work and is to be completed by Dr. Bradley.

Identifying phosphorous budgets in historic canal basin to address management concerns

CATEGORY: Technical Assistance

PARK: C&O Canal National Historical Park (CHOH)

USGS New Jersey Water Science Center

Comments:

This proposal would provide information on several different aspects of phosphorus concentrations within CHOH. Budget seems thin with several different tasks going on and a tight timeline to accomplish it all. Even with a better understanding of the system, remediation efforts would most likely remain the same, chemical or mechanical removal of nuisance vegetation. Proposal was low on transferability and project support.

This proposal did not follow the formats. There were no letters of support. They will request a summer intern. What happens if they do not get one?

There is a lot of background information missing to fully understand the problem in relation to the other resources/influences in close proximity to the park, and to historical activities that may have impacted the Cushwa Basin and that may still pose a significant threat to the parks management objectives. But proposal ok; there is nothing wrong with wanting some information about nutrients status and sources. My guess, the current external nutrient sources are but a small part of the problem. There is a huge internal sediment load because it's a 200-year-old closed system and it needs restoring, just like the rest of the canal. If this is not the case, then it would have been helpful to put the history of the basin in the background, because it is difficult to evaluate the proposal without it.

Duckweed has been a big problem in Europe for centuries, where they have very old canals and ponds that have been eutrophying for centuries, and the treatment regime is well understood, especially in a largely closed system like Cushwa Basin.

Dredge. Physically remove nutrients from the system. Has it ever been dredged? If not, the sediments probably have 200 years of mule feces, human sewage, coal dust, and accumulated leaves and plant matter, and who knows what else. It's also likely to be quite toxic (coal dust). Remove it and replace with just enough clean sediments, and make sure that you don't introduce mussels before you have done a pore water toxicity test. After that, mussels might help water quality. Don't forget to put in intermediate host fish. Actually remove all fish other than mussel intermediate hosts and create a good refugia/breeding facility.

Flooding is almost certainly good for the basin as it will flush water with high level of nutrients out of system. But likely to introduce large amount of sediment.

Without having the nine scoring criteria broken out, it was a little difficult to tease out some information. The proposal seems to have a lot of work lined up in a 6-month window of field work (maybe longer?) Seems like this proposal has a lot of work in in it and may be best developed as a 2-

year synoptic type study. Some interesting technology being used (peepers) and like the GW piezos. With the GW would it be worthwhile to add CFC/SF6 samples to assess the flow paths? What if there is a GW contribution but the water being discharged many years ago, which would mean years for the GW land management to have any impact. Any thoughts given to sediment oxygen demand work? What is the role of the sediment, seem to be getting there, but wonder if SOD could provide some valuable insight to the study.

Great project and proposed approach, a lot of results for a Technical Assistance project. However, the proposal did not follow the requested format to address the ranking criteria separately; found that quite annoying. Better as a synoptic study?

Modernizing water quality monitoring of the Colorado River in Glen Canyon, Arizona

CATEGORY: Technical Assistance

PARK: Glen Canyon National Recreation Area (GLCA)

USGS Grand Canyon Monitoring and Research Center

Comments:

Good addition to the project and will ease difficult logistics of accessing sites. Seems like this would be a part of the JFA or something the cooperator or center would fund in an effort to decrease O&M costs. A lot of project support. Proposal scored low on severity of resource threat.

Modernizing the water-quality sensor network is critically important and very much in line with WMA priorities (NGWOS). New modelling techniques combined with modernized technology provides tremendous benefits in information delivery and accuracy. This has tremendous transferability nationally. The budget information was confusing as the subtotal for provided funding in Table 4 is different than that provided in Table 2. The list of project team members and their years of experience is impressive.

This could be useful for several efforts, but low DO monitoring is really needed upstream of the dam so that the low DO plume can be tracked through the lake, and predictions made about the possibility of the plume intersecting with the penstock. Monitoring below the dam will only tell you what has happened not what will happen.

Well written proposal, but I am unsure of who benefits more, GLCA or GRCA, as it seems the sites are between the two. How will GLCA use the data to impact the quality downstream and likely for GRCA? Was GRCA contacted about this work? Would GRCA be interested and this turned into a 2-park (GLCA and GRCA) synoptic type study? Since this is a Tech Assist, what happens in the years after this tech assist project is done. I like the cost effectiveness and brings a lot to the table, as it looks like this will fund the equipment purchases needed. Recommend taking this and developing into a synoptic that would benefit both parks. Great use of technology and web-based output and can see that being good for the park.

It is likely more complicated than this, but it appears that GCMRC is "double-dipping" here by promoting technology to maintain the rainbow trout fishery in GLCA while simultaneously working on trout mitigation issues in GRCA immediately downstream.

Criteria 1: "Fish kills remain a possibility": I would think that many would be pleased with this outcome.

Criteria 2: HBC and RBS are less susceptible to lower DO conditions, so this study seems geared towards trout maintenance than the T&E species in GRCA.

Criteria 2: "other non-native aquatic species" should include rainbow trout.

Criteria 2: At what DO levels would noxious odors be expected? Have these been reached?

<p>Criteria 3: During the DO minima events in 2003, 2005, 2014, and 2019, were there documented fish kill events? If so, it seems as though that would be mentioned in the proposal.</p> <p>Criteria 4: A lot of new equipment and infrastructure is proposed here in a sensitive area. What is being done to mitigate environmental impacts or visitor experience degradation?</p>
<p>Support Letter: I wonder if GRCA would have developed as supportive a letter as GLCA did.</p>
<p>Assuming a monitor alerted park staff that a low-oxygen event was impending, what could park staff do to "prep" the downstream ecosystem?</p>
<p>Will NPS be required to enter into contractual obligations with AWS in order to continue the use of the monitoring and data telemetry setup in the future?</p>
<p>Two peer-reviewed papers on methods alone is ambitious. The idea of a connected monitoring network is not holistically novel. Deployments of solar-powered remote telemetry units has been utilized by educational research institutions, amongst others, though the "two-way" portion herein is novel. Custom, real-time data visualizers may be the highest-impact result of this effort.</p>
<p>Budget will essentially be used to buy equipment to carry on with this existing effort.</p>

Diel variations of cyanotoxins: are potent neurotoxins a risk outside of daylight hours?

CATEGORY: Technical Assistance

PARK: Voyageurs National Park (VOYA)

USGS Upper Midwest Water Science Center

Comments:

<p>Interesting proposal that could address an issue probably not being considered by other projects sampling for Habs/cyanotoxin across the U.S. Considering Covid limitations population could be spending more time outdoors and in contact with possibly impaired waters. Scored low on resolution due to project only providing additional information.</p>
<p>Knowledge of diel variation of cyanotoxins would seem to be critically important as existing data regarding toxicity is based on daylight sampling thus our existing knowledge of toxicity may be spurious.</p>
<p>Minor note but the proposal suggests that atropine is a plant. It is not. It is the drug found in the nightshade family of plants. Diel sampling can be costly, but the buoy system will not only help with cost-effectiveness but provide more site-specific PAR data that should enhance model accuracy. This was the only proposal that provided a caveat that COVID 19 may impact field sampling.</p>
<p>In principle, is a simple, neat experiment, but perhaps suffers from poor replication.</p>
<p>timely proposal and can strongly benefit from the in-kind work being done in 2020. I like having multi-year data, always good if one is anomalous (drought, excessive rain). The buoy system is nice touch and bringing in UW is good. The benefit of the park keeping the buoy is a plus. Will the park be able to maintain it and how will training be provided to use the system? PAR is a key variable to working with HABs and having a local measurement will improve the information. This project seems like a good start and test design. If this work is funded, and depending on the results, would it be possible to make a bigger study to look at mixing and how long it takes for concentrations to drop off during daylight hours? If the concentrations are found to be higher at night. Suggesting taking the data design and looking through the morning hours as the park wakens and water use is on the increase, how long does it take to have the light degrade the compound to a safe level in a recreational area? IF a bloom occurs, will it shut down the area for the day or can it be safe to swim later in the day?</p>
<p>Criteria 4: No mention of water sampling methodologies in this proposal. Statement here that they are published and well-established, but no reference is provided.</p>
<p>IOT buoy tech is really cool: would the build details be made available for other parks to utilize?</p>
<p>Criteria 9: Study will resolve the "lack of information problem" but does not resolve the problem of cyanotoxin distribution and abundance, so cannot be given higher-end score on this criterion.</p>
<p>Initial thought from the summary: isn't the park closed during these time periods? While this is a great research question, does it apply to the parks if, in fact, visitors are not allowed in the park at those times? Even so, it seems highly irresponsible to think that visitors would be allowed in the</p>

water during certain times of day unless it can be CLEARLY shown that there is NO toxicity from these neurotoxins during daylight hours. (First portion of this comment was addressed with discussion of overnight campers.)

For such a pointed study (diel variation in toxin concentrations) with only one chosen site location, why choose such a coarse sampling frequency (every three hours)?

What is PAR? It was never defined.

Trace organic contaminants in surface waters at 47 National Parks: support for analysis of biological relevance and watershed characterization

CATEGORY: Technical Assistance

PARK: Multiple

USGS Upper Midwest Water Science Center

Would benefit 47 parks and utilize existing data sets. Seems like this should have been a project objective early on but a good approach that will benefit many parks. Scored low on merit due to lack of new and innovative techniques.

Analyzing existing data that have been collected but not yet analyzed is an important scientific effort. It's curious that the NPS networks that participated in trace organic contaminant (TrOC) sampling from 2009-2019 did not include parks in the eastern U.S. where arguably large human populations may contribute significantly to TrOC occurrence and distribution. Relating TrOC to biological relevance is a valuable contribution, but a challenging effort, especially relying on one source such as ToxCast. The PIs note that ToxCast has limitations and suggest that other benchmark sources will be used but do not mention these specifically. A significant component of the proposed analysis is to link the TrOC data to GIS watershed data layers, compiled and analyzed by a USGS GIS specialist, accounting for 48% of the requested budget. However, the proposal notes that this person has yet to be hired/identified.

A timely study that leverages a considerable amount of past monitoring results.

Question: Why isn't the existing I&M budget covering this?

Is this all water quality samples being lumped together or focus solely on river sites? What about lakes or GW? Will it be parsed out by river, lakes, groundwater? I like the idea of the compilation being done at a national level, and a summary of findings would be nice, but it looks like the data will be used as a data release, which would have limited summary information, maybe? There is a reference to a report or journal article by NPS using the data. The connection to this needs to be stronger, as I really think that is what the purpose of the tech assist project is proposing. This is what the tech assist project would be used for, but I find the connection to the planned publication or NPS use lacking and was hard to make the connection. What is the purpose of the NPS pub and why is this data compilation/synthesis needed?

With over a decade of data collection and thousands of samples just in NPS units, at what point do trace organics, pharmaceuticals, CECs move away from the "unknown" category?

Are all the sample sites surface water sources? What about groundwater sources (springs, gaining streams) vs. surface water (runoff-dominated streams, lakes)? Groundwater sources would be a very defined metric to evaluate in the spatial analysis and would make delineation of catchments more difficult.

Criteria 2: does presence of TrOCs imply parks are being "impacted" by them? Also, concession wastewater systems are not the only ones, NPS is part of the problem too!

Criteria 4: Does ToxCast have the ability to differentiate potential impacts to organisms that are water obligate (macroinverts, fish) vs. those that predate on those organisms or just use a water body in passing? It is hard to understand how some universal understanding of toxicity can be determined.