Brainstorming GIT Funding and Science Needs – 7/29/2022

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This document outlines science needs identified in the Strategic Science and Research Framework that may be a good fit for GIT Funding. They are organized by outcome and include relevant comments. Needs that are highlighted were presented at the July 28th STAR meeting. To learn more about the details of each science need, visit the Science Needs Database here, click on the "Science Needs" tab, filter by Primary Outcome, and then click on "Detail" for that specific need.

Blue Crab Management Outcome - No science needs are listed in the database for this outcome.

Blue Crab Abundance Outcome

- Need: Development of Blue Crab Data Hub.
    - Comment: This would likely require someone in the partnership to maintain the data hub.
    - Comment from Peter Tango: Creating a database should be paired with creating a data entry interface and a data entry QA tool that minimizes the work needed to maintain the hub. The magnitude of such a project depends on what is meant by "Blue Crab Data" – can someone lay out what the data looks like? Is this a simple spreadsheet a high school level student could manage or is this 100 parameters of info for each data entry requiring big data approaches for management, or something in between. This needs more detail.
- Need: Evaluate models for fishery-independent indices (e.g., GAM, GLMM, GLM) to identify the most appropriate form and standardize index development.
    - Comment: This could be a good fit because it is a high priority, there is no funding engaged, and it seems to be a specific question a contractor could work on.
    - Comment from Peter Tango: Respectfully, fishery independent indices of what? NOAA SOEs for the MAB show many data sets with nonlinear and occasionally with linear trend assessments applied. Are those all different models being used for each different data display or there a consistent model already applied in linear or nonlinear analysis? Why wouldn't Chesapeake Bay specific data be treated the same as the MAB data to simplify analysis and reporting on whatever indices are considered? Does this need feed a need to consider standardizing analyses not just in Chesapeake Bay but for the MAB and Northeast regions.
- Need: Investigate potential applications of existing fishery-independent data sets.
    - Comment: This could be a good fit because it is a high priority, there is no funding engaged, and it could serve as a pilot project to demonstrate the

application of the data. We would need to define the specific application(s) the contractor would do.
    - Comment from Peter Tango: The most direct need for such data sets expressed in the region appears to be the development and calibration of the regional habitat assessment. A large project to assemble the data sets for this project was conducted between NOAA and USGS in the not too distant past. However, yes, investigating other applications (e.g. Healthy watersheds indicator assessment, criteria development and testing, climate change impact detection, etc.) may all be viable uses of the data sets.
- Need: Climate related changes in fish distribution.
    - Comment: This was identified as a potential GIT funding project by the CBPO modeling team. It received GIT funding in the past in the form of a study, so it could be an opportunity to build on the findings of that study. A conversation will be initiated between the modeling team and the Fish GIT.

    - Comment from Peter Tango: There is a Mid Atlantic Bight index of community shift found in the NOAA SOE suggesting population movements north and east associated with habitat shifts north and east. Relatively little information appeared with the findings, this seems important for the regional habitat assessment too, good information.

Oyster Outcome

- Need: To explain to the public/justify costs of oyster reef restoration and explain their ecosystem services. Need to synthesize existing results and determine gaps in implementing oysters as a BMP.
    - Comment: In the database, it states this need is building on Choptank research by Morgan State. Potentially there are follow up actions that need funding?

    - Comment from Peter Tango: It has been said that oyster populations use to recycle all the water in the Bay in a matter of days. The Modeling WG/Carl Cerco have explored oysters as a factor in effecting bay health to understand oyster biomass needs for improving water quality. Their effect on the bay is a question with a lot of history and something probed at for quite some time - http://www.oyster-restoration.org/wp-content/uploads/2012/06/Newell-1988-filtering.pdf . What is new about this question? Are you asking if perhaps oyster aquaculture can affect a very local tributary? Major restoration projects were wiped out on the Potomac River due to high freshwater flows to the bay in 2018, and climate change suggests we are expecting more precipitation annually. Cow nosed rays chowed down on some Virginia restoration sites one year – are they a major threat to wide-range recovery of oysters? There has been some harvesting

of rays but recognizing their long development period to reproductive maturity I believe there has been adjustments their management. Perhaps the question on filtering and BMP benefits is less about oysters and more about what else can we work with to create that effect? How is the mussel project going for example? Anyone doing co-planting of multiple filter feeders instead of just oysters?

Forage Fish Outcome

- Comment: All the potentially relevant GIT funding science needs for this outcome are already engaged in a GIT funding project or have already leveraged GIT funding.

Fish Habitat Outcome

- Need: Regional Fish Habitat Assessment, Parts 3-5: 3. pilot fish habitat assessment; 4. conduct watershed regional assessment; 5. ID/develop spatial tools useful to partners
    - Comment: Could use GIT funding to address steps 3-5, as the first two steps were already addressed through GIT funding.

    - Comment from Peter Tango: Good one.

Wetlands Outcome

- Need: Identify areas where wetland restoration would greatly benefit water quality and habitat.
    - Comment: The expansion of the WetCAT tool could be a GIT funding project, but perhaps before performing additional analysis or tool development, we should do an inventory of all the available targeting tools and resources in the Chesapeake to determine the relative need of expanding the tool.
- Needs: Identifying the amount of stream network incising in small to headwater streams. AND Identifying the amount of legacy sediment present along small to headwater streams.
    - Comment: These needs may be similar enough where a GIT Funding project could address both of them. Perhaps GIT Funding could utilize some added technical skills here to address these needs?
    - Comment from Andy Miller (STAC – UMBC)
        - My colleague Matt Baker here at UMBC is overseeing production of the 1-m streams network for the entire Chesapeake Bay watershed. Using a landform analysis tool known as geomorphons, we are pretty sure it's possible to generate maps of relative incision even up to fairly small headwater sites throughout much if not most of the drainage network. I would strongly recommend consulting with Matt on this issue.

        - Also in previous studies we have seen legacy sediment in streambanks at some very small drainage areas, both in places with mill dams and in places where there is no evidence of mill dams. It's pretty ubiquitous. Whether it poses a serious problem for the Bay is open to question. In places with very thick deposits and very high unstable banks such as some of those identified upstream of high mill dams in Lancaster County, there may be significant sediment loads - although probably pretty low concentrations of biologically available nutrients in most cases. In many places we've looked at in Baltimore County, even upstream of breached mill dams the rates of channel migration are low enough (i.e. 1-2 channel widths over time spans of 40-60 years) that the excess sediment loads are difficult to distinguish from conditions in other streams. The recommendations in the STAC workshop on legacy sediment (published in 2019) are worth looking at when considering the legacy sediment issue.
- Need: Evaluate how to assess water storage opportunities for existing and future restoration opportunities.
    - Comment: This need could potentially utilize technical skills provided in a GIT Funding project. Justification for the need: More research on the benefits wetlands provide for flood resiliency will be crucial for understanding their role in managing climate impacts and restoration opportunities.

- General comment from Peter Tango: Given we are days away from the Wetlands Workshop, maybe we can see what insights come out of those days that might tune one of the needs for developing a proposal.

Black Duck Outcome

- Need: Development of a new black duck indicator.
    - Comment: This could be a good fit as this need is listed as a high priority and has no resources engaged. However, it would most likely need a non-GIT Funded source to maintain the indicator.
- Need: Fully evaluate and model the recent sea level rise scenarios and how they are impacting. black duck habitat (energetic availability and refugia) in the Chesapeake.
    - Comment: Given the comments made at both science needs and indicator meetings, sometimes very technical needs can be difficult to fulfill on their own by the workgroup. This could be a good opportunity to use GIT funding to address this need.
- Need: A better understanding of mallard/black duck hybridization on resident birds.
    - Comment: This could potentially use GIT funding for a study, however more information is needed.

- Need: A better understanding of heavy metal/pollutant uptake by black ducks (and/or all ducks).
    - Comment: This could potentially use GIT funding for a study, however more information is needed.
- Need: Evaluate detectability and visibility correction factors of multiple breeding waterfowl survey techniques (fixed wing aircraft, helicopter, boats, walk in).
    - Comment from the potential resources section: A full proposal was written for Virginia a few years ago but their budget could not accommodate. Proposal could be used as a starting point for any other efforts. Perhaps GIT funding is the fuel this effort needs?
- Need: Evaluate ABDU Decision Support Tool assumptions and Update ABDU Decision Support Tool with updated SLAMM and Urban growth model data.
    - Comment: It seems like there is a framework for action, but the main ingredient lacking is funding. Perhaps GIT funding is the fuel this effort needs?

- General comment from Peter Tango: Have we done an assessment of co-benefits of managing for black ducks to other elements of the ecosystem? How well aligned are management directions for this single species to complement forage, crabs, oysters, commercial fisheries, community waterbird integrity, and more?

Stream Health Outcome

- Need: Establish guidelines and relationship between stream corridor restoration activities and functional lift including biological lift.
    - Comment: The notes said that GIT Funding in 2019 was a potential resource. If it did not receive funding that year, there might still be interest in using GIT funding to address this need.
- Need: Determine the effects of climate change on stream processes.
    - Comment: This could potentially use GIT funding for a study, however more information is needed.
- Need: Separate the impact of climate change vs. management actions on stream health.
    - Comment: This could potentially use GIT funding for a study, however more information is needed.

    - Comment from Peter Tango: Rosemary Fanelli (USGS) and her team have been working for years on a meta-analysis of the most prevalent factors affecting stream health. Chesapeake Bay Tidal benthic index of biotic integrity work has included over the years publication of a method for discriminant analysis that was geared towards identifying the factors affecting the health of a community based on sample results. Thinking similarly, it is not obvious to me that for all the work done in creating the stream health IBI work, or in the factors work, that anyone

has taken that information to the application level of using results to discriminate causes – or, recommending a unified method for discerning causes of impairment. MD DNR produced a report (ask Scott Stranko) that showed the strong impacts of impervious area in a watershed on bug community health, fish community health and so on. A potential project to tease out more of that relationship is recognizing the impervious relationships to impacts were not done on high resolution land use/land cover data. The new land use-land cover data available could be used to rewrite the books on defining impervious cover-to-community index results for one. And secondly, developing a protocol that can be used to discriminate stream health condition drivers would provide a method for assessing which factor or combination of factors most need to be focused on for managers of that watershed to improve stream health – can you give me the diagnostic check list to assess the top 5 or 10 most common impact factors and what tests are needed to make that assessment? Separate road salt from acid mine drainage from temperature from invasive species from wetting period from channel modification and so on. That probably requires something more than the RAPID assessment protocols.

Brook Trout Outcome

- Need: Track restoration efforts/monitoring across partners including states and non-profits like Trout Unlimited.
    - Comment from the database notes: GIT Funding could be a good way to build a framework for more efficient tracking of restoration efforts. There would be a need for an organization in the partnership to sustain the monitoring.
    - Comment from Peter Tango:
        - I am unclear in revisiting this need – is this about habitat restoration and habitat monitoring, or is this about population restoration efforts/monitoring needs specifically dealing with fish. A fish restoration project could be 1) I reconnected an upstream habitat with a downstream habitat with a fish-passage friendly culvert to allow a population to move into other catchments – are the fish moving? 2) I transplant fish from one catchment to another, did the fish survive, grow, reproduce, establish a population? 3) I raised an F1 generation stock of brook trout (first generation based on using wild fish to collect eggs and fertilize them, then raise them in aquaculture to release into the wild – West Virginia has done some of this), and I transplanted them to a high quality catchment with no evidence of brook trout now. Did it work? Contrast with strictly a habitat restoration project – e.g. dam removal and habitat reconnection, riparian buffers, flood zone reconnection, woody debris management, etc. Those are habitat projects. We should be tracking both efforts. I don't know if those are separate here.

        - The fish component could be connected to the overall need for a consistent brook trout monitoring protocol that includes assessment at restoration sites as part of the monitoring strategy.
        - Each state is already doing a lot of restoration tracking and reporting – why can't we tie in with those efforts with project tracking here and make this simple and not a new burden? Can we use the same tracking system and just add a code that says "THIS IS SPECIFIC FOR BROOK TROUT" and not create an entire new system separate from all other systems. Let's work smarter and not harder if we don't have to when and where we can.
- Need: Determine genetic metrics necessary to determine brook trout population health and resiliency.
    - Comment: This need seems like it could benefit from technical experts' focus, possibly obtained through a GIT funded project.
    - Comment from Peter Tango:
        - eDNA has been discussed for a long time now, it has been tested in lab, in the field – where are the results? How about a project maybe through ROAR or maybe through GIT or maybe both – one is a synthesis of the pilot studies and assessment in the watershed (very GIT-ish), the other is a region-wide test (ROAR-ish) that is designed in concert with standard techniques of netting or electrofishing or hook and line results to show the efficiency, value and conditions it works really well and the place and conditions it does not. There has been a lot of promise offered, put it in an application setting, let's put it to the test, don't tell me it doesn't work but rather let's look at the positive and false positive, negative and false negative relationships, discuss and consider if that is information we can use effectively to manage brook trout, have a cost effective monitoring program. Collect the information and close the project with a workshop event that presents the findings to managers and scientists and gets feedback on operationalizing the approach to monitoring brook trout over large regions, or to track restoration site success/failure.
- Need: Determine how interactions between climate change and land use will affect brook trout.
    - Comment: This need seems like it could benefit from technical experts' focus, possibly obtained through a GIT funded project.
    - Comment from Peter Tango:
        - Impervious cover is bad, more of it is worse, temperature increase remains on a steady increase locally, regionally and globally and will hasten the demise of the brook trout by degrading the habitat quality anywhere you see increasing imperviousness. More rainfall may allow for greater

confidence in ground water recharge and cold ground water contributions sustaining brook trout habitat such that there is a slight buffer/slight bit of resilience in some places in times before temperature overtakes the groundwater effect. I think we already may have covered this in the brook trout vulnerability assessment with scenario testing up to 6 degree C temperature increases? If someone finds a strain of wild brook trout that has greater plasticity for surviving in warmer waters, that might be an interesting area of research to consider for adding resilience to restoration efforts going forward (maybe a ROAR research direction too?), not unlike what has been discussed with heat-tolerant Zostera considerations for helping to sustain eelgrass populations in the lower Chesapeake Bay, that could be valuable for the long-term outlook of brook trout in the watershed.

- Comment from Peter Tango: The outcome is about improving the status of brook trout (distribution of catchments with brook trout) in the Chesapeake watershed recognizing more than a century of decline. If you can't yet speak to status and trends of the Chesapeake Bay watershed assessment of brook trout for 2025 as compared with either the mid-2000s Hudy assessment or the EBTJV updated evaluation around 2012-14, then having an established method for a watershed-wide assessment on status and progress would be an obvious high priority project that would be ripe for a GIT funded effort now that the BT Action Team has invested support in someone to help their effort. It is an issue that has needed resolution for over a decade. GIT funding could be used to develop the sampling design to accomplish the task.

Fish Passage Outcome - No science needs are listed in the database for this outcome.

- Comment from Peter Tango:
    - During Jen Greiners tenure with the habitat GIT, there was the genesis of work to map and characterize all culverts in the watershed. Road crossings are a huge deal for habitat fragmentation when little ecological consideration is used to move water from one side of a road to the other. Frequent results have been disconnected watersheds, classic habitat fragmentation. The idea of the work was to establish a catelog of crossings, characterize the connectedness and have a data set for targeting work to reconnect streams to allow for more contiguous fish and wildlife habitat/migration corridor connections, etc.
    - I don't believe we characterized all the culvert conditions of the watershed. A project to generate a protocol and perhaps an app that allows citizens to go to a site, make a few measurements, get GPS coordinates, take a few pictures and upload would be awesome - OR - I think the northeast region already has this sort of thing set up but it hasn't been used much here. Perhaps a training and adoption

program would be a good GIT project for the Fish Passage world. Inquiring minds want to know where this project went to?

Submerged Aquatic Vegetation Outcome

- Need: Assess integrated impacts of shallow water uses (e.g. living shorelines, aquaculture, clamming, shoreline structures) on SAV habitat
    - Comment: There are no resources currently to address this need. It is a mapping exercise and a pilot project could be beneficial with potential to expand after a pilot. I am not sure about the cross-outcome value potential but I think it is relevant to habitat, fisheries, and stewardship.
- Need: Assessment of future SAV habitat availability in relation to climate change, sea level rise, shoreline alteration, and nearshore development to determine if segment-specific and Bay-wide SAV restoration goals are feasible.
    - Comment: There's so much under this need that although there already is at least one project working on it, seems like there could be more, and it's got a lot of cross-outcome potential.
- Need: Chesapeake Bay SAV Sentinel Site Program Implementation
    - Comment: Perhaps a pilot Sentinel Site could be developed with GIT funding?
- Need: Compare the ecosystem services of Ruppia maritima and Zostera marina and determine if a shift from Zm to Rm dominance in the polyhaline will impact fisheries such as blue crabs.
    - Comment: The literature review part of this could be appropriate for a GIT funded project but I don't think the field study would because it seems more long-term.
- Need: Determine potential to restore Zostera populations in the Chesapeake by facilitating the migration of potentially more heat resistant Zostera seeds from North Carolina.
    - Comment: This could be appropriate for a pilot study.
- Need: Determine the contribution of Zannichellia palustris (horned pondweed) to baywide SAV totals.
    - Comment: This may not be a good fit because it does not have strong cross-outcome potential. Otherwise, it seems like it could benefit from GIT Funding.
    - Comment from Peter Tango: A test of new Planetscope satellite data assessments in the spring season to evaluate spring conditions in the bay would be new territory in the world of bay living resource assessment. We may want to visit that issue as a stepping stone to the value assessment of newer satellite data for multiple habitat assessment needs in nearshore habitats and habitat change as well as realtime dynamics at never before available temporal resolutions (daily) from satellite imagery.
- Need: Determine the Local effect of flow/Stormwater run-off on SAV density and acreages and options for targeting BMPs that would protect priority SAV areas.

    - Comment: No resources are currently identified, but it is high priority.
    - Comment from Peter Tango: Given the new Planetscope constellation of satellites providing data and never before, coincidentally available high temporal and spatial resolutions, assessing the application of that approach with this resource may be a viable project. Coupling it with satellite-based high resolution temperature assessment NOAA uses to track temperature change in the bay is worth exploring as to understand where the most significantly effected habitats of the nearshore environment are in the bay.
- Need: Develop algorithms to advance efforts in the use of Artificial Intelligence in the automated detection of SAV from satellite imagery.
    - Comment: Maybe there is not enough cross-GIT impact. Dick Zimmerman (ODU) is currently funded by NASA to work on this with CBP identified as the end-user (tech will be transferred to CBP upon project completion), but is in need of additional support to collect field data throughout the Bay to train the algorithms.
    - Comment from Peter Tango: IF this is tied to specific test application for example of the spring Zan study and/or temperature effects assessment, maybe there is a way to strengthen this idea into a project with a greater return on investment.
- Need: Explore the potential co-location of land-based BMPs, oyster/mussel restoration, and SAV.
    - Comment: High priority but no resources identified.
- Need: Identify SAV's role in Chesapeake Bay's carbon sequestration potential.
    - Comment: The scope is limited to eelgrass.

Forest Buffer Outcome

- Need: Develop tailored buffer outreach materials for farmers and non-farmers, reflecting different motivations and benefits that can be derived from buffers.
    - Comment: No resources have been identified and this is relevant across outcomes.
- Need: Exploring restoration systems, effectiveness, and plant species. What kinds of forests are we trying to create? Are we planting the right trees and shrubs to ensure the highest success rates?
    - Comment: A literature review seems feasible for a GIT funded project.
    - Comment from Peter Tango: Counterpoint for a moment – if you stop actively managing a piece of ground, Mother Nature is excellent at reclaiming it. She will use the best available plants in the seedbank and reclaim those acres if we just let her go at her own pace. Even if you leave bare pavement in an urban area unmanaged, as cracks in the pavement occur from weathering, plants start growing and will work to reclaim their rightful place in the world. I suggest one of the best BMPs for forest buffer work is understanding how to get a landowner to simply not manage every square inch of land up to the stream edge and let

Mother Nature reclaim to streamside corridor. Is it merely paying landowners some subsidy to not plant that much land? Have we attempted to go at this from an economics assessment of what do we need to invest in sustainable corridor preservation by taking that land out of production within 50 feet or 100 feet or some other width from the streambank to create the effect we need?

- Need: Identify agricultural landowners who have the greatest amount of bufferable acreage to target for buffer outreach.
    - Comment: Connects to the first need in this section.
- Need: Identify better methods for quantifying co-benefits from forest buffers in a way that can be easily incorporated into decision-making.
    - Comment: No resources have been identified and this is relevant across outcomes.

Tree Canopy Outcome

- The need for this outcome is not appropriate for GIT funding because it requires on-going monitoring.
    - Comment from Peter Tango: That may be true, but if we can for example use GIT funding to develop a protocol for using the new high resolution imagery Peter Claggett, Renee and others are working with is suitable to make that assessment, that protocol development for a targeted algorithm that can be used for tree canopy change over time would seem like an excellent result for the investment.

2025 WIPs - No science needs suitable for GIT Funding were established for this outcome.

Water Quality Standards Attainment and Monitoring (WQSAM) Outcome

- Need: Develop targeted shallow water monitoring strategy.
    - Comment: Maybe there is a project in here? A STAC workshop and/or some kind of written product has been brought up at STAR meetings though so maybe it doesn't need GIT funding.
    - Comment from Peter Tango: Maybe. Synching up shallow water monitoring with the new offshore network could be very valuable for this outcome and fish habitat outcomes, oyster restoration, etc.
- Need: Improve understanding of bay living resources to watershed and bay management effects.
    - Comment: No resources are identified. Some possible projects include: Fish habitat assessment project case studies, oyster restoration site recovery tracking, synthesis of living resource changes in light of ecosystem changes.
    - Comment from Peter Tango: A grand unified assessment of bugs, fish, shellfish, birds, trees, created against the backdrop of changes in the bay and teasing out the factors affecting change – conceptually feasible, respectfully though, I think this

needs a year of discussion, and perhaps using a team to revisit the work done in the 1990s by NOAA on an ecosystem integrity index to evaluate is applicability might put this on track for GIT funding next year. (See Jordan and Vaas 2000. An index of ecosystem integrity for northern Chesapeake Bay. https://www.sciencedirect.com/science/article/abs/pii/S1462901100000289 . I see a topic here for the Status and Trends WG as perhaps a place to review this and discuss it over the next year.

- Need: Improve understanding of fish and shellfish habitat to watershed and bay management effects.
    - Comment: Look at fish habitat needs.
    - Comment from Peter Tango: agreed.

Toxic Contaminants Research Outcome

- Need: Gather information on issues of emerging concern in the watershed to prioritize and identify related tasks.
    - Comment: There is an on-going study led by Lee Blaney and his graduate student at UMBC on Contaminants of Emerging Concern at several sites in Baltimore and details on this will be added to the database. More research would probably be beneficial.
    - Comment: The CBP Plastic Pollution Action Team (PPAT) is working with Tetra Tech on the second iteration of an ecological risk assessment looking at impacts of plastic pollution on striped bass in the Potomac River. This project should be completed by September 2022.
    - Comment: In response to a directive from the PSC, the PPAT has convened a monitoring subworkgroup to develop a monitoring strategy for plastic pollution in the Chesapeake Bay and watershed.
    - Comment: USGS New York Science Center and USGS MD-DE-DC Science Center is working on establishing monitoring stations for microplastics at non-tidal stream gauging stations in the Chesapeake Bay watershed.
    - Comment: DC Department of Energy & Environment, Metropolitan Washington Council of Governments, Tetra Tech, and EPA Region III Trash Free Waters Program are currently undertaking a sampling project looking at microplastics contamination in fish in the Anacostia and Potomac Rivers. Over 200 fish were sampled in 2021 and 2022. A final report is expected by December 2022.
    - Comment: Morgan State University PEARL Lab has multi-year NSF and NIH funded studies looking at presence of microplastics in oysters and jellyfish in the Chesapeake Bay. The oyster research will also assess potential impacts to human health.

- Need: Generate further information on mercury in the watershed (water, sediment, fish tissue).
    - Comment: Seems like this could be a great GIT funded project because it has cross-outcome relevance and has no resources identified. Project is to inventory data and create a story map and educational materials.
    - Comment from Peter Tango: I suggest you may want to speak to Cindy Gillmore at SERC before the August brainstorming session, have her perspective to consider on what is available and what might be an excellent proposal direction (https://sercblog.si.edu/SciArt/mercury-pollution/)
- Need: Synthesize and communicate information to document fish health and wildlife conditions in the Bay watershed.
    - Comment: It seems like the synthesis part has been done but not the communication and outreach. This point is unclear.

Toxic Contaminants Policy and Prevention Outcome - No science needs suitable for GIT Funding were identified for this outcome.

Healthy Watersheds Outcome

- Need: Determine a way to identify and track "marginally healthy" waters and watersheds. Shared data gap with Stream Health workgroup. Have states voluntarily report "trending towards healthy" waters as a way to show progress.
    - Comment: This is a cross-GIT need but it is low priority. No resources have been identified. Methodology development seems appropriate for a GIT funded project.

Stewardship Outcome - A project for GIT Funding has already been developed.

- Comment: There definitely could be project potentials, such as utilizing the data from the 2022 stewardship survey.
- Comment from Peter Tango: Yes, how does the analysis feed outreach directions would be nice to see.

Local Leadership Outcome - No science needs are listed in the database for this outcome.

- Comment from Peter Tango: I thought they were developing their indicator and, while they are working with their survey, could use pricing out what it would take to create a robust, repeatable, statistically defensible tracking effort over time.

Diversity Outcome

- Need: Identify measures of success towards the outcome beyond our internal diversity indicator to help track stakeholder engagement.

Protected Lands Outcome

- Need: Expanded analysis and mapping of projected climate impacts and other pressures like development.
    - Comment: Previous GIT Funding for the CRWG compiled climate change layers for analysis - would a similar project be helpful?
- Need: Update Important Datasets (Forest and Farmland) The CCP Important Forests and Farmland Datasets were produced just prior to the release of high resolution land cover data. Update the dataset using that data and incorporate any relevant outputs from other analyses.
    - Comment: Seems like it could be a straightforward GIT Funding project.

Land Use Methods and Metrics Development Outcome - No science needs suitable for GIT Funding were identified for this outcome.

Land Use Options Evaluation Outcome - No science needs suitable for GIT Funding were identified for this outcome.

Student Outcome - No science needs suitable for GIT Funding were identified for this outcome.

Sustainable Schools Outcome - No science needs suitable for GIT Funding were identified for this outcome.

Environmental Literacy Planning Outcome - No science needs suitable for GIT Funding were identified for this outcome.

Climate Monitoring and Assessment Outcome - Some efforts are ongoing to address these needs, and they need to finish before thinking of next steps.

Climate Adaptation Outcome

- Need: Better understanding of green infrastructure (e.g., living shorelines) performance in building resilience to climate change impacts, cost-effectiveness of these strategies, and potential unintended consequences to other restoration metrics (e.g., sediment dynamics).
    - Comment: Cost effectiveness studies for green infrastructure related to living shorelines could be a GIT Funding project.
- Need: Saltwater inundation impacts on wetland habitats (e.g., brackish waters), SAV, and land use (e.g., ag, forest).
    - Comment: This science need was brought forward due to MD's Salt Intrusion Plan - Maybe they have an action item that could use funding support.

- Project Idea: Effective designs for combining gray-green infrastructure approaches

- The need came from the LGAC Flooding Forum - “encourage the use of innovative green and grey infrastructure designs to protect residential and commercial properties from flooding that could also provide a multi-use function for the community”
- From the Local Government Forum report: “When it comes to promoting more innovative approaches, seeing is often believing. In the case of flooding, seeing the problems first-hand significantly improves the understanding of possible solutions and natural processes as mechanisms to better manage and control water. Encouraging more site tours and using pictures and videos whenever possible will help to better explain a concept and can encourage new ideas and promote collaboration. Because of the constraints of the permitting process, agencies may be limited in their flexibility for considering and utilizing innovative best practices. There is no database for innovative flooding approaches currently available and adopting new approaches will require training for engineers and other staff to clearly be able to identify and consider options.”
    - Targeted resilience education is also recommended for local elected officials, municipal staff, land and property owners, and constituents. State and federal governments are encouraged to conduct an evaluation of their regulators to focus on water quantity, not just water quality. Better documentation is needed and, as discussed earlier, a technical liaison (circuit rider) for funding and financing would also play an essential role in addressing water quantity issues at the local level. Better tools are needed to quantify the ability of stormwater management strategies like green infrastructure to help reduce flood risks since design standards are not always scaled for extreme precipitation.
    - https://www.chesapeakebay.net/channel_files/19528/2020_local_government_forum_report.pdf