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| GIT 1: Sustainable Fisheries | Blue Crab Abundance | * Already a big gap between connecting water quality projections to habitats and fisheries (need cross-GIT approaches) * Require a look at cross-cutting and multi-stressor issues - multiple stressors may combine in non-linear ways * Phenological issues – does it disrupt population/community dynamics - understanding life-stage specific effects | Medium |  | Review current knowledge of climate effects on fisheries (range changes/effects on life stages) | **High potential**   * Can alter fisheries regulations to handle some phenological changes (e.g., manage the spawning season) * Adapt restoration approaches (e.g., restored oysters placed into shallow water to avoid issues with stratification effects) * Creative solutions exist to adaptively manage   **Med potential**   * Habitat-friendly shoreline designs can be encouraged; living shoreline performance explained, but regulatory hurdles to innovative designs. * Manage land and shoreline management in the watershed (e.g., total impervious) to mitigate climate effects * BMPs can be adapted to mitigate climate effects * Think at watershed scales, pick appropriate scale for management |
| Blue Crab Mgmt. | Medium |  |  |
| Oyster | Medium |  | Invasive species/pathogens – understanding climate drivers and cross-interactions (salinity, temp, disease) |
| Forage Fish | High | Poor | Temporal and spatial variability of climate effects on habitats for forage life stages |
| Fish Habitat | High | Poor | Shoreline change monitoring |
| GIT 2: Vital Habitats | Wetlands |  | (non-tidal) - medium  (tidal) - high | (non-tidal) – Poor  (tidal) - Excellent | (non-tidal) – Need to better link precipitation with de-nitrification; that is, link hydrological patterns to wetland function.  (tidal) – how will climate change facilitate invasive species |  |
| Black Duck | black duck select Chesapeake bay due to habitat but food source will change due to climate change and migration patterns may also change | High | Poor | Need to assess “high marsh habitat condition”; need to map habitat |  |
| Stream Health | Climate Change impacts functional pyramid; urban runoff; subsidence may change flow and source for stream; recurrent flooding will increase run off; saturated earth will increase failure of low-buried urban infrastructure such as sewerage and oil lines, which are already aging. | High (with uncertainty) | Poor |  |  |
| Brook Trout | Dry streams and temperature change impact food. New temp ranges puts Brook Trout into competition with other species | High | Fair | How sensitive are species to temperature change? What conservation strategies will work? |  |
| Fish Passage | Climate change may impact the effectiveness of fish passage projects in mitigation or conditioning the health of the Bay environment (e.g., opening dams; stranding and low-flow events) | Medium-Low | Excellent |  |  |
| Submerged Aquatic Veg. | Increase SLR implies increased hardening shoreline implies decrease eelgrass; eelgrass in saltwater tolerant; when eelgrass disappears this means change in sheltering and food | High | Excellent |  |  |
| Forest Buffer | Climate change may impact the effectiveness of forest buffers in mitigating or conditioning the health of the Bay environment. | Medium-High | Fair |  |  |
| Tree Canopy | Climate change may impact the effectiveness of tree canopy in mitigating or conditioning the health of the Bay environment. | Medium-Low | Fair |  |  |
| GIT 3: Water Quality | 2017 WIP Outcome |  | Low | Poor | * How do climate change concerns drive behavioral changes that impact water quality * Investigate impacts on increasing irrigation/drainage (flows, fluxes, land subsidence) * Climate impacts on crop rotation and disease pressure. Changes in these may impact recommended BMPs and then there is a need to assess and evaluate the effectiveness of recommended BMPs that may need to/have been adapted to address a new climate reality. |  |
| 2025 WIP Outcome |  | Medium (uncertainty about how stakeholders will respond to uncertainty about climate change and adaptation to climate change) | Poor | * Design and function of BMPs under new climate reality (i.e. larger, more frequent storm events) * Need to develop BMP implementation guidelines that are outcome oriented rather than focused on meeting specific target dates or implementation milestones |  |
| Water Quality Standards Attainment and Monitoring |  | High (longer term) (Uncertainty about BMP functionality under and altered climate regime and uncertainty about behavior, e.g. changing crop rotations, increase irrigation/drainage, changing development patterns) | Poor (lack of clarity on how/if BMPs called for on WIPs will function as intended. This uncertainty is present at multiple scales from field to watershed) | * Need for scoping studies that take a given climate scenario forecast and examine consequences of alternate behavioral (management) scenarios. * Continually reassess/reprioritize monitoring schemes to ensure that monitoring considers climate change reality. * Need for more, higher resolution (in both space and time) monitoring, especially characterizing the impact of larger magnitude events. * Investigate impact of intensifying animal agriculture in the context of climate change (e.g., higher temps will require more ventilation for poultry operation; how will this impact loads from emissions. * High resolution analysis of change at various scales across systems. |  |
| GIT 4: Healthy Watersheds | Healthy Waters Outcome |  |  |  |  | General comments:   * Productive ag part of a healthy watershed. * Mgmt. opportunity to moderate is low and all a matter of scale. * Stream and wetlands are indicators of healthy watersheds. |
| Temperature (urban) - Assumption was that temperature was going to increase. | Low vulnerability because urban temperature signature overwhelms what we get from the natural system |  | General (not climate impact specific):   * Ground and surface water interaction. * Small scale watershed monitoring * Link between management and system response | Increases in shading, diminish urban E dial, surface water, etc. There is an ability to manage the landscape to reduce the vulnerability. |
| Temperature (rural) - Forest health (canopy changes) and an element in overall watershed health. |  |  |  | Increase stream shading, improve cold water habitats in upland systems. |
| Precipitation: Seasonality (urban) |  |  |  | Retrofit streams (expand floodplain), reduce flooding frequency, moderating peak flows. High mitigation increase would have high impact on aquatic ecosystem health. |
| Precipitation: Seasonality (rural) |  |  |  | Modest – Ag BMP implementation (edge of field practices) and scale of watersheds is increase as you move towards rural systems. Capacity to make a difference is better in smaller watersheds but as you scale up, there is less. Negative - drainage in winter and irrigation in summer. |
| Rainfall intensity bigger in urban. Increase intensity in warm weather. |  |  |  | Retention and infiltration |
| Rainfall intensity (rural) – little more capacity to manage. Timing matters. |  |  |  |  |
| Sea Level Rise –mainly coastal |  |  |  | No mitigation options |