Questionnaire for CIB CCMP Appendix Monitoring Plan Update - General

Responders

- DJ: Doug Janiec, Sovereign Consulting Inc., Natural Resources Program Manager, Senior Restoration Ecologist
- LT: Lauren Torres, Delaware Department of Agriculture, Nutrient Management Program
- JD/MN: Judy Denver/Mark Nardi, USGS, MD-DE-DC Water Science Center
- JC: John Clark, DNREC, Fish and Wildlife
- Jim Sadowski

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1. **Did you participate in preparation/meetings/workshops for initial 1995/1996 CCMP Monitoring Plan?**
   - DJ: No.
   - LT: No, I did not.
   - JD: Yes, to some extent, but don't remember much about it.
   - JC: No, I think Roy Miller and Jeff Tinsman participated for Fisheries.

2. **What areas, based on your experience/expertise, are the most important to focus on in a monitoring plan for the Inland Bays and (very briefly) why?**
   - DJ: Habitat loss and gain (e.g., shoreline). Habitat loss is a top of pyramid indicator, which includes the net outcome of many primary indicators working together in a complex system.
   - LT: Based on our experience, DDA believes that the most important areas to focus on in a monitoring plan for the Inland Bays are septic's, cesspools, and the expansion of sewer treatment plants based on the associated population growth in the Inland Bays watershed. DDA will continue to implement The Nutrient Management Program and the Concentrated Animal Feeding Operation (CAFO) Program to oversee nutrient handling activities associated with animal production, specifically poultry production, and on farm nutrient management practices.
   - JD/MN:
     - Monitoring to understand water quality in the tidal portion of the bays for assessing current conditions and trends where samples have been collected long-term by DNREC and others should be continued to assess the health of the Bays.
     - The addition of upstream sites for long-term monitoring of non-tidal fresh surface-water quality would be very useful to track changes in water quality related to changes in land use and land management which could lead to a better understanding of the system as a whole. A monitoring network in small sub-watersheds is suggested. To track and understand nitrogen, which is mostly from groundwater, several sites that were selected and sampled in the late 1990s and early 2000s (by USGS, DGS and UD) could be used to develop a network of non-tidal sites and sampling could be repeated during winter base-flow conditions every year. A subset of these sites could be selected as a base

for this network and, and, at a minimum, could be sampled during winter baseflow for nitrogen inputs, but it would be better to do at least season sampling and include ecological sampling at least during the warm seasons. This network could also be used to track and better understand sediment and phosphorus inputs.

- JC: My experience/expertise is with fish, so I would focus on fish and water quality, but water quality and fish habitat depend on land use in the watershed, so I would have a hard time coming up with a single most important focus.
- JS: The Indian River Power Plant has shut down three cooling units and the remaining unit, with the cooling tower, has not been running very much. It was always said that the plant was impacting the Indian River and Bay but the 316a and 316b studies showed "no appreciable harm". I think the Center should further investigate what affects, if any, shutting down of the once through units has had on the Indian River and Bay. What has happened to all the species, increased/decreased/remained the same? Are the species changing? Are they different during the different seasons due to the temperature changes? What are the effects of the temperature changes? What is the effect of the reduced flow in Island Creek? The list can go on and on, but I think the Indian River System would be a great lab to see what affects a power plant shutting down has on the ecosystem.

3. **What areas, based on your experience/expertise, are missing from the current monitoring plan?**
   - DJ: More detailed tracking on shoreline changes and its contribution to sediment loads in the Bays.
   - LT: Based on our knowledge, we think it would be helpful for an evaluation of the total number of septic systems, and cesspools that are in existence in the Inland Bays Watershed, and how many of those are planned to be converted to the city sewer systems to be included in the new monitoring plan. Additional data could include the age and types of systems, and the estimated nutrient load from those sources, and subsequent reductions from conversions. Additionally, a summary of how this monitoring plan and all of these activities relate to the State of Delaware's Watershed Implementation Plan along with the TMDL's would help explain how all these activities tie together.
   - JD/MN: See above answer for surface water.
   - JC: Given that the Inland Bays has one of the healthiest hard clam populations of any coastal lagoon system on the Atlantic Coast, hard clam monitoring would be a good addition.

4. **What monitoring activities/data collection is your organization undertaking in the Inland Bays that could be part of the CIB monitoring network?**
   - DJ: None, yet.
   - LT: Currently, none, but see new project below.
   - JD/MN:
     - Data are currently being collected at 7 stations in the Inland Bays watershed for flow, tide, and/or real-time monitoring of specific conductance, dissolved oxygen, pH, and temp.
     - The USGS has setup an ephemeral storm surge network (deployed only during events) comprised of 7 sites. Six of the sites measure water level and specific conductance; one of the sites is a rapid deployment gage (RDG) that measures and transmits in real time water level, wind speed and direction, barometric pressure, and air temperature. We will work with DelDOT on RDG siting.

5. **What monitoring programs are planned for the future that might be applicable to the Inland Bays?**
   - LT: DDA and USGS will be beginning a new study monitoring shallow ground water wells on a 5 year basis. See details in Table 2.
   - JD/MN: Most of the current USGS monitoring in the Inland Bays is done in collaboration or cooperation with other agencies including DGS, DNREC and Del DOT and is likely to continue in the near future. Future plans depend on program directions of all agencies involved and are not known now.

6. **For the data you discuss in this document, is your organization just collecting raw data or are you also processing the data and developing trends from the data?**
   - LT: The data is being collected currently to establish baselines, and the future data will be used to develop trends.
   - JD/MN: All data currently collected by USGS are published and available on the USGS NWIS webpage under the "Atlantic Coastal Bays" tabs (http://waterdata.usgs.gov/de/nwis/current/?type=flow&group_key=basin_cd). In limited areas the USGS is working with cooperating agencies to analyze the data. All data collected by the USGS are subject to QA/QC and processing procedures prior to public release, except in limited cases where partner agencies have direct data access.
   - JC: We process our trawl data and report trends in overall catch and trends in juvenile abundance indices.

7. **What additional monitoring activities would your organization benefit from if CIB could include in their monitoring plan? Please feel free to think outside of the box, without regard to availability of funding, including new or innovative technologies.**
   - LT: Monitoring activities that would benefit the DDA, and all organizations, would be data that indicates the source of impairments and the age of the water.
   - JC: The volunteer seining survey complements our trawl survey. I think it should be continued.

8. **What do you, or your organization, feel are the critical indicators of health for the Inland Bays?**
   - DJ: Fisheries, shellfish, and SAVs, shorelines.
   - LT: Critical indicators for the health of the Inland Bays are nutrient concentrations, dissolved oxygen, bacteria counts, submerged aquatic vegetation, and water clarity.
   - JD/MN: SAV's, dissolved oxygen, water clarity, biological diversity. Underpinning all of these is water chemistry of both groundwater and surface water inputs which from a monitoring point of view are very important to the Inland Bays system that has limited exchange with the Atlantic.
   - JC: Water quality, fish and other aquatic organism communities, hard clams, etc.

9. **Does your organization have historical monitoring data that was not included in the original monitoring plan that would be useful for future monitoring activities or for use as State of the Bays indicators? Please list them.**
   - DJ: No.
   - LT: We do not have historical monitoring data.

10. **Does your organization anticipate having sufficient future funding to carry out monitoring activities that CIB has included in the monitoring plan to date? If not, what level of additional funding is needed?**
   - LT: We do not have monitoring activities currently listed in the monitoring plan.
   - JC: Fisheries will continue the trawl survey.

11. **Do you anticipate future funding for additional data collection parameters beyond the current monitoring criteria included in CIBs plan?**
   - LT: We anticipate the funding for the new project between USGS and DDA.
   - JC: No.

12. **Do you have any recommendations for additional funding sources for Inland Bays monitoring activities?**
   - DJ: No.
   - LT: Not currently.
   - JC: No.

13. **Are you aware of any volunteer organizations/programs that are currently active and could be included in future Inland Bays monitoring for supplemental information?**
   - DJ: No.
   - LT: I am not aware of any other organization or programs currently active in the Bays other than the Inland Bays, “Your Creek” projects.
   - JC: No.

Table 1

Responder	Program/Monitoring Activity	Purpose/users	Where? (bay(s), stream(s), watershed(s), etc.)	Years collected, frequency of sampling	Parameters/species measured	Current/future status	Funding Status/ Source
JC	Division of Fish and Wildlife Juvenile Finfish Trawl Survey	This survey estimates year class strength of various fish and invertebrate species and assesses abundance and community structure	12 stations sampled in Indian River and Indian River and Rehoboth Bays	1986 to present Sites are sampled monthly from April through October	Fish and invertebrates are sorted and counted by species A subsample of each species is measured Surface water quality is taken at each station	DFW plans to conduct this survey indefinitely	Secure funding through the Federal Aid in Sport Fish Restoration Program

Table 2

Responder	Program/Monitoring Activity	Purpose/users	Where? (bay(s), stream(s), watershed(s), etc.)	Duration, frequency of sampling	Parameters measured	Anticipated Start Date	Funding Status/ Source
DJ	More real-time monitoring, such as the York Canal Project		Near oyster cages and floating wetlands				
	Update the IB GIS AP and shoreline migration rates						
	Monitoring for project success/failure, not just bay-wide status/trends						
LT	USGS/DDA Shallow Ground Water Monitoring Program	Establish trends in nutrient levels in shallow ground water (40 ft or less) To test nutrient loading BMPs	Statewide, approximately 70 total wells (all dedicated established monitoring wells)	Every 5 years	N, P, age dating ions, land use tracer ions	Fall of 2014 & fall of 2015 to establish baselines First trend assessment will be Fall 2020	USGS and DDA matches
JC	Division of Fish and Wildlife hard clam density survey	Determine whether hard clam density is compatible with shellfish aquaculture on a given acre of bottom	Indian River and Rehoboth Bays	Sampling began in 2014 to determine hard clam density in acreage that DFW attempting to get permitted for shellfish aquaculture leases	Number of hard clams per square yard, bottom type	2014	DFW funds