8. CRITICAL DATA AND ANALYSIS NEEDS

This committee finds that the highest priority for jurisdictional managers to consider is to continue to improve commercial and recreational blue crab harvest accountability. Better methods to quantify and verify removals will provide managers with a more accurate exploitation fraction each year and better support mid-season management changes. In addition to increasing accountability, CBSAC finds that critical research gaps and data needs that support an increase in both the accuracy and or precision of WDS data be considered as higher priority as the WDS is currently the most comprehensive and most valuable assessment tool for managers.

As blue crab management in each jurisdiction currently employs sex-specific regulatory strategies. The lack of data describing sex ratio and size composition of the harvest will impede efforts to develop effective management strategies. Below, CBSAC has identified and prioritized the following list of fishery dependent and independent data needs as well as the benefits provided to management. CBSAC will continue to discuss the potential investigators, cost and duration of the projects and coordinate with jurisdictional managers through the end of the 2013 crabbing season.

8.1 Gear efficiency pertaining to selectivity of WDS methods: The WDS survey methods to estimate gear efficiency differ between the two states. CBSAC recommends continuation of a comprehensive comparison between MD and VA WDS methodologies and gear. Following the comprehensive comparison, the accuracy and reliability of current scalars and efficiency corrections should be reevaluated. MD DNR and VIMS will meet to discuss survey design in an attempt to develop this comparison over the course of the next year. Costs and required time are unknown. However, it is anticipated that considerable progress can be made by exchanging assigned sample stations between the two jurisdictions rather than adding new stations. Additional manpower may be required to analyze the results of the comparisons.

Comments (Week 1): Also seen as a high priority and something that has been a reoccurring recommendation. In discussion the role of selectivity estimates play in both stock assessments and WDS results.

Comments (Week 2): In the latest discussion this item was highlighted as highest priority as selectivity coefficients and scalars heavily influence the absolute abundance estimate provided by the WDS. This efficiency study was described as scalable in costs and would greatly increase both the accuracy and precision of the WDS. It was also discussed that a substantial cut in stations in the WDS was possible without unduly affecting survey precision to provide the time and funding to complete these analyses.

8.2 Over-wintering mortality: Examine WDS data to see if there are available data that may better describe overwintering mortality. This data mining exercise could provide CBSAC and managers with a more complete understanding of the variability in natural mortality year to

year and potentially improve future assessments. CBSAC recommends that initial efforts be focused on determining a statistical approach to use with existing data that can be developed to provide a more reliable bay wide mortality estimate.

Comments (Week 2): In the latest discussion this research item was bumped up as it directly supports the accuracy and precision of the WDS. Improving the estimated overwintering mortality rate applied to survey data will provide a better and more comprehensive estimate of blue crab abundance and survivability into the next crabbing season. Lynn F. of MD DNR is looking into the staff time and potential commitments that her staff may be able to make to address this critical data need.

8.3 Increase access and ability to analyze summer survey data: One recommendation from the recent stock assessment was to undertake a more rigorous analysis of data from existing summer surveys (VIMS Trawl, Maryland Summer Trawl etc) to determine if they provide information to improve the reliability of the assessment. Such analyses would also help determine whether an assessment model that operates on a time step shorter than 1 year is feasible. Access to fishery-independent survey data focused on the spring through fall distribution and sex specific abundance of blue crabs remains important, especially if agencies are considering regional or spatially-explicit management strategies.

Comments (Week 1): This was classified as high priority as the existing summer survey data could be very valuable as a source of validation for WDS. We should discuss further with VIMS staff to learn what additional funds are needed to analyze data from summertime trawl surveys. It was also mentioned in our discussion last week that we may be able to scale the sampling portion of the survey down to allow for additional time and remaining resources to be spent on analysis.

Comments (Week 2): This was reclassified as a lower priority as funding has been acquired by VIMS to compile these data for analysis. This acquisition is in combination with a budgeting adjustment that also allows continued funding the WDS. The importance and or application of this data as a validation source for WDS is unknown as this will be the first year CBSAC scientists have had the opportunity to analyze the blue crab portion of the summer survey data. The question now is what do we get from this analysis, how does this support mgmt., and how can the summer survey data be used in collaboration with the WDS.

UMCES has also provided a ballpark estimate of additional costs for an analysis of summer survey data under the assumption that the data will be provided at no cost. This analysis completed by UMCES (Wilberg and Miller) will be tied directly to the utility of the surveys in upcoming stock assessments and will evaluate the utility of summer survey data in regard to the WDS and upcoming stock assessments. With UMCES staff time and matching commitment removed, the estimated cost for this is around $124,000 for a 1-yr project that would assess the full utility of the summer survey data to the current stock assessment.

8.4 Recruitment: Based on the results of the 2012-2013 WDS, a large number of recruits disappeared from the stock since the 2011-2012 WDS. Based on the stock assessment and pilot field experiments by VIMS and the Smithsonian Environmental Research Center, a large fraction of juveniles in shallow water is not sampled by the WDS. For the former, CBSAC recommends analyzing pertinent environmental and ecological variables to erect and examine potential hypotheses to explain the poor survival of this record recruitment event. Anticipated time to completion is three to four months. For the latter, CBSAC recommends that funding be pursued at the state and federal levels for shallow-water surveys to assess the potential for interannual bias in the fraction of juveniles that is not sampled by the WDS.

Comments (Week 2): This research item was again bumped up as it indirectly supports the WDS and these analyses would help explain to the public what happened to the bumper year class.

8.5 Other sources of incidental mortality: CBSAC also recommends analyzing the magnitude of other sources of incidental mortality, specifically sponge crab discards, unreported losses after harvest from the peeler fishery, disease, and predation. An analysis of non-harvest mortality could improve reliability of exploitation fraction estimates and inform future assessments. Initial efforts should be focused on better defining analyses that could address the problem.

Comments (Week 1): Prioritized over others as managers comparatively may have better control over other sources of mortality (peeler pot, dredge fishery, ghost pots and other sources.

Comments (Week 2): This research item remained in a relatively similar placement with regards to the previous discussion. It's utility and application to improving the calculated exploitation fraction and the assumed mortality in the assessment model was highlighted as reasoning for remaining higher priority.

8.6 Investigation of the potential for sperm limitation: CBSAC recommends an analysis of age composition of mature females over the history of the WDS to determine whether the proportion of females in their second reproductive year has increased. This data mining project is of high priority as the potential for sperm limitation would first be observed by analyzing the proportion of second and third year females in the WDS results. From this discussion, CBSAC has identified that this analysis could be completed from existing WDS data and would require only staff time to support further analysis.

Comments (Week 1): In discussion, this was presented as a relatively affordable data mining exercise that could better inform managers and researchers on the historical occurrence of sperm limitation. If evidence exists in survey data that suggests this has occurred in the past, more effort can be placed on section 8.7 and further investigation of OSR.

Comments (Week 2): Rom L of VIMS mentioned the potential for investigation based on terminal molt condition of female crab carpace seen in the WDS. Rom has mentioned he will investigate the data to see if available WDS data is enough to support this retrospective

analysis. If data is ample to support this analysis and does highlight a situation where sperm limitation has or is occurring in the Blue Crab population, discussions will be scheduled to investigate 8.7 and the utility to managers.

8.7 Operational sex ratio: There is no identifiable relationship between operational sex ratio, as calculated from the WDS, and male exploitation rate. Furthermore, CBSAC decided that the WDS abundance data are unsuitable for representing the Bay-wide operational sex ratio, and a summer month survey would provide a more accurate depiction. CBSAC recommends that this summer survey should be explored.