

MORE PRECISE ASSESSMENT OF BENTHIC CONDITIONS IN DELAWARE BAY USING PROBABILITY SURVEY DATA, TARGETED SAMPLING AND ACOUSTIC HABITAT MAPS

Henry A. Walker¹, Jeff Hollister¹, Bart Wilson², Robert Scarborough², David Carter², Danielle Kreeger³, Krista Laudenbauch-Nelson³, Amie Howell⁴ and Charles Strobel¹

¹ U.S. Environmental Protection Agency (USEPA), ORD, National Health and Environmental Effects Research Laboratory, Atlantic Ecology Division, Narragansett, RI 02882

² Delaware Department of Natural Resources and Environmental Control, DSWC, Delaware Coastal Programs,
89 Kings Highway, Dover, DE 19901

³Partnership for the Delaware Estuary, One Riverwalk Plaza. 110 South Poplar Street, Suite 202, Wilmington, DE 19801

⁴ U.S. EPA Region III, Office of State and Watershed Partnerships, 1650 Arch St. (3WP10). Philadelphia, PA 19103

Broad scale probability survey data from the National Coastal Assessment (NCA), and EMAP are used to: (1) help assess the overall ecological conditions in U.S. estuaries, (2) make unbiased comparisons among different estuaries in the Northeastern U.S., and (3) help determine reference conditions for more detailed studies on ecological responses & stressors in the Virginian Province (VP). The broad NCA surveys help in the identification of localized areas of impact in specific estuaries, but are often too sparse to create interpolative maps of specific benthic features, and may not be intensive enough to support impairment decisions or restoration efforts at fine spatial scales. One solution is to increase sampling intensity or use targeted sampling to confirm localized areas in poor condition and help diagnose causes of impairment.

Another approach, generation of natural resource habitat maps, involves different sampling protocols. For example, the Delaware Bay Benthic Mapping Project (DBBMP) uses a combination of synoptic acoustics and targeted sampling to create natural resource maps to be used for a wide variety of functions including: (1) identifying essential fish habitats (e.g. oyster reefs), (2) locating important locations for marine protections areas (e.g. sturgeon), and (3) locating areas of benthic habitat damage from trawling, dredging, and anchor scars. These methods can identify many hard bottom areas suitable for oyster reef restoration and harvesting, and some hard bottom outcrops in the upper Bay that may turn out to be important habitat for sturgeon.

We present a combined approach that uses probability survey data combined with detailed DBBMP resource maps to inform estuarine restoration and protection efforts in Delaware Bay. Future sampling of benthic communities in Delaware Bay is planned for the summer of 2008, which will be informed by the detailed DBBMP maps generated to date. Thereafter, this effort may be expanded, contingent on funding, to a comprehensive Delaware Estuary Benthic Inventory that would identify and map ecologically and economically important physical and

biological conditions and communities throughout the tidal system providing managers with broadly relevant information to guide benthic system restoration and protection.

Keywords: probability survey data, National Coastal Assessment (NCA), Delaware Bay Benthic Mapping Project, benthic communities