

January 6, 2025

John Dromsky-Reed
AECOM
1255 Broad Street, Suite 201
Clifton, NJ 07013

Subject: Board of Consultants Final Report on New Jersey PMP Study Report

Dear Mr. Dromsky-Reed:

Attached is the Board of Consultant's (BOC) Final Report on the NJ PMP Study Report. The BOC appreciates this opportunity to be involved in this important study supporting the New Jersey Department of Environmental Protection (NJDEP).

Background

In 2019, the New Jersey DEP engaged the services of Applied Weather Associates, LLC (AWA) to perform a probable maximum precipitation (PMP) study for the purpose of updating PMP values for the entire state of New Jersey. AWA was tasked with the following:

- Perform a hydrometeorological analysis of significant storms that influence PMP values in New Jersey. In addition to major storms included in the HMR 51 analysis, consider all additional major storm events which have occurred in subsequent years. Updated tools and methods should be applied for estimating extreme precipitation depth, area, and duration relationships for the entire area of New Jersey.
- Provide a final report to include PMP maps for the specified area sizes and durations in GIS format. Also, a GIS-based program will be provided to allow the user to extract the exact PMP values for any location in New Jersey.
- Coordinate an independent review of the study by a Board of Consultants (BOC) having expertise in hydrology, dams, and meteorology.

The NJDEP with AECOM through AWA, engaged the services of three committee members to perform the independent review: Barry Keim, Ph.D., Louisiana State Climatologist/Professor Louisiana State University; Arthur Miller, Ph.D., PE, D.WRE, of AECOM, and Professor Emeritus, Pennsylvania State University; and David Robinson, Ph.D., New Jersey State Climatologist/Professor, Rutgers University. In addition, representatives of the Federal Energy Regulatory Commission, NJDEP, AECOM, United States Department of Agriculture, Schnabel Engineers, FPA Engineers, National Oceanic and Atmospheric Administration, United States Army Corps of Engineers, GZA Engineers, the New Jersey Water Supply Authority, SUEZ Water, and Buck, Seifert, and Jost (BSJ) Inc., to varying degrees, attended meetings and provided input on the study results.

Seven virtual meetings, which included formal BOC meetings and updates were held to hear progress updates by AWA to participate in discussions regarding processes and methods for the study. Formal meetings were held virtually on the following dates:

- Kickoff Meeting - April 28, 2020
- July 9, 2020
- October 6, 2020
- March 30, 2021
- June 24, 2021
- September 30, 2022
- June 23, 2023

Conclusions Regarding Study Analyses

The BOC was charged with reviewing and assessing each phase of AWA's statewide PMP study and for providing oversight, as necessary, to confirm the study methods were consistent with accepted PMP theories and procedures. Among other things, the BOC assessed the meteorology and climatology of the project and reviewed each phase of the analysis.

The current study provides warm season PMP values, which are valid from May through October. PMP estimates are provided for Local (intense, short duration), Tropical, and General Storm distributions. Results appear to reflect the most current practices used for defining PMP, including comprehensive storm analysis procedures, Storm Precipitation Analysis System (SPAS), use of geographical information systems (GIS), quantification of orographic effects, updated maximum dew point climatologies for storm maximization and transposition, and an updated understanding of the weather and climate throughout the state. The BOC understands that the study used the same general procedures as the National Weather Service's HMR reports and World Meteorological Organization's PMP Manual for in-place maximizations and overall approach. The BOC understands that the PMP development procedures also utilize newer techniques and datasets, such as incorporation of updated precipitation frequency analysis data available from the National Oceanic and Atmospheric Administration (NOAA) Atlas 14, to calculate the Geographic Transposition Factors (GTFs) for each storm. The BOC further understands that the application of these procedures has been accepted in other AWA studies throughout the United States. Although this study produced deterministic values, the BOC realizes that there is some subjectivity associated with the PMP development procedures, such as selection of storms used for PMP, determination of storm adjustment factors, and storm transposition limits. The BOC provided guidance on appropriate storm transposition limits, considering both the meteorological and geographic limitations associated with each respective storm. The study also involved evaluations and discussions of appropriate temporal distributions for the PMP. The BOC believes the PMP estimates of this study provide much improved and geographically specific results over those presently being utilized from HMR 51.

Use of the moisture transposition factor (MTF) has been controversial in past PMP studies due to potential double counting of moisture in conjunction with the geographic transposition factor (GTF). The current study set the $MTF = 1.0$, which nullifies its use in this study. The BOC concurs with this decision.

Board of Consultants

New Jersey Statewide PMP Study

The BOC accepts AWA's estimates for probable maximum precipitation (PMP) for New Jersey. The BOC used our best professional judgment in evaluating the work of AWA. We note that the final PMP estimates are based on the historical record of the past century and more, with the underlying assumption that this record across the eastern United States region yields insight into the PMP across New Jersey.

The BOC performed the duties described above, but it should be noted that the BOC acted in an advisory capacity only. Specifically, no calculations were performed by the BOC, nor were detailed reviews of calculations performed by the BOC. It has been the BOC's expectation that AWA utilized adequate quality assurance and control procedures to provide assurance that the calculations were performed accurately and without error. As such, the BOC does not make any warranty, express or implied, regarding use of any information or method shown in the Probable Maximum Precipitation Study for New Jersey or assume any future liability regarding use of any information or method contained therein. These results are applicable to New Jersey only and should not be used in other states.

Respectively submitted,



Barry Keim



Art Miller



David Robinson