

PMP Steering Committee On Site Meeting
August 26-27, 2020
State Capitol Building Bismarck, ND

Meeting was called to order by Bill Kappel at 8:10am August 26, 2020. Roll Call was taken by Mike Hall.

Present:

Damon Grabow - SWC
Bill Kappel - AWA
John Petersen - USDA-NRCS
Matt Masek – USACE Omaha
George Hayes – USACE Omaha
John Paul Martin – NWS
Joel Toso – Barr Engineering
Dennis Reep – HDR
Greg Gust - NWS Grand Forks
Doug Hulstrand - AWA
Jake Rodel - AWA
Kevin Griebenow - FERC
Paul LeClair - HEI
Kate Kelly - SWC
Karen Goff - SWC
Sara Van Ningen - SWC
Mike Hall - SWC
Aaron Carranza - SWC
Karli Frohling - HDR
Nathan Zoch - FERC
Scott Airola - FERC
Adnan Akyuz - NDSU Climatologist

Bill Kappel reviewed what AWA has completed so far in the PMP study.

Tasks completed include:

- PMP development
- Storm search and storm list
- 100-year model data

PMP major tasks were reviewed with the steering committee and indicated the following tasks that are ongoing:

- AWA PMP Studies previous and ongoing work
- HMRS 53, 52, 51, 48, 44, 33, 22, 20, etc.
- USACE, USBR, USGS, NRCS, and other reports

- Scientific journals, NWS, etc.

Other major tasks being worked on:

- Ensuring consistency with other studies
- Have a good idea of which storms need to be included
- Defining the general and local thunderstorms
- Rain on snow and long duration
- See how the data comes together
- Adjusting the data factors

Getting and identifying the storms. The storms must have similar meteorology, topography to be considered transpositional.

Bill Kappel reviewed locations where they have done work.

Three Types of Storms:

- Frontal System storms that are a local storm that can go on for about 3 days
- Hybrid Storm is general and local storms. Duration high impact and months rain fall events
- Cool Season events. These occur March thru early May

GTF geographic transportation factor. FERC questioned the omission of the GTF greater than 1. AWA shows findings of the GTF being duplicated in the process of estimating the MTF and there omits it from consideration.

Extreme rain occasion made

Recapped the storm information from the past storms

Sensitivities and concerns are included as part of this study.

Due to the process differences from HMR51 there are increases in eastern North Dakota and Western Minnesota, as well as decreases in western North Dakota. This information has not been updated since 1953 so does not have any current storm data.

HRM51 handles its zones using 20 points throughout the entire study area. North Dakota was treated as one transportation zone. HMR51 uses, basically, 2 basins in North Dakota.

Spatial and Temporal Development in process. These are updates to the original RFP. The spatial patterning will allow the use of a recorded storm rainfall pattern within a hydrology model. In the same manner, the temporal pattern of each PMP storm will be usable for a hydrologic model. These are added to move away from the practice of a synthetic pattern for space and time.

Bill Kappel stated the PMP tasks are on track to be completed by June 2021.

A final in person meeting will be schedule for late winter/early spring.

Next tasks to be completed:

- Draft/final report
- Community information using action we have been thru the process and a responsible result.
- Comments letter

AWA is on version 5 of the study. The different versions they have completed are as follows:

- Version 1 they determined the 3 storms
- Version 2 make changes based on when they have seen
- Version 3 analyzed the storms
- Version 4 comparing sensitivities checking magnitudes
 - Between 4 and 5 finalized forecasts between Canada and Eastern Montana
- Version 5 checking storm 1336 Springbrook, MT and 1325 Savageton, WY

AWA included the very minimal storms to the most significant storms to help develop the PMP tool.

Questions reviewed to the steering committee:

- Do the PMP results represent reasonable estimations that can be used for PMF/IDF evaluations?
- Does the SWE/Meteorological Time Series climatologies and implementation methods provide the required information for cool-season/rain-on-snow flood runoff development?
- Does the steering committee concur that the suggested alternative spatial pattern application is a reasonable way to provide alternative spatial patterns for PMP development?
- Does the steering committee concur that the suggested alternative temporal patterns provide adequate options for reasonable PMF/IDF development?

Bill Kappel explained the Temporal Process and Spatial distribution function and how this information is being used in the study along with several examples.

Also discussed, was work AWA is doing that covers the Kingsley Dam basin from western Nebraska upper mountains of Colorado and Wyoming and how that information will be implemented in the North Dakota PMP tool.

SWE and Meteorological time series development

Doug Hulstrand shared how they developed the climatology, what climate sets they used and how they went through that process.

There are four main data sets:

SNODAS [1X1 km grid, 2004 – present]

DayMet Data [1X1 km grid, 1980 - present]

PRISM [4X4 km grid, 1981 – present, no data above 49th parallel]

Surface data

COOP Stations [31 stations, 46 yr avg]

SNOTEL [26 stations, 33 yr avg]

The GIS tool needs to have the melt rate co-efficient calibrated for both Kingsley and North Dakota.

AWA needs to calibrate the CM values.

Doug Hulstrand reviewed the snow melt coefficients. Bill Kappel discussed the SWE factor and what would be better for North Dakota when utilizing this factor for the melting rates in the basins.

Since there is not any Prism data that can be used for this study, it was suggested that DayMet data be used since it is like Prism data.

AWA is putting together this segment of the tool and hopes to have this complete in about a month.

Doug Hulstrand reviewed the fields in the PMP tool and described what information was needed for the different fields. Also advised that these fields are very customizable.

Doug Hulstrand also went thru several examples for different basins showing the various temperature profiles and showed how the different scenarios affected the snowmelt factors. This tool shows the average SWE by day by basin. A basin or grade across the state of ND can be chosen to see what these patterns look like which can help to understand the different seasonality's across the state. By doing this on a gridded base within the tool, it gives the flexibility to make unique seasonality judgements and applications depending on where you are in the state.

SWE data for March 1st – June 15th at a two-week timestep utilize the SNODAS and FEMA data sets and adjust them to observe data and that's the surface data. This information starts in 2015. DayMet is about 40 years. The 100-year SWE is complete and gridded. They are in the process of collecting and finalizing the 1 percent of 100-

year calculations of the surface data. This is unadjusted data sets. They are going to adapt the Kingsley PMP tool to ND.

What AWA envisioned is to take April 1st to start the melt process. Next they will put the cool season PMP on top of that at some point between April 1st and 15th when increases the melt process begin. The amount of rainfall over the Souris River basin averages 10 inches in 3 days which gets added to the amount of snowmelt. Next run the hydrology to get a flood run off elevation and take the all season and do the same thing.

Discussion followed about the input and output part of the tool being able to change the options and using the sensitivity component with the data. Bill Kappel mentioned these components could be put into one data set or they could be separated.

Greg Gust inquired how moisture is being obtained as melt occurs and how SNODAS conveys with this data. Bill Kappel discussed that this piece is going to be derived from the hydrologist modeling interface. This data will provide how much snow you have, how much is melting per day on a gridded or basin average basis and the hydrologist will need to figure out how much is running off, infiltrating or is standing water.

Discussion followed on the snow melt and configuring the SWE climatology.

George Hayes, USACE, commented that SNODAS does not go back and edit their simulations so their analysis would be off. Bill Kappel stated the questions of concern: How stable are the statistics at the 100-year level? Are we smoothing out the intricacies in the data set and what are they doing with it when they are moving forward? This information is being used for the spatial field.

SWE is being set up for North Dakota data. Adjustments need to be made to the grid for SWE. AWA is in the process of completing this. There will be approximately 100 – 200 stations. Periods of interest to build this into the tool and will develop the temperature profile or adjustments to calibrate the coefficients so it can be implemented into the tool. The durations of 1, 3 5 and 7 days have been implemented in the tool.

The tool is ready with the PMP depths rain on snow. Doug Hulstrand will need a couple of weeks to get the raw data into the gridded smooth form. About a month until there will be a prototype to test.

AWA is planning to use the DayMet data base.

Finalize SWE grids are not complete yet. Could take a couple weeks to complete this part. The whole tool should be ready in about a month.
Calibrate CM values

Gridded output and basin average output on a table of depth duration values.

One GIS tool interface as an output for that tool. It was asked if two different data sets should be used or are could they be combined. Regular PMP output for the basin and then second output the snowmelt should there be a third output that combines those? Bill Kappel suggested having one data set with the cool season PMP depths and another data set with the snow melt depth over the same time frame that would give the engineer and hydrologist a little more flexibility in how they combine them.

Damon Grabow liked the idea of having the snow melt and rain separate so the timing of the event could be illustrated by the hydrologist: rain on snow, rain after snowmelt.

Bill Kappel commented that a potential optional function to the tool would be spatial pattern, storm type and puts them to the basin centroid. This could be a drop down or check box that could be a user defined point in the basin for it to move to. The user could put in the coordinate either as a grid point number or a latitude longitude point in the basin. That pattern would be shifted to that point as well. This would give an option of not having to do 30 different problem. At the minimum a centroid could be used. As a result, it would provide 3 or 4 alternative patterns. User defined coordinates would give you more options.

Bill Kappel mentioned that spatial patterns will need to be reviewed, different storm information compiled, and analyze the information from those storms to determine what data should be used. This will be done internally.

- Cool season for the PMP will change in overall depth between March 1 – May 1.
- All season PMP depths are valid from June 1 – end of September 2, 2020
- It was discussed to download this tool on our website or map service
- It was suggested that at the final meeting that it could possibly be a mini workshop to help train everyone in how to use the PMP tool.
- Looking for guidance on dam safety

Bill Kappel mentioned that the SWC staff would be able to write most of the dam safety guidelines within the PMP tool.

Certain cut off of areas or regions across the state that may not be required to do one or more of the components in the process. Outlining of these areas will begin and placeholders will need to be set so these areas and can be assessed as to how they need to be addressed.

John Paul Martin asked how the PMP relates to changes that would have to be done to the dam. Policy documents that people would need to meet to obtain a construction permit.

Bill Kappel requested that the Steering Committee draft a letter stating that AWA has been to these meetings stating that this seems reasonable, everything seems appropriate. This needs to be provided as part of the documentation as proof that AWA

has worked with the Steering Committee to develop this PMP study. Also requested was a summary of the three meetings that the Steering Committee has had with AWA

AWA/SWC next steps and timeline:

- Provide slides to SWC for meeting summary get 1985 USACE report on the Red River
- Provide SWC daily and study domain maps
- Finalize the SWE climatology – 1 month meet the series
 - Preparation conference of tool usage getting the temps to adjust the temporal patterns getting the feedback by the end of the year.
- Finalize spatial patterns process – 1 month
- Provide initial temporal patterns – 1 month
- Provide draft tool for testing – end of September
- Conduct Steering Committee conference call with select engineer firms for PMP tool instruction/trial – late October
- Conduct Steering Committee conference call with select engineering firms for PMP tool feedback – late December
- Draft report documentation – January thru March
- Draft report comments/provide executive summary to committee
- Final PMP onsite meeting March, April, May in Bismarck, ND
- Finalize report documentation, dissemination/communication process
- Complete AWA web tool interface
- Discuss and establish PMP analysis/coordination with ND Dam Safety guidance
- Discuss and establish PMP effective date for ND
- Draft/sign PMP analysis concurrence document for PMP Steering Committee

Bill Kappel checked with each Steering Committee member for any specific feedback. Many were looking forward to testing this new tool and running some scenarios through it.

Meeting adjourned at 10:30am August 27, 2020

