



August 16, 2023

The Honorable Judge James Chou
Marin County Superior Court
P.O. Box 4988
San Rafael, CA 94913-4988
Emailed to: departmentb@marin.courts.ca.gov

Pat Shepherd, Foreperson
Marin County Civil Grand Jury
3501 Civic Center Drive, Room #275
San Rafael, CA 94903
emailed to: grandjury@marincounty.org

Re: Response to Marin County Civil Grand Jury Report: *Dam and Reservoir Safety Water May Save Us – Water May Drown Us, June 27, 2023*

Dear Honorable Judge Chou and Foreperson Shepherd:

Per your request, North Marin Water District (NMWD) is providing responses to the five (5) Findings and the six (6) Recommendations in the Marin Civil Grand Jury Report entitled: *Dam and Reservoir Safety Water May Save Us – Water May Drown Us, June 27, 2023*. The responses by NMWD were reviewed and approved by the NMWD Board of Directors at the August 15, 2023 Regular Meeting. The responses are presented in the required form (“Response Form: 2022-2023 Marin Civil Grand Jury Report”), provided as Attachment 1. Associated supporting statements and explanations to our responses, including any summary of actions taken, are provided as Attachment 2 (7 pages total).

We also have some comments on various portions of the Report as indicated in the table below. Following the table are NMWD’s comments on the content highlighted in the table.

NMWD General Comments on Report Content

#	Report Section	Page	Report Content
1	SUMMARY	1	<i>Further, they require that the dam owners be solely responsible for their dams’ safety.</i>
2	SUMMARY	1	<i>...MMWD and NMWD are the owners of the only eight dams in Marin requiring regulation by DSOD...</i>
3	BACKGROUND	4	<i>...the Division of Dam Safety (DOSD)...</i>
4	BACKGROUND	5	<i>The subsequent failure of the Oroville spillway in February 2017 was due to atmospheric rivers ...</i>
5	DISCUSSION	5	<i>The NMWD Seeger Dam...</i>
6	DISCUSSION	7	<i>...water levels were low due to prolonged drought.</i>
7	Federal and state dam and reservoir guidelines	9	<i>The basis of these classifications is the potential for dam failure,...</i>

NMWD General Comments on Report Content

#	Report Section	Page	Report Content
8	Dam and reservoir safety: MMWD and NMWD	11	Table 2; The DOSD also has a Safety Classification,...
9	Inundation Maps	12	DOSD now requires dam owners to prepare Mitigation Plans...
10	North Marin Water District	18	believes that the multi-jurisdiction plan should include a separate category specifically dedicated to climate change
11	[MMWD] and [NMWD] are not alone	19	California-wide numbers show that more than half of all dams are categorized as having some risk of failure.

Comment #1: NMWD feels that this statement is being interpreted by the MCGJ to mean that a dam owner is obligated to develop its own engineering criteria related to dam safety, especially if DSOD or another responsible agency hasn't kept up with the latest science. NMWD feels that the intent of the statement is that DSOD has the responsibility and authority to regulate dams but the dam owner ultimately has legal duties, obligations, or liabilities incident to the ownership or operation of the dam or reservoir¹.

Comment #2: According to the DSOD listing of dams with DSOD jurisdiction (September 2022) there are four (4) other jurisdictional dams (for water impoundment) in Marin County.²

Comment #3: The wrong title is used: it should be Division of Safety of Dams (DSOD).

Comment #4: This statement is not supported by the findings in the *Independent Forensic Team Report Oroville Dam Spillway Incident* (January 2018)³ which notes that "[T]here was no single root cause of the Oroville Dam spillway incident, nor was there a simple chain of events that led to the failure of the service spillway chute slab, the subsequent overtopping of the emergency spillway crest structure, and the necessity of the evacuation order. Rather, the incident was caused by a complex interaction of relatively common physical, human, organizational, and industry factors, starting with the design of the project and continuing until the incident".

Comment #5: Seeger dam is owned and operated by MMWD not NMWD.

Comment #6: This statement doesn't accurately describe the Stafford Lake level prior to the recent winter nor generally at the beginning of any given year before the annual rainy season. Looking at data for the period between the period of 2013 to 2022, which included drought years, the Stafford Lake levels on October 15th averaged 180.82 feet, with a minimum level of 176.83 in 2021 and a maximum level of 185 in 2019. In dry, normal or wet years, NMWD's lake level operational target is between 178 and 180 feet. At these elevations, there is approximately 1.166 and 1.239 billion gallons of available storage in the reservoir before water flows over the emergency spillway at an elevation of 199 feet.

¹ See CA Water Code Section 6029

² <https://water.ca.gov/-/media/DWR-Website/Web-Pages/Programs/All-Programs/Division-of-Safety-of-Dams/Files/Publications/Dams-Within-Jurisdiction-of-the-State-of-California-Listed-Alphabetically-by-County-September-2022.pdf> page 44 of 118

³ <https://damsafety.org/sites/default/files/files/Independent%20Forensic%20Team%20Report%20Final%2001-05-18.pdf> See page S-1

Comment #7: This statement is not factually correct. The DSOD uses a “Downstream Hazard”⁴ classification that is *based solely on potential downstream impacts to life and property should the dam fail when operating with a full reservoir*. This hazard classification is **not related to the potential for the dam to fail due to natural hazards such as earthquakes** as stated in the Report. NMWD feels this is a really important clarification that needs to be clear for the public. DSOD also adds a fourth category of downstream hazard: “Extremely High.”

Comment #8: The DSOD uses a “condition assessment rating”⁵ not a “Safety Classification” as noted in the Report.

Comment #9: The DSOD requires certain dam owners to prepare (or update) an Emergency Action Plan (EAP)⁶ not “Mitigation Plans” as stated in the Report. The inundation maps form a core of the EAP not Mitigation Plans as stated on the following page. NMWD’s EAP was completed and approved in 2021 and an exercise was held in 2022 with the City and County emergency managers to test and practice communications and various emergency response actions under a simulated dam failure event.

Comment #10: In the arena of dam safety, NMWD doesn’t believe that a stand-alone climate change category is required for the multi-jurisdictional plan. Climate change is having an effect on existing natural hazards such as severe weather (which includes atmospheric rivers) and recognizing and understanding what those impacts are on those hazards and how to mitigate their effects is more critical.

Comment #11: As noted in comment #7 above, the hazard classification that the state uses is *based solely on potential downstream impacts to life and property should the dam fail when operating with a full reservoir*. The Report incorrectly states that the majority of dams in California (58 percent for state-regulated dams) “are categorized as having some risk of failure.” The cited external report (Dam Safety Performance Report -2022 by ASDSO) actually indicates that of the 1,239 state regulated dams in California, 724 have a High-Hazard classification (58%). These dams have the potential for downstream impacts to life and property “[e]xpected to cause considerable loss of human life or would result in an inundation area with a population of 1,000 or more”, should the dam fail when operating a full reservoir and **not based on the condition of the dam or its potential for failure** as stated in the Report. As stated previously, NMWD feels this is a really important clarification that needs to be clear for the public.


The comments above are not intended to criticize or critique the MCGJ’s efforts in developing the Report. The comments above are provided to clarify particular technical content in the Report that likely has a different response or reaction from the public as it is written compared to what NMWD feels is more factually accurate as supported by the external references cited. NMWD is proud of its dam safety program for Stafford Dam and doesn’t take the potential for downstream impacts lightly. NMWD is also fortunate to have strong partnerships with local and regional emergency management agencies and actively participates in periodic emergency exercises.

⁴ See definition: <https://water.ca.gov/-/media/DWR-Website/Web-Pages/Programs/All-Programs/Division-of-Safety-of-Dams/Files/Publications/Division-of-Safety-of-Dams-Definitions-for-Downstream-Hazard-and-Condition-Assessment.pdf>

⁵ <https://water.ca.gov/-/media/DWR-Website/Web-Pages/Programs/All-Programs/Division-of-Safety-of-Dams/Files/Publications/Division-of-Safety-of-Dams-Definitions-for-Downstream-Hazard-and-Condition-Assessment.pdf>

⁶ <https://water.ca.gov/-/media/DWR-Website/Web-Pages/Programs/All-Programs/Division-of-Safety-of-Dams/Inundation-Maps/California-Inundation-Map-Resources/Inundation-Map-and-Emergency-Action-Plan-Fact-Sheet.pdf>

Sincerely,



Anthony Williams, P.E.
General Manager

Attachments:

1. Response Form: 2022-2023 Marin Civil Grand Jury Report
2. Response Form Continuation – Statements and Explanations

c: Robert Maddow and Craig Judson, Bold Polisner, Maddow, Nelson & Judson
Dennis Rodoni, Supervisor, Marin County Board of Supervisors
Eric Lucan, Supervisor, Marin County Board of Supervisors
Adam McGill, Novato City Manager
Bill Tyler, Fire Chief, Novato Fire Protection District

RESPONSE FORM: 2022-2023 Marin Civil Grand Jury Report

Report Title: Dam and Reservoir Safety Water May Save Us - Water May Drown Us, 2023

Respondent/Agency Name: North Marin Water District

Submitter Name: Anthony Williams Title: General Manager

FINDINGS

- Agree with the findings numbered: F5
- Disagree *partially* with the findings numbered: F1, F2, F3
- Disagree *wholly* with the findings numbered: F4

(Attach a **statement** specifying any portions of the findings that are disputed; include an explanation of the reasons therefor.)

RECOMMENDATIONS

- Recommendations numbered R4 have been implemented.
(Attach a **summary** describing the implemented actions.)
- Recommendations numbered R2, R3, R5, R6 have not yet been implemented, but will be implemented in the future.
(Attach a **timeframe** for the implementation.)
- Recommendations numbered _____ require further analysis.
(Attach an **explanation** and the scope and parameters of an analysis or study, and a **timeframe** for the matter to be prepared for discussion by the officer or director of the agency or department being investigated or reviewed, including the governing body of the public agency when applicable. This **timeframe shall not exceed six months** from the date of publication of the grand jury report.)
- Recommendations numbered R1 will not be implemented because they are not warranted or are not reasonable.
(Attach an **explanation**.)

Date: 8/16/23 Signed: 

Number of pages attached: 7



**NORTH MARIN
WATER DISTRICT**

Response Form Continuation – Statements and Explanations

Marin Civil Grand Jury Report

Dam and Reservoir Safety: Water May Save Us - Water May Drown Us (“Report”)

Report Findings

F1. Climate change is increasing the atmospheric rivers’ strength and frequency which impacts communities across Marin County. Failure to include and recognize these growing threats underestimates current dam safety risks and possible preventive strategies.

Response = Disagree partially with the finding

Statement: We agree that climate change is having an effect on the strength and frequency of weather events, including larger storm events that are referred to as atmospheric rivers. NMWD staff have been actively participating in webinars and email updates from the Center for Western Weather and Water Extremes as well as the California-Nevada Drought Early Warning System for the last few years. In addition, as a member of the Sonoma County Water Agency’s Technical Advisory Committee, NMWD is very familiar with atmospheric river forecasting and Forecast Informed Reservoir Operations (FIRO). However, to our knowledge, there is no published guidance on how to incorporate the current and evolving science on atmospheric rivers (or other weather events impacted by climate change) into the appropriate engineering analysis of the dam performance and safety or hazard mitigation actions. The responsibility to develop engineering criteria or guidance lies with state and federal agencies tasked with dam safety and water resources planning and engineering, and these agencies have the expertise and funding for those efforts. See response to F2 regarding what NMWD is currently doing regarding dam safety.

F2. MMWD and NMWD are in full compliance with both state DOSD (sic.), as well as all federal regulations. However, dam safety analysis and reporting would be enhanced by including current data on probable maximum precipitation (basis for risk analysis) numbers.

Response = Disagree partially with the finding

Statement: It is not clear what “current data” in general or specific to the Novato Creek watershed above Stafford Dam is available and would be included in a probable maximum precipitation (PMP) analysis. Stafford Dam was raised and modified in 1985 based on a probable maximum flood (PMF) developed from a PMP calculated from data in the Hydrometeorological Report No. 36 (HMR 36) as well as HMR 49. NMWD acknowledges that these HMR reports were updated in 1999 and superseded with reports HMR 58 and HMR 59, however they would also not have “current data” as the Report suggests, especially atmospheric river data from current scientific research.

As part of an ongoing project development for the Stafford Dam Adjustable Spillway Gate (ASG) project¹ consideration of a new PMP analysis is being evaluated by NMWD engineering staff in coordination with NMWD's dam consultant and ongoing coordination with the Marin County Flood Control & Water Conservation District, including how best to modify or adjust available hydrometeorological data. One concern NMWD has is if the methodology chosen to evaluate extreme rainfall events (with climate change impacts) and subsequent runoff is later superseded by or not in compliance with forthcoming official guidelines or regulations from the state then the costly effort has to be repeated.

There is currently no scientific consensus on how to best incorporate climate change into PMP values². It is a topic of active research at the federal and state levels, and to reinforce an earlier point made above (see F1 statement) regarding which entities are best equipped to integrate scientific research into engineering practice, the National Academies of Sciences, Engineering and Medicine's ad hoc committee project "Modernizing Probable Maximum Precipitation Estimation" and subsequent studies planned by the National Oceanic and Atmospheric Administration (NOAA) illustrate the more appropriate efforts to address the concern addressed in this finding. At the state level the California Extreme Precipitation Symposium (CEPSYM) (<https://cepsym.org/>) is an annual meeting of scientific and technical presentations meant to increase our knowledge and understanding of extreme precipitation events. The goals of CEPSYM are to improve flood risk management planning and increase warning time for large floods, including impacts from atmospheric rivers. The website "CalAdapt" (<https://cal-adapt.org/about/>) compiles Climate Change projections for California, however, their "Extreme Precipitation" projections are limited to 100-year storms and smaller, which are too small for dam design.

F3. MMWD and NMWD hazard mitigation plans fail to incorporate the latest scientific studies on climate change. They use DOSD and FEMA climate models that were last updated in 2012. This eleven-year gap may lead to an underestimation of current and future risks.

Response = Disagree partially with the finding

Statement: NMWD is a participant in the Marin County Multi-jurisdictional Hazard Mitigation Plan (MCMHMP). Marin County is currently leading the effort to update the adopted 2018 MCMHMP for 2023. Based on NMWD's participation in the 2023 update, it is anticipated that climate change impacts will be addressed in that updated plan. See explanation to R2 below for more information on this topic.

F4. FEMA and National Flood Insurance maps may not have entirely incorporated the most recent dam inundation maps and are not available on the MMWD and NMWD websites.

Response = Disagree wholly with the finding

¹ See approved CIP, page 28 of the FY23-24 Budget: <https://nmwd.com/wp-content/uploads/2023/06/Budget-Final-FY-23.24.pdf>

² US Army Corps of Engineers ECB 2018-14 *Guidance for Incorporating Climate Change Impacts to Inland Hydrology in Civil Works Studies, Designs, and Projects*, Rev 2 August 19, 2022.

Statement: The FEMA Flood Insurance Rate Maps (FIRM) and the companion Flood Insurance Study (FIS) for Marin County don't include dam inundation mapping. These flood risk products are instead based on flooding from various hydrologic scenarios and used for flood insurance purposes. The Grand Jury needs to inquire with FEMA directly about the mapping criteria and subsequent information included in those products.

The NMWD website does provide information on the dam and spillway inundation maps: <https://nmwd.com/your-water/novato-water/> (see "dam Inundation Mapping" link). The website links directly to the Department of Water Resources (DWR) Division of Safety of Dams' (DSOD) inundation mapping portal. NMWD feels this is the most appropriate public user interface for dam inundation mapping and is the repository of the most current "approved" mapping for Stafford Dam.

The website also provides a link to the County of Marin's Marin Map website which hosts the latest FEMA flood insurance rate maps (FIRMs): <https://nmwd.com/your-water/novato-water/> (see "FEMA Flood Maps" link).

NMWD doesn't have a local or regional flood control mission or purpose and Stafford Dam only provides a minor flood control function. In 1985, NMWD and the Marin County Flood Control & Water Conservation District (MCFC&WCD) entered into an agreement as part of joint project to modify the Stafford Dam spillway to delay the passage of flows downstream. The project, however, doesn't provide any flood control storage in the lake. Stafford Dam's primary function is water storage for domestic water supply.

F5. The advancement of dam safety is greatly enhanced with the expertise of scientific institutions. They use a range of tools and practices such as FIRO, flyovers, weather balloons, radar along the coast, and collaborations between dam owners and scientific institutions. These practices, used by other water districts, serve as an example from which MMWD and NMWD can benefit.

Response = Agree with the finding

Statement: NMWD agrees that the expertise of scientific institutions and the tools and practices they develop have proved useful for a select group of dam owners in California. Many of the largest dams in California are owned and operated by either a federal agency or the California Department of Water Resources, a state agency³. It is important to note that Forecast Informed Reservoir Operations (FIRO) is only fully practiced at one dam in California: Lake Mendocino⁴. It is still considered a pilot program and being studied at only three other locations in the state: Lake Oroville, New Bullards Bar, and the Prado Reservoir. Lake Mendocino is a dual-purpose reservoir, providing both water supply storage and flood control storage (the former is the responsibility of Sonoma Water and the latter, the US Army Corps of Engineers (USACE); overall dam safety is a USACE responsibility). FIRO practices at this dam provides better st

³ Top 3 largest dams and owners: Shasta Dam – US Bureau of Reclamation; Oroville Dam - CA Department of Water Resources; Trinity Dam – US Bureau of Reclamation.

⁴ Overall dam safety and the flood control operation of this dam is the responsibility of the US Army Corps of Engineers, not Sonoma Water.

orage management within these two distinct volumes within the reservoir. Stafford Lake doesn't have a flood control pool, only an available volume for water supply storage.

NMWD has been monitoring the progress of the Advanced Quantitative Precipitation Information (AQPI)⁵ system development in the region through our partnerships with Sonoma Water as well as Marin County. As part of that project, a series of new X-band radars have been installed in the Bay Area and a new C-band radar is planned for a site in Marin County. As the project progresses NMWD will continue to evaluate its role and level of future. It is anticipated, but not fully understood, that AQPI will have a benefit for NMWD in regards to dam safety.

The responsibility to develop engineering criteria or guidance and associated regulations lies with state and federal agencies tasked with dam safety. These agencies have the expertise and funding for those efforts as well as existing partnerships with other state and federal agencies with a scientific mission that allows vetted and verified scientific research to be applied to engineering criteria. The science-based agencies utilize the tools and practices noted in the Report's findings.

The Center for Western Weather and Water Extremes (CW3E) is the preeminent organization involved with the science of atmospheric rivers. NMWD staff have been actively participating in webinars and email updates, including AR forecast products from the CW3E as well as the California-Nevada Drought Early Warning System for the last several years. There are currently only 14 water providers in California that are active members of CW3E's Water Affiliates Group (WAG). See explanations for R1 and R6 below for more information on this topic.

Report Recommendations

R1. By March 15, 2024, MMWD and NMWD should establish a Climate Change and atmospheric rivers working group to consider, and begin to develop, new hazard mitigation actions. These should be based on the current scientific projections regarding atmospheric rivers and other extreme precipitation events.

Response = will not be implemented

Explanation: It is not clear what the benefit of forming such a working group is compared to participating in other existing groups engaged in the same issues. Examples of existing groups include the California Extreme Precipitation Symposium, the CW3E Water Affiliates Group, and the Association of State Dam Safety Officials⁶. In addition, climate change is not only impacting the two main water suppliers in Marin County but also the local cities, the County, other special districts, as well as private or publicly held utility providers. Therefore, if forming a local group is prudent, one with broader participation would likely make more sense and have a better overall benefit to the community. See explanation to R6 below for more information on this topic.

⁵ <https://www.sonomawater.org/aqpi/>

⁶ The NMWD Chief Engineer/Asst GM and the General Manager are both members of the Association of State Dam Safety Officials

R2. By December 31, 2023, the two water districts should begin work to expand their respective hazard mitigation plans, which should include a new section dedicated to climate change, and a discussion of atmospheric rivers and their accelerating potential threats to dam and reservoir safety.

Response = Recommendation will be implemented in the future

Explanation: As noted in F3, NMWD is a participant in the Marin County Multi-jurisdictional Hazard Mitigation Plan (MCMHMP). Marin County is currently leading the effort to update the adopted 2018 MCMHMP for 2023. Based on NMWD's participation in the 2023 update, it is anticipated that climate change impacts will be addressed in that updated plan. In the arena of dam safety, NMWD doesn't believe that a stand-alone climate change category is required for the MCMHMP. Climate change is having an effect on existing natural hazards such as severe weather (which includes atmospheric rivers), therefore recognizing and understanding what the impacts are on those hazards, including recurrence intervals and severity, and how to mitigate their effects, is more critical. The 2023 MCMHMP is likely to have a risk hazard vulnerability assessment that includes a "climate change influence" factor that increases the overall "risk score" for a given hazard.

Independent of the MCMHMP, NMWD engineering staff in coordination with NMWD's dam consultant and ongoing coordination with the Marin County Flood Control & Water Conservation District, is evaluating hydrologic and hydraulic modeling efforts including how best to modify or adjust available hydrometeorological data using downscaled climate model data for California⁷. There is uncertainty in the climate models and developing the appropriate PMP or resulting PMF is challenging.

Timeframe: NMWD anticipates the release of the 2023 MCMHMP will occur prior to December 31, 2023. There is no current firm completion date for new hydrologic and hydraulic modeling and evaluations efforts but the target is fall of 2024.

R3. By January 1, 2026, the water districts (at the time of their next dam inspections, and when their hazard mitigation plans are revised) should provide the public with new information about the updated plans. This information needs to ensure that they effectively consider flood risks in light of the new science, thus ensuring that the public is aware of this.

Response = Recommendation will be implemented in the future

Explanation: When a final draft of the 2023 updated MCMHMP is ready later this year, it will be presented to the NMWD Board of Directors at a public meeting for consideration and discussion. NMWD plans to do other forms of public outreach regarding dam safety in parallel with this plan update. A dam safety factsheet has been developed that provides details on the dam's physical characteristics, the benefits and risks of the dams; useful links about emergency preparedness, as well as flood insurance. This factsheet is included on the NMWD website: https://nmwd.com/wp-content/uploads/2023/07/NMWD_StaffordDam_Safety-FactSheet_7-20-23.pdf

⁷ The dataset is referred to as LOCA version 2 and was developed to inform California's fifth state-wide climate assessment.

Timeframe: NMWD anticipates the release of the 2023 MCMHMP Update will occur prior to January 1, 2026.

R4. By September 30, 2023, both water districts should update their websites to include links to the inundation and FEMA maps. They should also provide links to the National Flood Insurance Program.

Response = Recommendation has been implemented

Summary of Actions: The NMWD website does provide information on the dam and spillway inundation maps: <https://nmwd.com/your-water/novato-water/> (see “dam Inundation Mapping” link). The website links directly to the Department of Water Resources (DWR) Division of Safety of Dams’ (DSOD) inundation mapping portal. NMWD feels this is the most appropriate public user interface for dam inundation mapping and is the repository of the most current “approved” mapping for Stafford Dam.

The website also provides a link to the County of Marin’s Marin Map website which hosts the latest FEMA flood insurance rate maps (FIRMs): <https://nmwd.com/your-water/novato-water/> (see “FEMA Flood Maps” link). NMWD doesn’t have a local or regional flood control mission or purpose and the Stafford Dam only provides a minor flood control purpose. In 1985, NMWD and the Marin County Flood Control & Water Conservation District (MCFC&WCD) entered into an agreement as part of joint project to modify the Stafford Dam spillway to delay the passage of flows downstream⁸. The project, however, doesn’t provide any flood control storage in the lake, which is primarily for water supply.

NMWD has continued to work collaboratively with MCFC&WCD since 1985 including supporting the Marin One Rain stream and rain gage network, and is currently collaborating on hydrologic and hydraulic modeling efforts in Novato Creek. NMWD also participates and coordinates with the City of Novato and the County of Marin emergency response planning and mitigation efforts, including those related to dam inundation⁹.

The FEMA FIRMs don’t integrate dam inundation mapping nor do FIRMs include levee failure inundation mapping. These maps are solely based on creek and overland flooding resulting from hydrologic events and any changes to that approach should be addressed to FEMA directly. NMWD has provided a link to the National Flood Insurance Program (NFIP) on its website: <https://nmwd.com/your-water/novato-water/> (see “Flood Risk Below Dams” link).

R5. By December 31, 2023, dam owners should provide the public with easily accessible information on flood risks, as FEMA and National Flood Insurance may not have entirely incorporated the most recent dam inundation maps.

Response = Recommendation will be implemented

Explanation: See explanation to R4 above regarding inundation mapping and FEMA flood mapping. NMWD plans to do other forms of public outreach regarding dam safety including a

⁸ Flood Insurance Study, Marin County, California and Incorporated Areas, Volume 1 of 3, FEMA, August 15, 2017

⁹ Novato EOC Table Top Exercise – Dam Emergency Action Plan Public Safety Workshop, City of Novato, Novato Fire Protection District, North Marin Water District, October 6, 2022.

dam factsheet with additional information on inundation and flood insurance. NMWD has developed a dam safety factsheet that provides details on the dam's physical characteristics, the benefits and risks of the dams, as well as useful links about emergency preparedness and flood insurance. The factsheet is modeled after an example provided in the Federal Energy Regulator Commission's Risk Informed Decision Making (RIDM) Risk Guidelines for Dam Safety Interim Guidance Policy (2016)¹⁰. The NMWD Stafford Dam factsheet is provided on the NMWD website: https://nmwd.com/wp-content/uploads/2023/07/NMWD_StaffordDam_Safety-FactSheet_7-20-23.pdf

R6. By December 2023, both water districts should begin to explore collaborations with scientific institutions to learn from, expand their toolkit of mitigation strategies, and thus augment the safety of their dams in light of growing risks posed by atmospheric rivers.

Response = Recommendation will be implemented

Explanation: The Center for Western Weather and Water Extremes (CW3E) is the preeminent organization involved with the science of atmospheric rivers. As stated above, NMWD staff have been actively participating in webinars and email updates from the CW3E as well as the California-Nevada Drought Early Warning System for the last few years. There are only 14 water providers in California that are active members of CW3E's Water Affiliates Group (WAG). However, NMWD will explore a future collaboration with CW3E's WAG, likely in a joint effort with other Marin County organizations including MMWD.

As a water contractor with Sonoma Water, NMWD closely follows various programs and legislative efforts led by Sonoma Water that relate to extreme weather forecasting and response including; at the state level, AB 30 (Atmospheric Rivers: Research: and Reservoir Operations, as amended)¹¹ and AB 277 Extreme Weather Forecast and Threat Intelligence Integration Center; as well as the federal level with Sub-seasonal to Seasonal (S2S) Forecasting funding for NOAA's US Weather Research Program.

Timeframe: NMWD anticipates that exploring collaborations with scientific institutions, in partnership with other Marin agencies, will occur by December 31, 2023.

¹⁰ <https://www.ferc.gov/dam-safety-and-inspections/risk-informed-decision-making-ridm> (see Chapter 4)

¹¹ NMWD provided formal support for this legislation: <https://nmwd.com/wp-content/uploads/2023/03/030723.pdf> (see item #7)