



DEPARTMENT OF THE ARMY
OFFICE OF THE ASSISTANT SECRETARY
CIVIL WORKS
108 ARMY PENTAGON
WASHINGTON DC 20310-0108

SACW

MEMORANDUM FOR COMMANDING GENERAL, U.S. ARMY CORPS OF
ENGINEERS

SUBJECT: Army Civil Works Supporting Drought Resilience in America's Communities

1. Purpose. The onset of extreme drought across the nation has been an increasing trend over the past several decades, a situation grounded in and exacerbated by a changing climate affecting temperature, precipitation, hydrology, vegetation, and the overall availability of water. Given this challenge, and as the nation's premier engineering organization, it is important for the U.S. Army Corps of Engineers (USACE) to assess how it can more effectively use its authorities, address the growing demand for integrated water resources management, and apply its significant capabilities to advance a whole-of-government effort to build drought resilience across the nation. This includes meaningful and significant near-term actions to address drought-related issues on a year-to-year basis, while continuing to advance the long-term goal of drought resilience through an array of robust and meaningful actions that make use of the strong partnerships USACE has developed across the country through the Civil Works (CW) program.

During my tenure as Assistant Secretary of the Army for Civil Works [ASA(CW)], I have learned and observed how the CW program currently uses its existing authorities and programs to support drought resilience across the nation, particularly the drought-prone western U.S. In recognition of the breadth of USACE's existing authorities, its capabilities, and informed by the examples of the drought resilience actions highlighted below, this memorandum directs USACE to continue to advance this important work in communities across the nation through a range of actions. In addition, as set forth in more detail in Section 6, Next Steps - Drought Resilience, USACE is directed to provide a comprehensive brief to my office within 45 days on the ongoing, planned, and additional potential CW actions that can further drought resilience at local and regional scales. This memorandum applies to all CW programs and missions, including the Regulatory Program.

2. References.

a. Executive Order 13990, Protecting Public Health and the Environment and Restoring Science to Tackle the Climate Crisis, January 20, 2021

b. Executive Order 14008, Tackling the Climate Crisis at Home and Abroad, January 27, 2021

SACW

SUBJECT: Army Civil Works Supporting Drought Resilience in America's Communities

c. Comprehensive Documentation of Benefits in Decision Document, January 5, 2021, issued by the Assistant Secretary of the Army (Civil Works).

d. White House Drought Resilience Interagency Working Group – 1 Year Summary, June 1, 2022

e. Water Resources Reform and Development Act of 2014, Section 1046

f. Water Infrastructure Improvements for the Nation Act, Sections 1116 and 1117.

g. Water Resources Development Act of 2020

h. Water Supply Act of 1958, as amended (43 U.S.C. 390b)

i. Infrastructure Investment and Jobs Act (P.L. 117-58 also known as the “Bipartisan Infrastructure Law”)

j. Section 5 of the Flood Control Act of 1941, as amended (Public Law 84-99; 33 U.S.C. 701n)

k. Congressional Research Service – Testimony, “Short and Long-Term Solutions to Extreme Drought in the Western United States,” Committee on Energy and Natural Resources, U.S. Senate, June 14, 2022.

3. Background.

a. Among natural disasters in the United States during the past four decades, drought ranks third in terms of both total costs and costs per year for damages. According to the National Oceanic and Atmospheric Administration, during the period of 1980 to 2021, 29 drought events with costs in excess of \$1 billion occurred, with total losses exceeding \$291 billion for those events (reference 2.k). Among its many impacts, climate change is making droughts more frequent, severe, and pervasive. As a result, the terms “extreme drought” and “aridification” are now regularly used to describe the current trend.

b. Through the Civil Works mission, USACE can and does support drought resilience through its operation of existing water infrastructure, aquatic ecosystem restoration actions, multi-benefit planning studies, new infrastructure investments, and through a broad array of partnerships to develop and apply scientific data and tools to better assess and respond with equitable solutions to the pressing water resource challenges of the day.

c. During droughts, USACE has managed water resources to provide water for navigation, municipal and industrial use, agricultural use, hydropower, wildlife, and

recreation. Reservoirs and navigation systems have been operated to balance competing flow requirements and conserve water for multiple benefits in the face of reduced inflows. Extraordinary efforts and coordination with Federal, state, and local agencies, industry and other interested parties helped maintain navigation on major systems like the Mississippi River. During drought emergencies, USACE can and has provided temporary water connections, filtration, transportation, and distribution of water for human consumption.

d. To address worsening drought conditions in the U.S. and to support communities impacted by ongoing water shortages, in April 2021 the Administration launched the Drought Resilience Interagency Working Group (Drought IWG) as part of its National Climate Task Force (references 2.a, 2.b). The Drought IWG complements the ongoing work of the National Drought Resilience Partnership that enhances coordination of Federal drought resilience policies and reinforces the interagency Federal efforts of the National Integrated Drought Information System and the Western States Federal Agency Support Team. As part of the Drought IWG, USACE is increasingly focused on applying its technical capabilities, authorities, and financial resources, as bolstered through the Bipartisan Infrastructure Law (BIL), to support drought resilience in communities increasingly at risk from extreme drought (references 2.d, 2.i).

e. Given the breadth and scale of its role in managing water resources, USACE is uniquely positioned to play an important role in adapting to the changes in hydrology seen on the landscape where climate change is affecting the quantity, form, and timing of precipitation in many parts of the nation, particularly the American West. USACE's responsibilities in the areas of flood risk management, coastal protection, aquatic ecosystem restoration, water supply, and emergency response has the agency working throughout the nation's watersheds. The broad scope of its mission enables USACE to work with its partners to redefine water resources management from peak to shore, the scale necessary to build resiliency in the face of unprecedented water challenges posed by extreme drought.

f. Congress has recognized the value of USACE to address a myriad of the nation's water resource challenges and is charging USACE to take on an even greater role in drought resilience through recent legislation. The Water Resources Development Act (WRDA) of 2020 (reference 2.g) included sections on leveraging Federal infrastructure for water supply, increasing the application of Forecast Informed Reservoir Operations (FIRO), and multiple comprehensive studies to improve water management. Similarly, the House-passed version of WRDA 2022 has provisions on studying aquifer recharge opportunities at USACE projects, a comprehensive Western Infrastructure Study, FIRO expansion, additional environmental infrastructure (EI) water and wastewater projects, and increasing support for Western rural water projects.

4. Actions Demonstrating Drought Resilience. The discussion below highlights action areas where USACE is currently partnering with other Federal, Tribal, state and local

agencies to support drought resilience in communities facing water supply challenges. These actions all promote drought resilience regardless of the primary purpose of the project or program. They therefore provide a roadmap for developing a more strategic approach to drought resilience as part of a whole-of-government approach.

a. Science and Technology – USACE has long been a leader in the innovative application of science and technology to develop new tools and creative solutions to address cutting-edge issues facing water resource managers. USACE-produced tools such as the Time-series Toolbox and Climate Vulnerability Assessment Tool allow communities to be more drought resilient through a better understanding of potential hydrologic changes and impacts helping with climate preparedness, water supply issues, and drought resilience. Currently, with \$40 million in BIL funding in hand, USACE will work with state and Federal partners in developing and implementing enhanced soil moisture and snowpack monitoring stations in the Upper Missouri River Basin that build on, and add capacity to, an existing network to support drought and flood management. A system such as this could have applicability elsewhere. Also, USACE, working with the Kansas Water Office, is piloting a novel approach to hydraulic dredging of sediment to restore water supply storage capacity in Tuttle Creek Lake.

b. Operation of Existing Infrastructure – While meeting the primary purpose of flood risk reduction at many of its reservoirs, USACE also operates its existing facilities to support local water needs. Applying science and technology initiatives just discussed, USACE has partnered with academia and Federal, state, and local agencies, to apply advanced weather and streamflow forecasts to modify reservoir operations in a manner that does not increase flood risk while also improving water availability and ecosystem benefits. A pilot of this Forecast Informed Reservoir Operations (FIRO) approach at California's Lake Mendocino yielded a 19% increase in water supply in 2020, the third driest year on record. At Prado Dam, a FIRO pilot found that an average of 7000 acre-feet (af) per year of stormwater could be released in a modified manner to allow the Orange County Water District to use the water in its groundwater recharge system and provide additional supply for its customers. Importantly, FIRO and related initiatives are among the most cost-effective ways to increase water availability in drought-impacted regions. In some cases, water availability may be significantly increased on an annual basis for less than 5% of the cost of new infrastructure investments on a dollar per af basis. And even prior to FIRO, for more than 50 years, USACE has been operating a flood control dam and diversion channel on the Big Sioux River to provide artificial recharge for water supply for Sioux Falls. Finally, in the Middle Rio Grande region of New Mexico, USACE coordinated with the Bureau of Reclamation to approve a deviation in operations in 2022 to store water in Abiquiu Reservoir, ensuring water supply for six Middle Rio Grande Pueblos that would have otherwise been lost due to the unavailability to store that water in a Bureau of Reclamation facility.

c. Water Supply – USACE projects provide water supply storage for hundreds of communities around the U.S. Currently, there are 132 projects with an estimated 10.2 million af of authorized storage space allocated by agreement for municipal and industrial (M&I) water use. In addition, there are 15 projects with an estimated 433,000 af of authorized M&I water not allocated under an agreement. USACE is now funding eight additional studies (five reservoir studies and three locks and dams on the Cumberland River in Tennessee) for reallocation of storage for local water supply. USACE projects also directly support managed aquifer recharge to maintain and enhance local water supply needs at projects in Arkansas, Bayou Meto and Grand Prairie, as well as other locations. Finally, USACE is using its allocation of operation and maintenance BIL funding to ensure that projects like Toronto Lake, Kansas, and Joe Pool Lake, Texas, continue to serve community water supply needs through replacement of water intakes and embankment repair.

d. Recreation Areas – In FY22, USACE funded \$1.9 million in drought related support for the three Missouri River reservoirs (Ft. Peck Dam and Lake, Montana; Garrison Dam, Lake Sakakawea, North Dakota; and Oahe Dam and Lake Oahe, South Dakota and North Dakota) for maintenance and temporary relocation of docks to support safe recreational access during drought conditions. Also in FY22, USACE's Sustainability/Climate Resiliency program provided \$10.5 million to fix waterline breaks, reduce water usage, and ensure the availability of USACE recreation facilities for communities.

e. Aquatic Ecosystem Restoration (AER) – USACE's aquatic ecosystem restoration projects can support drought resiliency by restoring habitat and hydrologic function in oversubscribed or channelized watersheds thereby providing other tools beyond just reservoir releases and the restriction of diversions to maintain and enhance key environmental habitat and support for fish and wildlife species. Restoration opportunities of this nature may also include improving fish passage to facilitate access to better habitat. These types of projects may help to conserve water supply during periods of extreme drought. Relatedly, USACE has allocated \$1.5 million in BIL funding for evaluating restoration activities consistent with California's Salton Sea 10-year Management Plan. By working with the state and other Federal agencies to cover or restore approximately 30,000 acres of exposed lakebed, USACE's restoration activities can reduce ecological water needs and facilitate additional voluntary conservation of Colorado River water in support of overall efforts to preserve system water during this period of unprecedented drought in the basin. USACE is increasing its research in the area of AER, funding and participating in an interagency working group examining how streamflow affects different fisheries.

f. Water Resource Investigations – Increasingly, USACE is being asked to look broadly at its Congressionally-authorized water resource studies to consider integrated solutions with multiple benefits (including drought resilience) in its traditional navigation, flood risk reduction, and aquatic ecosystem restoration studies. The Yolo Bypass

comprehensive study is a good example. With a commitment of funding in the President's FY2023 Budget, USACE, in partnership with other federal agencies, the State of California, and local entities, will initiate a new study of the Yolo Bypass to comprehensively assess flood risk management, water supply, agricultural enhancement, and habitat protection and restoration as part of a large-scale overall effort to address water resource challenges in California's Central Valley region. Similarly, USACE has been working with California's Department of Water Resources (CA DWR) on a range of flood control projects (American River Common Features, Natomas, West Sacramento, and Lower San Joaquin) that, based on comprehensive studies, have incorporated nature-based features, levee setbacks, habitat expansion/access, and shallow aquifer recharge opportunities into the project design.

g. New Infrastructure – With significant BIL funding, USACE is using its Environmental Infrastructure (EI) program and Continuing Authorities Program (CAP) to support the development of new infrastructure that in many situations, is providing additional and supplementary water supplies to local communities whether directly (e.g. new pipelines and desalination facilities) or indirectly (e.g. water reuse and aquifer recharge facilities). Of note, during 2022, USACE allocated over \$70 million of BIL funding for environmental infrastructure in the western states most impacted by drought. Examples include using \$2.25 million on a reclaimed water pipeline in Arizona; approximately \$600,000 for non-potable water distribution line for irrigation on the Pascua Yaqui Reservation; and \$4.4 million to fund a brackish water desalination facility for communities in southern California to reduce their reliance on imported water supplies from drought impacted watersheds (i.e. Colorado River and Sacramento/San Joaquin river basin). Another example of new infrastructure promoting drought resilience is the Folsom Dam raise project which will not only improve flood risk management, but also increases storage capacity providing more flexibility in operations that increases water supply and/or helps alleviate unhealthy environmental conditions for threatened and endangered fish species downstream.

h. Water Infrastructure Finance and Innovation Act (WIFIA) Program – Related to USACE's new infrastructure programs is the WIFIA program. WIFIA authorized USACE to create a loan program to promote investment in non-Federal dam safety projects. The proposed rule for this program has been published for a 60-day public comment period and the final rule is expected to be published as soon as spring 2023.

i. Planning for Drought – Through the Planning Assistance to States and other technical assistance programs, USACE has used its technical expertise to support state water planning efforts that include drought resilience. USACE has worked with state and local governments in Texas, Virginia, and Iowa, among many others, to support collaborative planning approaches to drought and other hazards as a result of drought conditions.

j. Tribal Programs – Based on location and historic underinvestment, Tribal Nations may be the communities most impacted by periods of extended and extreme drought. USACE can assist Tribes become more drought resilient through regular, Congressionally-authorized infrastructure projects, the Tribal Partnership Program (TPP), EI, and CAP. These projects range from environmental restoration actions to build resilience and protect important cultural landscapes for Tribes (e.g. Espanola Valley, Rio Grande, New Mexico) to basic infrastructure investments to improve water supply reliability. In FY2022, USACE allocated \$6.8 million of BIL EI funding and \$6.1 million of BIL CAP funding for tribal projects. Currently, there are 20 active projects and 11 pending projects within the TPP and increasing demand and capability for new investigations and construction funding.

k. Emergency Response and Recovery – Addressing the impacts of drought-induced wildfires in a historically disadvantaged community, USACE recently used BIL funding to act promptly and take several actions to protect the water supply and infrastructure of the City of Las Vegas, New Mexico, at risk of post-wildfire catastrophic flooding and debris flow due to the lack of vegetation within the burned watershed. USACE has released post-wildfire debris flow models for predicting rain-on-snow, precipitation, sedimentation, and ecological impacts for western arid regions, and transitioned this knowledge through training in partnership with agency, state, and academic partners.

5. Regulatory. In addition to the Civil Works program, USACE's Regulatory program can, where appropriate, assist in quickly permitting facilities and infrastructure that are integral to the drought resilience strategies being employed by many communities. As an example, water reuse has become an integral strategy to enhance water supply reliability in many drought-stricken areas. USACE's Nationwide Permit 59 provides authorization for discharges of fill material for the construction, expansion, and maintenance of water reclamation and water reuse facilities. USACE may also issue permits to authorize reservoir sediment management activities that help maintain the storage capacity of existing reservoirs, as well as the continuity of sediment transport that sustains downstream aquatic habitats. Some reservoir sediment management activities may be authorized by USACE's Nationwide Permit 27, and others through individual permits. Use of the nationwide permit process is an efficient, effective tool for authorizing drought resilience work that has no more than minimal adverse effects to the environment. Other nationwide and individual permits that address living shorelines, emergency watershed protection, and aquatic habitat restoration may also support community drought resilience efforts.

6. Next Steps - Drought Resilience. As outlined above, numerous examples exist that describe how USACE uses its existing authorities and capabilities to contribute to drought resilience at local and regional levels. Given this period of extreme drought and the likely continuation of this trend, USACE must continue to advance its efforts to develop and implement integrated solutions that support drought resilience as part of a

whole-of-government approach. Further analysis is needed as we work to develop priorities that inform future budget requests and to assess the organizational structure needed to manage the allocation of work in an area likely to experience significant growth in coming years. Accordingly, USACE is directed to develop a summary of ongoing, planned, and potential CW actions that support drought resilience, particularly any actions supporting the needs of Tribal Nations, economically disadvantaged communities, as well as science and technology needs or work. USACE should specifically address the following:

- a. *Existing Partnerships and Collaborative Agreements* – Agreements or arrangements with other federal, state, and local agencies to work collaboratively on actions to build drought resilience in specific drought-impacted watersheds or regions as identified by the U.S. Drought Monitor and National Drought Mitigation Center;
- b. *FIRO* – Capability and specific opportunities to increase the number of FIRO pilot projects in drought impacted watersheds or regions;
- c. *Water Supply* – Pending proposals or requests to enter into water supply agreements from USACE reservoirs and/or investigations to directly support water supply projects, particularly those integrating managed aquifer recharge features;
- d. *Investigations* – Existing congressionally authorized investigations (e.g. Yolo Bypass) that require the study of multi-purpose and benefit water resource projects in drought-impacted regions, particularly those with the opportunity to integrate nature-based features;
- e. *EI and CAP* – Assess and identify proposed projects within the EI program and CAP that are likely to contribute to building drought resilience in regions experiencing extended and extreme drought;
- f. *Technical Assistance* – Opportunities to use the Planning Assistance to States, Water Operations Technical Support, or other technical assistance programs to support drought resilience at the local level or to engage with local or regional watershed organizations to assist in developing resilience strategies that may involve multiple agencies and organizations;
- g. *Tribal Nations* – Specific opportunities/requests from Tribal Nations to use the Tribal Partnership Program or other authorized programs (e.g. EI and CAP) to support water resource projects that assist in building drought resiliency;
- h. *Emergency Response and Recovery* – Examples (beyond the New Mexico wildfire example) where USACE assistance has been requested to provide emergency services (e.g. general drought assistance and post-wildfire watershed stabilization actions) and the source of funding used to provide those services;

SACW

SUBJECT: Army Civil Works Supporting Drought Resilience in America's Communities

i. *Regulatory* – Examples of best practices to improve permitting timelines for facilities and infrastructure important to drought resilience strategies;

j. *Research and Development* – Other capabilities and tools (beyond FIRO) being developed to directly identify, address, and/or mitigate the impacts of drought.

7. Point of Contact. Questions regarding this matter may be directed to Hal Cardwell, Water Resources Specialist, Office of the Assistant Secretary of the Army (Civil Works) at henry.e.cardwell.civ@army.mil.

MICHAEL L. CONNOR
Assistant Secretary of the Army
(Civil Works)

CF:
DCG-CEO
DCW