

**New Mexico Water and Natural Resources Committee**  
**Water Management in an Era of Decreasing Supply:**  
**Increased Use and the Effect of Groundwater Depletions and Climate Change**  
**Testimony of Dr. Maurice Hall**  
**Vice President, Climate Resilient Water Systems, Environmental Defense Fund**  
**July 25, 2022**

Thank you, Chairman Lente and Chairman McQueen, Vice-Chair Stefanics and committee members for the opportunity to speak to you today on this most urgent issue.

The mission of Environmental Defense Fund (EDF) is to build a vital earth for everyone. That means we're deeply involved in efforts to minimize climate change and to build resilience to the impacts of climate change that we're already seeing.

I speak to you today from the perspective of someone who has worked on water issues across the West for three decades. I now lead EDF's Climate Resilient Water Systems program. Our water work focuses on building resilient water supplies for fish and other wildlife, farms and ranches, cities, and drinking water for Tribal and rural communities.

I also speak to you as a "new" New Mexican, and a constituent in Chairman McQueen's district. I recently moved here with my wife because we have come to love the landscapes, the cultures and the traditions that are so vibrant here in the Land of Enchantment. So, I come before you today with a long history of working on water issues across the West, and with a fresh lens on water issues in New Mexico that is colored by that experience across the West.

### **New Mexico's Water Budget**

I want to first highlight some important basic points on New Mexico's water budget. In New Mexico, all of our renewable water supply comes from rain and snow in our state or inflows from states upstream of us. At our downstream borders, interstate compacts on the major rivers commit us to passing a given amount of water through to the states downstream. As the committee has heard, we are in deficit on some of these interstate commitments. This means we're already in the red in terms of our overall water use. We are out of balance. We are using more water than we have available to use on a regular basis. And as the "leap-ahead analysis" (See: <https://geoinfo.nmt.edu/announcements/home.cfm?ID=538>) conducted by Dr. Dunbar and her colleagues, clearly describes, that deficit is growing under climate change, not shrinking.

The laws of physics tell us that our water use will eventually come into balance. Eventually if you keep using more water than is being replenished, you will eventually run out. So, the questions for us are – what do we want New Mexico to look like under that future, and how do we steer the transition to that new future that is in balance and that can adapt as the realities of climate change unfold? If we just let the inevitable shortages happen, there will be a lot of unfortunate and unmitigated impacts on people and ecosystems. If we steer this transition with bold action and clear-eyed choices about the tradeoffs, we can minimize the impacts and sustain ecosystems, our rural communities, and our economies. We can avoid a lot — though not all — of the pain and build a more just and resilient future for New Mexico. Those are the two options as I see it.

## Proactive Groundwater Management

Now let me turn to a crucial and often overlooked water source that is also part of this equation: groundwater. Groundwater is the water that is stored naturally in sediments and rocks under our feet. It's where practically all New Mexicans outside the Albuquerque and Santa Fe metro areas get their water. Tens of thousands of individual wells and around 500 small community water systems rely solely on groundwater to meet basic human needs.

Groundwater literally and figuratively underpins our entire water supply system — and it is not separate from the water imbalance I just mentioned. New groundwater withdrawals in New Mexico are adding to our overall deficit and increasing localized deficits. Growing groundwater withdrawals are also reducing flows in our streams, rivers, and springs.

Despite groundwater's importance, in most areas of the state we have only a basic idea of the condition of this asset. The aquifer mapping program at New Mexico Tech is changing that, but we need to accelerate that understanding, and we need to put in place authorities, capacities, and resources to proactively manage these groundwater aquifers.

And, as we increase attention on groundwater we must address the urgent needs of the small community drinking water systems, most of them dependent on groundwater, that provide drinking water to much of rural and small-town New Mexico families. Most of our small community water systems are operating on razor thin budgets and scrambling just to keep their pumps running and their pipes from leaking. With water shortages and drought throughout New Mexico, it is incumbent upon us to protect and repair these systems ensuring safe drinking water for New Mexico families. We don't need to imagine what it can look like when we fail our small communities, we only need to look at the recent news from the Village of Chama.

A recent report (see: <https://doi.org/10.1080/07900627.2021.1976116>) by Dr. Ben Warner and colleagues at the University of New Mexico highlights some of the main hurdles faced by these small systems, and points to some ways we may address counterproductive state policies. Many of these small systems are on the precipice of crisis, and it is urgent that we make sure the families served by these systems don't go off that precipice.

## A Portfolio of Solutions to Build Resilience

To address the water challenge in New Mexico, for groundwater and our entire water system, we need to deploy the broadest portfolio of tools that we can assemble. This challenge is just too big for one single solution. Our toolbox might include some targeted water supply enhancement, but we must have an increased emphasis on tools for reducing the demand. We also need actions that directly respond to the compounding risks of climate change. In a word, we must build resilience.

The portfolio of strategies needed includes some familiar actions, including:

- Municipal conservation, reuse, and recycling

- Water-saving agricultural practices, like lower water use crops and deficit irrigation
- Infrastructure investment, but these investments must also extend to our long-neglected natural infrastructure. This includes the watersheds, streams, and rivers. And importantly, it also includes groundwater aquifers.

Moreover, there is simply no way to come into balance, much less be resilient to climate change without reducing the water use of our agricultural sector. We absolutely need a resilient farm and ranch economy. These are important parts of our state's culture and landscape, and of course, we need them to grow our food. To be resilient, our farmers and ranchers need reliable water supplies and tools to adjust flexibly during droughts and as the vagaries of climate change unfold. And to be reliable long term, these water supplies must be in balance with a clear-eyed view of the available supply.

### **Multibenefit Land Repurposing**

To achieve the balance I've been describing, some agriculture will inevitably have to come out of production. Other states in the West are facing this same situation. One strategy that can help agricultural regions proactively steer through this transition and minimize the impacts is multibenefit land repurposing. This resilience strategy has emerged from the work of EDF and many community and agricultural partners in California's San Joaquin Valley, where studies indicate between 500,000 and 1 million acres of agricultural land will have to come out of production due to insufficient water supplies. Unmanaged, this transition could leave a patchwork of dusty fields with invasive weeds, worsen already very poor air quality, and put many farm workers out of work.

To avoid this devastating outcome, the state of California recently committed \$50 million to launch an innovative new Multibenefit Land Repurposing Program (see attached). The intent is to steer a transformation in the Central Valley toward a water-resilient agricultural region by supporting growers who voluntarily reduce their water use to repurpose previously irrigated land into a mosaic of vibrant new land uses that require less water and that provide other needed benefits to the community. The new benefits include habitat corridors, wildlife-friendly groundwater recharge areas or outdoor recreational spaces for families. Already, demand for this program from farmers and water managers is twice the funding we have available.

Local conditions vary, but this general concept is adaptable, with local tailoring, to other places. With strong collaboration, New Mexico can create a partnership and plan on how and what will work for our state and our local communities.

### **Unprecedented Collaboration**

This brings me to another major point I would like to make: the durable solutions we need will require an unprecedented level of good faith collaboration amongst diverse stakeholders. We certainly see examples of such collaboration emerging in New Mexico.

We need to support and invest in promising collaborative solutions and replicate them. For ideas, it's helpful to look for examples from throughout the West that could be successfully adapted to New Mexico's unique and special setting – solutions such as the Yakima River Basin

Integrated Plan. And as in Yakima, it can no longer be just water agencies making decisions. We need everyone's ideas and perspectives in the game. This means:

- Tribal communities and leaders
- Historically disenfranchised communities and communities of color
- Other rural communities
- Environmental interests.

### **Good Data and Information**

To accelerate collaboration and make it successful, we need good information. This means fully funding and implementing New Mexico's Water Data Act. We also need new tools like the OpenET platform that EDF helped to launch with NASA, the Desert Research Institute, Google and use partners across the West. Attached is a brief description of OpenET, and you can go to the website, [OpenETdata.org](https://www.openetdata.org), establish your own account, and look at the data directly.

### **Additional Steps by the Legislature**

I've mentioned above some actions the legislature can take. Additionally, if my experience in water management has taught me anything, it's that nothing gets done unless good people are given the charge — and the resources — to get it done.

Beginning at the State level, I urge you to turn immediately to building out and modernizing the basic capacity in the state government dedicated to managing our water system and ensuring clean drinking water. At the same time, increased and sustainable funding streams are needed to support this modernized water governance, including the data and programs I've mentioned, at a level commensurate with the urgency and importance of water to New Mexico's future.

Of course, there are many details to be worked out about the right structure for water governance of the future and the priorities for funding, but Tribal leaders, the Middle Rio Grande Water Advocates, and other community-based groups most affected, have put forth valuable ideas. A modernized and strengthened state governance system certainly needs to include authorities and support for proactive groundwater management. And, as a matter of water justice, we need to provide desperately needed funding and support to the Tribal and other rural water agencies to make sure they repair and upgrade their systems to provide clean, safe drinking water to the families of New Mexico.

Our decisions, your decisions as our leaders, are about how we bring our water systems into balance, build water resilience for New Mexico's future, and provide clean, safe drinking water to rural and small-town communities right now and in the future.

A lot of great work has been done and many positive things are happening across the state. And we must build on these efforts. But we can no longer continue at the current pace. Our current track and our current pace will undoubtedly lead to more severe impacts, particularly on

those who can least afford it – the small communities, small farmers and ranchers, and the environment.

But with bold, inclusive, and collaborative action, guided by your leadership, and supported with state and federal resources, we can secure the clean drinking water needs of New Mexico's families today and steer a transition to a healthier and more water resilient New Mexico.

EDF and I stand ready to work with the Committee, our other state leaders, and communities across the state to take the second course, taking bold action to steer the transition to water resilience in New Mexico.

Thank you for the opportunity to share my thoughts today.

# California's Multibenefit Land Repurposing Program

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Increasingly frequent and intense droughts are adding to a long-term imbalance between water supply and demand in many of California's agricultural regions. Bringing groundwater basins into balance and agricultural production in line with water supplies will require significant acreage of irrigated farmland to be taken out of production in the coming decades. Central Valley communities are wrestling with this challenge as they work to implement the Sustainable Groundwater Management Act, which sets a 2042 target for transition to sustainable groundwater use.

Experts estimate least 750,000 acres of farmland in the San Joaquin Valley alone may need to be fallowed to balance groundwater supply and demand and address climate change-driven water scarcity. If unmanaged, fallowed fields can emit dust and worsen air quality; host weeds and pests; and adversely impact agricultural economies, rural communities and ecosystems.

However, there is an alternative: **multibenefit land repurposing**, which is the practice of transitioning irrigated land to new uses that conserve water and deliver benefits to communities and ecosystems. With public funding, growers can be compensated for voluntarily transitioning formerly irrigated farmland to new uses, such as habitat corridors, parks, wildlife friendly groundwater recharge basins, and well-managed rangeland.



In 2021 California established the **Multibenefit Land Repurposing Program** and funded the program with an initial \$50 million to reduce reliance on groundwater while providing community health, economic well-being, water supply, habitat, renewable energy and climate benefits.

## Block grants for local entities

The program is administered by California's Department of Conservation and delivers block grants up to \$10 million to local entities, such as groundwater sustainability agencies and community groups, to support coordinated planning and implementation of land repurposing projects. Local organizations can use these block

grants to collaboratively plan for land use transitions, cover land repurposing project costs, and provide incentive payments to growers who voluntarily participate.

In addition to block grants, the program can provide grants directly to Tribes to plan and implement multibenefit agricultural land repurposing projects.

A new statewide support entity, co-chaired by Self-Help Enterprises and Environmental Defense Fund, also has been established and funded through the state program to provide support and coordination to block grantees.

### Supporting regional coordination

To ensure multibenefit land repurposing projects funded through the state program are coordinated and prioritize the needs and preferences of local stakeholders, block grantees are required to develop a multibenefit agricultural land repurposing plan. These plans outline the regional strategy to reduce reliance on groundwater while providing other benefits related to community health, economic wellbeing, water supply, flood resilience, habitat, renewable energy and/or climate. Development of these plans will be informed by stakeholder input and coupled with outreach, education, and training as needed to build capacity.

Block grantees are also required to monitor repurposing projects to ensure defined conservation outcomes have been achieved and maintained for the agreed upon duration the benefit.

### Creating benefits for people and nature

With funding from the state, local organizations have the flexibility to determine which land repurposing project types and durations make the most sense and will provide the greatest benefits to their communities. Projects funded by the program must use less water than the previously irrigated cropland. Benefits of land repurposing projects can

be permanent or maintained for a minimum of 10 years.

Examples of strategies and projects that may be funded by the program include:

- Creation or restoration of habitat such as pollinator habitat, wetland habitat, upland habitat and riparian habitat.
- Development of multibenefit groundwater recharge areas.
- Restoration of floodplains.
- Transition of irrigated land to dryland farming or non-irrigated rangeland.
- Transition to less water intensive crops, including those for native seed production.
- Planting of cover crops or conservation cover.
- Reestablishment of Tribal land uses.
- Implementation of Tribal cultural practices.
- Facilitation of renewable energy projects that have an overall net greenhouse gas reduction.
- Creation of parks or community recreation areas.

### Progress to date

In the first round of applications, the highly competitive program received requests from 12 regions for over \$110 million in funding — more than two times the funding available. The Department of Conservation awarded block grants to four agricultural regions facing significant water scarcity and agricultural transitions. The successful applications included partnerships with diverse organizations, a foundation of collaborative planning processes and strong commitments to multibenefit outcomes.

Learn more about the California Multibenefit Land Repurposing Program and the awarded projects at [www.edf.org/mlrp](http://www.edf.org/mlrp).

# OPENET

FILLING THE BIGGEST DATA GAP IN WATER MANAGEMENT

## VISION

Our goal is simple, but transformative: to fill a critical data gap in water management across the western U.S. through a transparent, credible, and easily accessible web-based platform – OpenET.

## OVERVIEW

A growing scarcity of water, compounded by the impacts of changing climate and a growing population, has made sustainable water management one of the most challenging issues of our time. Adequate freshwater supplies are critical for the health of communities and wildlife, and nothing is more important to agriculture's ability to grow food. But in arid regions such as the western U. S., freshwater resources are dwindling.

To maximize the benefits of our water supplies, we must know how much water is available and how much is being used. Evapotranspiration (ET) is a measure of the water used by crops and other plants as they grow. Scientists are currently using satellite and weather data to calculate ET at the individual field level. However, access to this data has previously been limited and expensive, keeping it out of the hands of most water users and decision-makers.

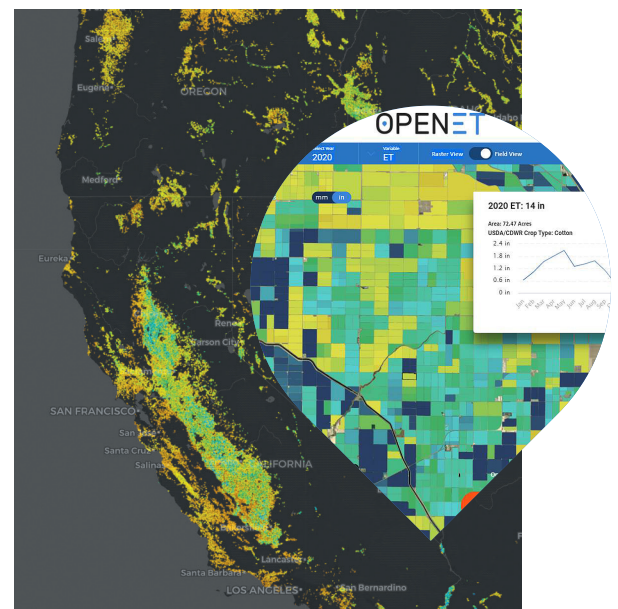
## A TOOL FOR EFFECTIVE WATER MANAGEMENT

It is now possible to generate field scale ET data across vast areas, thanks to a growing array of satellites and powerful cloud computing resources like Google Earth Engine and the NASA Earth Exchange. The OpenET platform leverages these resources and applies an ensemble of trusted methods to generate ET data from satellite observations for user-defined geographies and time frames across the western U.S. OpenET has brought together a community of scientists and nationally recognized experts to develop a consistent, trusted source of ET data.

Low-cost, reliable, and widely accessible ET data at the field scale can help:

- ✓ **Rural communities** to design locally driven water conservation and trading programs.
- ✓ **Water managers** to develop more accurate water budgets, incentive programs and other innovative strategies.
- ✓ **Farmers** to improve irrigation practices to maximize “crop per drop” and reduce costs for fertilizer, water, and energy.
- ✓ **Policymakers** to more accurately track water supplies, simplify regulatory compliance, and co-develop solutions with local communities.

**Evapotranspiration (ET)** is the process by which water is transferred from the land to the atmosphere. It includes both evaporation from soil and transpiration from plants. ET is a core driver of the Earth's water cycle, returning water to the atmosphere to fall again as precipitation. For irrigated agricultural fields, ET is necessary for plant growth and food production.



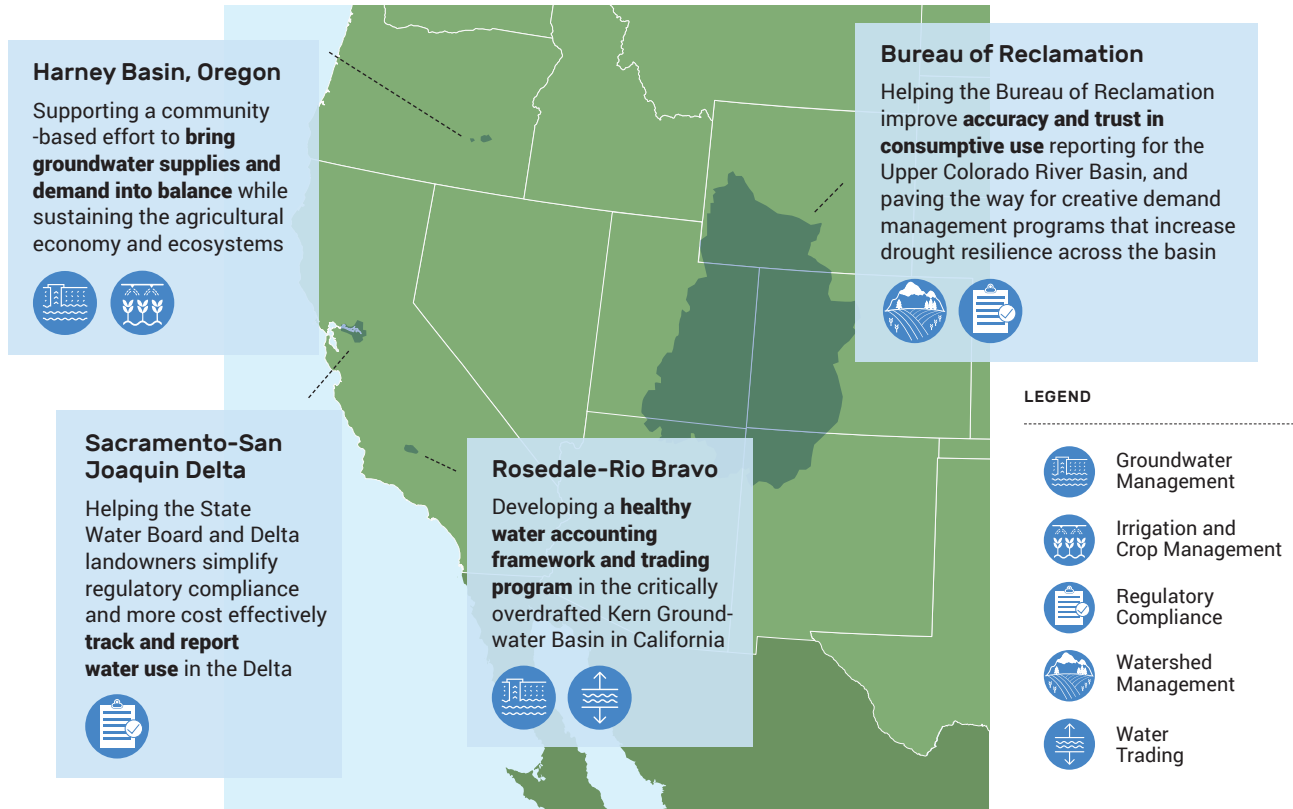
ET data at the field scale is accessible across the western U.S. from the OpenET web interface.



## USE CASES AND APPLICATIONS

Project partners have developed use cases and applications to demonstrate OpenET's value in supporting sustainable land and water management practices at the local, regional, and even international scales.

Examples of current applications include the following:



## TRANSPARENT SCIENCE, GROUND-TRUTHED DATA

To provide the most scientifically rigorous data, the OpenET team conducted the largest intercomparison and accuracy assessment of field-scale satellite-driven ET models to date. This includes comparing OpenET data to in-situ ET estimates collected by 142 ground-based stations throughout the United States and data records from four weighing lysimeters. Importantly, results from these accuracy assessments are available on the OpenET website. Our transparent data and methodologies allow for open dialogue with growers across the western U.S. so that we can continually advance the science for the benefit of all OpenET users and support sustainable land and water management.

## PROJECT PARTNERS

OpenET has been developed through an unprecedented public-private collaboration led by Environmental Defense Fund, NASA, Desert Research Institute, and HabitatSeven. The team includes leading national and international experts in remote sensing of ET, cloud computing, web design, and water resources and policy. OpenET has received funding from the NASA Applied Sciences Program Western Water Applications Office, S. D. Bechtel, Jr. Foundation, Gordon and Betty Moore Foundation, Walton Family Foundation, The Keith Campbell Foundation for the Environment, Lyda Hill Philanthropies, The Laney and Pasha Thornton Foundation, Water Funder Initiative, Desert Research Institute Maki Endowment, Delta Water Agencies, and the Windward Fund. In-kind support has been provided by partners in the agricultural and water management communities, Google Earth Engine, and the Water Funder Initiative.

**OPENET**

FILLING THE BIGGEST DATA GAP IN WATER MANAGEMENT

Learn more at [openetdata.org](https://openetdata.org).