Elephant Butte Irrigation District

Drought and Climate Change Effects
Past, Present and Future

RECORD BREAKING

Drought Effects

- **1954 Run to dead** storage of 9900 AF August 6,, resulting in a fish kill that made T or C quite unpleasant.
- **2013 Lowest** Annual Caballo Release: 168,000 AF
- **2013 Shortest** Release Season: 47 days
- **2018 Least** San Marcial Inflow: 54,600 AF, lower than 2002 record low
- **2018 Ending** EB storage, 58,484 AF, 2.9% of capacity
- **2018 Lowest** Elephant Butte Reservoir level since August 27, 1972

EBID turned 100 years old in 2018 and its extensive system, designed and constructed by the Bureau of Reclamation, needs rehabilitation. Drought has become one of the greatest water issues facing the West; the District and its members have countered with innovative, creative and conservative practices to deal with this crisis.

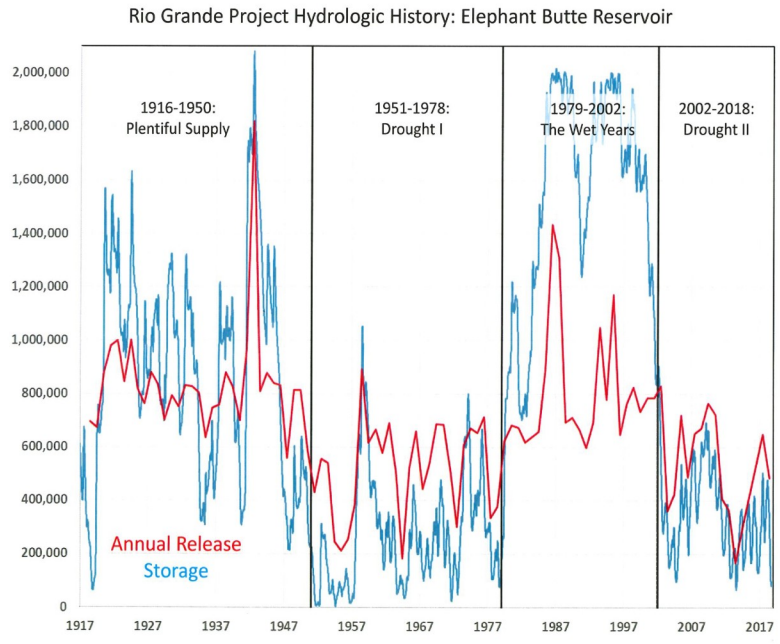
Infrastructure improvements, including piping and metering and monitoring instrumentation, are needed across the District to better utilize our limited water resources. EBID delivers water to 90,640 water righted acres through a network of over 264 miles of canals and laterals.

To date, EBID has piped less than 10% of its canals and laterals, mostly due to a lack of funding. EBID has numerous shovel ready projects to conserve water through the reduction of seepage and evaporation.

Elephant Butte Reservoir, 9/26/2018. (courtesy Rett Salopek)

Year	Allotment (ft)
2009	2.50
2010	2.00
2011	0.33
2012	0.83
2013	0.29
2014	0.63
2015	0.92
2016	1.08
2017	2.00
2018	0.83

Note: A full allotment is 3.00 ft.



Elephant Butte Irrigation District; 530 S. Melendres, Las Cruces, NM 88005; 575-526-6671 FAX: 575-523-9666, www.ebid-nm.org Gary Esslinger—Treasurer/Manager, Ext. 1

EBID has implemented a comprehensive stormwater management system aimed at tracking storm activity, monitoring stormwater inflow to the Rio Grande and capturing stormwater in areas where groundwater aquifer levels have been most affected. The system is comprised of Remote Telemetry Units (RTU) installed in a wide variety of locations from watersheds to arroyo channels, the river, canals and stormwater capture sites to measure diverted stormwater and track the effects on aquifer levels at nearby groundwater monitoring sites.

Stormwater Management System

- Watershed weather stations & rain gauges
- RTU flow monitoring on major arroyo channels
- Utilization of existing Rio Grande gauging stations

Stormwater Capture Planning

- Analyzed 2009 – 2015 groundwater levels
- Identified critical areas with low aquifer levels
- Leasburg, Eastside, and Westside canals

RTU Monitoring

- Installed flow monitoring at capture sites
- Also installed RTU at nearby groundwater monitoring well
- Able to see real-time affect on aquifer level

Upgrade to RTU Software

- Upgraded to OneRain Contrail software
- Created specifically for rain monitoring and flood warning

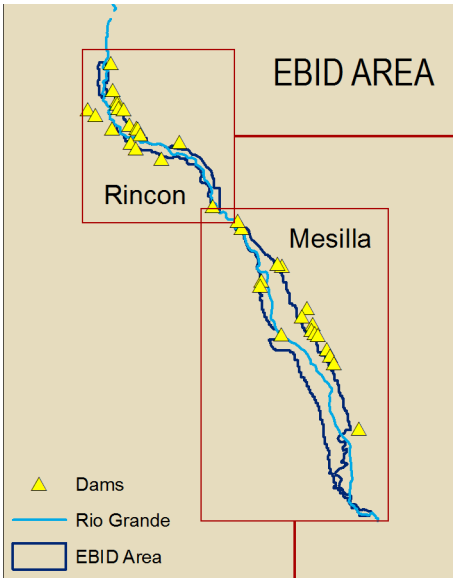
Improving this system required additional RTUs and monitoring sites to alert EBID to specific areas of inflow within the Rio Grande channel. Automated systems would allow for increased stormwater capture, thereby benefitting aquifer recharge.

Capture Results 2015 - 2018

Site	Hours	Gallons	Acre Feet
Leasburg Canal	266.5	245,988,517	754.8
Eastside Canal	267.5	250,574,766	768.9
Westside Canal	160.5	149,850,880	459.8
Total Capture Data	694.5	646,414,163	1983.5

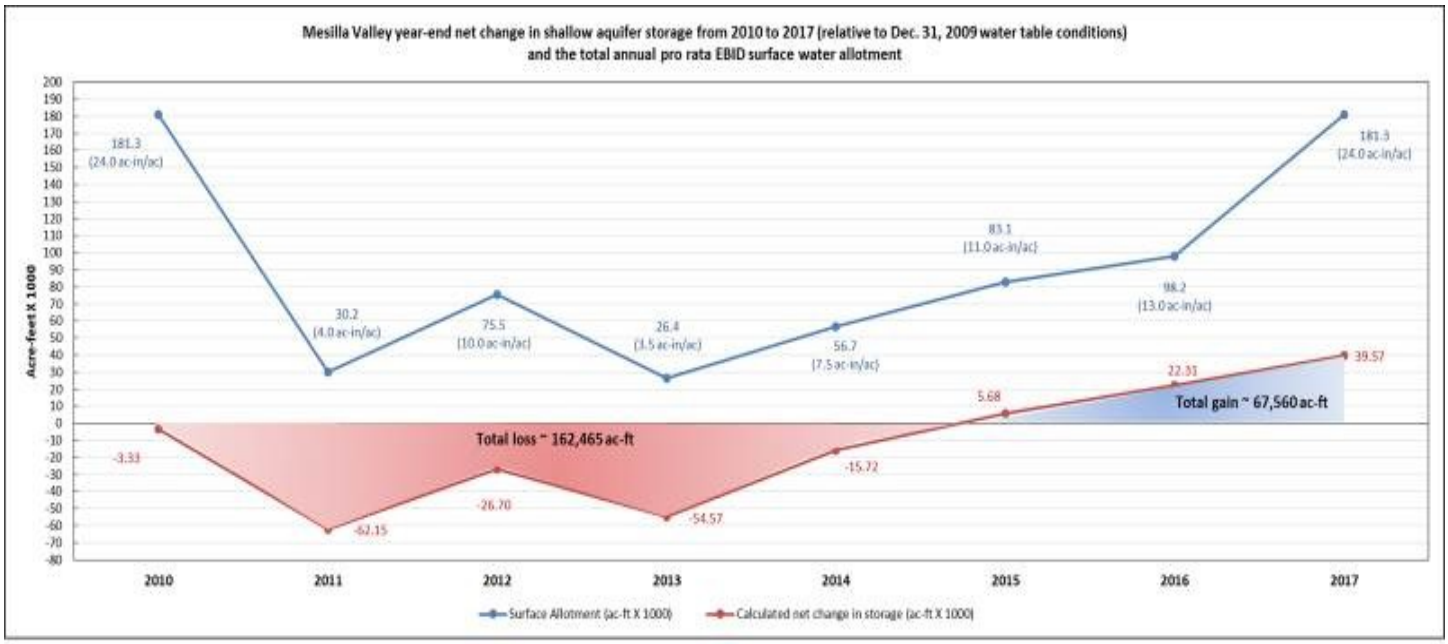
EBID operates and maintains 25 flood control dams along the east and west edges of the Rincon and Mesilla Valleys, including above highly populated areas. The dams were constructed for soil and water conservation and most were only designed to protect farm land. But now most of EBID's dams protect homes and communities from flooding and catastrophe. These dams are approaching or have passed their design life of 50 years. and due to increasing spillway capacity requirements do not meet OSE-Dam Safety Bureau design requirements. The District is looking for revenue streams to assist with dam maintenance or other government units like the counties or the Bureau of Land Management to take over the responsibility. EBID and its farmers alone cannot afford the huge expense of replacing or rehabilitating these dams to meet new safety regulations. It is reasonable that all residents pay taxes for the operation and maintenance of flood control dams that protect everyone. The District wisely utilizes the minimal current LID assessments to keep the current dams and facilities operating safely, but much more is needed.

Top-Garfield Dam



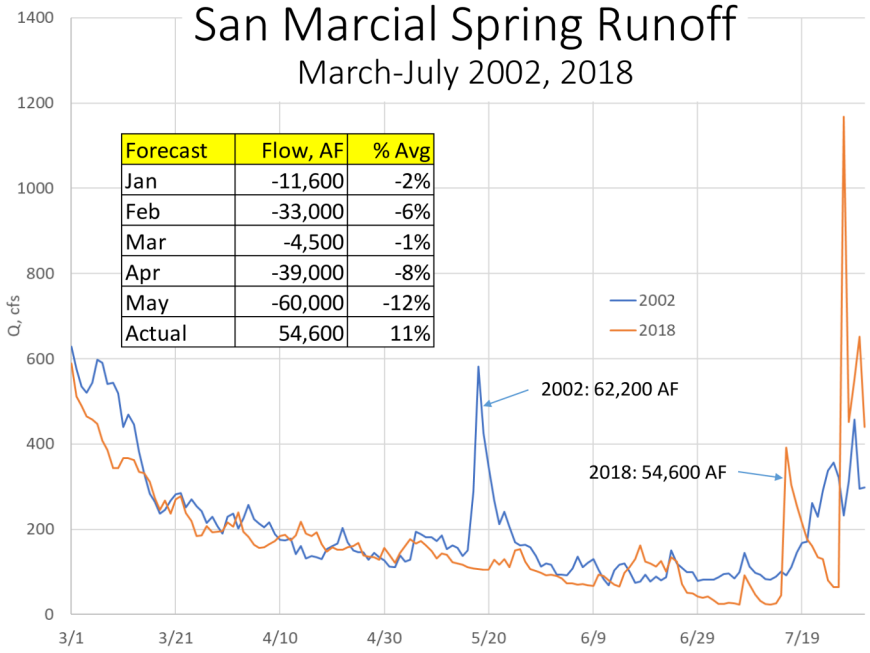
Right-Dam locations throughout EBID

Flooding remains a high level risk to everyone, especially those living on the valley floor. Legislators need to understand the vital importance of watershed management and infrastructure improvements for current flood dams as well as improving and recognizing the need to prevent catastrophic flooding events. Funding for all watershed restoration should be recognized by the State as a large component of safety and public welfare.



- Total loss from shallow aquifer storage in the Mesilla over the last eight years from 2010 to 2017 was almost 60% greater (over twice as much) than total gains to storage during this period, but gains have occurred, at least in the shallow aquifer.
- Highly variable EBID surface water allotments are driven primarily by fluctuating upstream watershed drought conditions, which governs local aquifer response to pumping stress and limited recharge.
- 2017 was the first significant surface water allotment improvement seen in recent years, but established aquifer effects at greater depths in the Mesilla have tended to marginalize or delay gains otherwise hoped for in terms of recharge.
- 2018 has not been an improvement over 2017. Additional monitoring and measurement is needed to better understand and predict pumping effects at greater depths.

Persistent drought conditions in the Mesilla and Rincon Valleys of southern New Mexico have led to significantly decreased surface water allotment to farms. To offset these shortages groundwater well pumping has increased, resulting in declining groundwater aquifer levels. There is a critical need to examine and implement alternative water sources to supplement farm irrigation.



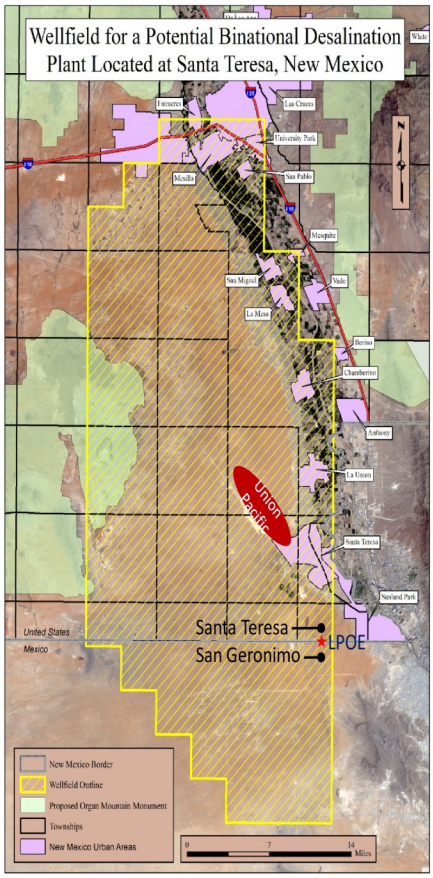
Forecast	Flow, AF	% Avg
Jan	-11,600	-2%
Feb	-33,000	-6%
Mar	-4,500	-1%
Apr	-39,000	-8%
May	-60,000	-12%
Actual	54,600	11%

EBID can move further in its innovation and management of limited water resources if we have more funding…

Critical Funding Needs for Infrastructure Improvements

* Efficient and improved utilization of limited surface water--piping can reduce costs and water loss by almost 35%
* Stormwater capture for irrigation and aquifer recharge
* Dam maintenance and rehabilitation for public safety

EBID led the effort to assess the feasibility of a desalination plant to provide fresh water for the planned municipal and industrial development in the Santa Teresa are on the US-Mexico border. Researchers from New Mexico State University are currently conducting a project to evaluate desalination technology options and develop a Preliminary Engineering Report on the potential for binational development of a regional desal plant. Partners include EBID, the Border Industrial Authority, the Camino Real Regional Utility Authority, and the US International Boundary and Water Commission. Final development of desal capacity will require collaboration and coordination of resources.



The Booming Border Region
Santa Teresa/San Geronimo

- Binational effort to develop trade, Land Port of Entry infrastructure
- Access to deep water ports in Long Beach, Houston, Mazatlán
- Development for 200 k platted in Santa Teresa
- Grande plans for San Geronimo
- Deep Upper/Middle/Lower Santa Fe aquifers
- Lots of brackish water, little fresh
- Development will come looking for fresh water
- 50M acre-feet of economically extractable (for M&I) brackish to saline water in the yellow area

1929-1938: The Rio Grande Compact

Legal Update

- In its March, 2018 opinion, the issued regarding substantive issues in the TX & US v. NM case, the United States Supreme Court decided, among other things, that the area below Elephant Butte is compact Texas, and what it calls "the downstream contracts" that are responsible for operations in compact Texas will play a significant role in the litigation.

- Following that opinion, and as a result of the State of NM suing over the 2008 Operating Agreement, the Special Master determined that EBID and EPCWID#1, the two Rio Grande Project beneficiaries responsible for administering the Project, will play an "enhanced" role in the case, thus allowing the districts to participate on a level above what other amici will be allowed to do. Of importance, EBID will be allowed to participate in discovery and depositions. As long as the Operating Agreement is at issue on the case, EBID and EPCWID#1 will be allowed to participate through their "enhanced" roles, and may even be made parties to the case.

- The Supreme Court litigation is off to a strong start with initial discovery already having been disclosed. Discovery will be complete by 2020, with trial that same year. EBID expects early briefing regarding the Operating Agreement issues to take place toward the end of this year.

- While EBID remains aligned with EPCWID#1, the United States and Texas on the Operating Agreement issues, EBID is always open to looking for solutions with New Mexico, and it continues to do so through ongoing discussions in the LRG.