

Lake Palo Pinto and Hilltop Reservoir Pass-Through Plan
Certificate of Adjudication 12-4031 & Permit 5447
Palo Pinto County Municipal Water District No. 1
(August 14, 2013)

Background and Purpose

The Palo Pinto County Municipal Water District No. 1 (District) owns and operates Lake Palo Pinto, a channel dam on Palo Pinto Creek, and Hilltop Reservoir as shown on the attached figure. Certificate of Adjudication 12-4031 (CA 12-4031) authorizes the District to: impound 44,100 acft in Lake Palo Pinto and to divert 12,500 acft/yr for municipal purposes and 6,000 acft/yr for industrial purposes; and to maintain a diversion point and a 24 acft reservoir (channel dam) on Palo Pinto Creek; with priority dates of July 3, 1962 and September 8, 1964. Permit 5447 authorizes the District to impound 1,153 acft in Hilltop Reservoir that is diverted under CA 12-4031. The District operates its system by releasing water from Lake Palo Pinto into Palo Pinto Creek where it is then diverted from the District's channel dam on Palo Pinto Creek and into Hilltop Reservoir where it is then diverted to the Hilltop water treatment plant (Hilltop WTP).

TCEQ issued an Order on July 2, 2013 (TCEQ Order), that called for the suspension of the refilling of the District's storage reservoirs subject to the senior call by the Dow Chemical company (with a priority date of February 14, 1942) during those days when streamflow as measured at the USGS gage located on the Brazos River near Glen Rose is below 106 cfs. The District has developed the following pass-through plan (PTP) which describes how the City intends to comply with the TCEQ Order.

District's Pass-Through Plan

The District plans to address the TCEQ Order at each of its water supply components as described below and in the attached Pass-Through Plan Accounting Document (PTPAD). The District will make appropriate pass-throughs in accordance with the attached PTPAD until storage levels in Lake Palo Pinto reach 40 percent of capacity. At which time, under Provision No. 10 on Page 12 of the TCEQ Order, the District will suspend pass-throughs because of public health, safety and welfare concerns, including drinking water supply, fire suppression needs, and Brazos Electric Power Co-operative's (BEPC) inability to divert water when the level of Lake Palo Pinto reaches 854 ft-msl (23 % storage level).

Public Health and Safety Provision

The District operates Lake Palo Pinto as its primary source of water supply for its customers. Although the District's water rights permit allows the District to store up to 44,100 ac-ft, a June 2007 volumetric survey performed by the TWDB indicates the lake only stores 27,215 ac-ft or less than 62% of its authorized storage. To recover this lost storage, the District is pursuing the development of the Lake Palo Pinto Storage Restoration Project (a.k.a. Turkey Peak Reservoir Project) which will fully restore the capacity of Lake Palo Pinto. The District submitted their application for this project to TCEQ in January 2009 and is still awaiting a draft permit from TCEQ.

Lake Palo Pinto is located on a predominantly dry tributary of the Brazos River known as Palo Pinto Creek. Inflows generally only occur after significant storm events and last only a few days. During drought conditions there is no sustained base flow upstream of Lake Palo Pinto. The District has adopted a lake level of 40% storage as an appropriate trigger for invoking the public health and safety provision of the TCEQ order for the following reasons.

1. This lake level corresponds to Stage 2 of the City of Mineral Wells drought contingency plan.
2. This level is only 4 feet above the elevation when BEPC's intake for their R.W. Miller Steam Electric Station located on the shores of Lake Palo Pinto would no longer function.
3. Historically, when the lake reaches this level, as it did back in 2009, the District immediately takes action to supplement their supply through other more costly sources. For example, when the lake reached this level in 2009, Brazos River water released from Possum Kingdom Reservoir was pumped into the District's system and mixed with Lake Palo Pinto supplies to prolong the supplies as long as possible.
4. As shown in Figure 1, at a storage level of 40%, the District only has about 3 months of supply left before the lake level drops below BEPC's minimum intake level. At the 23% storage level, BEPC can no longer divert water for power generation purposes.
5. Based on a historical hydrology, Lake Palo Pinto at 40% storage level indicates that significant drought conditions exist. Historically, when storage levels have reached this critical level such as in 2009, the District has been required to take drastic measures to ensure the health, welfare and public safety of its customers is protected.

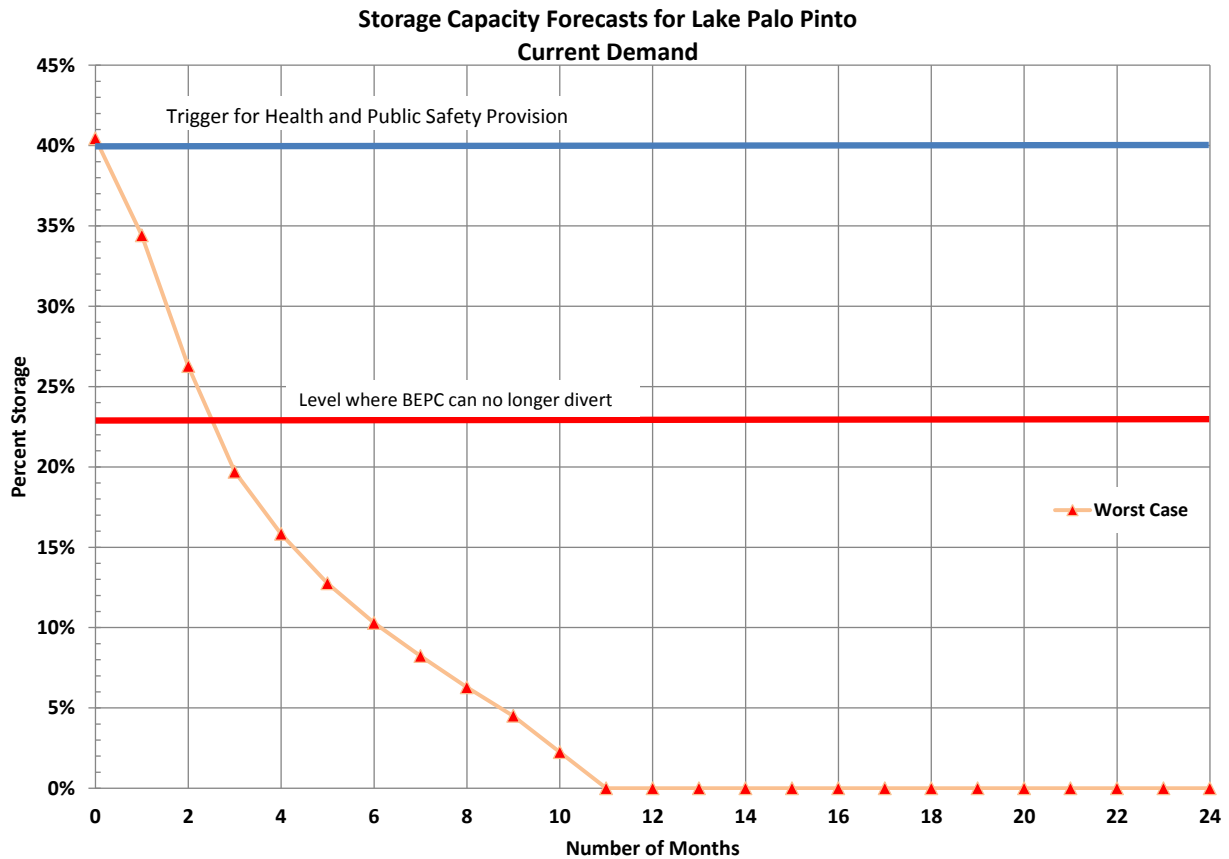


Figure 1. Lake Palo Pinto Forecast showing that from a 40% starting level the reservoir enters a level BEPC can no longer divert and there is less than a 12 month supply of water available.

District's Channel Dam on Palo Pinto Creek

The District will make their best efforts to operate their reservoir at the channel dam on Palo Pinto Creek full (but not spilling) with stored water releases from Lake Palo Pinto. Keeping the reservoir full will ensure that pass-throughs from Lake Palo Pinto as well as intervening runoff below Lake Palo Pinto will flow unobstructed over the channel dam and travel downstream. The District will record daily water surface elevations at the channel dam and record these values in the PTPAD. As shown in the PTPAD, the District will only divert water released from Lake Palo Pinto at this location with all intervening runoff below Lake Palo Pinto spilling over the channel dam.

District's Hilltop Reservoir

Almost all of the water entering Hilltop Reservoir is water diverted at the channel dam on Palo Pinto Creek as released from Lake Palo Pinto. However, Hilltop Reservoir is also authorized under Permit 5447 to impound inflows from its 0.56 square mile watershed on a non-priority basis. To calculate runoff from this watershed, the District will install both a rain gage near the perimeter of the reservoir and a water level gage to monitor the water surface elevation in the reservoir on a daily basis. This information will be recorded on a daily basis in the PTPAD along with the estimated volume of water pumped into the reservoir from the channel reservoir and the estimated volume diverted from the Hilltop Reservoir to the Hilltop WTP. Once this information is entered into the PTPAD, a calculation will be performed to determine the volume of inflow received from its watershed that may need to be passed on those days when streamflow as measured at the USGS gage located on the Brazos River near Glen Rose is below 106 cfs. This calculation will be based on the change in storage of the reservoir adjusted for precipitation on the surface of the reservoir. The passing of inflows is addressed in the section of the PTP entitled *Releases of Water to Meet Pass-Through Obligations*.

District's Lake Palo Pinto

The USGS maintains a lake level gage at the reservoir which the District will use to record daily lake level in the PTPAD. The District will install a rain gage along the perimeter of the reservoir or use locally available rainfall data to record daily rainfall in the PTPAD. The District operates the outlet works of the dam to provide water supply releases from Lake Palo Pinto to the downstream channel dam for subsequent diversion and will use a rating curve to estimate daily releases from Lake Palo Pinto. Inflows will be calculated in the PTPAD using a change in storage equation adjusted for precipitation on the reservoirs surface and releases. The PTPAD will calculate the volume of water that should be passed on those days when streamflow, as measured at the USGS gage located on the Brazos River near Glen Rose, is below 106 cfs. The passing of inflows is addressed in the section of the PTP entitled *Releases of Water to Meet Pass-Through Obligations*.

Releases of Water to Meet Pass-Through Obligations

The District will satisfy calculated pass-through requirements using one or more of following three options. The District will decide at the time a pass through is required which method provides for the greatest level of protection of the health and safety of its customers. The District will notify TCEQ regarding which method will be used to pass inflows at the time inflows are passed and will notify TCEQ if the method changes, but anticipates utilizing the following priority for determining the source of the pass-throughs. The first option for meeting pass-throughs would be to apply any water supply releases from LPP that were not diverted at the channel dam but spilled into the Brazos River. Second would be calling on BRA to release stored water from Possum Kingdom. Third would be releases of stored water from Lake Mineral Wells and finally would be releases from Lake Palo Pinto. These options are described in more detail in the following text.

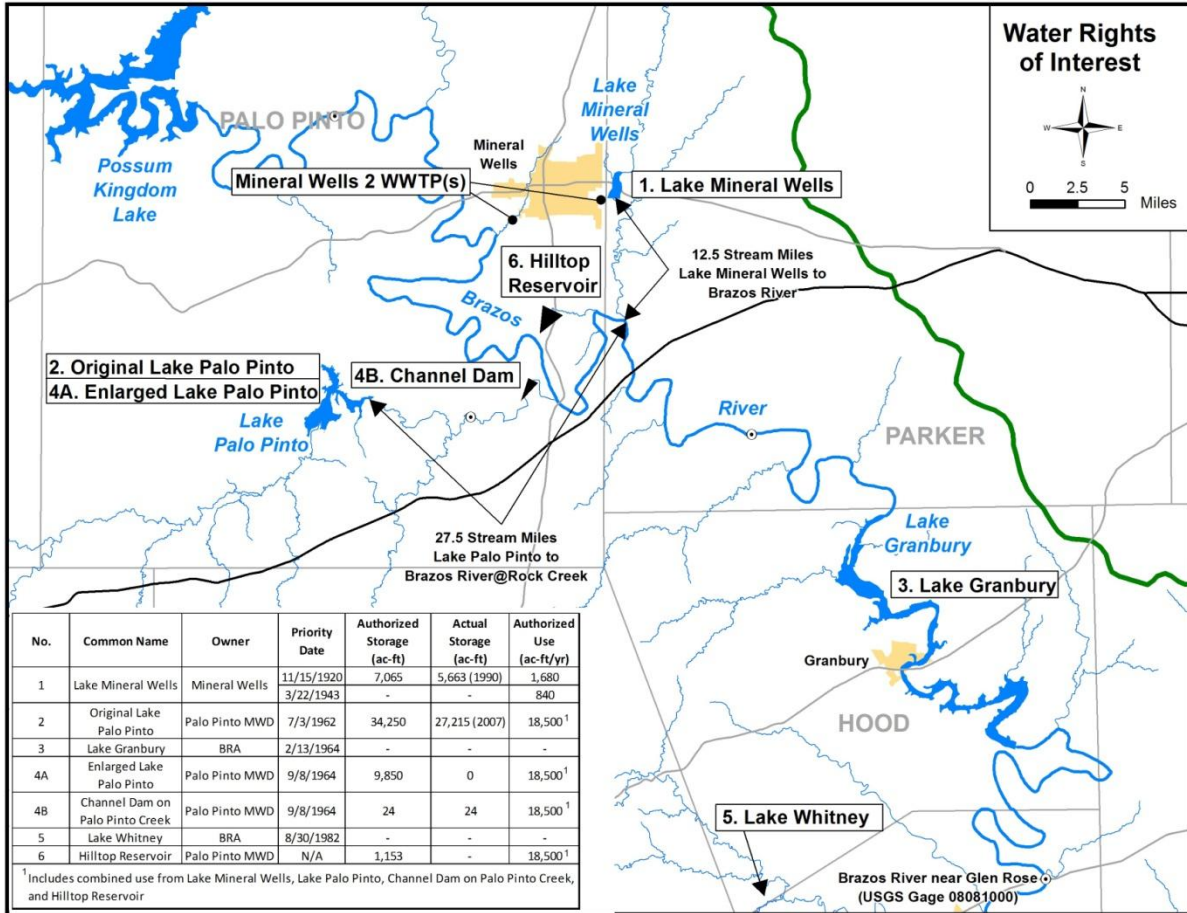
1. **Water supply releases spilled and not captured at the channel dam.** The PTPAD assumes that anytime water is released from Lake Palo Pinto and not subsequently diverted from the channel dam, the resulting spills over the channel dam are considered to meet any inflow passage requirements first. These flows are accumulated in the PTPAD and applied accordingly if a past through event occurs.
2. **Release of stored water from Possum Kingdom Reservoir.** The District (under a BRA contract for stored water in Possum Kingdom Reservoir) will request BRA to release stored water as authorized under the BRA contract to satisfy in whole or in part required pass-throughs from Hilltop Reservoir and Lake Palo Pinto as calculated in the PTPAD. The volume of water requested to be released will be increased by an appropriate factor to account for additional channel losses, if any, so that the volume of water passing the confluence of Palo Pinto Creek where it joins the Brazos will be the same volume released from Hilltop Reservoir and Lake Palo Pinto as calculated in the PTPAD.
3. **Release of water from Lake Mineral Wells.** After adjusting for flow volumes in Items 1 and 2 above, the City of Mineral Wells will release stored water from Lake Mineral Wells to satisfy in whole or in part required pass-throughs from Hilltop Reservoir and Lake Palo Pinto as calculated in the PTPAD.
4. **Release of water from Lake Palo Pinto.** The combined pass through volume calculated in the PTPAD for both Hilltop Reservoir and Lake Palo Pinto will be released from Lake Palo Pinto using the available capacity in the outlet works above the amount required for water supply releases. Water will be released with the volume recorded in the PTPAD until the calculated pass through volume is satisfied. The estimated maximum release rate from the outlet works at Lake Palo Pinto is about 17 cfs.

The District, in conjunction with the City of Mineral Wells, does not anticipate the combined diversion from Lake Palo Pinto, Hilltop Reservoir and Lake Mineral Wells to exceed 18,500 acft/yr. Therefore, special condition 5.D in CA 12-4031 is not anticipated to impact this PTP.

Contact

For information regarding this PTP or the PTPAD, contact:

Scott Blasor
Secretary
Palo Pinto County Municipal Water District No. 1
940-328-7712
scottblasor@gmail.com



No.	Common Name	Owner	Priority Date	Authorized Storage (ac-ft)	Actual Storage (ac-ft)	Authorized Use (ac-ft/yr)
1	Lake Mineral Wells	Mineral Wells	11/15/1920 3/22/1943	7,065	5,663 (1990)	1,680 840
2	Original Lake Palo Pinto	Palo Pinto MWD	7/3/1962	34,250	27,215 (2007)	18,500 ¹
3	Lake Granbury	BRA	2/13/1964	-	-	-
4A	Enlarged Lake Palo Pinto	Palo Pinto MWD	9/8/1964	9,850	0	18,500 ¹
4B	Channel Dam on Palo Pinto Creek	Palo Pinto MWD	9/8/1964	24	24	18,500 ¹
5	Lake Whitney	BRA	8/30/1982	-	-	-
6	Hilltop Reservoir	Palo Pinto MWD	N/A	1,153	-	18,500 ¹

¹ Includes combined use from Lake Mineral Wells, Lake Palo Pinto, Channel Dam on Palo Pinto Creek, and Hilltop Reservoir