

Region K Cutoff Model Surface Water Availability Modeling Discussion

Lower Colorado Regional Water Planning Group

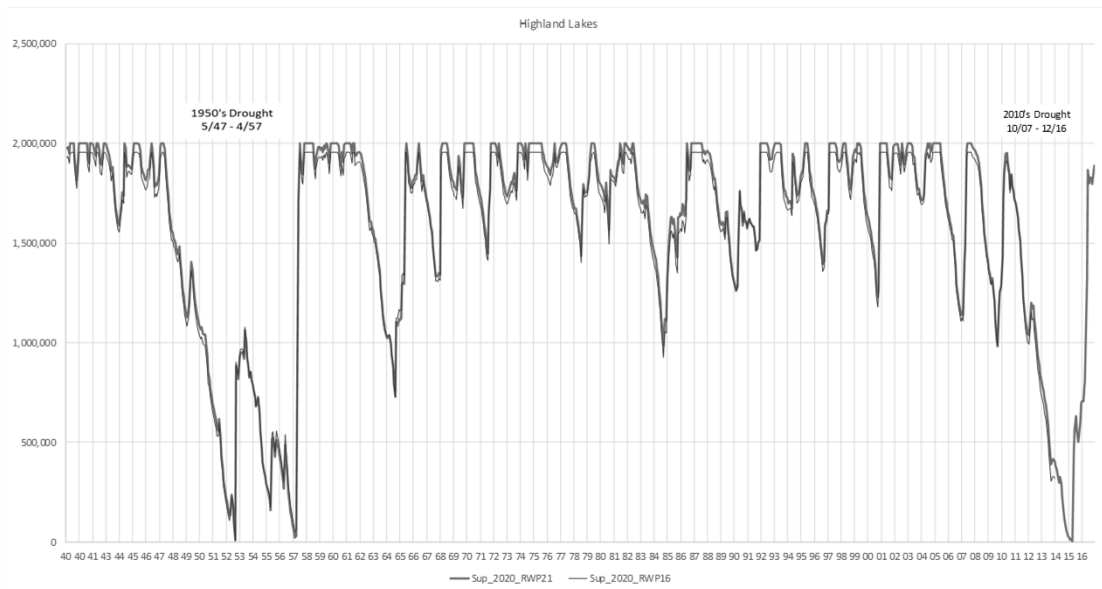
July 11, 2018

(all results based on updated eva and
multiple use type for lower basin LCRA irrigation rights)

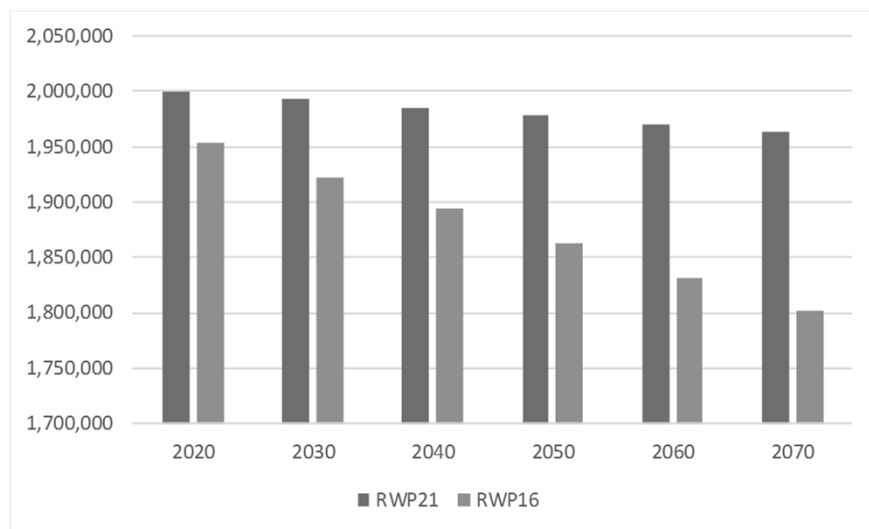
Background and effort-to-date

- WAM Hydrology (2013->2016)
- LCRA's lower basin water rights
 - Off-Channel Reservoir (Arbuckle)
 - Monthly Demand Pattern (~~irr~~ → ind irr → mul, except 100k of Garwood)
 - Gulf Coast Water Right split into 2 parts
- Reservoir Sedimentation by Decade
- Water Rights Updates
- New City of Austin's municipal water right monthly demand pattern
- Update to Travis/Buchanan Storage balancing (OR record)

WAM Hydrology



Highland Lakes Combined Storage



Components of the Highland Lakes Firm Yield Full to Full

Entity or Use	RWP 2016					
	Region K Cutoff Model Results (Ac-Ft/Yr)					
	2020	2030	2040	2050	2060	2070
Water Available for LCRA Firm Contracts and Env Commitments	296,243	290,742	285,242	279,242	272,742	266,742
LCRA Backup of STPNOC Run-of-River Water Right	32,240	32,226	32,202	32,172	32,142	32,120
LCRA Backup of City of Austin Municipal Run-of-River Water Rights	90,327	90,327	90,327	90,327	90,315	90,261
LCRA Backup to Interruptible Run-of-River Water Rights	0	0	0	0	0	0
Total Highland Lakes Firm Yield	418,810	413,295	407,772	401,742	395,198	389,124

Entity or Use	RWP 2021					
	Region K Cutoff Model Results (Ac-Ft/Yr)					
	2020	2030	2040	2050	2060	2070
Water Available for LCRA Firm Contracts and Env Commitments	274,970	274,262	273,574	272,876	272,178	271,469
LCRA Backup of STPNOC Run-of-River Water Right	19,564	19,559	19,554	19,549	19,545	19,540
LCRA Backup of City of Austin Municipal Run-of-River Water Rights	90,268	90,268	90,268	90,268	90,268	90,268
LCRA Backup to Interruptible Run-of-River Water Rights	0	0	0	0	0	0
Total Highland Lakes Firm Yield	384,802	384,089	383,397	382,693	381,991	381,277

Entity or Use	RWP 2021 -2016					
	Region K Cutoff Model Results (Ac-Ft/Yr)					
	2020	2030	2040	2050	2060	2070
Water Available for LCRA Firm Contracts and Env Commitments	-21,273	-16,480	-11,668	-6,367	-564	4,727
LCRA Backup of STPNOC Run-of-River Water Right	-12,676	-12,667	-12,648	-12,623	-12,597	-12,580
LCRA Backup of City of Austin Municipal Run-of-River Water Rights	-59	-59	-59	-59	-47	7
LCRA Backup to Interruptible Run-of-River Water Rights	0	0	0	0	0	0
Total Highland Lakes Firm Yield	-34,008	-29,206	-24,375	-19,049	-13,208	-7,847

Major Run-of-River Rights

Water Right	Water Rights Holder	Maximum Permitted Diversion (ac-ft/yr)	Priority Date	RWP 2016		RWP 2021		RWP 2021 - 2016	
				Region K Cutoff Model 2020	Region K Cutoff Model 2070	Region K Cutoff Model 2020	Region K Cutoff Model 2070	Region K Cutoff Model 2020	Region K Cutoff Model 2070
5434	LCRA - Garwood	133,000	Nov 1, 1900	120,762	120,762	121,845	121,845	1,083	1,083
	Garwood	Sub-Total		120,762	120,762	121,845	121,845	1,083	1,083
5475	LCRA - Lakeside #1 Sr	52,500	Jan 4, 1901	2,780	2,780	2,856	2,856	76	76
5475	LCRA - Lakeside #1 Jr	78,750	Nov 1, 1987	0	0	0	0	0	0
5475	LCRA - Lakeside #2	55,000	Sep 2, 1907	2,912	2,912	2,912	2,912	0	0
	Lakeside #1 and #2	Sub-Total		5,692	5,692	5,768	5,768	76	76
5476	LCRA - Gulf Coast Sr	228,570	Dec 1, 1900	13,446	13,446	56,337	56,337	42,891	42,891
5476	LCRA - Gulf Coast Jr	33,930	Nov 1, 1987	78	78	0	0	-78	-78
	Gulf Coast	Sub-Total		13,524	13,524	56,337	56,337	42,813	42,813
5477	LCRA - Pierce Ranch	55,000	Sep 1, 1907	2,912	2,912	2,912	2,912	0	0
	Pierce Ranch	Sub-Total		2,912	2,912	2,912	2,912	0	0
5471	City of Austin - (mun.) ¹	250,000	Jun 30, 1913	158,781	158,848	183,819	183,819	25,037	24,971
5471	City of Austin - (mun.) ¹		Jun 30, 1913	29,201	29,201	1,197	1,197	-28,005	-28,005
5471	City of Austin - (mun.) ¹	21,403	Jun 27, 1914	8,284	8,284	8,583	8,583	299	299
5471	City of Austin - (stm.)	24,000	Jun 27, 1914	4,970	4,970	4,084	4,084	-886	-886
5471	City of Austin - (stm.)		Jun 27, 1914	871	871	396	396	-475	-475
5489	City of Austin - (mun.) ¹	20,300	Aug 20, 1945	5,108	5,108	7,247	7,247	2,139	2,139
5489	City of Austin - (stm.)	16,156	Aug 20, 1945	0	0	0	0	0	0
5489	City of Austin - (stm.) ¹		Aug 20, 1945	5,097	5,097	5,099	5,099	2	2
5437	STP Nuclear Operating Co. ¹	102,000	Jun 10, 1974	44,397	44,397	71,030	71,030	26,633	26,633
5434	City of Corpus Christi	35,000	Nov 2, 1900	22,105	22,105	22,101	22,101	-4	-4
	Totals	1,433,200		421,705	421,772	490,418	490,417	68,712	68,646

¹ The water availability was averaged over the drought-of-record period because of LCRA backup water.

Path Forward

- Pending update to evaporation file (completed and included in results herein)
- Incorporate necessary changes to TCEQ Run 3 (new water rights) strategy model

Extra Slides

Components of the Highland Lakes Firm Yield Full to Empty

Entity or Use	RWP 2016					
	Region K Cutoff Model Results (Ac-Ft/Yr)					
	2020	2030	2040	2050	2060	2070
Water Available for LCRA Firm Contracts and Env Commitments	301,178	295,596	290,016	283,927	277,331	271,244
LCRA Backup of STPNOC Run-of-River Water Right	29,025	28,998	28,954	28,898	28,841	28,800
LCRA Backup of City of Austin Municipal Run-of-River Water Rights	77,340	77,340	77,340	77,340	77,340	77,340
LCRA Backup to Interruptible Run-of-River Water Rights	0	0	0	0	0	0
Total Highland Lakes Firm Yield	407,543	401,935	396,310	390,165	383,512	377,384

Entity or Use	RWP 2021					
	Region K Cutoff Model Results (Ac-Ft/Yr)					
	2020	2030	2040	2050	2060	2070
Water Available for LCRA Firm Contracts and Env Commitments	272,350	271,648	270,965	270,273	269,581	268,878
LCRA Backup of STPNOC Run-of-River Water Right	23,864	23,858	23,852	23,846	23,840	23,834
LCRA Backup of City of Austin Municipal Run-of-River Water Rights	103,888	103,888	103,888	103,888	103,888	103,888
LCRA Backup to Interruptible Run-of-River Water Rights	0	0	0	0	0	0
Total Highland Lakes Firm Yield	400,101	399,394	398,705	398,007	397,309	396,600

Entity or Use	RWP 2021-2016					
	Region K Cutoff Model Results (Ac-Ft/Yr)					
	2020	2030	2040	2050	2060	2070
Water Available for LCRA Firm Contracts and Env Commitments	-28,828	-23,949	-19,050	-13,655	-7,750	-2,366
LCRA Backup of STPNOC Run-of-River Water Right	-5,161	-5,140	-5,102	-5,052	-5,000	-4,966
LCRA Backup of City of Austin Municipal Run-of-River Water Rights	26,548	26,548	26,548	26,548	26,548	26,548
LCRA Backup to Interruptible Run-of-River Water Rights	0	0	0	0	0	0
Total Highland Lakes Firm Yield	-7,441	-2,541	2,396	7,841	13,797	19,216

Components of the Highland Lakes Firm Yield Effect of changing use type (new eva has no impact)

Entity or Use	RWP 2021 (IND/old eva)					
	Region K Cutoff Model Results (Ac-Ft/Yr)					
	2020	2030	2040	2050	2060	2070
Water Available for LCRA Firm Contracts and Env Commitments	283,978	283,320	282,692	281,814	281,206	280,497
LCRA Backup of STPNOC Run-of-River Water Right	20,124	20,124	20,124	20,124	20,124	20,124
LCRA Backup of City of Austin Municipal Run-of-River Water Rights	88,159	88,159	88,159	88,159	88,159	88,159
LCRA Backup to Interruptible Run-of-River Water Rights	0	0	0	0	0	0
Total Highland Lakes Firm Yield	392,262	391,603	390,976	390,098	389,490	388,781

Entity or Use	RWP 2021 (MUL/new eva)					
	Region K Cutoff Model Results (Ac-Ft/Yr)					
	2020	2030	2040	2050	2060	2070
Water Available for LCRA Firm Contracts and Env Commitments	274,970	274,262	273,574	272,876	272,178	271,469
LCRA Backup of STPNOC Run-of-River Water Right	19,564	19,559	19,554	19,549	19,545	19,540
LCRA Backup of City of Austin Municipal Run-of-River Water Rights	90,268	90,268	90,268	90,268	90,268	90,268
LCRA Backup to Interruptible Run-of-River Water Rights	0	0	0	0	0	0
Total Highland Lakes Firm Yield	384,802	384,089	383,397	382,693	381,991	381,277

Entity or Use	IND->MUL					
	Region K Cutoff Model Results (Ac-Ft/Yr)					
	2020	2030	2040	2050	2060	2070
Water Available for LCRA Firm Contracts and Env Commitments	-9,008	-9,057	-9,118	-8,938	-9,028	-9,028
LCRA Backup of STPNOC Run-of-River Water Right	-560	-565	-570	-575	-580	-585
LCRA Backup of City of Austin Municipal Run-of-River Water Rights	2,109	2,109	2,109	2,109	2,109	2,109
LCRA Backup to Interruptible Run-of-River Water Rights	0	0	0	0	0	0
Total Highland Lakes Firm Yield	-7,460	-7,514	-7,579	-7,405	-7,499	-7,504

Major Run-of-River Rights

Effect of changing use type (new eva has no impact)

Water Right	Water Rights Holder	Maximum Permitted Diversion (ac-ft/yr)	Priority Date	IND/old eva		MUL/new eva		IND->MUL	
				Region K Cutoff Model 2020	Region K Cutoff Model 2070	Region K Cutoff Model 2020	Region K Cutoff Model 2070	Region K Cutoff Model 2020	Region K Cutoff Model 2070
5434	LCRA - Garwood	133,000	Nov 1, 1900	121,615	121,615	121,845	121,845	230	230
	Garwood	Sub-Total		121,615	121,615	121,845	121,845	230	230
5475	LCRA - Lakeside #1 Sr	52,500	Jan 4, 1901	3,212	3,212	2,856	2,856	-356	-356
5475	LCRA - Lakeside #1 Jr	78,750	Nov 1, 1987	0	0	0	0	0	0
5475	LCRA - Lakeside #2	55,000	Sep 2, 1907	4,748	4,748	2,912	2,912	-1,836	-1,836
	Lakeside #1 and #2	Sub-Total		7,960	7,960	5,768	5,768	-2,192	-2,192
5476	LCRA - Gulf Coast Sr	228,570	Dec 1, 1900	42,258	42,258	56,337	56,337	14,079	14,079
5476	LCRA - Gulf Coast Jr	33,930	Nov 1, 1987	0	0	0	0	0	0
	Gulf Coast	Sub-Total		42,258	42,258	56,337	56,337	14,079	14,079
5477	LCRA - Pierce Ranch	55,000	Sep 1, 1907	2,139	2,139	2,912	2,912	773	773
	Pierce Ranch	Sub-Total		2,139	2,139	2,912	2,912	773	773
5471	City of Austin - (mun.) ¹	250,000	Jun 30, 1913	185,377	185,377	183,819	183,819	-1,559	-1,559
5471	City of Austin - (mun.) ¹		Jun 30, 1913	1,197	1,197	1,197	1,197	0	0
5471	City of Austin - (mun.) ¹	21,403	Jun 27, 1914	9,079	9,079	8,583	8,583	-496	-496
5471	City of Austin - (stm.)	24,000	Jun 27, 1914	0	0	4,084	4,084	4,084	4,084
5471	City of Austin - (stm.)		Jun 27, 1914	0	0	396	396	396	396
5489	City of Austin - (mun.) ¹	20,300	Aug 20, 1945	7,301	7,301	7,247	7,247	-54	-54
5489	City of Austin - (stm.)	16,156	Aug 20, 1945	0	0	0	0	0	0
5489	City of Austin - (stm.) ¹		Aug 20, 1945	5,262	5,261	5,099	5,099	-162	-162
5437	STP Nuclear Operating Co. ¹	102,000	Jun 10, 1974	71,287	71,287	71,030	71,030	-257	-257
5434	City of Corpus Christi	35,000	Nov 2, 1900	21,901	21,901	22,101	22,101	200	200
	Totals	1,433,200		475,376	475,376	490,418	490,417	15,041	15,041

¹ The water availability was averaged over the drought-of-record period because of LCRA backup water.