

3. CONDITIONS IN THE OWENS VALLEY

3. CONDITIONS IN THE OWENS VALLEY

Figure 11 provides a summary of Owens Valley Conditions. Winter of 2004-2005 was a very wet season. Both the snow fall on the Sierra Mountain and the rainfall on the valley floor was far above the long-term average. Based on the April 1 snow survey, the forecasted runoff for 2005-2006 runoff year is 527,200 acre-feet or approximately 128% of normal. Similarly, precipitation of the valley floor throughout the valley has been well above normal with an average of 10.3 inches compared to the long term average of 5.9 inches. Overall vegetation cover in the Owens Valley is comparable to the mid-1980's baseline conditions.

3.1 Well On/Off Status

The Water Agreement has provisions to ensure wells linked to specified monitoring sites without sufficiently available soil moisture to meet the needs of vegetation within those monitoring sites are turned off. LADWP may turn on the wells linked to a monitoring site once the soil water in the area of the monitoring site has recovered to the level where it can meet the estimated water needs of the vegetation as of the time that the wells were turned off. Table 9 provides a listing of April 2005 Owens Valley well ON/OFF status, the monitoring wells associated with each monitoring site, and the groundwater wells linked to each monitoring site.

Certain wells are exempt from the ON/OFF provisions of the Water Agreement usually because the well is in an area that can not cause an adverse impact to the surrounding vegetation or because the well is a required source of water. Table 10 is a list of the Owens Valley wells that are exempt from the ON/OFF provisions of the Water Agreement.

3.2 Wellfield Hydrographs

LADWP hydrographers monitor groundwater levels in over 700 monitoring wells throughout the Owens Valley. Groundwater levels are considered when evaluating the overall condition of the groundwater basin and calibrating groundwater models. Hydrographs are used to observe the changes in groundwater levels over time. Figure 12 illustrates the hydrographs of key Owens Valley wellfield monitoring wells. As shown in Figure 12, groundwater levels are generally high throughout the valley considering that the runoff during the previous five years was below normal. With the forecasted high runoff for the 2005-06 and water spreading activities, water levels are expected to rise throughout Owens Valley.

3.3 Precipitation Record and Runoff Forecast

Owens Valley-floor precipitation during the 2004-2005 runoff year ranged from 6.7 inches in the Lone Pine to 12.6 inches at Tinemaha Reservoir (Table 11). The valley floor receives 5.9 inches per year on the average.

The forecasted Owens Valley runoff for 2005-06 runoff year is 527,200 acre-feet or 128% of normal valley-wide (Table 1). Figure 13 shows how the predicted runoff for the 2005-2006 year compares to past years.

FIGURE 11

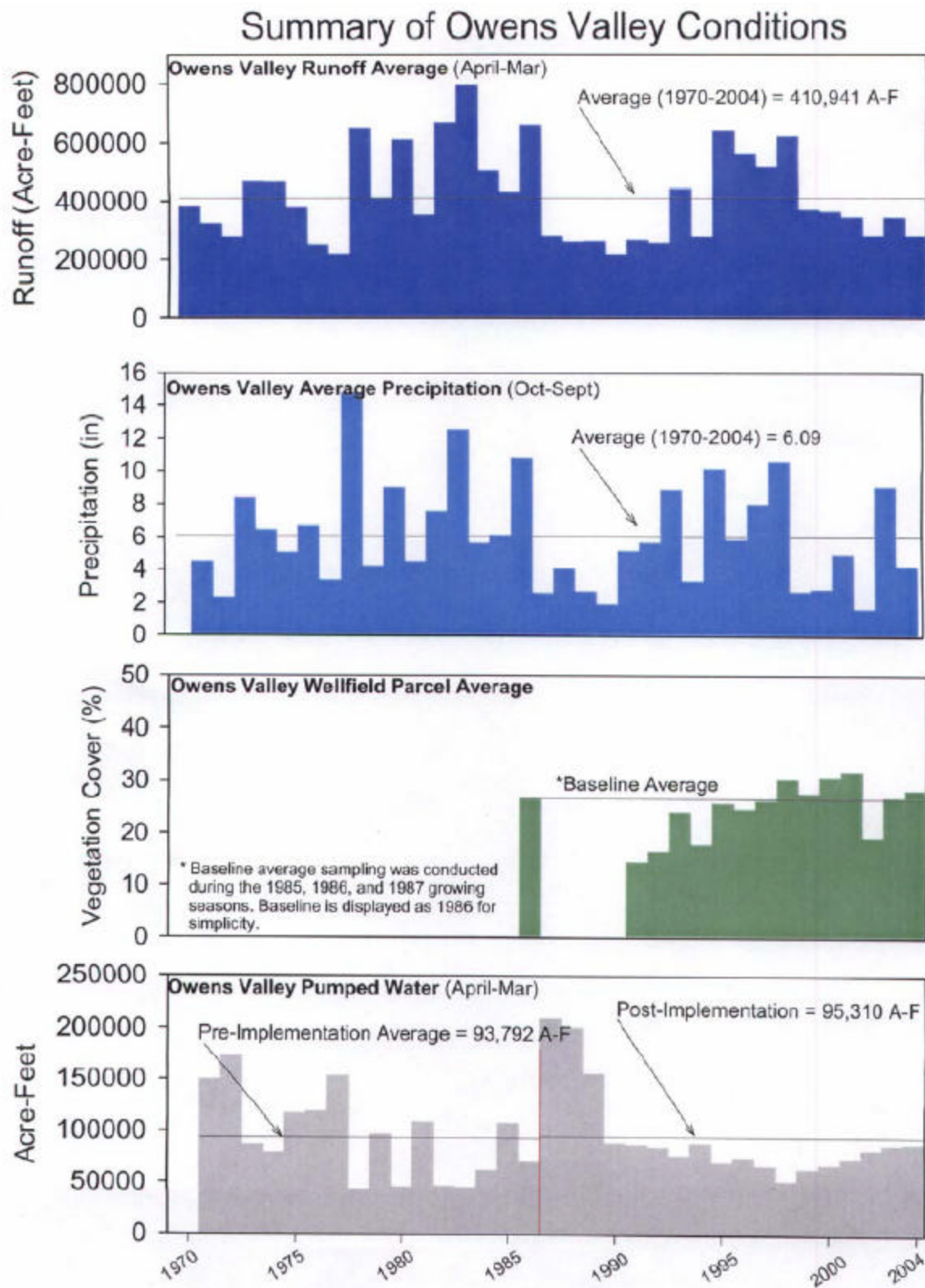


Table 9 - Pumping Well Status (ON/OFF) as of April 2005

Wellfield	Mon. Site	Monitoring Well	Pumping Wells	E/M Wells	ON/OFF Status
Laws	L1	795T	247, 248, 249, 398		ON
	L2	USGS 1	239, 243, 244		ON
	L3		240, 241, 242	376, 377	OFF
	L4a, L4b			385, 386	
	L5		245	387, 388	
	Exempt		236, 354, 365, 413		na
Bishop	All wells		140, 411, 410, 371		na
			406, 407, 408, 412		na
Big Pine	BP1	798T	210, 352	378, 379, 389	OFF
	BP2	799T	220, 229, 374	375	OFF
	BP3	567T	222, 223, 231, 232		ON
	BP4	800T	331		ON
	Exempt		218, 219, 330, 332, 341, 352, 415		na
Taboose-Aberdeen	TA3	505T	106, 110, 111, 114		OFF
	TA4	586T	342, 347		OFF
	TA5	801T	349		ON
	TA6	803T	109, 370		OFF
	Exempt		118		na
Thibaut-Sawmill	TS1	807T	159		OFF
	TS2	T806	155		OFF
	TS3	454T	103, 104	382	ON
	TS4	804T		380, 381	OFF
	Exempt		351, 356		na
Indep.-Oak	IO1	809T	77, 391		OFF
	IO2	548T	63		ON
	Exempt		59, 60, 61, 65, 401, 357, 384*	383, 384	na
Symmes-Shepherd	SS1	USGS 9G	69, 392, 393		ON
	SS2	646T	74, 394, 395		OFF
	SS3	561T	92, 396		OFF
	SS4	811T	75, 345		ON
	Exempt			402	na
Bairs-Georges	BG2	812T	76, 343*, 348, 403		ON
	Exempt		343*		na
Lone Pine	Exempt		344, 346	390	
	Other		416		na

*dual use

Table 10 - List of Exempt Wells in the Owens Valley

LADWP Wells not subject to the turn-off provisions of the Agreement

WELL NUMBER	WELL FIELD	DURATION	REASON
354p	Laws	Annual	Sole Source-Town Supply
413b	Laws	Annual	Town Supply and Laws Museum E/M Project Irrigation Well
341p	Big Pine	Annual	Sole Source-Town Supply
352b	Big Pine	Annual	Sole Source-Town Supply
415b	Big Pine	Annual	Sole Source-Town Supply
357p	Independence-Oak	Annual	Sole Source-Town Supply
384b	Independence-Oak	Annual	Sole Source-Town Supply
344p	Lone Pine	Annual	Sole Source-Town Supply
346b	Lone Pine	Annual	Sole Source-Town Supply
330	Big Pine	Annual	Sole Source-Fish Hatcheries
332	Big Pine	Annual	Sole Source-Fish Hatcheries
351	Thibaut-Sawmill	Annual	Sole Source-Fish Hatcheries
356	Thibaut-Sawmill	Annual	Sole Source-Fish Hatcheries
218	Big Pine	Annual	No Impact on Areas With Groundwater Dependent Vegetation
219	Big Pine	Annual	"
118	Taboose-Aberdeen	Annual	"
401	Independence-Oak	Annual	"
59	Independence-Oak	Annual	"
60	Independence-Oak	Annual	"
65	Independence-Oak	Annual	"
383E/M	Independence-Oak	Annual	"
384E/M	Independence-Oak	Annual	"
61	Independence-Oak	Irrigation Season	Sole Source-Irrigation Water
365	Laws	Annual	Sole Source-Irrigation Water and No Impact on Areas With Groundwater Dependent Vegetation.
402E/M	Symmies-Shepherd	Irrigation Season	"
390E/M	Lone Pine	Irrigation Season	"
343	Bairs-Georges	Irrigation Season in Below Average Runoff Years	Sole Source-Irrigation Water in Below Average Runoff Years

p:primary town supply well

b: backup town supply well

FIGURE 12a

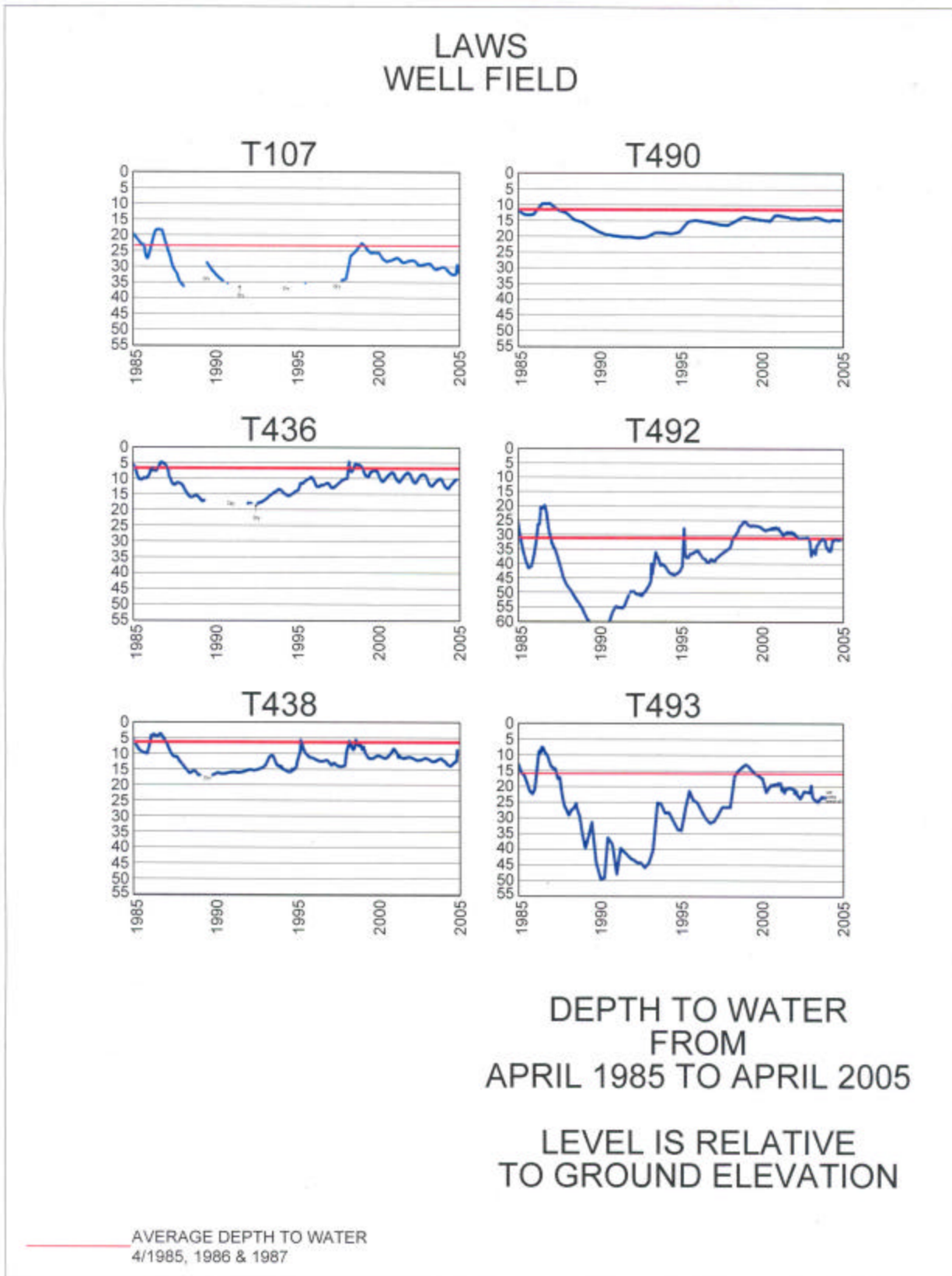


FIGURE 12b

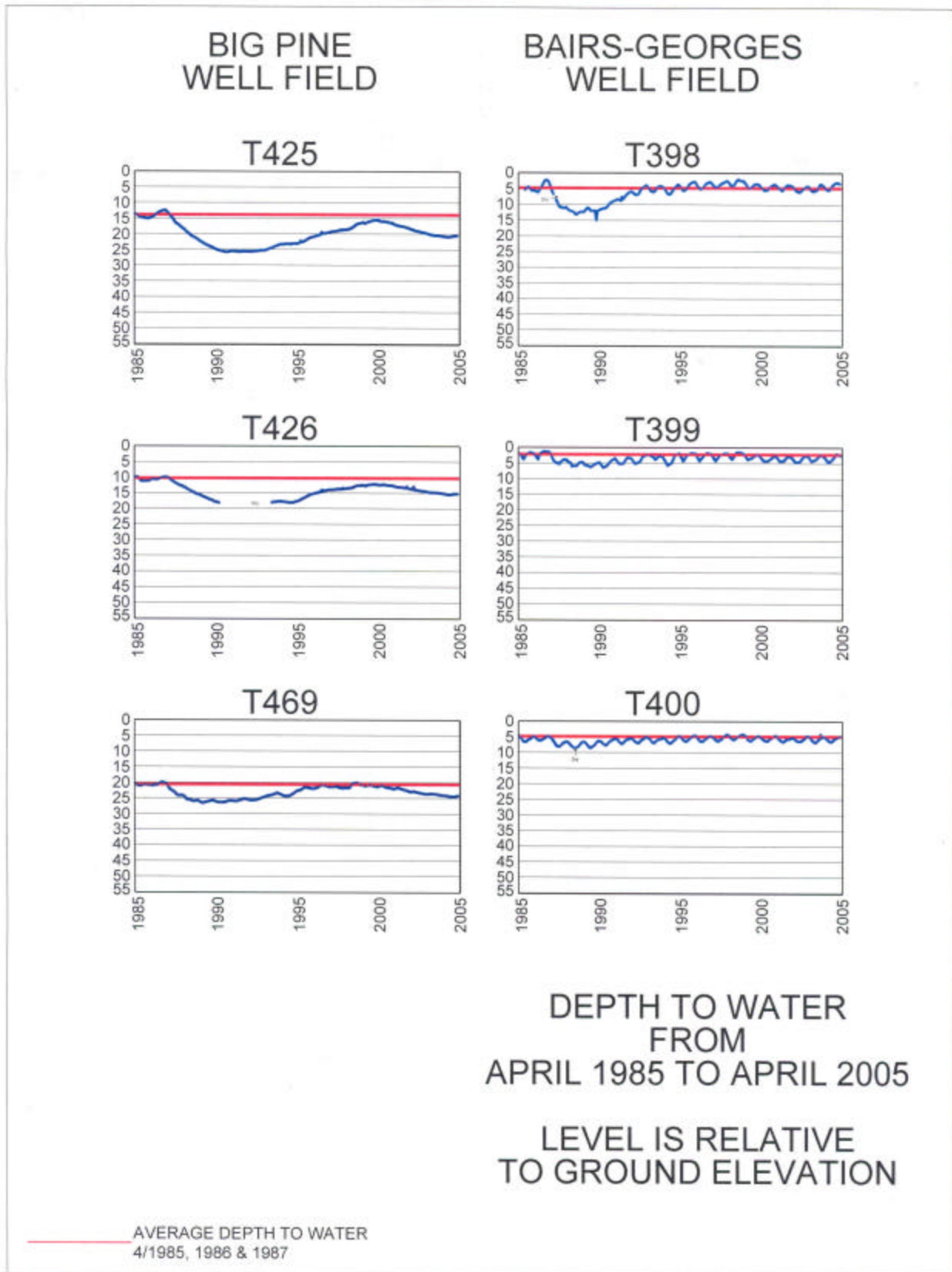


FIGURE 12c

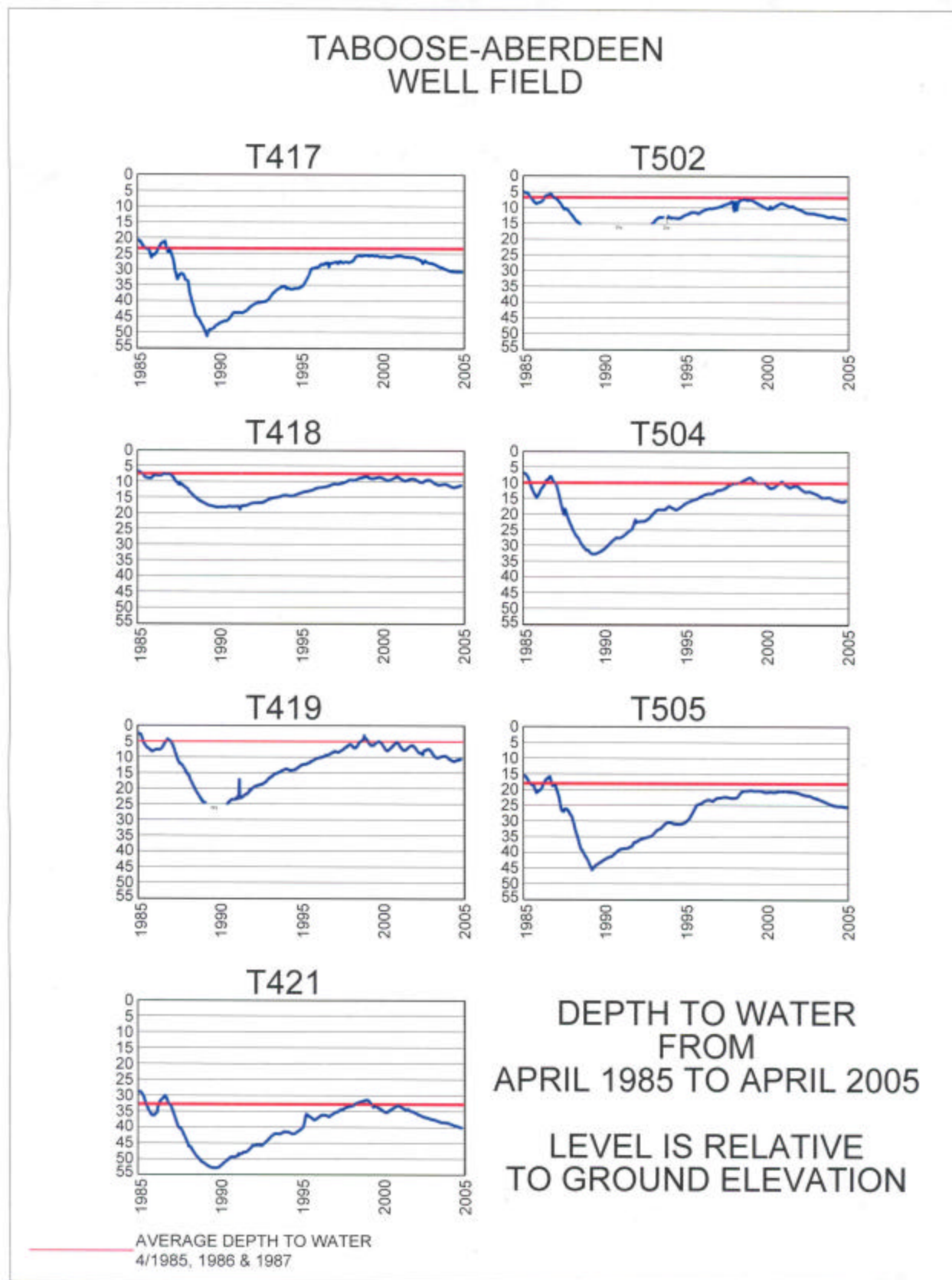


FIGURE 12d

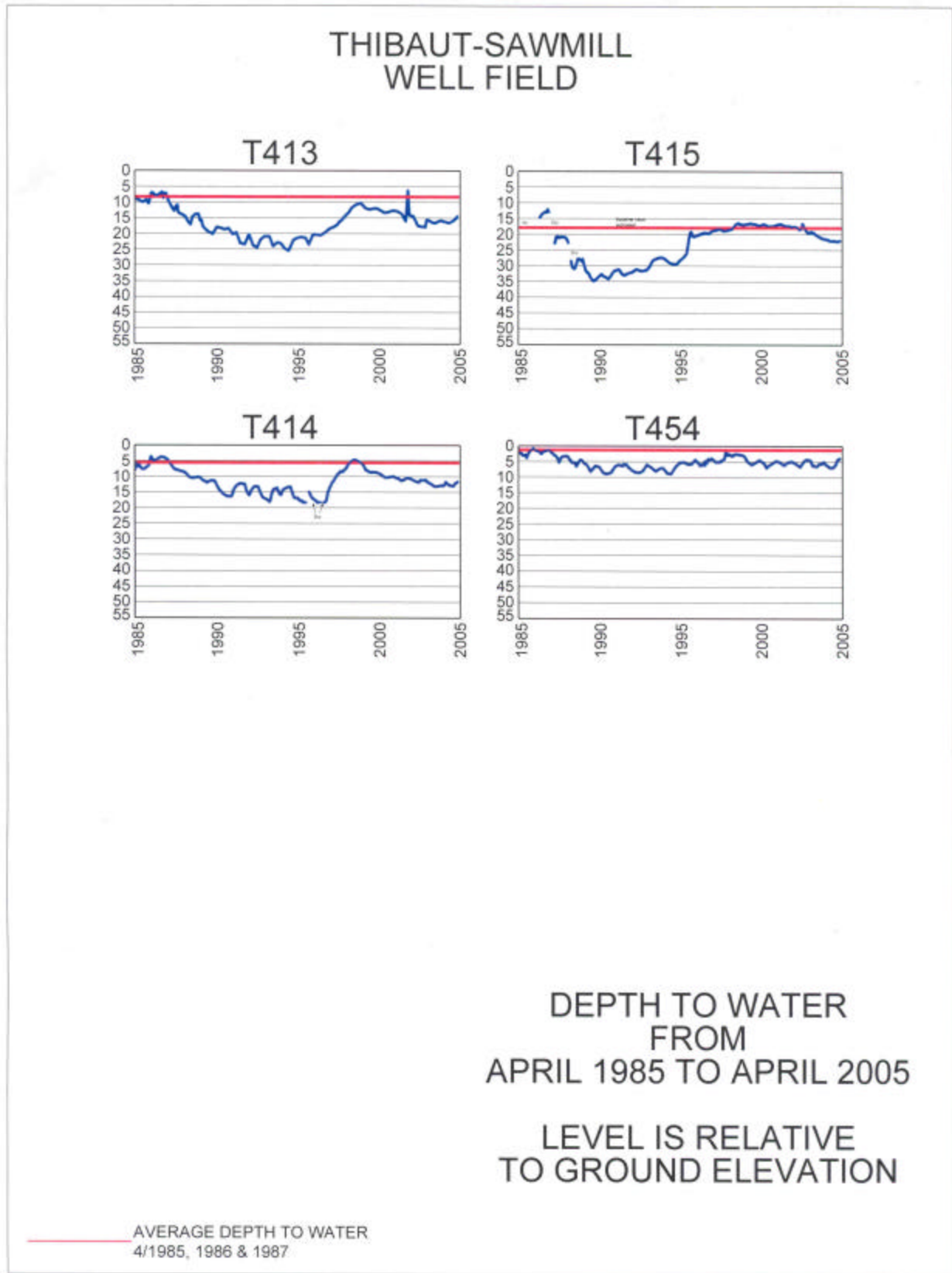


FIGURE 12e

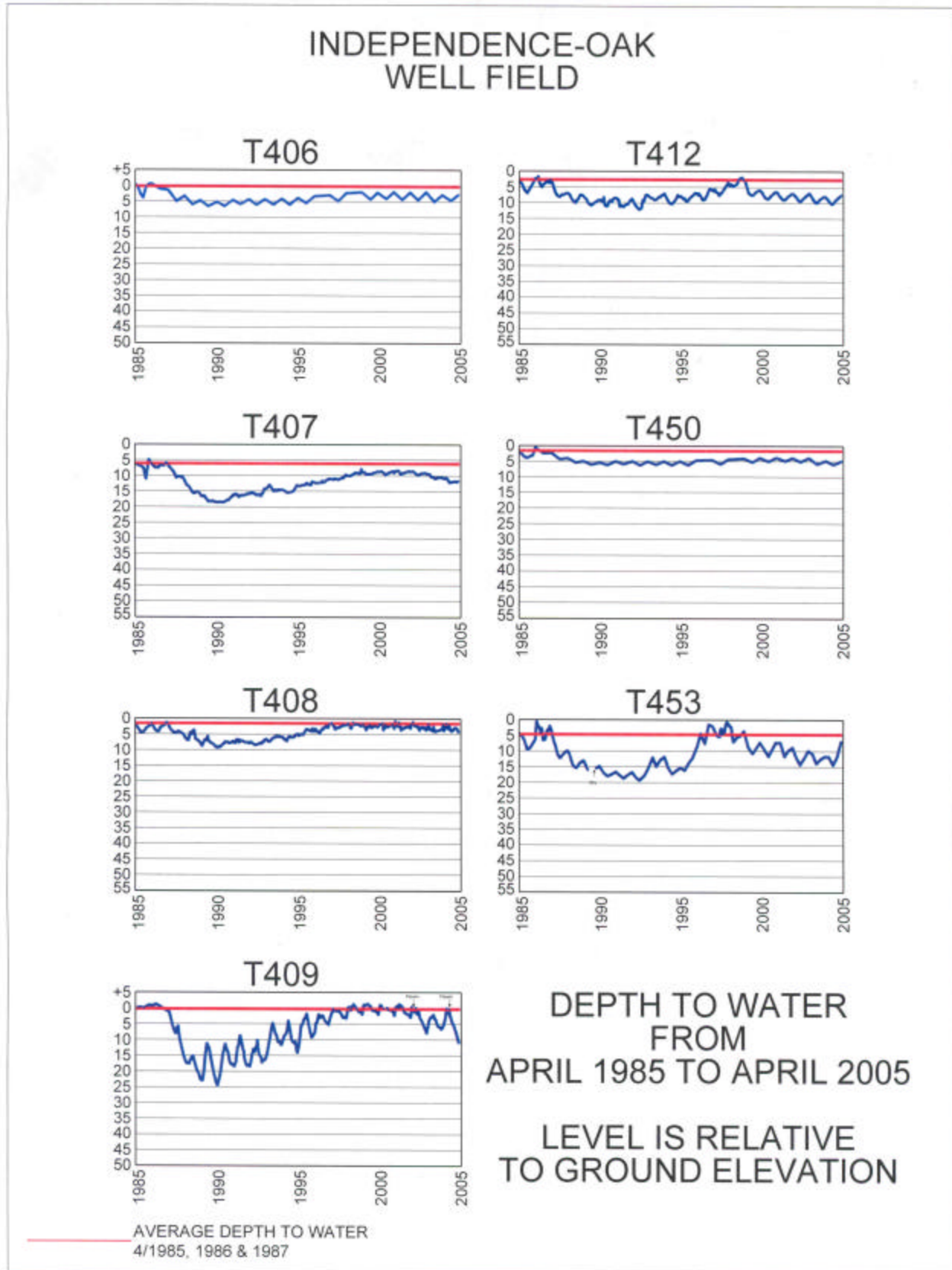


FIGURE 12f

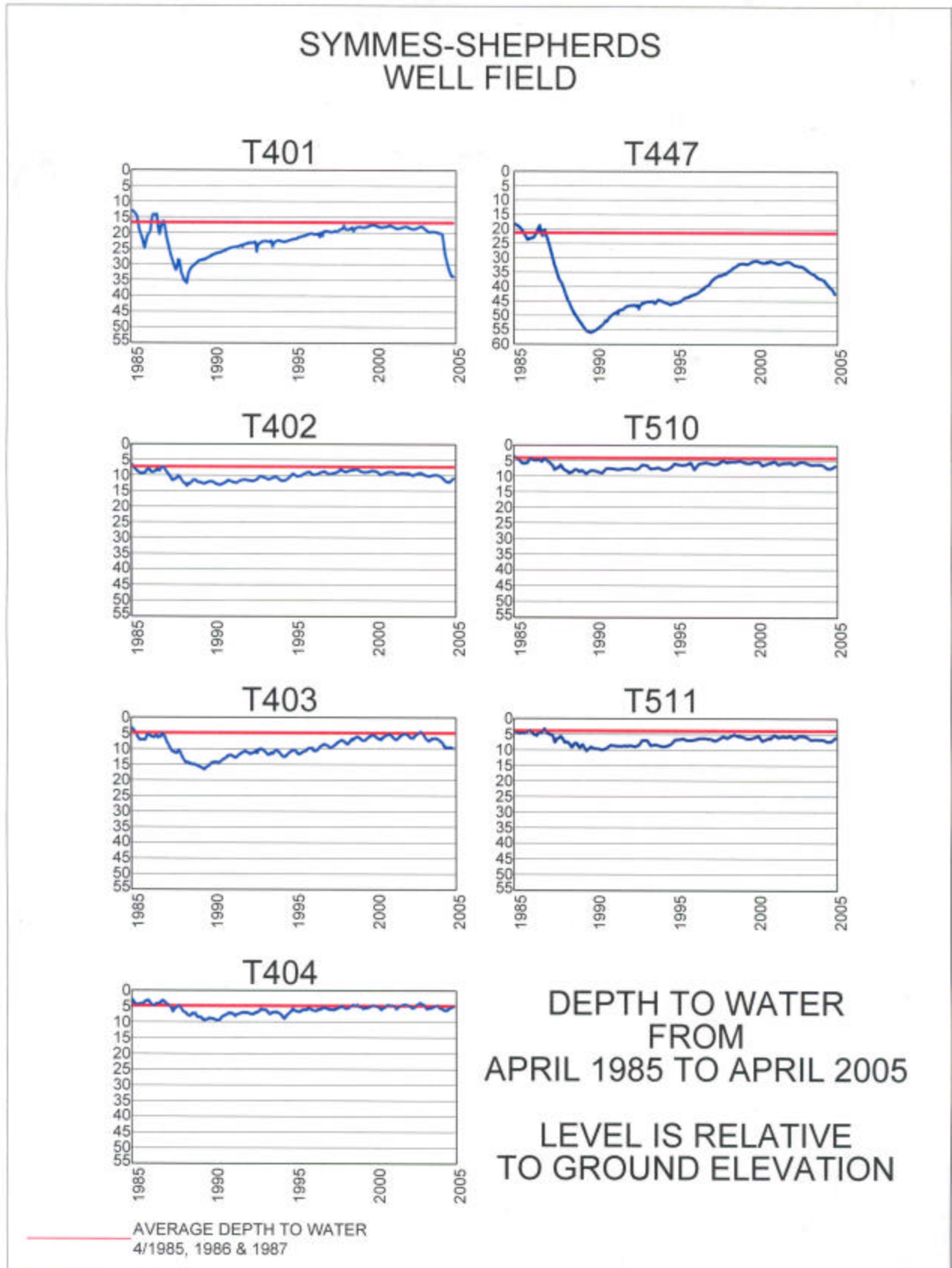
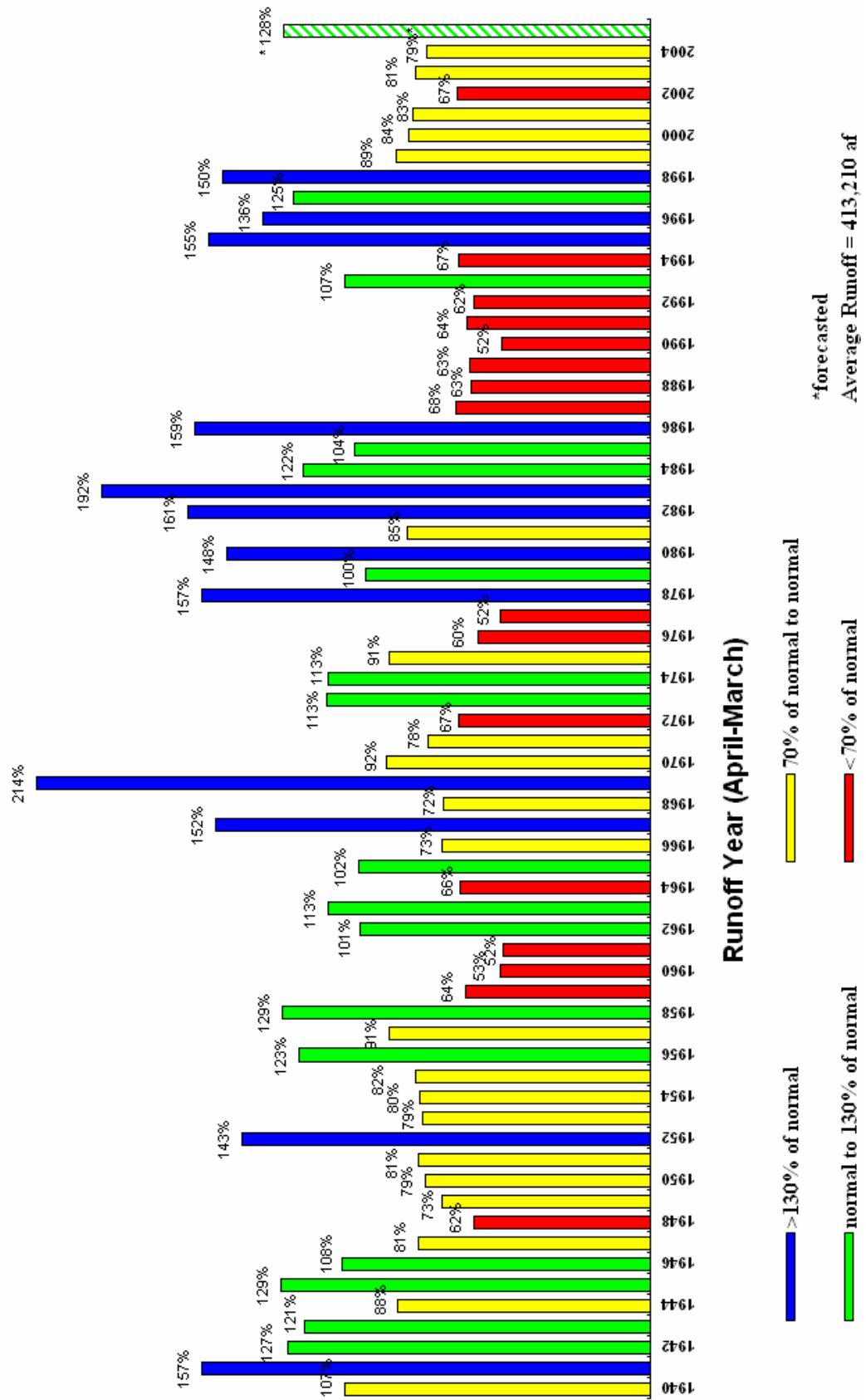


Table 11 - Owens Valley Precipitation during Runoff Year 2004-05

Month	Bishop	Big Pine	Tinemaha Reservoir	LAA Intake	Independ.	Alabama Gates	Lone Pine	Cotton- wood	S. Haiwee
April, 2004	0.02	0.14	0.14	0.08	0.13	0.12	0.11	0.15	0.14
May	0.10	0.00	0.00	0.04	0.01	0.01	0.00	0.05	0.00
June	0.08	0.09	0.03	0.01	0.01	0.02	0.01	0.00	0.00
July	0.00	0.00	0.10	0.01	0.05	0.00	0.00	0.04	0.00
August	0.05	0.11	0.02	0.00	0.11	0.95	0.00	0.20	0.34
September	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
October	1.24	0.84	0.82	0.60	0.51	0.14	0.18	1.07	1.25
November	1.30	1.44	1.29	1.10	1.25	1.31	1.00	1.00	0.35
December	1.84	1.82	1.68	1.48	1.94	1.63	1.98	2.57	2.80
January, 2005	4.81	4.18	5.22	2.96	2.69	1.40	1.58	5.25	3.94
February	1.39	1.38	2.09	1.62	1.80	1.37	1.67	2.28	4.49
March	1.41	0.00	1.16	0.51	0.33	0.20	0.20	0.66	0.38
TOTAL	12.2	10.0	12.6	8.4	8.8	7.2	6.7	13.3	13.7

Figure 13- Owens Valley Runoff - Percent of



3.4 Owens Valley Water Supply and Use

Table 12 provides an overview of Owens Valley water supply in the Owens Valley, in-valley uses, and LAA export for the 2004-05 runoff year as compared to the average pre-Water Agreement and estimated Water Agreement supply uses. The in-valley uses are consistent with the estimated values however this is because unanticipated diversions to Owens Lake have offset delays in bringing the LORP project online. The Owens Valley water supply and the LAA flow is reflective of the recent dry years, conservative pumping, reduction in diversions from Mono Basin, and releases to Owens Lake. This information is shown on a year-by-year basis in Figures 14 and 15.

Table 13 shows different components of water use in the Owens Valley from 1985-86 to the present and also the planned water use for the 2005-06 runoff year. One component of water use, Enhancement/Mitigation water supply, is the water supply to specific project as specified in the Water Agreement and Memorandum and Understanding. Table 14 lists a breakdown water supply to each of the E/M projects during 2004-05 runoff year.

3.5 Vegetation Conditions

With reference to LADWP's groundwater pumping operations, vegetation conditions within the Owens Valley are monitored using vegetation transects along with other methods. Vegetation transects are conducted per the Green Book, the technical appendix to the Water Agreement. The Green Book describes the methods and purposes of vegetation transects. As stated in the Green Book: "Vegetation transects are included within the Green Book to serve two purposes: 1) to estimate transpiration from a monitoring site, and 2) for use in determining whether vegetation has decreased or changed significantly from the previous cover." Reference points for the comparison of vegetation changes in order to determine significance include the 1984-87 vegetation inventory data.

The Green Book requires the 1984-1987 vegetation inventory to be used as a baseline when determining whether vegetation cover and/or species composition has changed. The 1984-1987 inventory transects were chosen using aerial photos to aid in determining transect locations. Transects were located visually by choosing lines that appeared to cover the representative units of vegetation within the parcel being measured. Transects were generally run toward the center of the parcels in order to avoid transitional areas at parcel edges. A minimum of five transects were run on each parcel. If the vegetation cover was particularly heterogeneous, a qualitative method was employed in selecting additional transects. The transect data were checked visually and additional transects were run to lessen the degree of variability as necessary.

The Green Book advises that future transects should be performed in a similar manner as the initial inventory to determine whether vegetation has changed, but allows the technique to be modified to permit statistical comparison by randomly selected transects. In any case, the Green

Book requires statistical analysis to be used to determine the statistical significance of vegetation changes from the 1984-87 inventory maps.

Figure 16 is a series of graphs documenting Owens Valley vegetation conditions based upon vegetation transect data gathered by the ICWD. Using the attached graphs it is possible to distinguish the trend that vegetation cover has increased valley-wide since the early 1990's. It is probably not reasonable to make year to year comparisons in vegetation cover based upon the random vegetation measurement methodologies currently employed.

3.6 Reinhackle Spring Monitoring

As required by the '91 EIR, Owens Valley groundwater pumping is managed to avoid reductions in spring flows that would cause significant decreases or changes in spring associated vegetation. Additionally, groundwater pumping from wells that affect flow from Reinhackle Spring are managed so that flows from the spring are not significantly reduced compared to flows under prevailing natural conditions. Table 15 shows daily flow values for Reinhackle Spring. For the 2004-2005 runoff year Reinhackle Spring had a high daily flow rate of about 2.8 cfs, a low daily flow rate of about 1.2 cfs, and average daily flow of about 2.2 cfs. A geochemistry study that included Reinhackle Spring was initiated in February 2003 and completed in December 2004. The study was conducted cooperatively by LADWP, MWH and ICWD. Three shallow testholes and one deep testhole were installed to aid in study implementation. This study analyzed water samples from Reinhackle Spring in comparison to water samples from the aqueduct, pumping wells, deep wells and shallow wells. This study concluded that the water flowing from Reinhackle Spring is similar in origin to the aqueduct and dissimilar to the deep aquifer samples and up-gradient shallow aquifer wells.

3.7 Bishop Cone Audit

LADWP's groundwater pumping on the Bishop Cone is governed by the provisions of the Stipulation and Order filed on the 26th day of August, 1940, in Inyo County Superior Court in the case of Hillside Water Company, a corporation, et al. vs. The City of Los Angeles, a Municipal Corporation, et al., ("Hillside Decree") as well as the Water Agreement. Annual groundwater extractions from the Bishop Cone are limited to an amount not greater than the total amount of water used on Los Angeles-owned lands on the Bishop Cone during that year. Annual groundwater extractions by LADWP are limited to the total of all groundwater pumped by LADWP on the Bishop Cone, plus the amount of artesian water that flowed out of the casing of uncapped wells on the Bishop Cone during the year. Water used on Los Angeles-owned lands on the Bishop Cone, shall be the quantity of water supplied to such lands, including conveyance losses, less any return flow to the aqueduct system. An annual audit of LADWP water uses and groundwater extractions by LADWP on the Bishop Cone is performed by the ICWD. Appendix A is a copy of the most recent audit dated July 2004.

TABLE 12
Owens Valley Water Supply and Uses
(Amounts in Thousands of Acre-Feet/Year)

	Pre- Project	Projected per MOU/ Agreement	Actual 2004-05
<u>Owens Valley Water Supply</u>			
Runoff	310 ⁽¹⁾	310	316 (est)
Flowing Wells	44	15	10(est)
Pumped Groundwater	10	110 ⁽²⁾	86
Total	364	435	412
<u>City Water Used in O.V.</u>			
Irrigated Lands ⁽³⁾	62	46	50
Stockwater, Wildlife, and Rec. Uses ⁽⁴⁾	20	23	19
Post 1985 E/M Projects (except Lower Owens River Rewatering E/M Project)	0	12	9
Lower Owens River	0	40 ⁽⁵⁾	9
Additional Mitigation (1600 af from MOU)	0	2	0
Owens Lake	0	0	29
Total	82	123	116
<u>Other O.V. Uses and Losses</u> ⁽⁶⁾	134	122	146
<u>Components of Aqueduct Export</u>			
Owens Valley Contribution	103	210	85
Long Valley Contribution	149	149	152
Mono Basin Contribution ⁽⁷⁾	95	30	16
Total	347	389	253

1. Average runoff for period 1935 to 1988 (Runoff Year)
2. Assumed based on 1991 O.V. Groundwater Pumping EIR
3. Does not include areas receiving water supplies non-tributary to the Owens River/Aqueduct (approx. 7,000 AFY).
4. Includes projects such as the Billy and Twin Lakes, Farmers and Lone Pine Ponds implemented after 1970 and before 1985 when E/M projects commenced.
5. Assumes: 6,500 AF year-round flow to delta, 4,000 AF to habitat flows, 3,000 AF to Blackrock, 26,500 AF for other losses.
6. Includes uses on private lands, conveyance losses, recharge, and evaporation.
7. 1993 Court decision allows approximately 30,000 AFY when lake reaches elevation 6392. Prior to Court decision Mono Basin export averaged 95,000/yr.

Figure 14

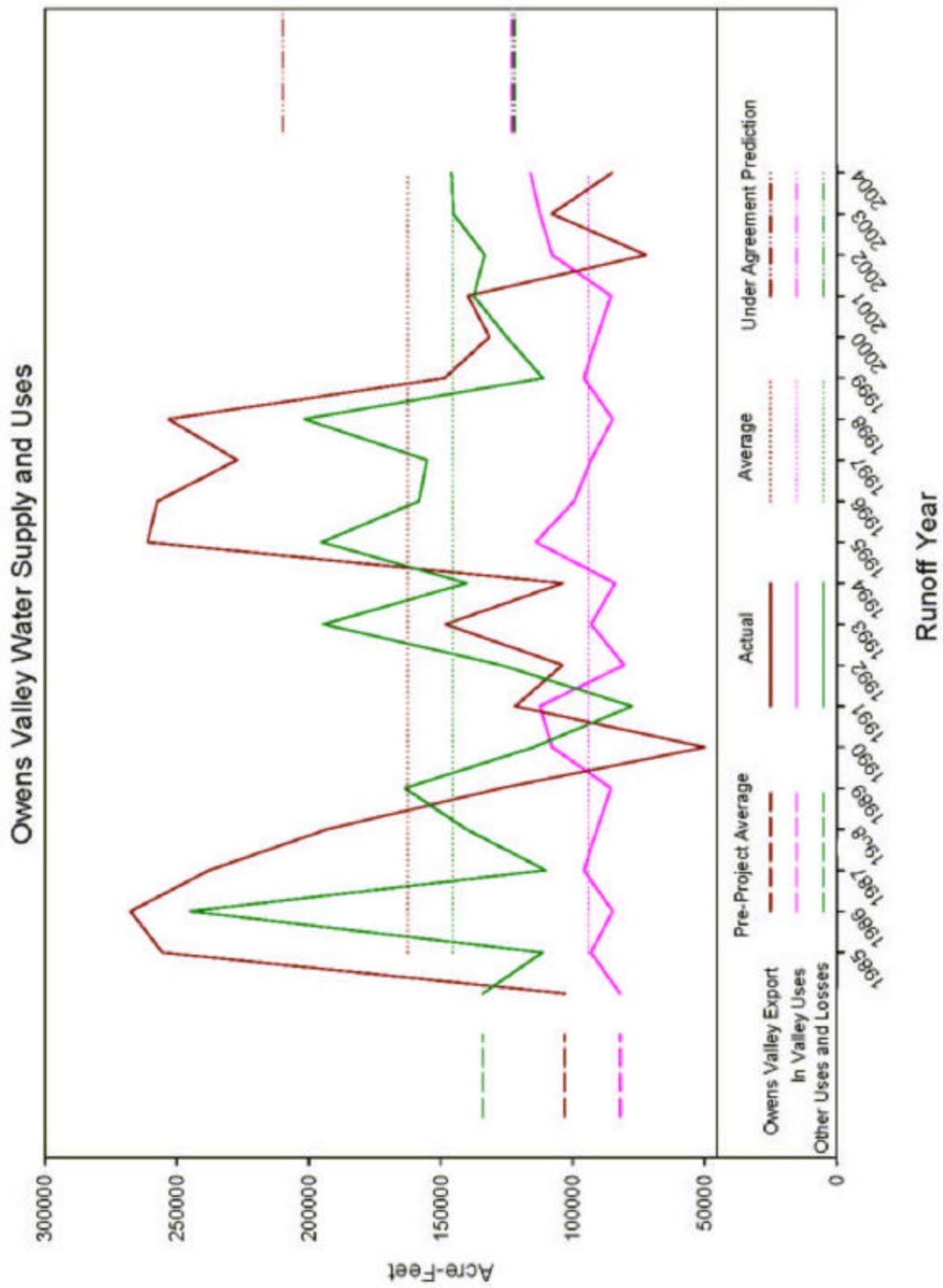


Figure 15

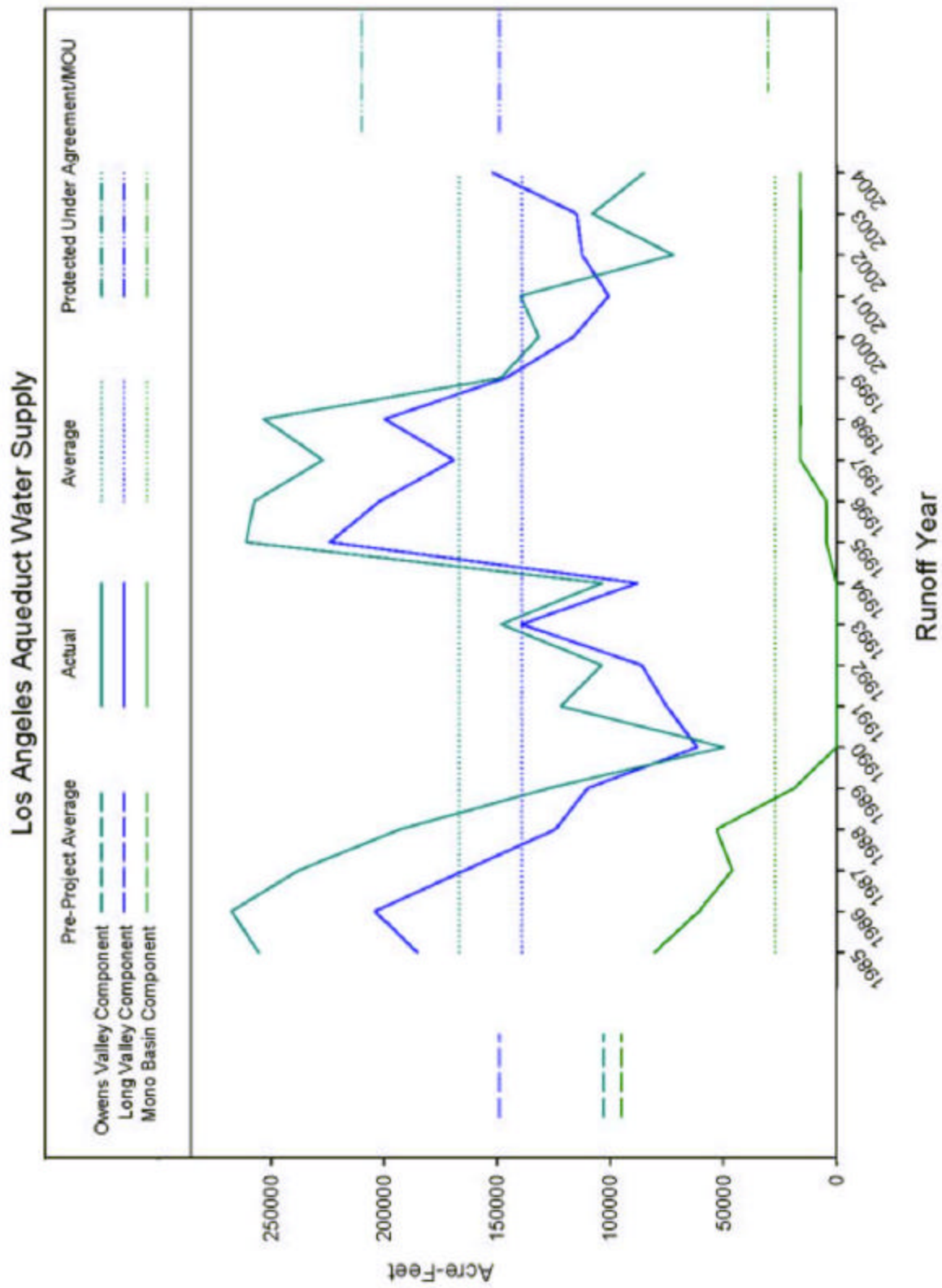


Table 13 - Owens Valley Water Uses for 1985-05 and Planned 2005-06 Runoff Year
(ACRE-FEET)

RUNOFF YEAR	%NORM. RUNOFF	OV PUMPING (1000 AF)	IRRIG.	STOCK- WATER	OPS	E/M	GRNDWTR RECHG	LAW'S SPREADING	REC. & WILDLIFE	INDIAN	IN-VALLEY USES	ALL USES
1985-86	104	108	47,390	15,394	13,712	109	8,890	4,068	13,396	5,568	76,289	104,459
1986-87	159	70	47,884	15,125	72,387	12,696	87,680	20,429	11,200	4,966	86,905	251,938
1987-88	68	209	48,679	15,443	7,499	29,360	0	0	6,420	4,621	99,902	112,022
1988-89	63	200	46,463	14,381	6,705	30,958	0	0	8,429	6,209	100,231	113,145
1989-90	63	156	48,232	13,922	8,935	23,330	0	0	8,669	6,119	94,153	109,207
1990-91	52	89	46,424	14,360	5,312	17,899	0	0	9,983	5,903	88,666	99,881
1991-92	64	88	42,112	14,662	9,923	18,552	0	0	9,143	6,775	84,469	101,167
1992-93	62	85	37,131	17,285	12,182	18,357	0	0	7,725	6,214	80,498	98,894
1993-94	107	76	47,798	17,218	12,432	19,310	25,152	10,640	8,676	6,612	93,002	137,198
1994-95	67	89	37,784	17,178	12,143	20,812	0	0	8,116	6,392	83,890	102,425
1995-96	155	70	57,489	20,971	13,335	22,914	51,274	21,083	12,479	6,471	113,853	184,933
1996-97	136	75	46,267	19,724	21,050	23,949	4,606	0	9,439	7,058	99,379	132,093
1997-98	125	67	47,013	16,395	13,991	21,608	8,219	4,104	8,022	6,957	93,038	122,205
1998-99	150	52	45,445	13,654	23,016	19,672	56,047	31,027	8,691	5,854	87,462	172,379
1999-00	89	64	49,308	14,446	11,226	24,452	0	0	7,470	5,208	95,676	112,110
2000-01	84	68	49,327	13,442	12,517	20,782	790	790	7,263	6,760	90,814	110,881
2001-02	83	73	43,329	12,758	13,097	21,815	230	230	7,504	5,870	85,406	104,603
2002-03	67	82	43,759	12,318	8,530	21,394	0	0	7,380	5,759	84,851	99,140
2003-04	82	88	45,995	11,569	8,773	21,116	0	0	6,874	6,270	85,554	100,597
2004-05	78	86	50,300	11,500	9,600	18,700	400	300	6,900	5,800	87,400	103,200
2005-06	128	95	47,940	11,220	10,000	18,680	8,000	5,000	6,800	6,000	84,640	108,640
AVG.	95	95	46,479	14,903	14,589	20,308	11,966	4,651	8,599	6,066	90,289	122,910

NOTES: PUMPING 1987 TO PRESENT INCLUDES E/M PUMPING

IN-VALLEY USES ARE THE SUM OF IRRIGATION, STOCKWATER, E/M, AND RECREATION & WILDLIFE

GROUNDWATER RECHARGE INCLUDES LAWS SPREADING

VALUES FOR 2005-06 ARE FORECASTED OR PLANNED VALUES

**Table 14. Water Supplied to Enhancement/Mitigation Projects
During 2004-2005 Runoff Year**

Project	Water Supplied (acre-feet)
McNally Canals Conveyance Losses	290
McNally/Laws/Poleta Native Pasture Lands	1,682
McNally Ponds	0
Laws Historical Museum	32
Klondike Lake	1,278
Lower Owens River	8,910
Independence Pasture Lands	2,489
Independence Springfield	280
Independence Ditch System	451
Independence Woodlot	276
Shepherd Creek Alfalfa Lands	1,072
Lone Pine Park/Richards Field	916
Lone Pine Woodlot	76
Lone Pine Van Norman Field	337
Lone Pine Regreening	238
Total E/M Uses	18,327

FIGURE 16

Owens Valley Vegetation Conditions
Well Field/Management Area and
Valley Wide Averages

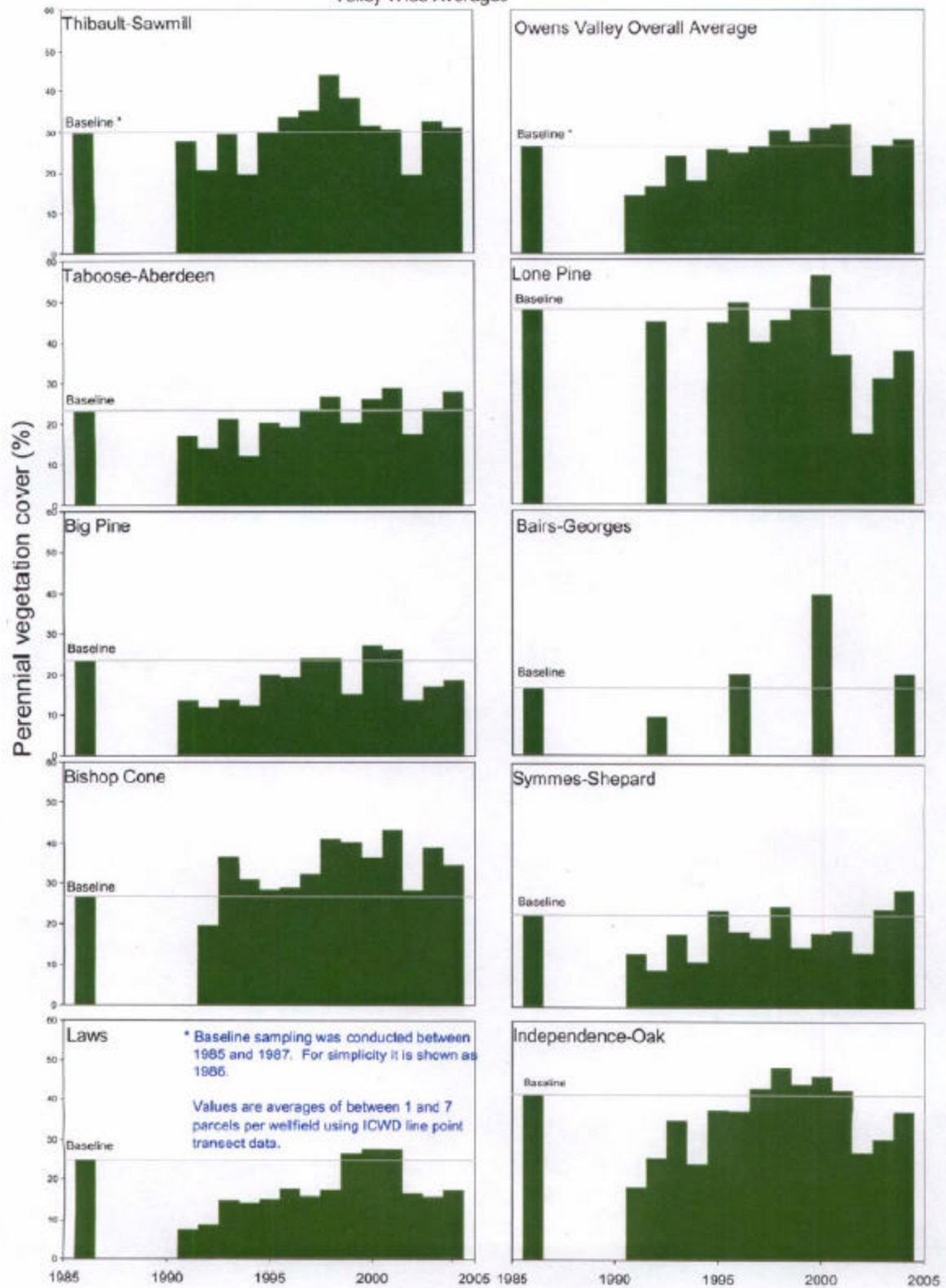


Table 15 - Reinhackle Spring Flow during 2004-05 Runoff Year

day/mo	Apr-04	May-04	Jun-04	Jul-04	Aug-04	Sep-04	Oct-04	Nov-04	Dec-04	Jan-05	Feb-05	Mar-05	Annual
1	2.18	2.18	2.06	2.37	2.63	2.62	2.58	2.53	2.37	2.05	1.87	1.79	
2	2.22	2.18	2.05	2.4	2.67	2.56	2.58	2.53	2.32	2.03	1.86	1.75	
3	2.22	2.2	2.07	2.43	2.69	2.58	2.58	2.5	2.27	1.95	1.84	1.66	
4	2.22	2.2	2.07	2.43	2.63	2.58	2.58	2.48	2.26	1.88	1.84	1.66	
5	2.22	2.22	2.07	2.48	2.62	2.58	2.58	2.48	2.22	1.88	1.84	1.66	
6	2.22	2.22	2.05	2.53	2.63	2.58	2.58	2.48	2.22	1.88	1.84	1.66	
7	2.22	2.24	2.07	2.49	2.63	2.58	2.58	2.47	2.22	1.88	1.84	1.66	
8	2.18	2.25	2.07	2.48	2.63	2.58	2.56	2.48	2.19	1.88	1.84	1.64	
9	2.12	2.25	2.08	2.48	2.63	2.58	2.56	2.46	2.17	1.87	1.87	1.65	
10	2.14	2.24	2.12	2.49	2.63	2.58	2.55	2.43	2.17	1.84	1.87	1.63	
11	2.16	2.23	2.12	2.5	2.66	2.58	2.58	2.43	2.17	1.84	1.84	1.61	
12	2.17	2.23	2.12	2.5	2.67	2.61	2.57	2.43	2.16	1.84	1.8	1.61	
13	2.17	2.22	2.14	2.5	2.69	2.63	2.58	2.43	2.13	1.84	1.79	1.61	
14	2.17	2.22	2.17	2.51	2.69	2.63	2.58	2.43	2.12	1.84	1.79	1.61	
15	2.17	2.22	2.17	2.52	2.69	2.64	2.57	2.43	2.12	1.86	1.79	1.65	
16	2.19	2.18	2.18	2.53	2.69	2.67	2.57	2.43	2.12	1.88	1.81	1.63	
17	2.22	2.18	2.17	2.53	2.69	2.67	2.55	2.43	2.12	1.88	1.82	1.61	
18	2.2	2.2	2.21	2.53	2.69	2.67	2.53	2.43	2.12	1.88	1.84	1.61	
19	1.18	2.21	2.22	2.53	2.69	2.66	2.53	2.43	2.09	1.88	1.84	1.61	
20	2.17	2.2	2.24	2.5	2.69	2.64	2.53	2.43	2.07	1.88	1.84	1.61	
21	2.17	2.2	2.28	2.48	2.69	2.66	2.54	2.43	2.07	1.88	1.84	1.61	
22	2.22	2.21	2.32	2.48	2.73	2.66	2.58	2.4	2.07	1.88	1.84	1.62	
23	2.22	2.16	2.3	2.49	2.74	2.63	2.58	2.37	2.07	1.88	1.84	1.62	
24	2.22	2.15	2.3	2.53	2.74	2.63	2.58	2.37	2.07	1.88	1.84	1.64	
25	2.22	2.17	2.32	2.53	2.74	2.63	2.58	2.37	2.07	1.88	1.84	1.64	
26	2.22	2.14	2.33	2.54	2.74	2.63	2.58	2.37	2.07	1.88	1.84	1.61	
27	2.22	2.07	2.37	2.58	2.74	2.62	2.58	2.37	2.07	1.88	1.82	1.61	
28	2.18	2.07	2.37	2.58	2.74	2.61	2.58	2.37	2.08	1.88	1.89	1.61	
29	2.17	2.07	2.37	2.6	2.74	2.58	2.57	2.37	2.07	1.88	0	1.61	
30	2	2.05	2.13	2.63	2.71	2.73	2.53	2.54	2.07	1.88	0	1.61	
31	0	2.04	0	2.45	2.61	0	2.6	0	2.19	1.91	0	1.61	
TOTALAF	128	134	130	154	165	156	158	145	132	116	102	94	1,614
AVECFS	2.15	2.18	2.18	2.51	2.68	2.62	2.57	2.44	2.15	1.89	1.84	1.64	2.24
Max Daily	2.27	2.27	2.43	2.63	2.8	2.69	2.58	2.53	2.37	2.07	1.88	1.79	2.8
Min Daily	1.18	2.03	2.03	2.37	2.58	2.53	2.53	2.37	2.07	1.84	1.79	1.56	1.18