The Owens Valley Monitor is the Inyo County Water Department's (ICWD) annual report on monitoring and other work performed by ICWD and the Los Angeles Department of Water and Power (LADWP). The 2008 Owens Valley Monitor reports runoff year 2007: April 2007-March 2008. In accordance with the Inyo/Los Angeles water agreement, ICWD and LADWP monitor water activities in the valley and their effects on groundwater levels and vegetation. The two agencies also conduct scientific research on methods of improving water management.

The Monitor can be accessed on our website at http://inyowater.org/Annual_Reports/. This annual report was produced by the Inyo County Water Department in Independence, California, October 2008.

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Director's Report - by Bob Harrington

The past year has been marked by changes for the Water Department. The Water Department's offices relocated from Bishop to Independence early this summer, and last fall, Tom Brooks stepped down as director and I took over as director. While these overlapping transitional events made for a challenging year, our mission and focus remains the same as in years past: to assist in implementation of the County's water resources policies through the Water Agreement and Groundwater Ordinance. This mission is accomplished through four general work efforts: oversight of LADWP water management; monitoring to assess impacts of LADWP activities; planning, monitoring, and implementation of mitigation measures associated with the Water Agreement, and assessments related to projects associated with the County Groundwater Ordinance.

Oversight of LADWP's water management activities through the provisions of the Water Agreement is a critical task for the Department (see Groundwater Conditions and Current Pumping). The Water Agreement provides for the Water Department and LADWP to jointly manage groundwater pumping by monthly monitoring of soil moisture and plant water requirements at key monitoring sites, and turning wells on or off according to the monitoring results (see Soil Water Conditions). The technical appendix to the Water Agreement, the "Green Book," describes the methods and protocols for conducting the measurements and analysis to manage pumping. Since this monitoring was initiated nearly twenty years ago, it has been recognized by both the Department and LADWP that changes to the Green Book are necessary to make pumping management more effective. In 2006, an Interim Management Plan was adopted by the Standing Committee, and since then we have been working with LADWP to modify the pumping management methods. Rather than basing management on soil moisture and plant water requirements, we are developing methods that will base management on changes in water table elevation, thereby linking pumping management directly to the hydrologic variable most directly affected by pumping. The Interim Management Plan holds pumping from wells management under the Water Agreement's "on/off" provisions to levels predicted to maintain 2007 water levels.

The Department has continued its annual program of monitoring vegetation conditions and assessing the status of vegetation relative to the mid-1980's baseline conditions established by the Water Agreement (see Vegetation Conditions). Assessment of vegetation conditions tells us whether our management strategies are meeting the goals of the Water Agreement.

The new ICWD office in Independence

The Water Agreement specifies over fifty mitigation measures. In relation to these mitigation measures, the Department's activities include implementing the Saltcedar control program (see Saltcedar Update), joint development of plans for the 1,600 acre-feet/year of water allocated to Hines Spring and other projects, participation in the Rapid Assessment Survey of the Lower Owens River, and identifying problems with particular mitigation projects (see Mitigation Status). With water finally flowing in the Lower Owens River Project, we have been working with LADWP to finalize joint funding mechanisms for the project. Also, this past spring Ecosystem Sciences Inc., the consultant for the LORP, issued their final draft Monitoring and Adaptive

Management Plan (following seven prior drafts). The past year has been a transition from the planning and initiation stages to the implementation stage of the LORP.

The Planning Department is developing an EIR for Coso Operating Company's proposed interbasin groundwater transfer from Rose Valley to the Coso geothermal field. This project proposes to pump water from agricultural wells in Rose Valley, pipe the water nine miles into the Coso Range, and inject the water into the geothermal field to enhance power generation. The Department has assisted the Planning Department in processing this permit application and developing the EIR by assisting in evaluation of hydrologic impacts of the proposed project and making recommendations for monitoring and mitigation of potential impacts of the project. The Department has also assisted the Planning Department in evaluating hydrologic analyses related to the Yucca Mountain Project. The Yucca Mountain Project filed their site application this summer with the Nuclear Regulatory Commission, and it is currently under review.

Many challenges are anticipated in the upcoming year. In addition to the core activities described above, as agreed to in the Interim Management Plan, we will soon begin a joint assessment of groundwater resources beneath Owens Lake for the purpose of supplying water to LADWP's dust abatement activities on the lake. The Water Agreement will regulate any LADWP pumping from Owens Lake. Potential impacts, mitigations, and management strategies will have to be identified in a hydrologic setting quite different from other LADWP wellfields.

2007-2008 Budget

Inyo County Water Department's general operations budget for fiscal year 2007-2008 was $1,318,569. General operations included ongoing monitoring and management in the Owens Valley and the Lower Owens River Project and administration. The total revenues were $1,338,616. Revenue details are as follows:

Annual Payment from LADWP: $1,271,669
Accrued Interest: $42,390
Payment from Planning Department for effort provided: $17,246
Payment from Yucca Mountain Office for effort provided: $7,296

Water Department Staff

- Bob Harrington, Director
- Doug Daniels, Fiscal Analyst
- Chris Howard, GIS / LAN Coordinator
- Randy Jackson, Senior Hydrologist
- Sally Manning, Vegetation Scientist
- Irene McLean, Administrative Secretary
- Derik Olson, Research Assistant
- Rick Puskar, Saltcedar Project Manager
- Aaron Steinwand, Soil Scientist / Science Coordinator
- Irene Yamashita, Revegetation Project Coordinator
- Jerry Zatorski, Research Assistant
- Kyle Schill, Vegetation Field Assistant
- Sondra Grimm, Vegetation Field Assistant
- Ian Kyle, Vegetation Field Assistant

Board of Supervisors Members

- Linda Arcularius
- Jim Bilyeu
- Beverly Brown
- Susan Cash
- Richard Cervantes

Inyo County Administrator

- Kevin Carunchio

Water Commission Members

- Rex Allen
- Teri Cawelti
- Matt Kemp
- Paul Lamos
- Jennifer Roeser

2008 Saltcedar Annual Report

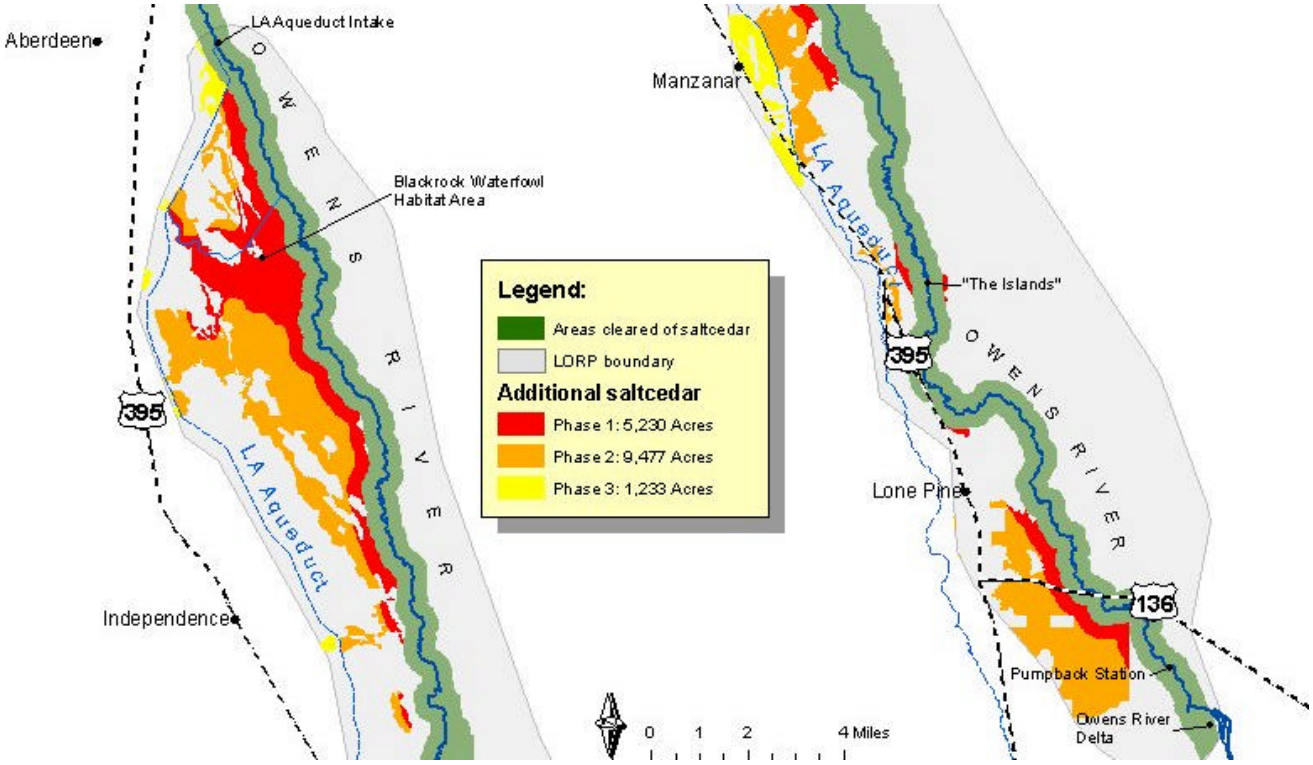
This year marks the tenth season of saltcedar control in the Owens Valley. Most of our efforts were concentrated north of Billy Lake in spreading basins adjacent to the Owens River. Since most of the river channel has been treated, the current priority is to increase the treated acreage parallel to the river that is a potential saltcedar seed source in the LORP area.

The LADWP and the California Department of Forestry crews are continuing to pile and burn slash along the Lower Owens River channel during the cooler months of November through March.

The Saltcedar Control Program was successful in securing funding from the Wildlife Conservation Board (WCB). The grant amount is $600,000 and must be spent by April, 2011.The current WCB grant will be matched dollar for dollar by LADWP.

The past Saltcedar Program Manager, Brian Cashore, decided to retire from Inyo County Water Dept. last year. Brian was instrumental in developing the Saltcedar program from the embryonic stage in the mid to late nineties to the well oiled machine it has become today. His leadership and sense of humor will be missed.

Below is a figure showing the saltcedar control progress in the north (left) and south (right) LORP area. The green areas along the Lower Owens River have been cleared of saltcedar, a major accomplishment of the ICWD Saltcedar Control Program. The additional saltcedar in the LORP, in red, orange, and yellow, are our next work areas.



Owens Valley Precipitation

Inyo County Water Department (ICWD) has collected precipitation data at seven rain gauges in Owens Valley since 1993. Precipitation totals for ICWD rain gauges appear in Table 1. For the 2007 water year (beginning October 1, 2006, and ending September 30, 2007), precipitation measured at the gauges averaged 1.4 inches. For comparison, Bishop Airport long term average precipitation as of 2007 is 5.2 inches.

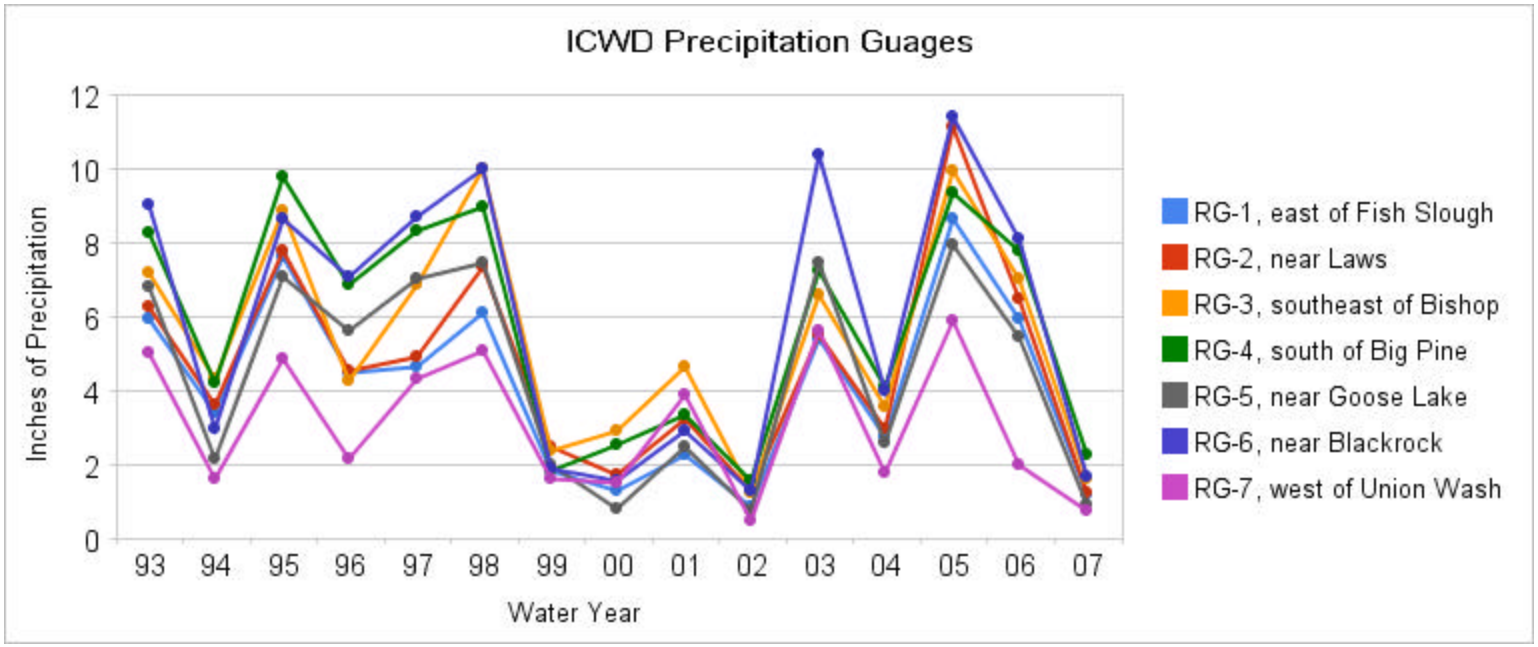


Table 1. Precipitation (in inches) measured in ICWD rain gauges by water year (October 1 of the previous year through September 30 of the year noted).

Rain Gage	93	94	95	96	97	98	99	00	01	02	03	04	05	06	07
RG-1, east of Fish Slough	5.94	3.40	7.60	4.51	4.66	6.09	1.82	1.32	2.26	0.86	5.41	2.75	8.65	5.94	1.19
RG-2, near Laws	6.29	3.62	7.80	4.55	4.91	7.34	2.50	1.73	3.27	1.28	5.49	2.96	11.13	6.47	1.23
RG-3, southeast of Bishop	7.21	4.34	8.87	4.29	6.85	9.98	2.39	2.93	4.63	1.24	6.57	3.59	9.96	7.04	1.63
RG-4, south of Big Pine	8.29	4.24	9.76	6.85	8.33	8.99	1.83	2.56	3.34	1.59	7.23	4.09	9.35	7.8	2.25
RG-5, near Goose Lake	6.83	2.15	7.07	5.64	7.02	7.47	1.98	0.80	2.46	0.75	7.47	2.58	7.94	5.44	0.93
RG-6, near Blackrock	9.00	2.95	8.67	7.07	8.68	10.01	1.88	1.59	2.91	1.28	10.38	4.01	11.38	8.13	1.66
RG-7, west of Union Wash	5.00	1.61	4.88	2.14	4.35	5.06	1.61	1.54	3.91	0.51	5.62	1.77	5.88	1.99	0.76
Rain Gage Average	6.94	3.19	7.81	5.01	6.40	7.85	2.00	1.78	3.25	1.07	6.88	3.11	9.18	6.12	1.38
Avg. Precipitation Occurring Oct 1 - Apr 15 ("Winter")	6.85	1.81	6.76	4.45	4.67	5.81	1.48	1.17	2.60	0.97	6.38	2.87	7.74	5.65	0.92
percent in winter	98.7	56.7	86.6	88.8	73.0	74.0	73.9	65.7	79.9	90.4	92.7	92.4	84.3	92.3	66.7

Status of Mitigation Projects

The 1991 EIR provided 55 mitigation projects, listed in the table below.

Mitigation	2007 Status
Laws/Poleta Native Pasture E/M (220 acres)	This project consists of two pastures. One pasture is adjacent to and east of Hwy. 6 (160 acres). In the past, only the eastern half of this pasture has been effectively irrigated. The other pasture, SE of Laws (60 acres), has also had poor plant cover. LADWP does not separate the water use for this project from the McNally pasture projects, therefore combined water use reported for the two projects was 1,396 acre-feet with 305 acre-feet of conveyance losses in the 2007 runoff year.
McNally Ponds and Native Pasture E/M (348 acres)	This project consists of ponds, a 100 acre native pasture east of the ponds, and two pastures (100 acres each) SE of the Laws museum. Ponds west of Hwy 6 received 0 acre-feet of water in runoff year 2007. In the past, LADWP has reported that management of this project includes supplying water to the ponds only when water is diverted from the Owens River to the McNally Canals. This management change has not been discussed with or approved by the Standing Committee. The 100-acre pasture had poor cover at the time of a field visit in 2004. Pastures on the east side of the river provide good grass cover. See above for water supply in 2007, LADWP reports that the water supply to this project and the Laws/Poleta project cannot be separated.
640 acres near Laws	The Standing Committee has not evaluated the need for mitigation of this area. The Desert Aggregates gravel mine expansion included 174 acres of the western portion of this potential site.
300 acres Five Bridges area	In progress. Management changes have been made to some provisions of the mitigation plan without Technical Group approval. Providing a regular supply of surface water to the site has increased cover in some areas. The area north of the river appears to have declined in cover and requires attention. This area was not addressed in the mitigation plan. LADWP reports two permanent transects measured perennial cover of 61% and 70% in 2007; however, the revegetation plan goals did not base mitigation attainment on the two permanent transects. Vegetation cover goals should be demonstrated over the larger area. Methods and analysis for measuring goal attainment should be developed and agreed to by the Technical Group.
Farmers Pond	Implemented and ongoing. Water supply for runoff year 2006 between Oct and Jan was 517 acre-feet.
140 acres near Laws	The Technical Group implemented a 10 acre study plot in 2001 in lieu of planting container plants as required in the Mitigation Plan. Results of the study were provided in Nov. 2003. In 2005, LADWP reported they expanded and planted the drip irrigation study plot. No results of this planting effort have been presented to the Technical Group.
Laws Museum Pastures E/M (21 & 15 acres)	Implemented. LADWP completed a sprinkler irrigation system in 2006. In 2007, the project received 147 acre-feet of water.

Laws area	The County and LADWP are currently revising groundwater management procedures contained in the Long-Term Water Agreement. Monitoring of select vegetation parcels is ongoing.
Bishop Cone	Not implemented. Inyo County provided an outline to LADWP April 2004 for evaluating the potential impacts of increased groundwater extraction on the Bishop Cone. LADWP has not commented on the outline but recently (3/20/07) requested a meeting to conduct a hydrological evaluation of the Bishop Cone.
Millpond Recreation Area E/M	Implemented and ongoing.
Buckley Ponds	Implemented and ongoing, although an operations plan needs to be developed.
120 acres near Bishop	Behind schedule. Fencing has been installed. Monitoring results between 1999 and 2003 showed little to no increase in perennial vegetation. The Mitigation Plan provided for the implementation of test plots if vegetation did not naturally increase. Therefore, the Technical Group should have developed test plots in 2004 to develop effective revegetation methods. Instead, LADWP utilized their contractor, MWH, to conduct revegetation studies in 2002. In 2004, LADWP reported, "a drip irrigation system is being designed for this site" and that implementation of revegetation will commence one year after the projects at Big Pine 160 and Independence 123 are fully implemented and operating properly." No schedule or plan has been provided to the Technical Group.
Saunders Pond	Implemented and ongoing, although an operations plan needs to be developed. This project does not have a management plan nor is it clear whether LADWP considers this project a mitigation measure.
Klondike Lake E/M	Providing water to the lake is ongoing; however, several management issues need to be addressed. The Technical Group began test water releases to the South Shore Habitat Area in 2005. LADWP installed a water delivery system and measuring device for the habitat area. Because of the low gradient and build up of vegetation, it has been difficult to provide the allotted 200 acre-feet of water to the habitat area. However, the project description for the lake includes a water allotment of 1,700 acre-feet which is not met regularly and a lake elevation range which has no reporting requirements. Therefore, it is not clear whether meeting the allotted water supply or elevation levels would increase flow to habitat area. A report on the 2007 releases to the habitat area have not been received by the Technical Group (July 22, 2008). The Water Department recommends that a reporting procedure for lake levels be developed by the Technical Group. In addition, ICWD is concerned that LADWP's rechannelization of Lyman Ditch in 2004 may adversely affect the native pastures adjacent to the ditch. Water supply in the 2007 runoff year as reported by LADWP was 1,201 acre-feet.
Big Pine Northeast Regreening E/M (30 acres)	Not implemented. CEQA requirements have not been completed although LADWP reports that an archaeological survey has been conducted. LADWP's annual report (May 2008) states CEQA filing and work will begin in 2008 although the Technical Group has not approved a mitigation plan for the site. ICWD revisions to LADWP's plan were sent 6/22/05.

Big Pine Ditch System	Implementation in progress. Construction for the ditch system is nearly complete. Potential impacts from pumping water for the ditch above that necessary for the town water supply will be evaluated by the Technical Group. A new well in Bell Canyon was described as a potential future water source for the ditch system. LADWP reports 372 acre-feet of water were used for the ditch system in 2007.
20 acres near Big Pine E/M	Not implemented. The Technical Group has not agreed on a plan or schedule although the MOU required plans be completed in 1998. LADWP reported a fence was constructed in 2007. LADWP describes, "If this area does not revegetate naturally, it will be included with LADWP's ongoing revegetation efforts." However, no schedule or plan for making this determination has been provided to the Technical Group.
160 acres near Big Pine	Behind schedule. The site has been fenced. Perennial native vegetation cover in 1991 was 2.3% and 3.1% in 2006. The Mitigation Plan scheduled revegetation test plots in 2001 and expansion of planting in 2006. Instead, LADWP's contractor implemented a revegetation study in 2002. LADWP reports that results of the revegetation studies will be used to implement larger scale revegetation efforts. However, a report on the studies showed little to no success and LADWP has not provided a plan or schedule to the Technical Group.
Steward Ranch	Mitigation agreement is in place.
Big Pine general	The County and LADWP are currently revising groundwater management procedures contained in the Long-Term Water Agreement. Monitoring of select vegetation parcels is ongoing.
Fish Springs	Hatchery is in place and implementation of the LORP has been initiated. Hatchery water use for runoff year 2007 was 19,909 acre-feet.
Tule Elk Field	Ongoing, although recent changes in management may be in violation of the Long-Term Water Agreement and 1991 EIR because LADWP has decreased the water supply to this project. The reduction in water supply has reduced vegetation cover in the field and adjacent meadows as indicated by satellite imagery.
Big and Little Seeley	Ongoing, although an operations plan is needed. For example, there are no clear project goals or guidelines regarding operations and management.
Calvert Slough	LADWP supplied water to Calvert Slough in 2004 after seven years of no water supply. It is not known whether water has been supplied since 2004. This project does not have a management plan nor is it clear whether LADWP considers this project a mitigation measure.
Hines Spring	In process. A final mitigation plan was developed by consultants and received May 2006; however, project implementation was replaced by the formation of an ad hoc group. The group is developing a plan for the spring. No schedule for completion has been presented.
80 acres (Taboose/Hines Spring area).	In progress. The entire impact area consists of 3 sites that total approx. 115 acres. Implementation at one site (Hines Spring South) has been delayed because it is dependent on plans for mitigating Hines Spring. This area is approx. 100 acres. Tin 54 is 0.3 acres. Vegetation cover has decreased 0.9% between 1999 and 2004. Perennial native vegetation cover was measured as 3.3% in 2004 far below the site goal of 33% cover.

	Activities at the site include planting 108 alkali sacaton plants in 1999 and installing a drip irrigation system. LADWP reports irrigation was eliminated after 2004. No monitoring has taken place since 2004. Blk 16E is 7.2 acres. Transects run in 2005 resulted in higher perennial native vegetation, 8.4%, compared to 1999, 5.4%; however, shrubs are now the dominant species. The goal was to recover the site to an alkali meadow with 34% cover. Therefore, the Water Department recommends the Technical Group discuss options for shrub control and increasing grass cover.
Little Blackrock Spring	Implemented and ongoing, although an operations plan is needed. LADWP reports the water supply ditch, the Goodale Bypass Ditch, normally runs all year at less than 1 cfs, providing approx. 700 acre-feet a year.
Big Blackrock Springs	The fish hatchery and the LORP serve as compensatory mitigation. The hatchery is in place and implementation of the LORP has been initiated. Hatchery water use was 12,732 acre-feet in 2007.
Thibaut/Sawmill marsh habitat	The LORP serves as compensatory mitigation and is in the process of implementation.
Independence Pasturelands E/M (610 acres)	The acreage of this project was changed from 610 to 470 acres without discussion or approval from the Standing Committee. Accordingly, LADWP decreased the water allotment from 1,825 acre-feet/year to 1,493 acre-feet/year. DWP reports water use in runoff year 2007 was 3,272 acre-feet. Site topography prevents flood irrigation from reaching some portions of the project.
Billy Lake	Implemented and ongoing, although an operations plan needs to be developed.
Independence East Side Regreening E/M (30 acres)	Not implemented. LADWP completed CEQA and obtained approval from their Board in May 2005. However, the County requested the location for the new project well be changed so that it can also be used to supplement the town water supply. The County has assumed responsibility for filing the necessary CEQA documents. The Technical Group has not approved a mitigation plan. Comments on a draft mitigation plan were sent to LADWP on 6/22/06. In their annual report, LADWP stated that the irrigation system will be implemented on 2/3 of the area to accommodate a potential sports complex in the future as requested by Inyo County.
Independence Woodlot E/M (21 acres)	Implemented and ongoing. IMACA has been managing the project since 1997. An operations plan is needed based on management guidelines agreed to by Inyo Co. and LADWP. LADWP reports that water supply during runoff year 2007 was 237 acre-feet.
Independence Springfield E/M (283 acres)	Implemented and ongoing. As noted below, approx. 40 acres were identified as still requiring mitigation. Water supply during runoff year 2007 was 1,962 acre-feet.
Additional 40 acres w/in springfield	Not implemented. The MOU required schedule for a plan by 1998 has not been met. LADWP reported implementation will begin in 2008; however, the Technical Group has not reviewed or approved a mitigation plan.
60 acres in S/S well field	One of the three sites that comprise this mitigation measure are behind schedule. The 3 sites total 115.2 acres. Ind 123 (28.4 acres) did not have test plots implemented in 2002 as scheduled in the Mitigation Plan.

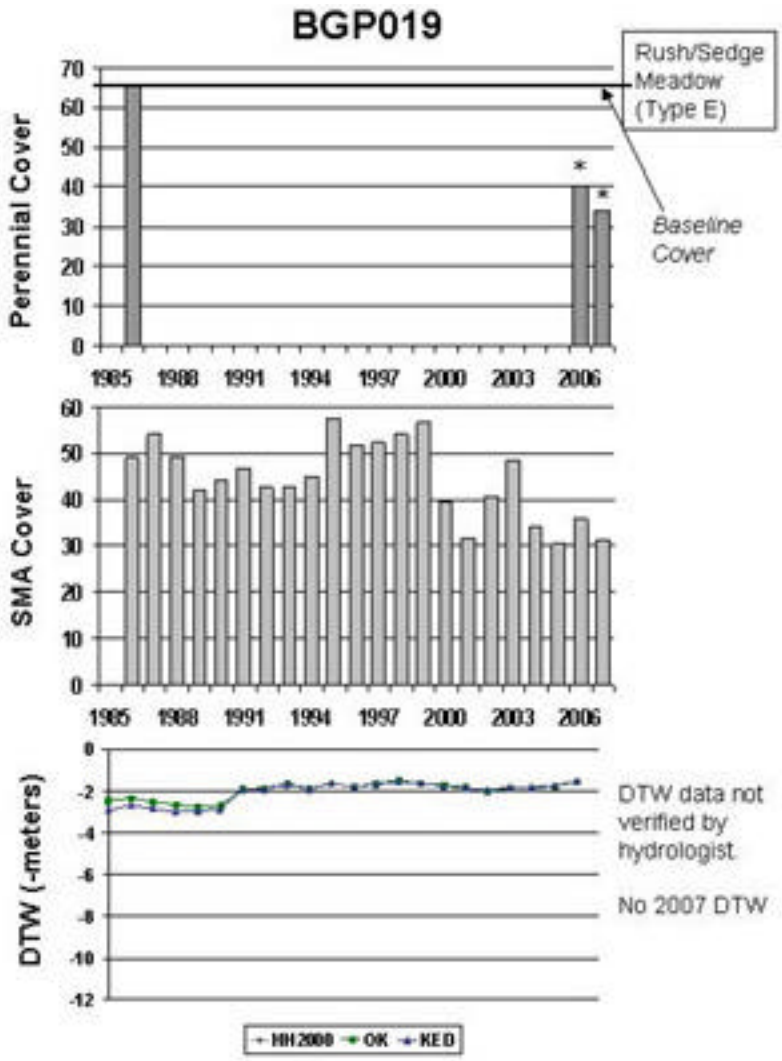
	Perennial vegetation cover measured by LADWP in 2006 was 16.4% compared to 4.8% in 2001. The mitigation goal is 17%. Ind 105 (13.6 acres) perennial vegetation cover data increased from 1999, 8.1%, to 2006, 25.2% meeting both the mitigation cover and composition goals. Ind 131 (73.2 acres) had a Technical Group approved study implemented in Dec. 2001 and a final report was received in March 2004. LADWP's contractor, MWH, conducted additional test plots in 2002. Perennial native cover in 2001 was 3.7% and 8.2% in 2006. The perennial cover goal is 17%. The mitigation plan schedule provides that a site plan will be developed in 2007 and implemented in 2008. No plan has been provided to the Technical Group.
Shepherd Creek Alfalfa Field E/M (200 acres)	Implemented and ongoing. LADWP reports that water supply for runoff year 2007 was 1,100 acre-feet.
Expand Shepherd Creek Alfalfa E/M (60 acres)	In August 2004, LADWP reported that data from transects run in the potential mitigation area showed an increase in vegetation cover from 18%, baseline, to 44% and thus no expansion of the Shepherd Creek E/M Project was necessary. The Technical Group has not discussed or approved this determination.
Reinhackle Spring	Not implemented. The Technical Group has not developed a plan for monitoring the flows and spring dependent vegetation.
Lone Pine Ponds	Implemented and ongoing. This project is included as part of the off-river lakes and ponds in the LORP.
Lone Pine East Side Regreening E/M (11 acres)	Implemented and ongoing. LADWP reported a combined water supply of 232 acre-feet for the Lone Pine 'East' and 'West' regreening projects for runoff year 2007.
Lone Pine West Side Regreening E/M (7 acres)	Implemented and ongoing. LADWP reported a combined water supply of 232 acre-feet for the Lone Pine 'East' and 'West regreening projects for runoff year 2007.
Lone Pine Woodlot E/M (12 acres)	Implemented and ongoing; however, management may have been modified without Standing Committee approval. LADWP informed the Water Dept. in August 2004 that the project would no longer receive water during the non-irrigation season as practiced in the past. The project is currently managed by IMACA; however, an operation plan is needed based on management guidelines agreed to by Inyo and LADWP. LADWP reports water use was 78 acre-feet for runoff year 2007.
Richards Field E/M (160 acres)	Implemented and ongoing; however, management may have been modified without Standing Committee approval. LADWP informed the Water Dept. in August 2004 that the project would no longer receive water during the non-irrigation season as practiced in the past. Water to this project is not measured separately from the park supply. LADWP reports 2007 runoff year water use was 570 acre-feet for Lone Pine Riparian Park and this field.
Van Norman Field E/M (160 acres)	Implemented and ongoing. A portion of the project is not capable of being irrigated due to the topography. Inyo recommends an evaluation of this portion of the project. LADWP reports water use was 306 acre-feet in runoff year 2007.
Diaz Lake	Ongoing, however, an operation plan needs to be developed. This project does not have a management plan

	nor is it clear whether LADWP considers this project a mitigation measure.
Lower Owens Rewatering Project E/M	The LORP (below) replaces this E/M project.
Lower Owens River Project	CEQA documentation was completed in Dec. 2005. Water was released at the intake for the project in Dec. 2006 and the first seasonal habitat flow was initiated in February 2008.
Meadow/riparian vegetation dependent on agricultural tailwater	The LORP serves as compensatory mitigation. See LORP status above.
Salt Cedar Control Program	Ongoing, program funded by LADWP and implemented by Inyo. Approx. 62 mi. of the Owens River floodplain south of the aqueduct intake to the delta has been cleared of saltcedar, thus the program expanded its efforts to approx. 100 acres outside the river floodplain in 2007. The program also monitors and maintains cleared areas. Continuation of the salt cedar control program is dependent upon obtaining funding beyond that provided by LADWP.
Irrigated fields, including Cartago and Olancha	Ongoing. Irrigated lands are not directly monitored; instead, lessees are relied upon to indicate if there are changes in irrigation water supply.
Springs/Seeps	The Technical Group does not have a plan for monitoring flow or vegetation at springs and seeps. Ecosystem Sciences completed a draft inventory of springs and seeps. The MOU described that the inventory would provide baseline data adequate for monitoring change to species and/or their habitats. ICWD provided extensive comments on the adequacy of the draft to Ecosystem Sciences. No revisions to the inventory were ever made.

Vegetation Conditions

During summer 2007, ICWD research assistants reinventoried 109 parcels. These tables (online only: csv / pdf) show total perennial cover for all parcels in all years in which they were reinventoried, and LADWP baseline data from the mid 1980s are included for comparison. Methods employed in 2007 were the same as methods used in previous years (see previous ICWD annual reports and Vegetation Scientist reports). Landsat satellite data were obtained and interpreted for all reinventoried parcels. The attached graphs (ppt, example below) show ICWD field cover measurements (top graph), and total living (green) plant cover in each parcel during late summer of each year derived from the satellite data (middle graph). The bottom graph shows estimated April depth to water table (averaged beneath entire parcel) according to interpolation procedures implemented by ICWD hydrologists. Depth to water estimates for 2007 are not available.

A PowerPoint presentation showing each reinventoried vegetation parcels can be downloaded from our website: http://inyowater.org/Annual_Reports/2007_2008/vegetation_conditions.htm. An example slide is shown below.



Soil Water Conditions

The Water Agreement established procedures to determine which LADWP pumping wells can be operated based on soil water and vegetation measurements. Staff from ICWD regularly monitors depth to groundwater and soil water content at 25 sites in wellfields and eight sites in control areas. Data from 22 wellfield sites visited each month are used to determine the operational status (On or Off) of nearby pumping wells. Six sites were in On-status through the 2007-08 runoff year. One site in Bairs-George wellfield went into On-status; one site in Laws went into Off-status for five months.

The purpose for the On/Off procedures is to manage pumping to protect plant communities that require periodic connection to the water table for long-term survival. Generally the sites with On-status have wet soil and shallow water tables, and the Off-status sites have dry soil and deep water tables. The On/Off determination is based on an incomplete accounting of the components of the soil water balance, however. Sometimes On-status sites are those with a deep water table and low plant cover. Conversely, a site with adequate water table depth may be in Off-status if the water table occurs just below the root zone and plant cover is high.

We identify the monitoring sites where the root zone is connected with the water table to give a better picture of the conditions underground that are affected by pumping. Several wellfield sites have an intermediate zone where soil water contents change little that separates lower depths affected by water table fluctuations from upper depths affected by precipitation. Infiltration for several sites sometimes extends to about 40 inches (1 m) deep which is the middle of the root zone in grass-dominated sites. In years like 2007-08 with moderate precipitation over the winter, it can be difficult to distinguish soil water recharge from the water table when it is relatively shallow. We rely on both soil water and groundwater data because the water table depth necessary to provide water to the plant roots depends on the soil characteristics as well as water table depth. For example, the capillary rise above the water table in a silty soil is much greater than in a sandy soil. For the same water table depth, the plants may have access to groundwater if the soil is silty, but not if it is sandy. How well plant roots can take up groundwater also depends on the type of vegetation. In similar soils, a shallower water table is necessary to supply groundwater to grasses than shrubs because of the

shallower roots of the grasses. For management purposes, grass-dominated monitoring sites are assigned a root zone of 6.6 feet (2 m); shrub sites are assigned a root zone of 13.1 feet (4 m).

The wellfield monitoring sites (including three that are monitored but not used for pumping management) were grouped into simple categories to summarize the connection between the root zone and the water table. Brief descriptions of the three categories are given below:

1. Disconnected: No recharge from lower depths is occurring in the root zone. Nine sites occur in this category compared with eight last year. Sites L1, L2, and TA5 have retained soil water available to plants at depth but the water table at the beginning of the 2008 growing season is probably too deep to recharge the root zone. Soil at the other sites is dry.

2. Weakly connected: Water table fluctuations caused soil water changes in the bottom half of the root zone. Ten sites occur in this category. Sites BP3, TS6, IO1, SS1, SS3, and BG2 have ample soil water stored in the soil profile.

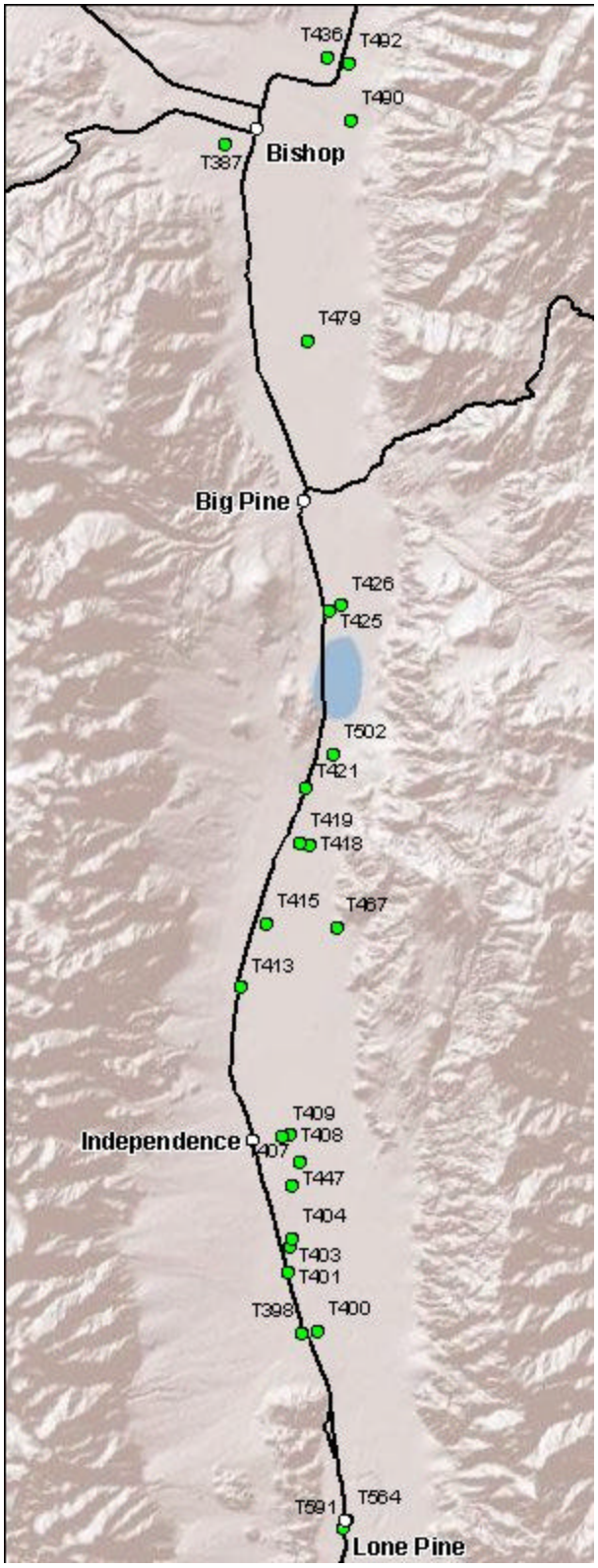
3. Connected: Water table fluctuations caused soil water changes in the top half of the root zone. Six sites were placed in this category.

At the beginning of the 2008 growing season, the water table was capable of supplying water to the root zone at 16 monitoring sites located in wellfields (see map). This compares to about 17 sites last year. Most sites in the coupled and weakly connected categories had relatively moist soil in much of the soil profile. Three sites are probably not receiving groundwater in the root zone but have moist soil. The remaining six sites have dry soil throughout the root zone.

Groundwater Conditions

Inyo County, through the Inyo County Water Department (ICWD), and the Los Angeles Department of Water and Power (LADWP) entered into an Interim Management Plan (IMP) for groundwater management within the framework of the Water Agreement during the next three runoff-years beginning in Runoff-year 2007-08. The IMP was implemented to provide an environment conducive to the successful performance of the Green Book Revision Cooperative Study.

The IMP provides for specific sole-source uses in Owens Valley and curtails export pumping if it causes groundwater levels to decline below April 2007 levels. The IMP will terminate on March 31, 2010 unless terminated sooner as provided by the provisions of the IMP agreement. Groundwater pumping in the Owens Valley under the IMP will be managed with the goal of having average forecasted wellfield groundwater levels on April 1, 2008, April 1, 2009 and April 1, 2010 (wellfield target levels) at or greater than the average measured wellfield groundwater levels on April 1, 2007, subject to criteria described in the IMP agreement. April groundwater levels are forecasted using the IMP monitoring wells shown in Table 1, below and their associated regression models contained in the documentation in the link provided above. A list of exempt pump-equipped wells is also provided in the IMP documentation. The Lone Pine and Bishop Wellfields are not managed under the water level provisions of the IMP. Instead, the Bishop Wellfield will be managed in accordance will the Hillside Decree, the Water Agreement and applicable court rulings, and in Lone Pine pumping will be limited to supplying the town water system and Enhancement/Mitigation project irrigation and possibly an operational test of a new well.



Runoff during the 2007-2008 runoff-year was forecasted at 58% of normal on April 1, 2007. Runoff-year 2007-2008 is defined as April 1, 2007 through March 31, 2008. In the runoff-year 2007-2008, 60,338 acre-feet of groundwater was pumped from Water Agreement-controlled wells in the Owens Valley. Table 2 shows pumping for the runoff-year 2007-2008 by wellfield within the Owens Valley. This was within the 63,232 acre-feet prescribed under the IMP for 2007-2008. The IMP capped pumping and the below runoff-year runoff combined to produce a relatively stable shallow water table with small increases and decreases in the shallow groundwater table in the 20 IMP indicator test holes and other indicator test holes (See Table 1, and Map at right). The Laws Wellfield was one notable wellfield

exception. In 2005-2006, court mandated water spreading developed relatively high water tables in Laws and in 2007-2008 the water tables declined due to drainage of groundwater to the Owens River, evapotranspiration and pumping for use in the Laws Wellfield (See Table 1).

Water levels generally remain below the levels of the mid-1980's baseline vegetation mapping period (See Table 1, last column). Of the 36 test holes in Table 1, seven were above the baseline in April 2008.

The groundwater recharge estimation methods used for the groundwater mining calculations mandated by the Green Book show approximately 129,000 acre-feet of recharge for the 2007 water-year (October 1, 2006 through September 30, 2007) for the Owens Valley. In contrast, pumping for the 2007 water-year was 65,230 acre-feet.

Table 1. Depth to water (DTW) from Shallow Test Hole Reference Point (R.P.) at Indicator Wells, April 1, 2008. All Data are in Feet. Baseline is the Average of 1985, 1986, and 1987 April DTW (given available data). Negative change from April 2007 indicates a declining water table; negative deviation from baseline Indicates the Water Table is below baseline. Asterisks(*) indicate IMP wells.

Wellfield and Shallow Test Hole Number	DTW, April 2008	DTW, April 2007	Change from April 2007	Baseline DTW from R.P.	Deviation from Baseline, April 2008
Bairs-Georges					
T398*	5.38	4.31	-1.07	6.34	0.96
T399	3.52	2.97	-0.55	2.96	-0.56
T400*	6.02	5.77	-0.25	6.32	0.30
Symmes-Shepherd					
T401*	21.71	23.21	1.50	17.87	-3.84
T402	11.00	10.82	-0.18	8.03	-2.97
T510	7.29	7.44	0.15	4.98	-2.31
T403*	6.84	7.57	0.73	5.32	-1.52
T404*	5.75	5.81	0.06	3.55	-2.20
T511	7.90	8.01	0.11	4.60	-3.30
T447*	35.03	36.23	1.20	22.20	-12.83
Independence-Oak					
T407*	10.81	11.05	0.24	7.57	-3.24
T406	3.63	3.93	0.30	1.53	-2.10
T408*	4.17	4.31	0.14	3.13	-1.04
T409*	4.38	4.53	0.15	2.12	-2.26
T546	6.78	6.48	-0.30	3.60	-3.18
T412	7.72	7.24	-0.48	4.29	-3.43
T453	11.11	4.43	-6.68	5.52	-5.59
Thibaut-Sawmill					
T413*	12.78	11.33	-1.45	9.34	-3.44
T414	10.65	8.92	-1.73	6.95	-3.70

T415*	19.57	19.94	0.37	18.54	-1.03
T507	6.24	6.56	0.32	4.62	-1.62
Taboose-Aberdeen					
T417	29.99	30.81	0.82	26.92	-3.07
T418*	8.95	9.72	0.77	8.18	-0.77
T419*	6.51	7.70	1.19	6.55	0.04
T421*	33.63	34.18	0.55	34.31	0.68
T502*	8.14	8.73	0.59	7.49	-0.65
T504	9.74	10.53	0.79	10.78	1.04
T505	21.68	22.47	0.79	18.60	-3.08
Big Pine					
T425*	15.90	15.87	-0.03	14.89	-1.01
T426*	13.15	13.01	-0.14	11.57	-1.58
T469	22.91	22.18	-0.73	21.73	-1.18
Laws					
T107	26.00	21.98	-4.02	24.00	-2.00
T436*	8.23	6.45	-1.78	8.40	0.17
T438	11.42	9.49	-1.93	9.61	-1.81
T490*	14.14	11.80	-2.34	13.03	-1.11
T492*	28.41	24.69	-3.72	32.83	4.42

Table 2. LADWP Actual Pumping by Wellfield for the 2007-2008 Runoff-year.

Wellfield	Pumping in Acre-Feet
Lone Pine	1,196
Bairs-Georges	466
Symmes-Shepherd	1,267
Independence-Oak*	7,035
Thibaut-Sawmill	12,732
Taboose-Aberdeen	932
Big Pine	20,406
Bishop	10,018
Laws	6,286
Total	60,338

* In December and January 2008, 155 acre-feet were pumped from Independence-Oak for freeze protection.

Review of conditions by area for the 2007-2008 runoff years

Laws Wellfield

In the Laws Wellfield, located north and east of Bishop, the shallow water table responds dramatically to pumping and recharge from the McNally Canals. Shallow water table hydrographs for test holes T107, T436, T438 T490 and T492 are shown in Figure 1. Pumping was 6,286 acre-feet which was used in the immediate wellfield. Groundwater levels declined to below April 2007 levels and three test holes are below baseline water levels (See Table 1). Declines were due to the mound decay from previous court mandated recharge, pumping for uses in the wellfield and evapotranspiration of vegetation. No water was diverted from the Owens River into the McNally Canals during 2007-2008.

FIGURE 1. LAWS WELLFIELD HYDROGRAPHS OF TEST HOLES T107, T436, T438, T490 AND T492

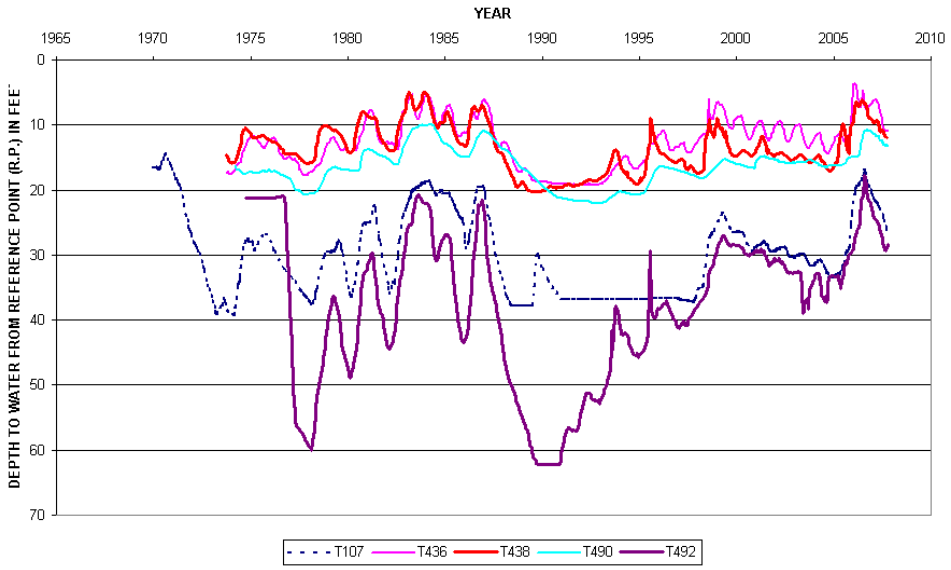
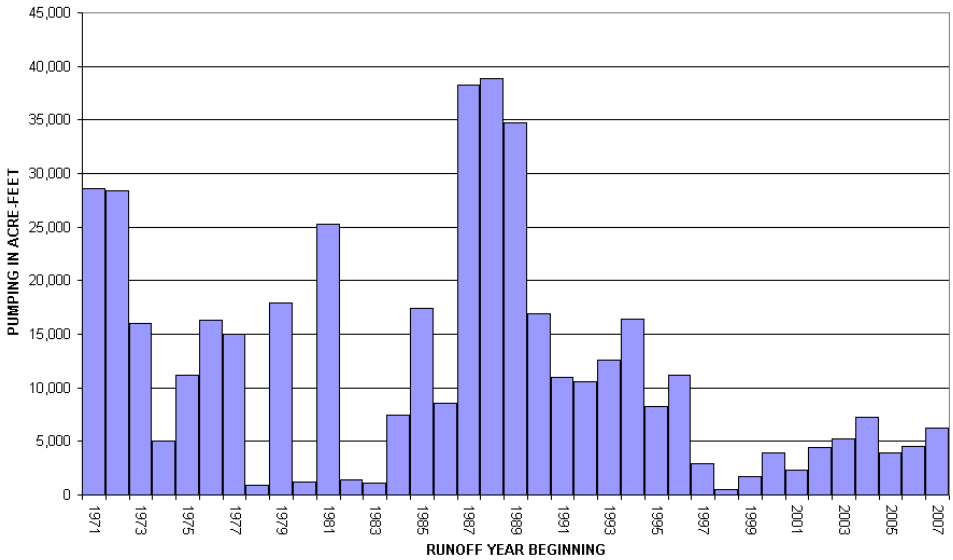


FIGURE 10. LAWS PUMPING



Bishop Cone Wellfield

Pumping on the Bishop Cone was 10,018 acre-feet. Shallow water table hydrographs for test holes T387 and T479 are shown in Figure 2. Generally, pumping from wells on the Bishop Cone and recharge from the extensive network of canals, ditches and creeks balance to produce stable water levels. The Bishop Cone Wellfield is exempted from the groundwater level provisions of the IMP and it will be managed consistent with the Hillside Decree, the Water Agreement and applicable court rulings. A draft of the Bishop Cone Audit for the 2007-2008 runoff-year indicates that total groundwater extraction did not exceed water usage on Los Angeles-owned land on the Bishop Cone.

FIGURE 2. BISHOP CONE WELLFIELD HYDROGRAPHS OF TEST HOLES T387 AND T479

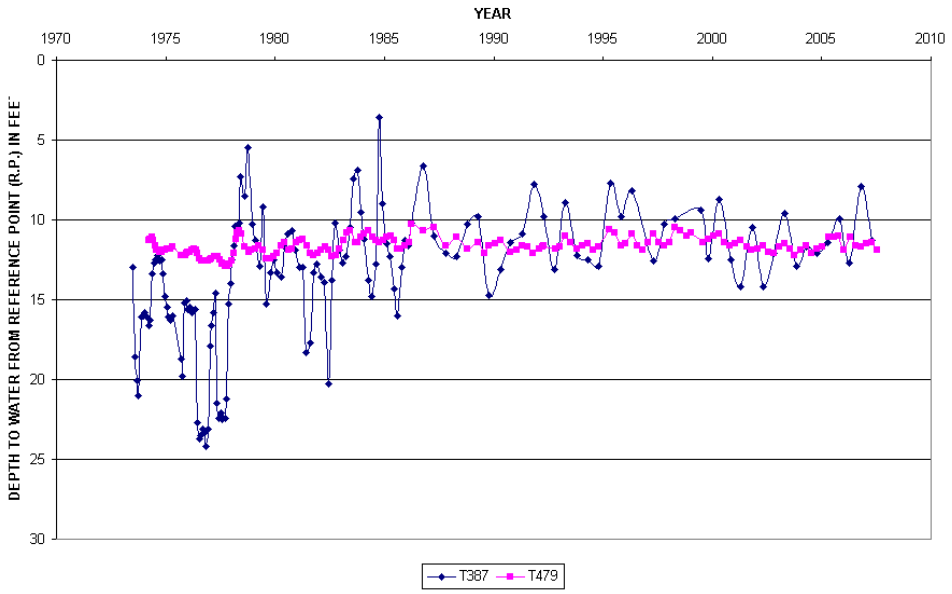
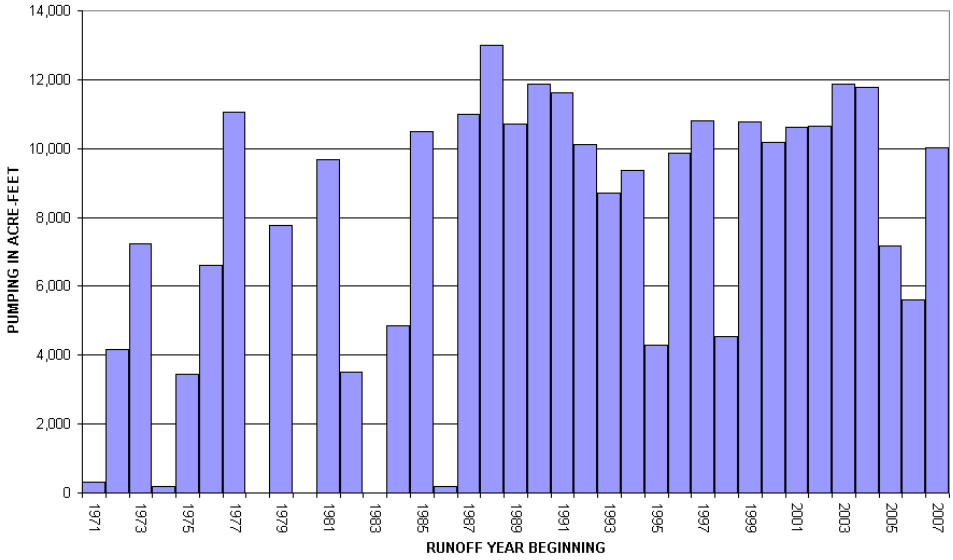


FIGURE 11. BISHOP CONE PUMPING



The Big Pine Wellfield

Pumping in the Big Pine Wellfield was 20,406 acre-feet. Pumping has been historically relatively high compared to other wellfields because of LADWP pumping for the Fish Spring Fish Hatchery. Shallow water table hydrographs for test holesT425, T426 and T469 are shown in Figure 3. Groundwater levels in April 2008 were slightly below April 2007 levels in Table 1. In all three test holes in Table 1 shallow groundwater water levels remain approximately a foot below baseline levels (See Table 1).

FIGURE 3. BIG PINE WELLFIELD HYDROGRAPHS OF TEST HOLES T425, T426 AND T469

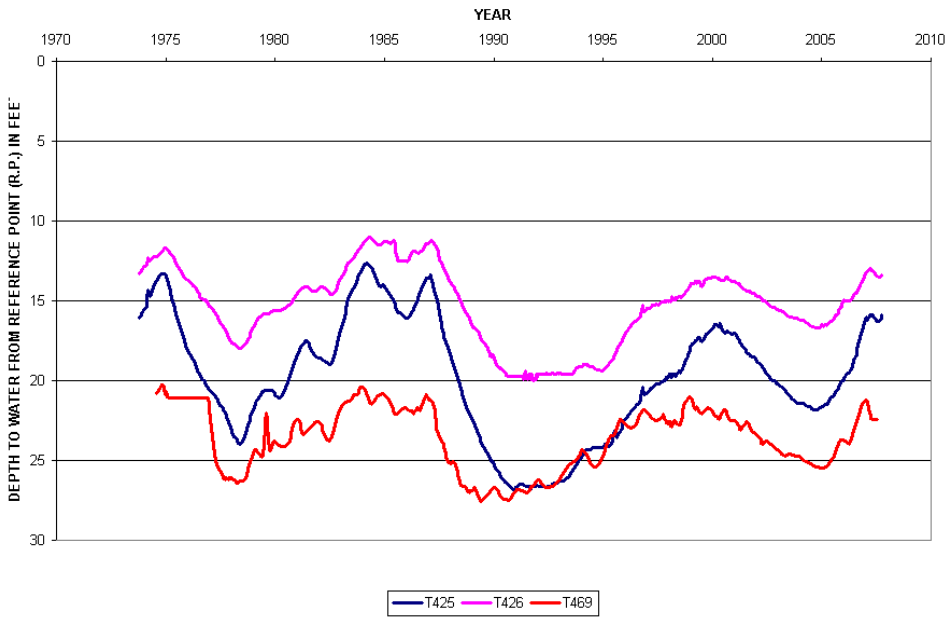
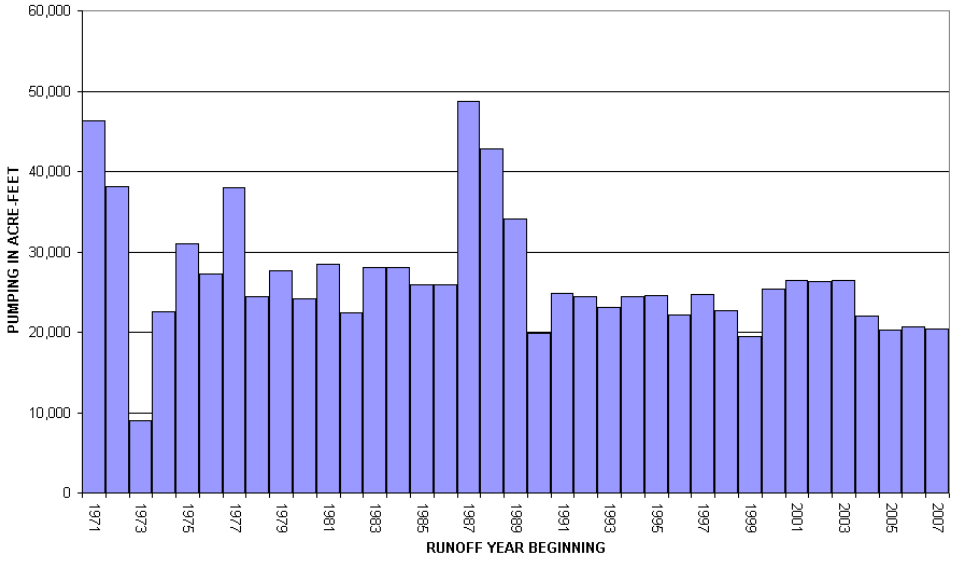


FIGURE 12. BIG PINE PUMPING



The Taboose-Aberdeen Wellfield

Pumping in the Taboose-Aberdeen Wellfield was 932 acre-feet. Shallow water table hydrographs for test holes T417, T418, T419, T421, T502, T504 and T505 are shown in Figure 4. Groundwater levels in April 2008 were slightly above April 2007 water levels in Table 1. In three of the seven test holes in Table 1, groundwater levels remained above baseline levels. In the past this wellfield has undergone large pumping induced fluctuations (See Figure 4).

FIGURE 4. TABOOSE-ABERDEEN WELLFIELD HYDROGRAPHS OF TEST HOLES T417, T418, T419, T421, T502, T504 AND T505

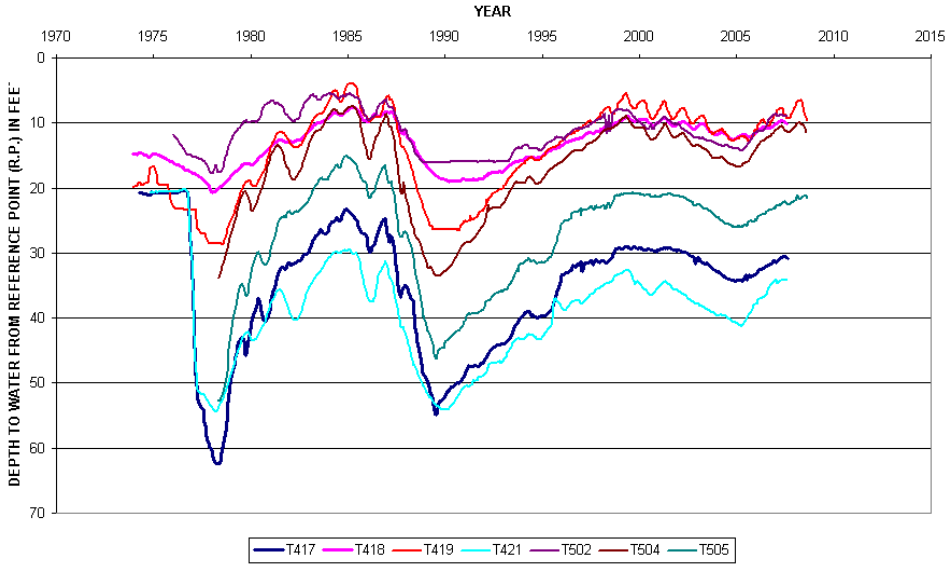
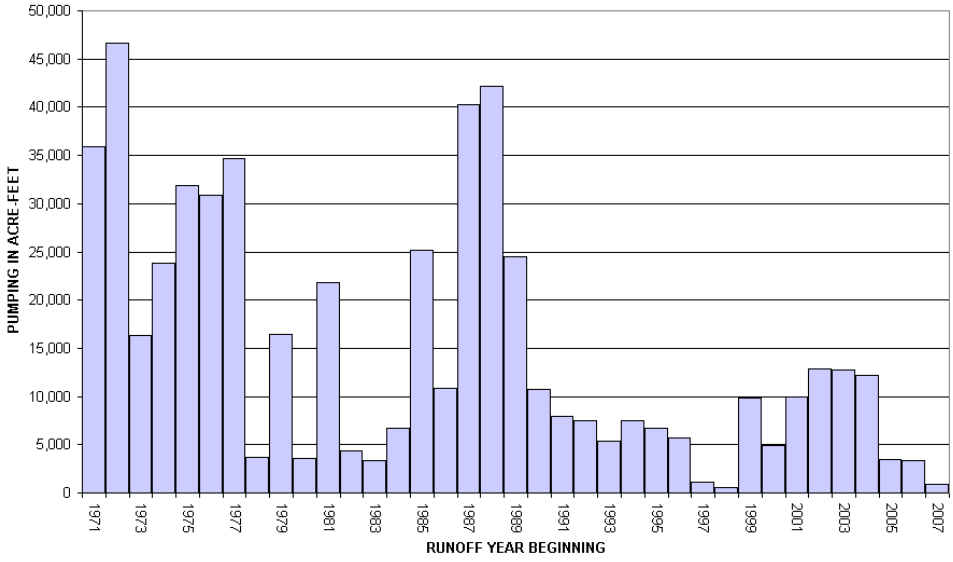


FIGURE 13. TABOOSE-ABERDEEN PUMPING



The Thibaut-Sawmill Wellfield

Pumping in the Thibaut-Sawmill Wellfield was 12,732 acre-feet. Historically, pumping has been approximately this amount or higher for the Blackrock Fish Hatchery. Shallow water table hydrographs for test holes T413, T414, T415 and T507 are shown in Figure 5. Groundwater level in April 2008 was mixed, with two test holes being above April 2007 levels and two test holes being below April 2007 levels (See Table 1). In all indicator test holes in the Thibaut-Sawmill Wellfield water levels remain below the baseline levels (See Table 1). In the past this wellfield has undergone large pumping-induced fluctuations (See Figure 5).

FIGURE 5. THIBAUT-SAWMILL WELLFIELD HYDROGRAPHS OF TEST HOLES T413, T414, T415 AND T507

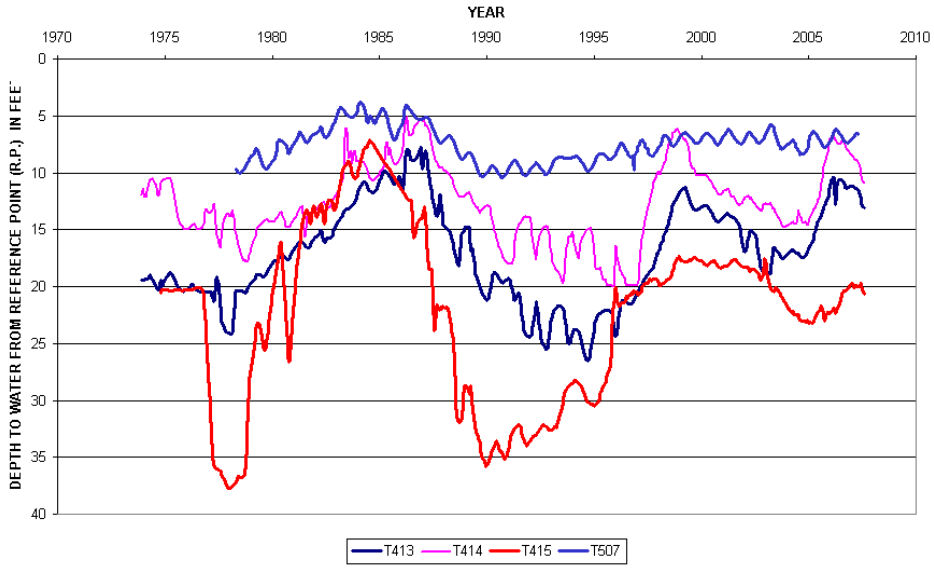
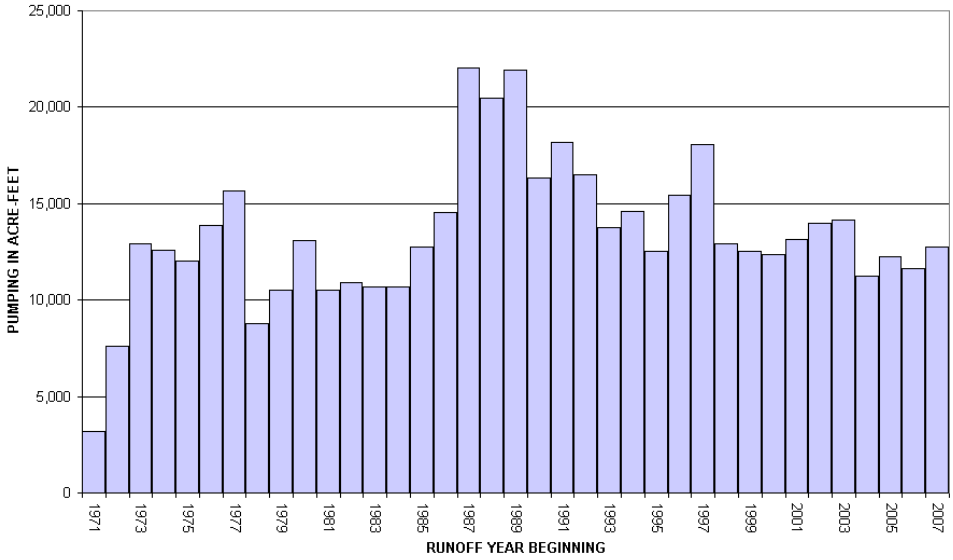


FIGURE 14. THIBAUT-SAWMILL PUMPING



The Independence-Oak Wellfield

Pumping in the Independence-Oak Wellfield was 7,035 acre-feet. Shallow water table hydrographs for test holes T407, T406, T408, T409, T546, T412 and T453 are shown in Figure 6. Groundwater levels in four of the seven test holes in April 2008 were above April 2007 levels (See Table 1). In all of the seven indicator test holes in the Independence-Oak Wellfield water levels remain below the baseline levels (See Table 1). In the past this wellfield has experienced sustained pumping due to the large number of exempt wells.

FIGURE 6. INDEPENDENCE-OAK WELLFIELD HYDROGRAPHS OF TEST HOLES T407, T406, T408, T409, T546, T412 AND T453

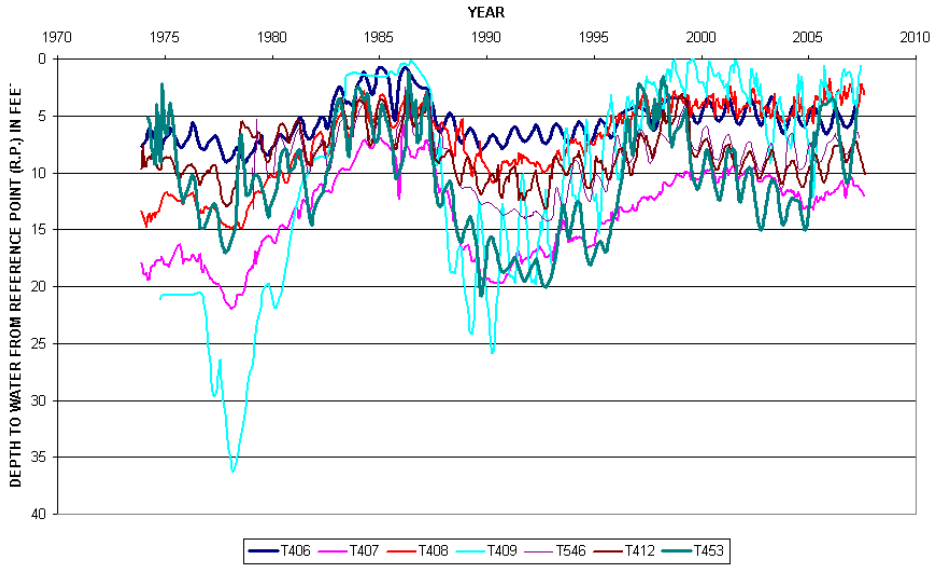
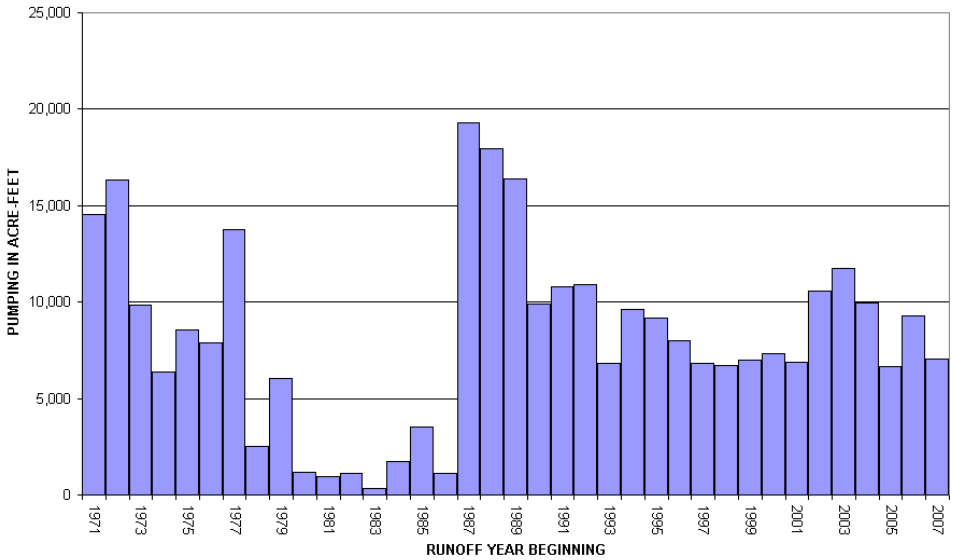


FIGURE 15. INDEPENDENCE-OAK PUMPING



The Symmes-Shepherd Wellfield

Pumping in the Symmes-Shepherd Wellfield was 1,267 acre-feet, entirely used for irrigation. Shallow water table hydrographs for test holes T401, T402, T403, T404, T510, T447 and T511 are shown in Figure 7. Groundwater levels in six of the seven test holes in April 2008 were above April 2007 levels (See Table 1). In all of the seven indicator test holes in the Symmes-Shepherd Wellfield water levels remain below the baseline levels (See Table 1). Historically, pumping has varied greatly from this wellfield.

FIGURE 7. SYMMES-SHEPHERD WELLFIELD HYDROGAPHS OF TEST HOLES T401, T402, T510, T403, T404, T511 AND T447

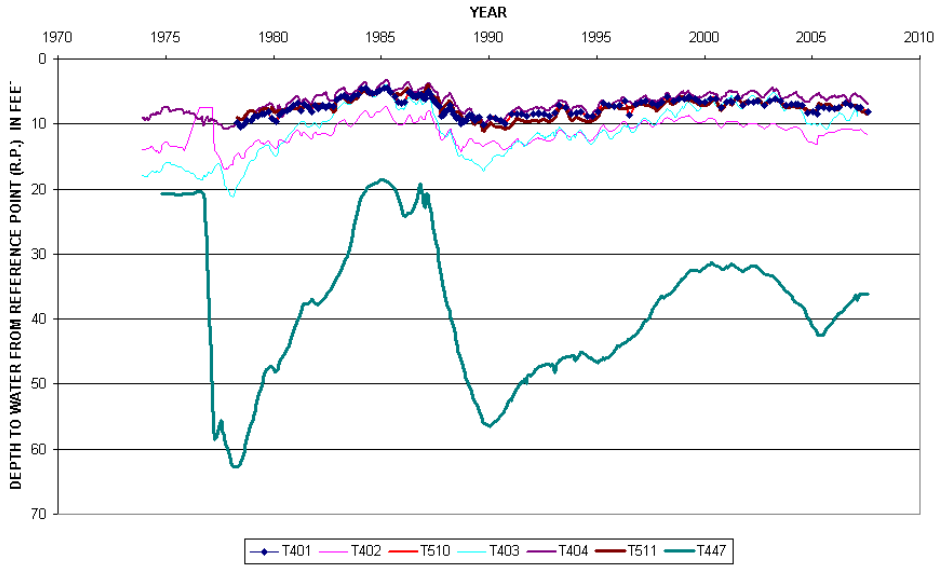
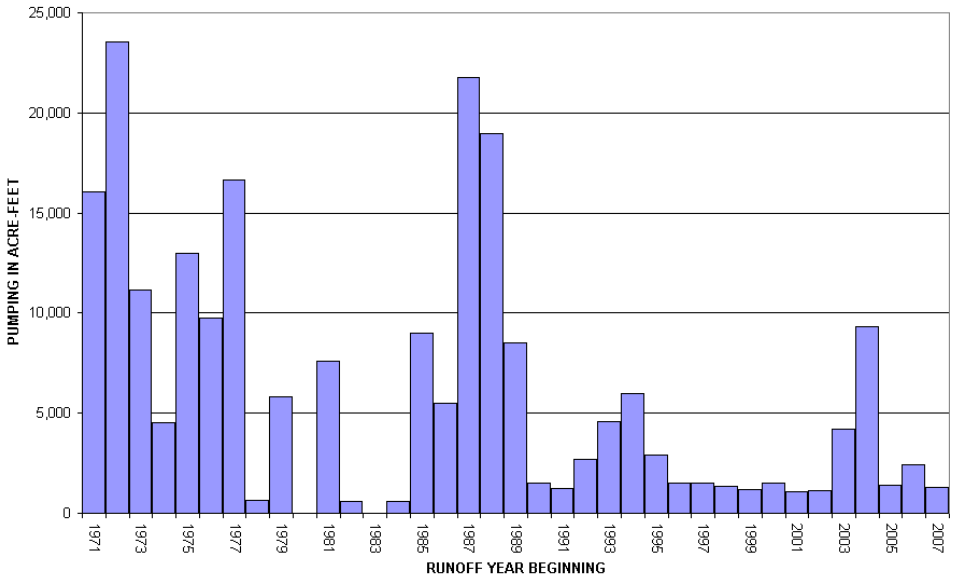


FIGURE 16. SYMMES-SHEPHERD PUMPING



The Bairs-Georges Wellfield

Pumping in the Bairs-Georges Wellfield was 466 acre-feet. Shallow water table hydrographs for test holes T398, T399 and T400 are shown in Figure 8. Groundwater levels all three of indicator test holes in April 2008 were slightly below April 2007 levels (See Table 1). In two of the three indicator test holes in the Bairs-Georges Wellfield water levels remain above the baseline levels (See Table 1). Historically, pumping has varied greatly from this wellfield.

FIGURE 8. BAIRS-GEORGES WELLFIELD HYDROGRAPHS OF TEST HOLES T398, T399 AND T400

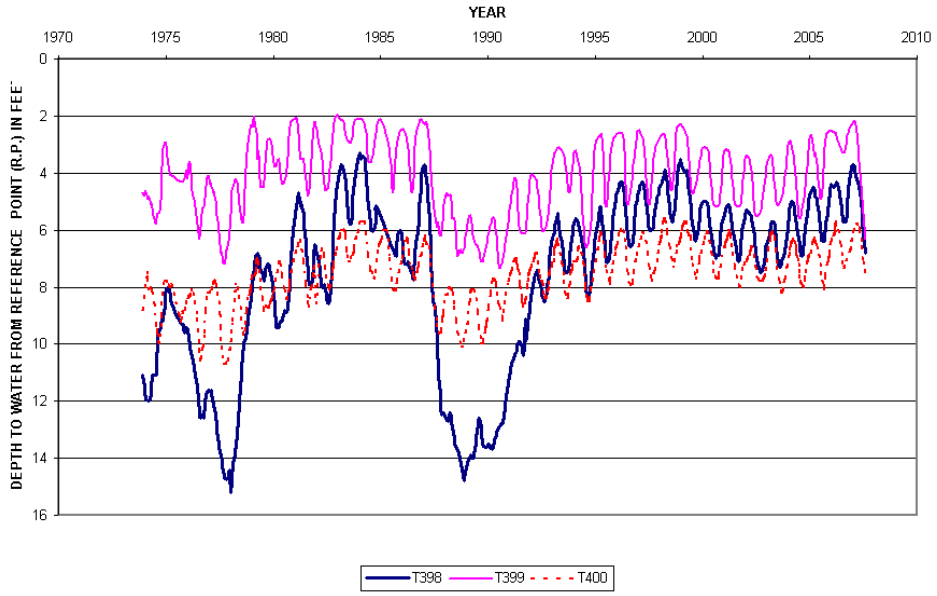
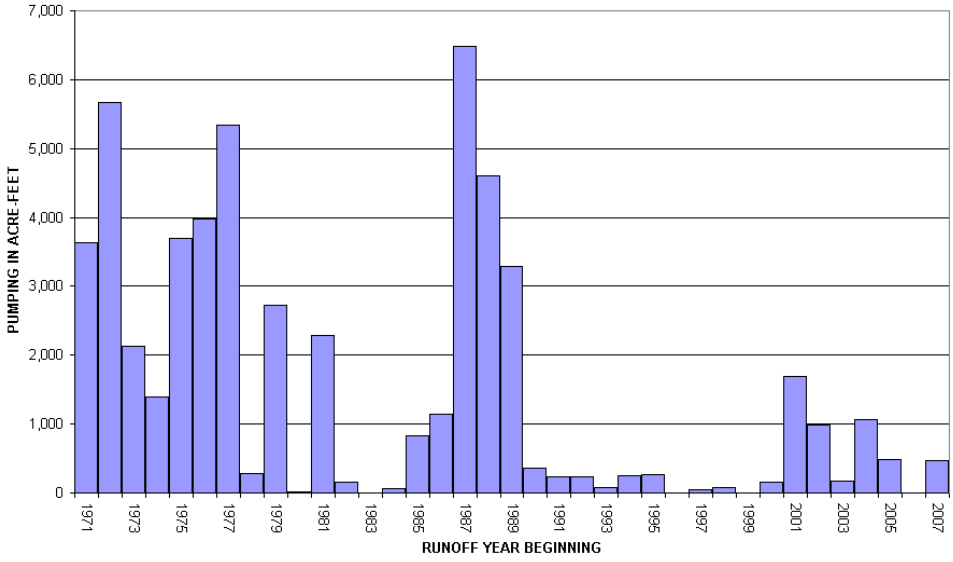


FIGURE 17. BAIRS-GEORGES PUMPING



The Lone Pine Wellfield

Pumping in the Lone Pine Wellfield was 1,196 acre-feet, used for irrigation and town supply. Shallow water table hydrographs for test holes T564 and T591 are shown in Figure 9 for reference. There are no indicator test holes in this wellfield. Pumping in this wellfield has been principally for town supply, Diaz Lake and an Enhancement/Mitigation project east of the town. LADWP has constructed a new production well west of the town of Lone Pine to supply the Los Angeles Aqueduct (W416). LADWP and ICWD are currently developing a process and plan for testing this well and implementing management to protect groundwater dependent natural resources and private wells.

FIGURE 9. LONE PINE WELLFIELD HYDROGRAPHS OF TEST HOLES T564 AND T591

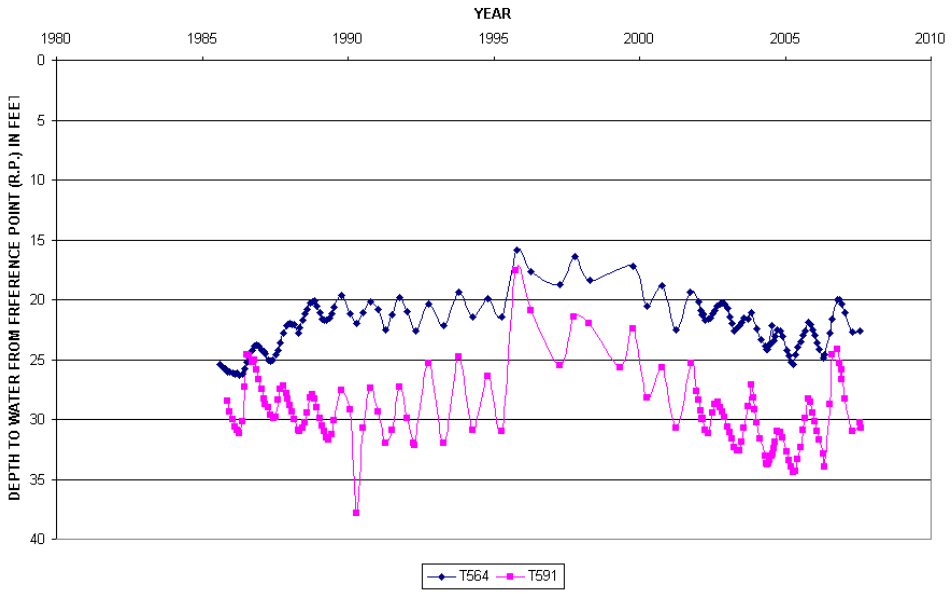
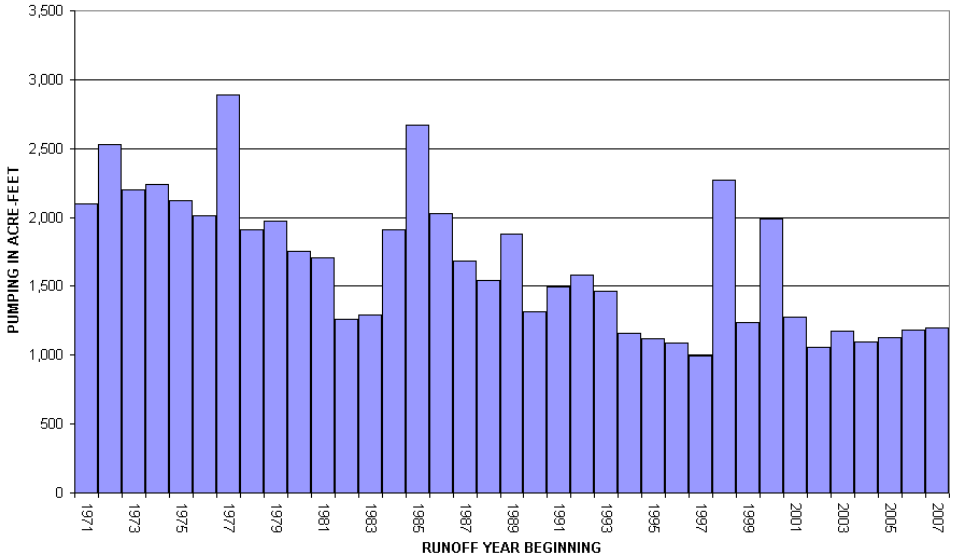


FIGURE 18. LONE PINE PUMPING



Shallow Groundwater Adjacent to the Lower Owens River

The court decided that base flows of 40 cubic feet per second were established in the Lower Owens River on February 27, 2007. A shallow test hole, T467 was monitored by ICWD staff during the establishment of base flows. T467 is located approximately 700 feet east of the Owens River near the return of the Blackrock Ditch. Shallow groundwater levels have increased by approximately two feet at T467 and other wells adjacent the river. in response to the increase in stage associated with the establishment of base flows in this section of the Lower Owens River where the channel was previously dry.

Projections Concerning the 2008-2009 Runoff-year

The April 1, 2008 LADWP runoff forecast for 2008-2009 was 86% of normal. Although 2008-2009 was forecast to be below normal, it was not as dry as 2006-2007 which was forecast to be 48%. Using the IMP regression equations and the planned pumping in the LADWP 2008-2009 Owens Valley Operations Plan (Table 3), projections concerning April 2009 water levels in the 20 IMP Indicator wells have been made by ICWD and LADWP Staff. Those projections by ICWD are shown in Table 4 below.

Table 3. LADWP Planned Wellfield Pumping for the 2008-2009 Runoff-year

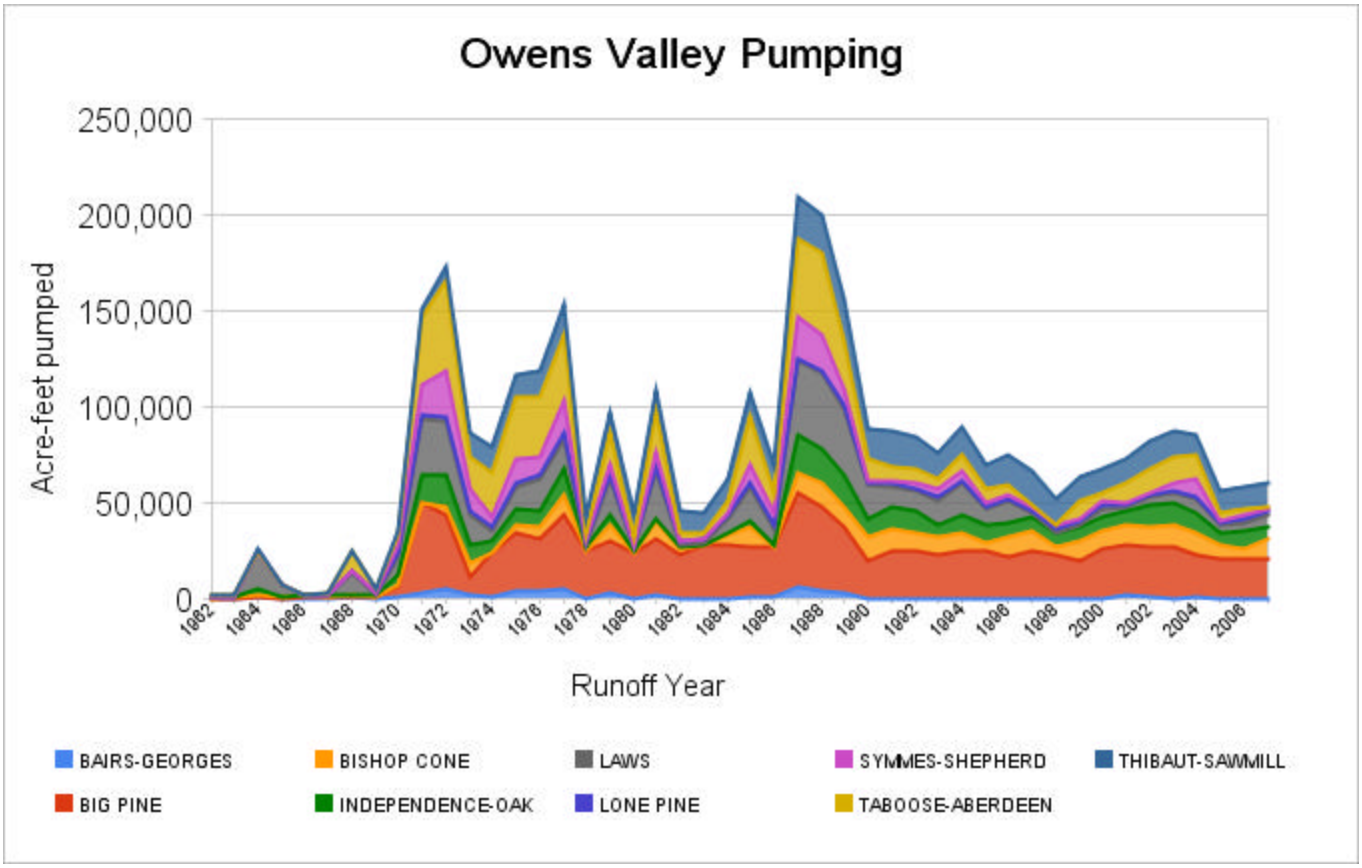
Wellfield	Planned Pumping in Acre-Feet
Laws	6,300
Bishop	10,200
Big Pine	20,400
Taboose-Aberdeen	6,800
Thibaut-Sawmill	12,800
Independence-Oak	7,400
Symmes-Shepherd	1,200
Bairs-Georges	500
Lone Pine	1,200
Total	66,800

Table 4. Projected Change in Depth to Water from April 2007 to April 2009.

Wellfield	Indicator Test Hole	April 2009 DTW change from April 2007 in Feet
Laws	T436	-3.7
	T490	-9.3
	T492	-3.7
	Average	-5.6
Big Pine	T425	-0.7
	T426	-0.5
	Average	-0.6
Taboose-Aberdeen	T418	0.8
	T419	0.9
	T421	-0.7
	T502	-0.8
	Average	0.1
Thibaut-Sawmill	T413	-2.2
	T415	0.5
	Average	-0.9
Independence-Oak	T407	0.0
	T408	-0.1
	T409	-1.4
	Average	-0.5
Symmes-Shepherd	T401	1.9
	T403	1.2
	T404	0.4
	T447	2.3
	Average	1.5
Bairs-Georges	T398	-1.1
	T400	-0.3
	Average	-0.7

Historic Pumping

The chart below shows cumulative annual pumping by wellfield, runoff years 1962-2007.



Current Pumping

In runoff year 2007-2008, Owens Valley groundwater pumping was governed by the Interim Management Policy (IMP), an agreement reached by Inyo County and LADWP.

Table 1. LADWP Owens Valley planned and actual groundwater pumping in acre-feet for runoff year 2007-2008. (Source: Planned Pumping values are derived from Section 2, Table 3 of the LADWP 2007-2008 Annual Operations Plan. Actual Pumping is from DWP.)

Wellfield	**Planned Pumping**	**Actual Pumping**
Lone Pine	1,250	1,196
Bairs-Georges	500	466
Symmes-Sheperd	1,300	1,267
Independence-Oak	6,700	7,035
Thibaut-Sawmill	12,500	12,732
Taboose-Aberdeen	900	932
Big Pine	20,400	20,406
Bishop	10,782	10,018
Laws	8,900	6,286
Total (Owens Valley-wide)	**63,232**	**60,338**