

**Virgin Valley Water District  
500 Riverside Road  
Mesquite, Nevada 89027**

**WATER CONSERVATION PLAN**

**Revised and Adopted, October 16, 2007  
Addendum added June 29, 2008**

**Prepared by:**

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# VIRGIN VALLEY WATER DISTRICT

## WATER CONSERVATION PLAN

Revised and Adopted, October 16, 2007  
Per NAC 540.131.4(c)

### 1. GENERAL

Water is a scarce commodity in the Virgin River watershed and Nevada is particularly short on this natural resource. Water conservation is everyone's responsibility and is an 'everyday' way of life in the High Desert Country. Common sense is usually the best rule to follow. The water that is used carelessly is depriving someone else of this valuable resource. Water is not only vital for human habitation but also for the wildlife in our area. They too should be considered in any water conservation plan.

It is the intent of this Water Conservation Plan to insure an adequate supply of water to each homeowner within the Virgin Valley Water District with sufficient water to meet the needs of domestic demand; for the enjoyment of well-groomed landscaping and to allow adequate water resources for the Virgin Valley desert fauna and flora.

This Water Conservation Plan was originally prepared in compliance with the provision of NRS 540.141 and is hereby revised per NAC 540.131.4(c). It is intended that the plan be enforced at all times, whether under drought conditions or during years of sufficient precipitation.

### 2. METHOD OF PUBLIC EDUCATION

#### A. PUBLIC INPUT

The general public will be noticed of the regularly scheduled Board of Directors meeting for input prior to adoption of this revised Water Conservation Plan.

#### B. COPIES OF THE PLAN AVAILABLE TO CUSTOMERS

A copy of the adopted Water Conservation Plan (as revised on October 16, 2007) will be posted at the regular meeting notice location and will be available at the General Offices of the Virgin Valley Water District, 500 Riverside Road, Mesquite, Nevada to each water customer.

C. WATER CONSERVATION INFORMATION

The Virgin Valley Water District will, from time to time, provide its customers with water conservation information. Such information will be distributed through inserts in the monthly billing, special mailings, posters, flyers, newspaper and other appropriate methods. Water conservation information will include desert landscaping, drought tolerant plant material; home leak detection, domestic water conservation practices, water system operation status, results of customer conservation practices and other related subjects that will assist homeowners in conserving water.

D. AGENDA ITEM AT MONTHLY BOARD MEETINGS

The Board of Directors will provide time at their monthly board meetings for public input and education of the customers.

E. LANDSCAPE

The Virgin Valley Water District will encourage the reduction of lawns and other high water use landscaping. Demonstration of the use of drought tolerant plant material will be provided for the customers in the District. A list of "Low Water Use Plants" will be on file with the Virgin Valley Water District. Suggestions of decorative plant material which should be considered in xeriscaping include:

DROUGHT TOLERANT TREES (to 20 ft.)

- \* PARKINSONIA ACULEATA "MEXICAN PALO VERDE"
  - ACACIA ABYSSINICA
  - ACACIA CONTSRICTA
- \* ACACIA FARNESIANA
  - ACACIA ANEURA
  - ACACIA CRASPEDOCARPA
  - ACACIA CULTRIFORMIS
  - ACACIA SHCAFFNERI
  - BLUE PALO VERDE
  - CERCIDIUM MICROPHYLLUM "LITTLE LEAF PALO VERDE"
  - OLNEYA TESTOSA TREE
- \* DESERT MUSEUM PALO VERDE

DROUGHT TOLERANT TREES (to 30 ft.)

- ACACIA PENDULA
- \* CHILOPSIS LINEARS "DESERT WILLOW"
- \* CHITALPA TREE

- \* VITEX AGNUS CASTUS
- MEXICAN BLUE PALM

DROUGHT TOLERANT TREES (to 40 ft.)

- ACACIA SALICENA
- PALO VERDE
- \* THORNLESS CHILEAN MESQUITE
- CHILEAN MESQUITE
- SCREWBEAN MESQUITE
- TEXAS HONEY MESQUITE
- WASHINGTONIA FILIFERA

DROUGHT TOLERANT TREES (over 40 ft.)

EUCALYPTUS SPECIES (ALL SPECIES)

DROUGHT TOLERANT SHRUBS (LARGE)

- \* FOUNTAIN GRASS
- ENCELIA FARINOSA
- CASSIA WISLIZENI
- \* CASSIA PHYLLODENIA
- CASSIA STURTII
- \* CASSIA NEMOPHILA
- \* BUDDLEIA MARRUBIIFOLIA
- ACACIA CULTIFORMIS
- \* LUECOPHYLLUM (ALL SPECIES)
- ATRIPLEX LENTIFORMIS
- ATRIPLEX BREWERI
- ATRIPLEX SEMIBACATA
- BACCHARIS SAROTHROIDES
- \* CAESALPIMA GILLIESII
- \* CASSIA ARTISMOIDES
- CELTIS PALLIDA
- \* OCOTILLO
- \* LARREA TRIDENTATA "CREOSOTE"
- \* NERIUM OLEANDER
- YUCCA WHIPPLEI
- YUCCA ELATA
- YUCCA ALOFOLI
- \* RED YUCCA
- YUCCA GLORIOSA
- JOSHUA TREE

### DROUGHT TOLERANT SHRUBS (SMALL)

- SANTOLINA CHAMAECYPARISSUS
- ENCELIA FARINOSA
- \* YUCCA RECURVAFOLIA
- \* DASYLIRION WHEELERI
- \* FEIJOE SELLOIANA
- \* LUECOPHYLLUM FRUTESCENS
- ASPISTRA ELATIOR

### DROUGHT TOLERANT VINES

- BOUGANVILLEA
- FEIJOA SELLOWIANA
- \* HALLS HONEY SUCKLE
- CATS CLAW VINE

### DROUGHT TOLERANT GROUND COVER

- SEDUM CONFUSIUM
- DWARF COYOTE BUSH
- COMMON ICE PLANT
- ACACIA REDOLENS

### CACTI AND SUCCULENTS

OPTUNIA SPECIES; RABBIT EARS, BEAVER TAIL, BLUE BLADE  
DOLLAR CACTUS, DOLLAR CATUS, PRICLY PEAR, AGAVAE SPECIES  
(ALL) CHOLLA, ARIZONA BARREL, GOLDEN BARREL, ALOE VERA,  
AFRICAN ALOE, SAGUARO, HESPERALOE PARVIFLORA, AND MANY  
MORE AVAILABLE WITH AND WITHOUT NAMES.

- \* These plant have done well in the Mesquite/Bunkerville area

### 3. CONSERVATION MEASURES TO BE IMPLEMENTED IF NEEDED OR IN AN EMERGENCY

#### A. WATERING SCHEDULE

The following watering schedule shall be implemented:

- a. Even numbered houses shall only water on even numbered days.
- b. Odd numbered houses shall only water on odd numbered days.

The schedule may be modified during the months of July and August to allow for more frequent watering because of the hot weather. Watering shall be confined to the cooler hours of the day and shall be limited to the morning hours prior to 10:00 AM and evening hours after 6:00 PM.

**B. WASTEFULL USE OF WATER**

The following wasteful uses of water will be grounds for a written notification from the Virgin Valley Water District. Water service could be terminated upon the fourth violation (see Section 11, "Action for violation of Water Conservation Plan").

**a. OVERSPRAY NOT ALLOWED**

Sprinklers shall be set so that no over spray of driveways, roads, native vegetation or other non-planted areas will occur. This may be accomplished by proper location of sprinklers and by reducing the volume to limit water coverage area.

**b. DEFECTIVE PLUMBING**

Water customers will be notified of defective plumbing, leaks or other service malfunctions observed by or reported to the Virgin Valley Water District. Water service to the premises will be terminated if repairs have not been made within seven days after notification has been served.

**c. EXCESSIVE USE OF WATER**

Excessive use of water that results in flooding and run-off from the property shall not be permitted.

**d. OUTSIDE USE OF WATER NOT FOR IRRIGATION**

Hoses used for washing vehicles, boats, buses, trucks and trailers and other major objects shall be equipped with a positive shut-off nozzle attached to the outlet end of the hose. Hoses shall not be allowed to run free while not in use.

**e. USE OF WATER FOR CONSTRUCTION**

Special arrangements shall be made with the Virgin Valley Water District for the use of a fire hydrant for construction water. The District will install a meter on a designated fire hydrant. The watering of gravel roads shall only be permitted when the health and safety of the residents are at risk. The rates adopted by the Virgin Valley Water District shall apply to the volume of water taken through the fire hydrant water meter.

f. **HAND WATERING OF LANDSCAPED AREA**

A positive shut-off valve shall be used on all hoses that are being used for hand watering of landscape and/or gardens.

g. **DECORATIVE AND RECREATIONAL USE OF WATER**

Fountains and pools shall be equipped with recycling pumps.

4. **PENALTY FOR VIOLATION OF PROVISIONS OF THIS PLAN**

Penalties will be imposed by the Virgin Valley Water District for violations of the provisions of the water conservation plan. Penalties could vary from a verbal warning to termination of service based on frequency of violations. (See Section 11, "Action for Violation of Water Conservation Plan")

Violations may be removed from the customer's service record after three years of compliance with the provisions of the Conservation Plan.

5. **APPEAL PROCEDURE**

Any customer who seeks a variance from any of the provisions of this Water Conservation Plan shall notify the Virgin Valley Water District in writing no less than fourteen (14) calendar days prior to the board meeting at which a hearing is requested. The notice shall explain in detail the reasons for the requested variance. Presentation of pertinent fact may be made at the board meeting. The Board of Directors of the Virgin Valley Water District shall make a determination at the meeting and will advise the customer(s) in writing of the final decision.

6. **EXCEPTIONS TO THE PROVISIONS OF WATER CONSERVATION PLAN**

Exceptions to the provisions of this Water Conservation Plan may be made for water dependent industries, commercial nurseries, golf courses and commercial car and truck washing facilities. A written request for non-compliance shall be made to the Virgin Valley Water District. A "Non-compliance Permit" will be issued for a period of two years after board approval. The water user may apply for a renewal permit at the end of each two-year permit period. A "Non-compliance Permit" is not transferable.

Unless prior arrangements have been made with the Virgin Valley Water District, three consecutive months of non-use of water under a "Non-compliance Permit" shall be grounds for cancellation of said permit.

7. RIGHTS OF WATER DISTRICT TO IMPOSE RESTRICTIONS

The Virgin Valley Water District may, during period of severe drought and an insufficient supply of water, impose additional water use restrictions in the water service area to insure that a sufficient supply is available for the public health and safety.

8. SCHEDULE OF WATER CONSERVATION IMPLEMENTATION

In addition to the routine water use restrictions in this conservation plan, the following conservation measures could be implemented in response to the severity of the drought:

<u>Event</u>	<u>Response</u>
Static groundwater level decreases by 20 feet	Newspaper, TV and Radio Notice
Static groundwater level decreases by 30 feet	Reduce yard watering to two days per week. Even numbered houses may water on Wednesdays and Saturdays while odd numbered residences may water on Tuesdays and Fridays.  Commercial establishments including apartments, condominiums and townhouses may water on Mondays and Thursdays  Watering times shall be as stated in Section 3.A
Static groundwater level decreases by 50 feet	Vehicle and boat washing will not be permitted. No washing of driveways or other outside non-irrigation use will be allowed. District personnel will patrol the community for water wasting.
Static groundwater level decreases by 70 feet	Sprinkler irrigation will be suspended. Drought punitive water rates will be implemented.  Punitive water rates shall be 150% of the current adopted water service rates.

## 9. WATER CONSERVATION TOOLS (CUSTOMER)

Bathroom showers, toilets, and sinks account for approximately 75% of the water used in each American home. It is important for all to do more to save water; both to protect our natural resources and to lower the economic impact of wasteful water usage. A few modifications to bathroom design nationwide could save 10 trillion gallons of water per year in the United States.

The most important modifications are the installation of dual-flush toilets, faucet aerator, and adjustable or low flow showerheads. A reduction of the amount of water used in an older toilet will be realized by placing a half gallon plastic jug in the tank. An adjustable flow showerhead should be set it to use the lowest amount of water pressure that still provides a relaxing and enjoyable shower.

Additional suggestions for water savings:

- A. Showerheads installed prior to 1992 probably put out 5 gallons of water a minute (GPM). After 1992, showerheads became legally required to put out no more than 2.5 gallons of water. Adjustable showerheads are available that puts out 1.0 gallon of water per minute, adequate for a refreshing shower. Reducing the length of showers from the average of 10 minutes to 8 minutes will save additional water.
- B. Standard bathroom faucets use 2.5 gallons of water per minute. Turning off the water while brushing teeth (2 minutes) should save approximately 5 gallons of water per day, or 1825 gallons of water per year per person. Installing a faucet aerator will reduce bathroom faucet water use; usually from a flow of 2.5 GPM to 1.5 GPM.
- C. Turning off the faucet while washing hands, filling up the wash basin to rinse the shaving razor before shaving instead of running the water, and being generally conscious to keep the water off unless it is absolutely necessary to have it running will save a significant amount of water.
- D. Placing the water heater as close as possible to the kitchen and master bathroom will lower the amount of time a faucet must run before the water gets hot.
- E. The amount of water used in the steam portion of a steam bath or steam shower is relatively low compared to the amount that runs down the drain while a shower is being used. Most steam showers only generate steam for a few seconds at a time. However, the smaller the enclosure that the steam room is in, the less water will disappear into the air.

- F. A whirlpool bathtub with an in-line heater allows heating of the water in the tub rather than refilling the tub with warmer water as the tub cools down. This can be a significant water saving.
- G. To void the use of steam, an infrared sauna (dry) could be used that does not require any water to generate heat.
- H. Leaking toilets will use a significant amount of water. A leak can be detected by adding food coloring to the tank. Color will appear in the toilet bowl within a few minutes if there is a leak.
- I. Check for dripping faucets. This can be fixed by replacing washers. A faucet dripping at a rate of 1 drop per second, will waste 2500 gallons per year.
- J. Take a look at the water meter while no water is being used in your house. If flow is being recorded, there is obviously a leak in the water system. This can also help in locating underground leaks in the service lateral from the meter to the house.
- K. Do not use your toilet as a trash can. Throw trash in the trash!  
Extra flushes waste water.
- L. Keep water pitchers around to collect water that runs while you wait for the water to heat up. You can use this as drinking water or to water your plants.
- M. Keep drinking water in the refrigerator instead of letting the tap run while you wait for cool water.
- N. Consider installing an instant water heater on the kitchen sink to eliminate wasting water while waiting for the water to heat up. This will also reduce water heating costs.
- O. If taking a bath, begin filling the tub with the drain already plugged, don't wait for the water to warm up before plugging the drain. Instead, adjust the water temp while the tub fills. Take a short shower instead of a bath. While a five minute shower uses 12 to 25 gallons, a full tub requires about 70 gallons.
- P. Install a dual wastewater system and divert 'Gray Water' to storage for irrigation use.
- Q. Install drip irrigation system for all shrubs and trees.

- R. Irrigation systems should be installed with automatic timers.
- S. Monitor water use throughout the year and compare seasonal use to determine the possibility of leaks in the customer system.

10. WATER CONSERVATION TOOLS (WATER DISTRICT)

The Virgin Valley Water District shall implement water conservation tools to insure conservation in the transmission and delivery system. These management tools shall include, but not be limited to the following:

- A. Insure that all water meters are read on a regular scheduled basis
- B. Establish water service rates that will encourage water conservation
- C. Develop an analysis of the water consumption that would include the evaluation of:
  - a. Comparison of seasonal use of water
  - b. Comparison of well water production and monthly meter readings
  - c. Random review of customer water consumption
- D. Daily reading of the well water production
- E. Periodic leak survey of the distribution system
- F. Routine reading of the static groundwater level
- G. Repair known leaks in a timely manner
- H. Exchange meters known to be non-functional
- I. Assist customers with water conservation techniques

11. ACTION FOR VIOLATION OF WATER CONSERVATION PLAN

A. FIRST VIOLATION

The Virgin Valley Water District will issue a verbal notice to any property owner who is found to be violating the provisions of the adopted Water Conservation Plan.

**B. SECOND VIOLATION**

A written notice of non-compliance with the provisions of this Water Conservation Plan will be sent or delivered in person by a representative of the Virgin Valley Water District notifying the property owner that he/she is in violation of the plan. The notice shall specify the section of the plan that has been violated.

**C. THIRD VIOLATION**

A flow-restricting device will be installed on the customer's service line upon the third violation of the Water Conservation Plan. The flow restrictor shall not restrict the water delivery by more than 50% of normal flow. The flow restrictor may only be removed by a representative of the Virgin Valley Water District. The customer will be billed for the cost of installation of the flow-restricting device (material and labor).

**D. SUBSEQUENT VIOLATION**

Subsequent violations will be grounds for termination of service upon proper notification.

**12. EVALUATION OF WATER CONSERVATION PLAN**

The Board of Directors of the Virgin Valley Water District shall evaluate the effectiveness of the adopted Water Conservation Plan on a monthly basis and shall provide for an agenda item for public discussion and education of water conservation matters.

**13. IMPLEMENTATION OF PLAN**

The provisions of this Water Conservation Plan shall go into effect on the first day of the month following the adoption of said plan by the Board of Directors of the Virgin Valley Water District and shall remain in force continually, subject only to changes, amendments or cancellation by the Board.

**14. ADOPTION OF THE REVISED CONSERVATION PLAN**

Adopted the 16th day of October, 2007

Yeas	<u>Cecil Leavitt</u>	Nays	<u>None</u>
	<u>Ted Miller</u>		<u></u>
	<u>Robert Smith</u>	Absent	<u>Kenyon Leavitt</u>

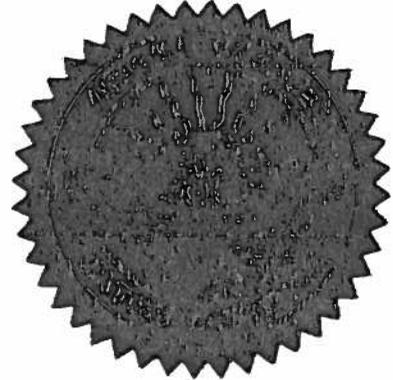
Yeas John Paul Abstain None

/s/ John Paul  
John Paul  
President, Virgin Valley Water District

Original on file with the Virgin Valley Water District

Board of Directors:

John Paul, President  
Cecil Leavitt, Secretary-Treasurer  
Robert "Bubba" Smith  
Kenyon Leavitt  
Ted Miller



**ADDENDUM TO THE WATER CONSERVATION PLAN**

**of the**

**VIRGIN VALLEY WATER DISTRICT**

**WATER CONSERVATION MEASURES TAKEN**

The Nevada Revised Statutes suggests several ways to implement water conservation measures in a water utility service area. One of these measures is to implement a rate structure that will affect the consumption of water (NRS 540.141.2). The statutes states the following:

2.(a) The feasibility of charging variable rates for the use of water to encourage the conservation of water.

2.(b) How the rates that are proposed to be charged for the use of water in the plan or joint plan will maximize water conservation, including, without limitation, an estimate of the manner in which the rates will affect consumption of water.

The Virgin Valley Water District has established a record of increasing various fees that have had a significant impact on water conservation.

**Meter and Impact Fee Schedule**

Since the Impact Fee, Ordinance II Fee and the Installation Costs were formally implemented on January 1, 2002 the Capacity Allowed (gpd) has not changed. Fees have been significantly increased to the present time, however, as follows:

5/8 x 3/4 inch meter	\$3,300.00	to	\$5,770.00
1 inch meter	6,500.00	to	11,440.00
1 1/2 inch meter	15,910.00	to	28,260.00
2 inch meter	25,050.00	to	44,810.00
3 inch meter	48,720.00	to	88,490.00
4 inch meter	75,620.00	to	137,620.00
6 inch meter	150,750.00	to	274,650.00
8 inch meter	239,500.00	to	437,500.00
10 inch meter	343,670.00	to	628,380.00
12 inch meter	462,175.00	to	845,685.00

## Monthly Water Rates and Service Charges

The monthly water rates and service charges have likewise been increased. A tiered water rate system for all meters became effective on June 1, 1998. The monthly minimum meter rates and water use charges were increased effective on July 1, 2001 with a further increase in the tiered water use charges effective on January 1, 2008. The monthly minimum meter charges in 1998 and then increased on July 1, 2001 were:

5/8 x 3/4 inch meter	\$10.00	to	\$13.30
1 inch meter	25.00	to	33.25
1 1/2 inch meter	50.00	to	66.50
2 inch meter	95.00	to	126.35
3 inch meter	350.00	to	465.50
4 inch meter	550.00	to	731.50
6 inch meter	750.00	to	997.50
8 inch meter	1,250.00	to	1,662.50
10 inch meter	1,400.00	to	1,862.00
12 inch meter	1,500.00	to	1,995.00

The tiered water use rates have been increased since their adoption on June 1, 1998. The current tiered rates were increased January 1, 2008 as follows:

	0-Usage to 24,000 gal	25,000 gal to 49,000 gal	50,000 gal to 99,000 gal	100,000 gal +
1998 rates are per 1,000 gallons:				
	\$1.20	\$1.35	\$1.50	\$1.75
2001 rates are per 1,000 gallons:				
	\$1.32	\$1.49	\$1.65	\$1.93

Early water use rates for the Mesquite Farmstead Water Association, dated March 8, 1983, indicate that the monthly flat rate for the first 5,000 gallons ranged from \$14.00 for a 3/4 inch meter to \$141.50 for a 6 inch meter. The monthly cost for water use over the 5,000 gallons was \$0.70 per thousand gallons and \$1.00 per thousand gallons for water use exceeding 250,000 gallons.

### Effect on Water Consumption:

Has the increase in Rates and Service Charges had an effect on the water consumption in the district service area? Absolutely. A review of the residential meter usage reveals the following interesting statistics:

## Residential Water Use

Year	Number of Meters	Acre Feet Used	Acre Feet Per Home
1998	2,567	1,263	0.49
1999	3,229	1,482	0.46
2000	3,531	1,599	0.45
2001	3,917	1,732	0.44
2002	4,229	1,872	0.44
2003	4,633	1,965	0.42
2004	5,167	2,137	0.41
2005	5,753	2,170	0.38
2006	6,078	2,502	0.41
2007	6,632	2,730	0.41

The 'Rule of Thumb' for individual residential use is approximately 1 acre-foot of water per year. The Virgin Valley Water District is far below this average at 0.41 acre feet indicating that the residents are extremely water use conscious and that efforts are made to conserve water. Water consumption has dropped from 0.49 acre-feet to 0.41 acre-feet in nine years or a decrease of 16%.

### Use of Secondary Water:

NRS 540.141.1.(c).(2) encourage water utilities to implement reuse of effluent. This is not possible for the Virgin Valley Water District since the City of Mesquite is responsible for the wastewater collection, treatment and reuse. The City does have an extensive program of making wastewater effluent available to the several golf courses in the community for the watering of the fairways. Culinary water is still being used for irrigation of the greens. The City of Mesquite delivered 1,470 acre-feet in 2004 and 2,116 acre-feet in 2007 for golf course irrigation, a significant saving in groundwater consumption for the Virgin Valley Water District. (See attached table of secondary water use by the City of Mesquite.)

The Virgin Valley Water District has implemented a secondary water delivery system in the Town of Bunkerville where non-potable water is being pumped from the Virgin River zone of influence, through a secondary delivery system and made available to each customer in the community for irrigation. The irrigation water delivered in 2007 from this system was 112.82 acre-feet.

**Water Resources of the Virgin River Basin**

A power point presentation was made to the Nevada Legislative Committee on Public Lands on March 7, 2008 by Mr. Michael Johnson, Chief Hydrologist for the Virgin Valley Water District at which time he discussed the Water Resources of the Virgin River Basin. A copy of this power point presentation is attached hereto as additional information related to the water use and conservation practices of the Virgin Valley Water District.

DATE	Oasis Golf Course	Falcon Ridge Golf Course	Mesquite Facilities	Construction Water	Total Reuse Water	Acre Foot Annual Usage
	Total Gallons	Total Gallons	Total Gallons	Total Gallons	Total Gallons	
Jan-04	8,960,000	3,793,000	128,000	115,000		
Feb-04	22,248,000	9,524,000	363,000	214,000		
Mar-04	26,679,000	15,304,000	1,199,000	356,000		
Apr-04	28,628,000	13,127,000	1,660,000	293,000		
May-04	31,535,000	16,842,000	2,908,000	682,000		
Jun-04	29,371,000	18,076,000	3,094,000	495,000		
Jul-04	27,758,000	23,945,000	2,951,000	524,000		
Aug-04	10,788,000	40,883,000	3,221,000	495,000		
Sep-04	13,274,000	37,286,000	2,534,000	342,000		
Oct-04	8,098,000	23,418,000	1,002,000	290,000		
Nov-04	6,019,000	14,214,000	392,000	170,000		
Dec-04	10,930,000	15,052,000	161,000	182,000		
	224,288,000	231,065,000	19,613,000	4,168,000	479,134,000	1470 acft
Jan-05	5,339,000	11,533,000	59,000	61,000		
Feb-05	8,680,000	4,612,000	6,000	47,000		
Mar-05	12,768,000	11,825,000	555,000	21,637,000		
Apr-05	14,781,000	16,811,000	1,639,000	3,499,000		
May-05	10,867,000	21,150,000	2,204,000	11,237,000		
Jun-05	3,049,000	30,868,000	3,452,000	10,781,000		
Jul-05	629,000	38,817,000	3,083,000	8,343,000		
Aug-05	13,732,000	22,463,000	2,318,000	3,744,000		
Sep-05	12,984,000	23,602,000	2,021,000	3,070,000		
Oct-05	11,275,000	28,722,000	1,311,000	6,716,000		
Nov-05	17,200,000	12,120,000	495,000	14,709,000		
Dec-05	19,777,000	13,924,000	587,000	7,004,000		
	131,101,000	236,647,000	17,930,000	90,728,000	476,406,000	1462 acft
Jan-06	18,402,000	18,438,000	300,000	7,252,000		
Feb-06	25,057,000	14,055,000	765,000	5,309,000		
Mar-06	16,608,000	19,871,000	809,000	5,658,000		
Apr-06	19,708,000	18,013,000	1,284,000	7,035,000		
May-06	11,239,000	25,680,000	2,867,000	17,946,000		
Jun-06	1,993,000	29,939,000	3,230,000	16,276,000		
Jul-06	23,052,000	28,315,000	3,323,000	2,187,000		
Aug-06	16,870,000	28,229,000	2,871,000	9,783,000		
Sep-06	13,163,000	35,450,000	1,711,000	8,611,000		
Oct-06	15,562,000	23,247,000	1,335,000	7,859,000		
Nov-06	12,639,000	22,162,000	545,000	11,171,000		
Dec-06	10,469,000	17,012,000	301,000	17,484,000		
	184,759,000	280,411,000	19,321,000	116,780,000	601,271,000	1845 acft

Jan-07	17,867,000	17,460,000	209,000	10,902,000	
Feb-07	21,289,000	17,693,000	491,000	3,257,000	
Mar-07	28,316,000	24,875,000	1,179,000	2,920,000	
Apr-07	28,629,000	24,315,000	1,519,000	658,000	
May-07	29,454,000	33,819,000	2,659,000	904,000	
Jun-07	29,097,000	33,541,000	2,874,000	866,000	
Jul-07	24,927,000	50,781,000	2,908,000	3,006,000	
Aug-07	27,440,000	30,076,000	2,598,000	1,504,000	
Sep-07	29,112,000	36,935,000	1,693,000	144,000	
Oct-07	29,413,000	19,620,000	1,184,000	198,000	
Nov-07	27,036,000	19,513,000	753,000	184,000	
Dec-07	14,648,000	8,420,000	96,000	22,446,000	
	307,238,000	317,048,000	18,133,000	46,988,000	689,407,000 2116 ac/ft
Jan-08	14,368,000	11,537,000	2,150,000	17,734,000	
Feb-08	20,131,000	5,475,000	4,068,000	18,100,000	
Mar-08	28,346,000	21,590,000	881,000	1,183,000	
Apr-08	28,613,000	24,668,000	1,559,000	217,000	
May-08					
Jun-08					
Jul-08					
Aug-08					
Sep-08					
Oct-08					
Nov-08					
Dec-08	91,458,000	63,470,000	8,648,000	37,244,000	200,620,000

# **Water Resources of the Virgin River Basin**

**Michael Winters, General Manger  
Michael Johnson, Chief Hydrologist  
Virgin Valley Water District**

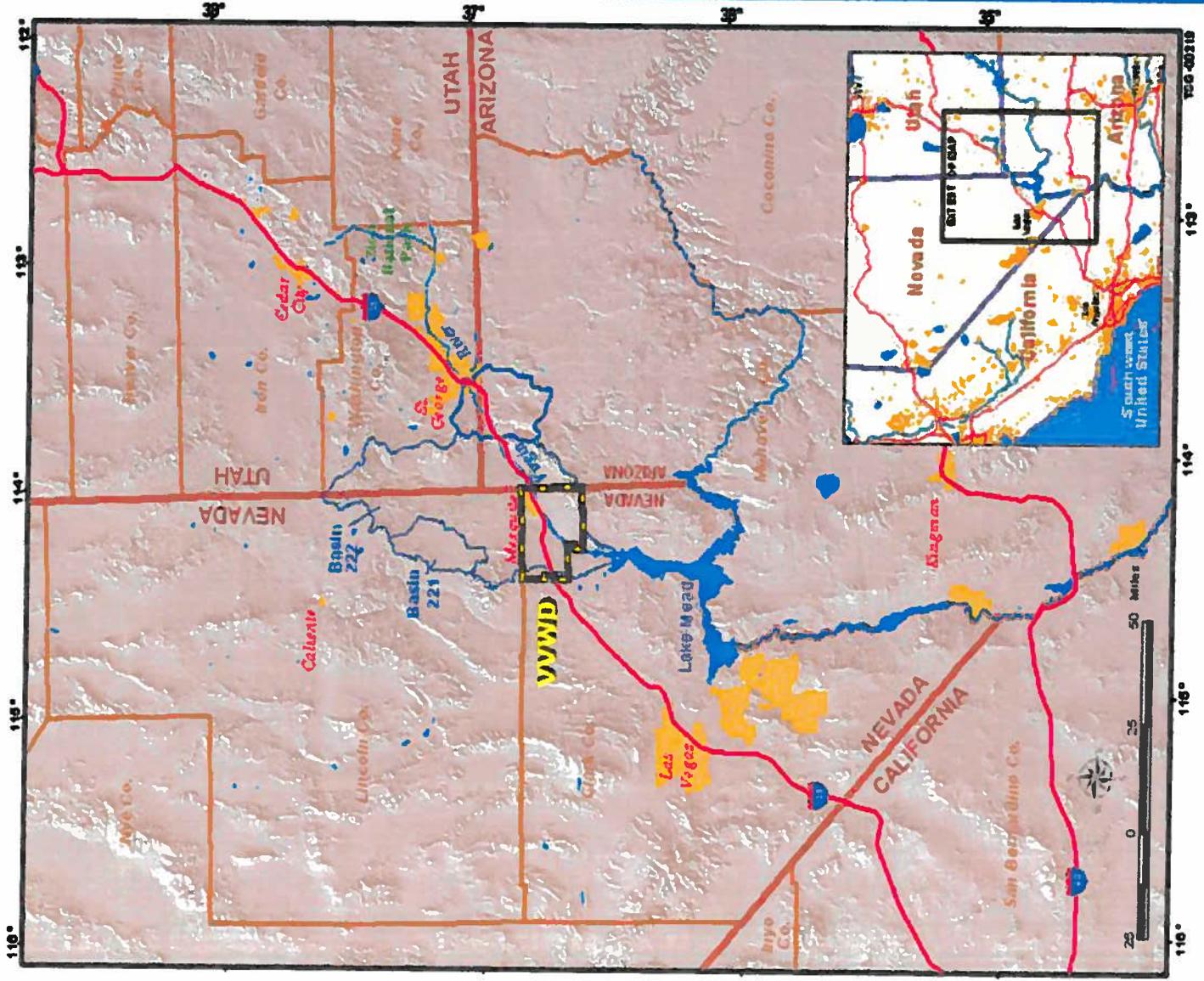
**for**

**Legislative Committee on Public Lands  
March 7, 2008  
Caliente, Nevada**



# Discussion

- Virgin River Basin
- Lower Virgin River
- Ground Water Resources
- Surface Water Resources
- Population and Use
- Future Demands





# Land Use and Demands on Virgin River

- Virgin River is not governed by any interstate compact
- Individual State water rights have been permitted
- Historical use of water was agriculture
- Virgin River Basin and adjacent area is a rapidly growing region
- Change from rural-agriculture to residential-municipal land and water use
- Greater demands for water imposed by urbanization
- Balance between sustainable water resource development and habitat/species conservation

# Virgin Valley Water District Ground Water Resources

- Nine Production Wells, Deepest Well 3300 feet
- Additional production well planned
- Production rate 700 to 3,000 gallons per minute, total capacity 13,000gpm 19 million gallons per day (mgd)

Constructing 5 Arsenic Treatment Plants  
**\$22,000,000**

- Peak Usage 10 mgd, storage 15 million gallons,



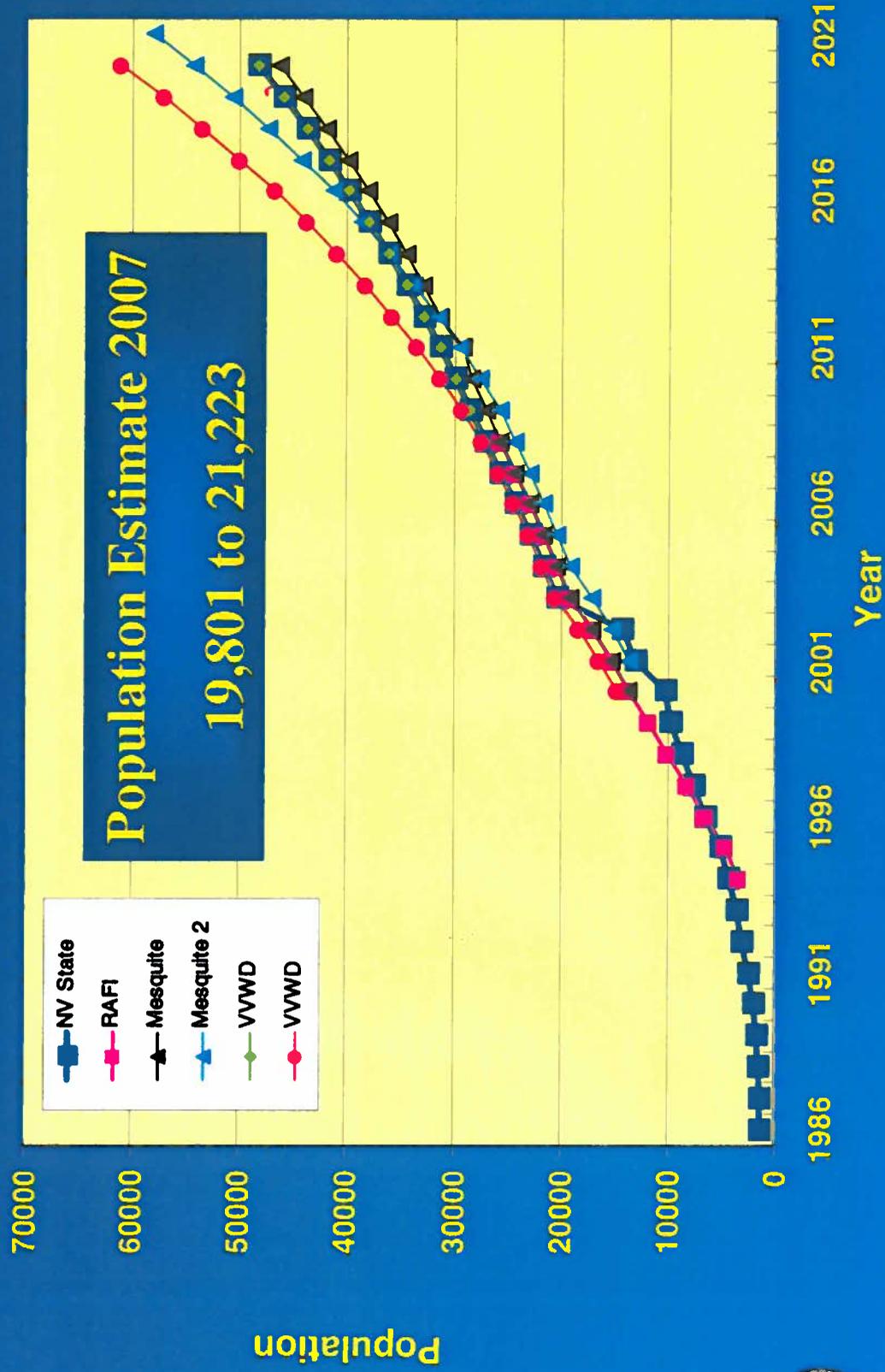
# Ground Water Rights in Nevada for the Lower Virgin River Basin

<u>Type of Use</u>	<u>Permitted and Certificated Water Rights</u>	
Municipal & Industrial Stockwater/Recreation	Virgin Valley Water District	12,039.0 afy 76.9 afy <b><u>12,115.9 afy</u></b>
<u>Type of Use</u>	<u>Applications</u>	
Municipal & Industrial (1989-1996)	Southern Nevada Water Authority & Virgin Valley Water District Virgin Valley Water District J & J Building Supply Lincoln/Vidler	65,158 afy 161,667 afy 362 afy <b><u>14,480 afy</u></b> <b><u>241,667 afy</u></b>
Irrigation (1999)		

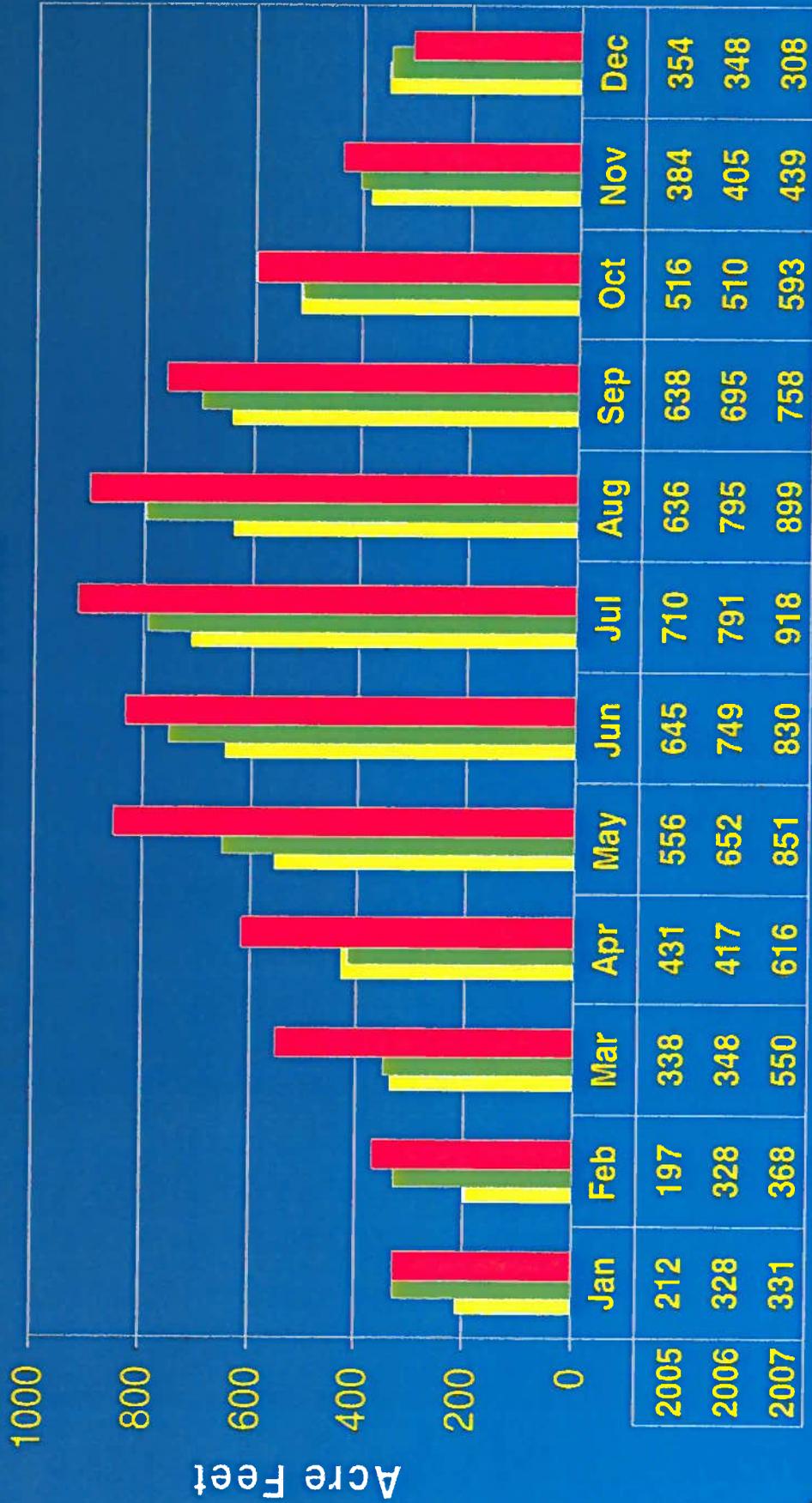
Data source Nevada Division of Water Resources



# Population Projections for the Service Area of the Virgin Valley Water District



# Virgin Valley Water District Water Production



■ 2005 ■ 2006 ■ 2007



# Annual Delivery of Potable Water Virgin Valley Water District

1982 to 2007



# Conservation

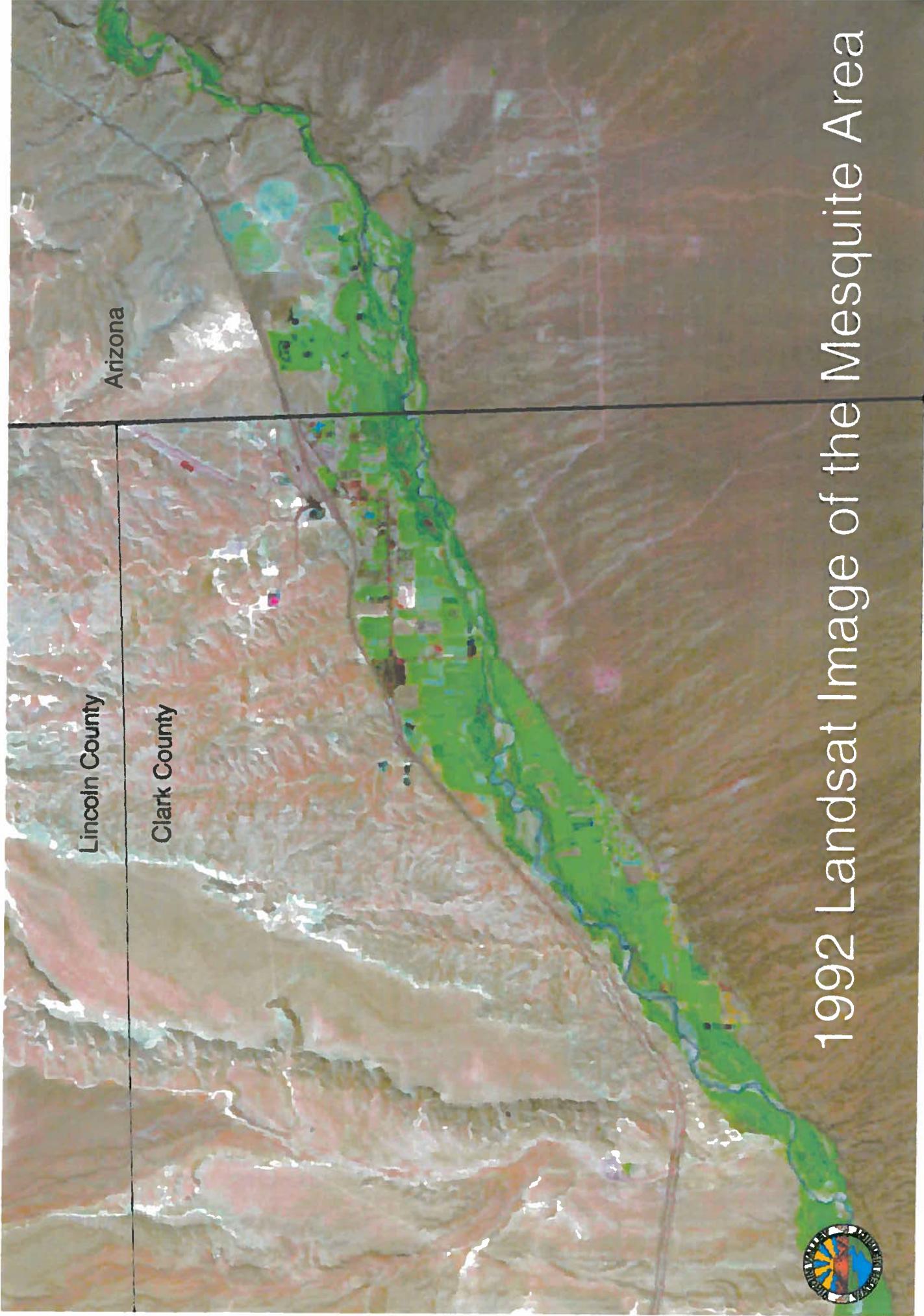
- Revised Conservation Plan submitted to Division of Water Resources in 2007
- Adopted NEW Tiered Rate Structure to promote conservation January 2008, partially to fund O&M for Arsenic Treatment Plants
- Virgin River/recycled water utilized at parks and golf courses
- Secondary System for domestic use in Bunkerville
- Virgin River Habitat Conservation and Recovery Program

30.12.20

17.7.2003

6.6.1999





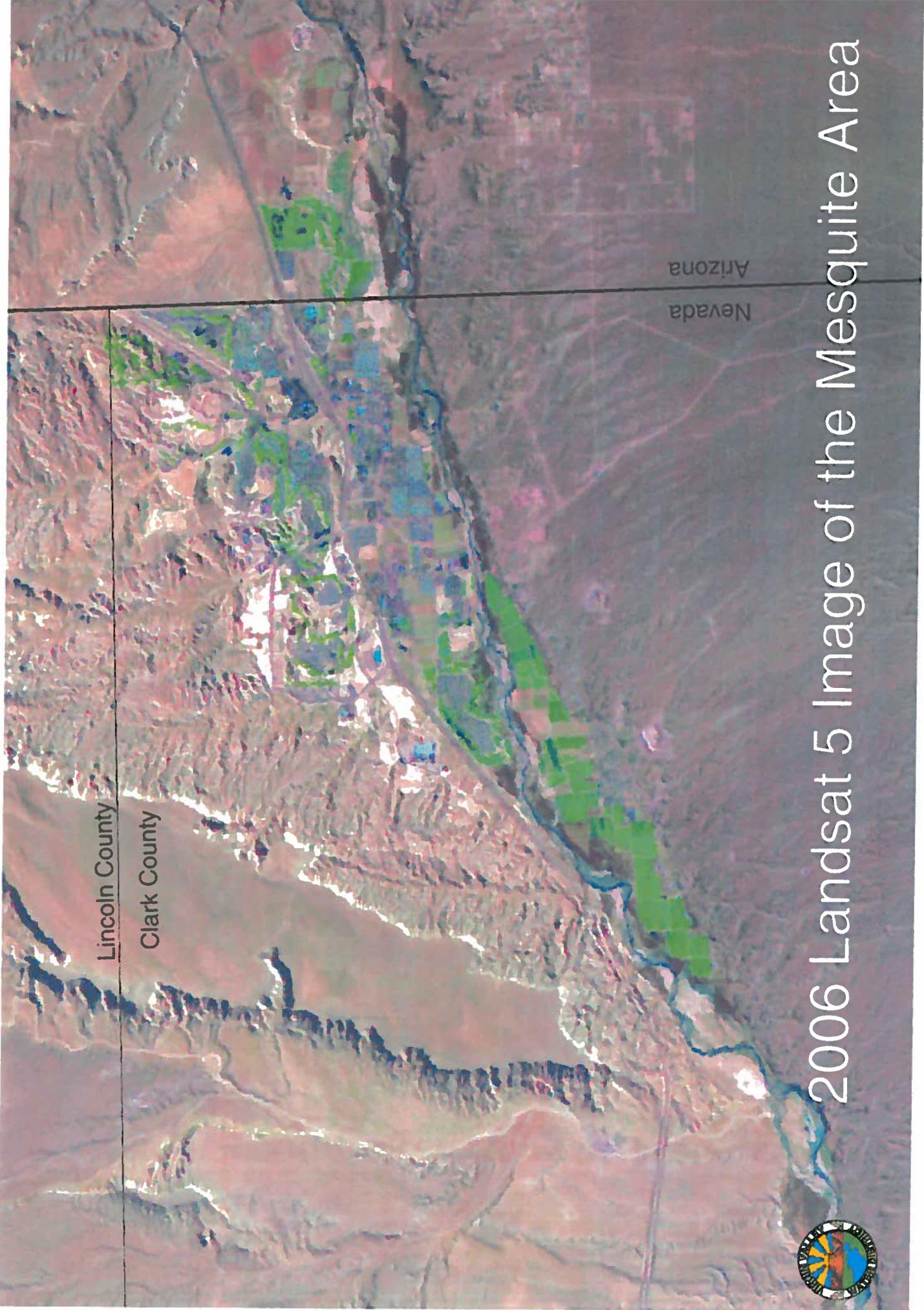
Lincoln County

Clark County

Arizona

1992 Landsat Image of the Mesquite Area





Lincoln County

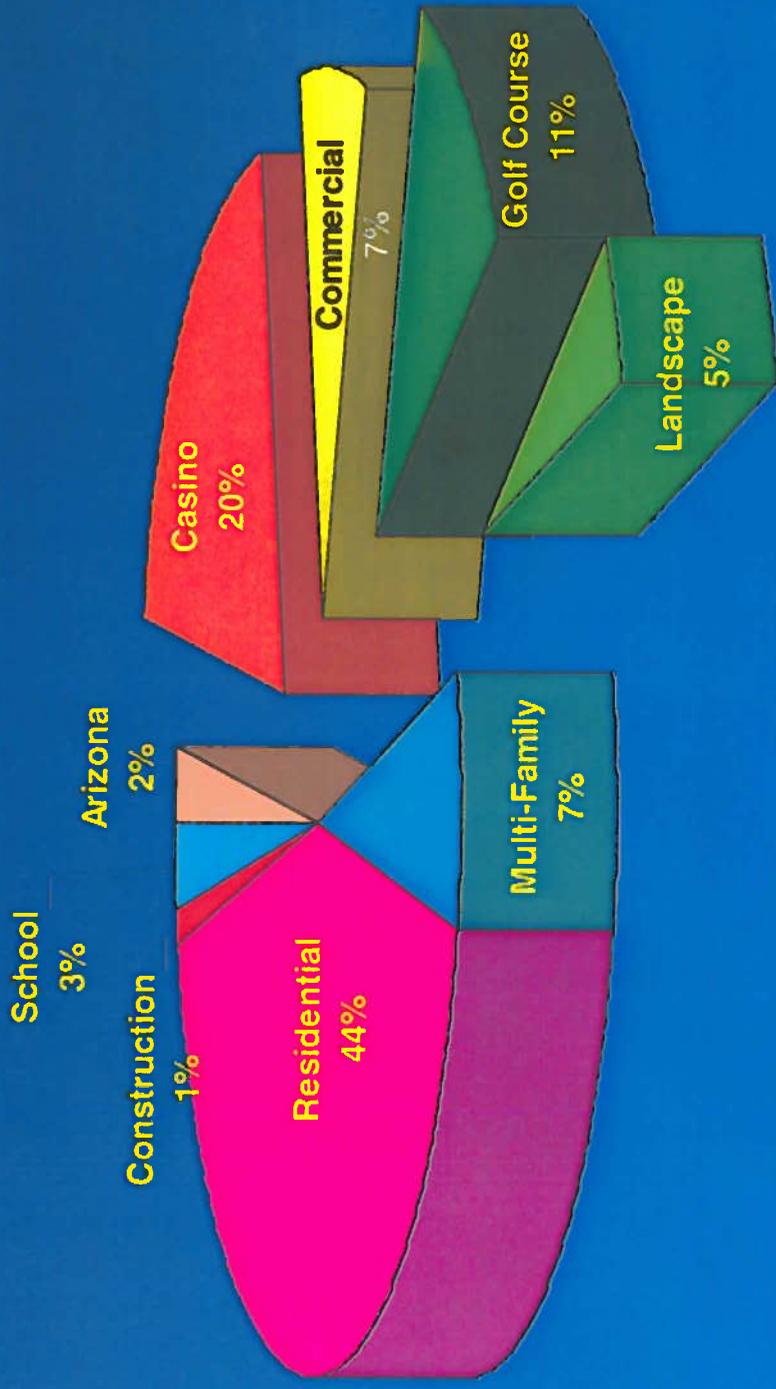
Clark County

Nevada  
Arizona



# 2006 Landsat 5 Image of the Mesquite Area

# Water Use by Category in the Service Area of the Virgin Valley Water District in 2005



# Surface Water Rights on Lower Virgin River

- Virgin River Decree – date 1927
  - Bunkerville Irrigation
  - Mesquite Irrigation
  - Priority Date 1905

8,116 afy  
9,670 afy  
17,786 afy

- Other NV permitted priority 1914 - 1956
  - Mesquite Irrigation
  - Bunkerville Irrigation
  - Riverside

2,106 afy  
1,496 afy  
1,916 afy

5,518 afy

- SNWA; 1989 113,000 afy average annual diversion up to a maximum 190,000 afy; priority
  - Under agreement VVWD holds 3,750 acre-feet



# Challenges for Development in the Lower Virgin River Valley

- Water Quality,
  - new Arsenic standard of 10  $\mu\text{g/L}$ ,
  - Desalination of Virgin River water
- Growth and infrastructure development
- Environmental Issues, Virgin River Habitat Conservation and Recovery Program NEPA and ESA compliance associated with land acts
- Competing water resource demand with Arizona and Utah

