SOUTHERN NEVADA WATER AUTHORITY
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December 19, 2013

Terry Fulp, Ph.D., Regional Director
Bureau of Reclamation
Lower Colorado Regional Office
P.O. Box 61470
Boulder City, Nevada 89006

Dear Dr. Fulp:

SUBJECT: SOUTHERN NEVADA WATER AUTHORITY MUDDY AND VIRGIN RIVERS TRIBUTARY CONSERVATION AND IMPORTED INTENTIONALLY CREATED SURPLUS CERTIFICATION REPORTS, CALENDAR YEAR 2012

*4200 Action

Enclosed are the Southern Nevada Water Authority's (Authority) Calendar Year (CY) 2012 Certification Reports for Tributary Conservation and Imported Intentionally Created Surplus (ICS) for the Muddy and Virgin Rivers and Coyote Spring Valley in Nevada.

These Certification Reports demonstrate the amount of Tributary and Imported ICS created and that the method of creation was consistent with Nevada Water Law (specifically NRS 533.030), the Authority's approved ICS Plans of Creation, and requirements as outlined in Section 3 of the *Colorado River Interim Guidelines Lower Basin Shortages and the Coordinated Operations for Lake Powell and Lake Mead* (Guidelines).

As the Certification Reports document, in CY 2012 the Authority created Tributary Conservation and Imported ICS in the volumes indicated below, prior to accounting for the one-time deduction of 5% for the benefit of additional system storage in Lake Mead as described in the Guidelines:

Calendar Year 2012	Volume, in acre-feet/year Cited in the Certification Reports		
	Muddy River (Tributary Conservation)	Virgin River (Tributary Conservation)	Coyote Spring (Imported)
Created ICS	17,313	14,129	3,918

The enclosed CY 2012 Certification Reports, dated November 2013, have been approved by the Nevada State Engineer and incorporate comments provided by the Bureau of Reclamation. If you find the documents satisfactory, please address your letter verifying the quantity of water conveyed from Coyote Spring Valley and through the Muddy and Virgin Rivers to the Colorado River mainstream for the purposes of creating ICS to Zane Marshall, Director – Water & Environmental Resources, at P.O. Box 99956, Las Vegas, Nevada 89193-9956.

If you have any questions, please contact me at 702-862-3748.

Sincerely,

Jeffrey Johnson, SNWA Manager
Water Management and Planning

JJ:lmv

Enclosures (3)

c: Steven Hvinden, Chief, Boulder Canyon Operations Office, Bureau of Reclamation w/ enclosures
Paul Matuska, Manager, Water Conservation and Accounting Group, Lower Colorado River Regional Office, Bureau of Reclamation w/enclosures
Zane Marshall, Director, Water & Environmental Resources – w/o enclosures

Muddy River Tributary Conservation Intentionally Created Surplus Certification Report Calendar Year 2012

SOUTHERN NEVADA WATER AUTHORITY

Cover: Background image is the Lower Muddy River near Logandale, Nevada. Individual photos are within the services area of the Muddy Valley Irrigation Company.

Muddy River Tributary Conservation Intentionally Created Surplus Certification Report

Calendar Year 2012

Southern Nevada Water Authority
100 City Parkway, Suite 700
Las Vegas, Nevada 89106

Water and Environmental Resources Department
Water Management and Planning

November 2013

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Acronyms

AZMET	Arizona Meteorological Network
BCPA	Boulder Canyon Project Act
CY	Calendar Year
ET	Evapotranspiration
ICS	Intentionally Created Surplus
LCRAS	Lower Colorado River Accounting System
MET	Meteorological
MVIC	Muddy Valley Irrigation Company
MBPI	Moapa Band of Paiute Indians
MVWD	Moapa Valley Water District
NDWR	Nevada Division of Water Resources
NVE	NV Energy
OWMA	Overton Wildlife Management Area
PBU	Proof of Beneficial Use
POU	Place of Use
SNWA	Southern Nevada Water Authority
USGS	United States Geological Survey
WSNA	Warm Springs Natural Area

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Abbreviations

af	acre-feet
afy	acre-feet per year
cfs	cubic-feet per second
ft	foot
yr	year

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Introduction

The Secretary of Interior (Secretary) issued a Record of Decision for 'Colorado River Interim Guidelines for Lower Basin Shortages and the Coordinated Operations for Lake Powell and Lake Mead' (Guidelines) on December 13, 2007, which established criteria for the development and delivery of Intentionally Created Surplus (ICS). One type of ICS is Tributary Conservation, which allows a Contractor, as defined in the Guidelines, to increase tributary flows into the mainstream of the Colorado River within its state for ICS credits. The conservation of tributary flows into the mainstream of the Colorado River is limited to water rights that have been used for a significant period of years and were perfected prior to June 25, 1929, the effective date of the Boulder Canyon Project Act. (BCPA).

To generate ICS, the Guidelines require a Contract holder to enter into a Delivery Agreement with the United States of America and a Forbearance Agreement with Lower Basin Contract holders. On December 13, 2007, the Southern Nevada Water Authority (SNWA) and Colorado River Commission of Nevada entered into a Delivery Agreement with the United States of America and Forbearance Agreement with Lower Basin Contract holders. Exhibit A of the Forbearance Agreement describes the surface water rights on the Muddy and Virgin Rivers, pre-dating June 25, 1929, which SNWA plans to use to create Tributary Conservation ICS, and how the Muddy River flows reaching Lake Mead will be calculated (Appendix A).

The Guidelines, Forbearance Agreement, and Delivery Agreement require a plan for the creation of ICS (ICS Plan). An ICS Plan for Muddy River Tributary Conservation ICS was submitted to the Bureau of Reclamation (Reclamation) for Calendar Year (CY) 2012 on June 30, 2011. SNWA received a letter from Reclamation dated December 30, 2011, approving the ICS Plans for CY 2012 (Appendix B).

This report satisfies the requirements of Nevada State Engineer Order 1194 (Appendix C) and the Guidelines as follows:

- Under Nevada State Engineer Order 1194, an annual report will be submitted to the Nevada Division of Water Resources giving a "full accounting of adjudicated water rights on the Muddy River or its tributaries owned or controlled by the entity with an ICS Delivery Contract, which have been conveyed through the Muddy River system to the Colorado River mainstream for the creation of ICS." After review of the annual report, the Nevada State Engineer shall issue a letter verifying the quantity of water conveyed through the Muddy River system to the Colorado River mainstream for the purpose of creating ICS.
- Based on the Guidelines, an annual certification report will be submitted for the Secretary of Interior's review and verification to demonstrate the amount of Tributary Conservation ICS created in the preceding year, and that the method of creation was consistent with SNWA's approved ICS Plan.
- Intentionally Created Surplus is declared a beneficial use under NRS 533.030

Project Description

Muddy River water rights that are being utilized to create Tributary Conservation ICS pursuant to the approved ICS Plan and Exhibit A of the Forbearance Agreement are decreed Nevada state water rights with an established history of use prior to 1929, but have experienced periods of non-use in the interim. Per Exhibit A of the Forbearance Agreement, SNWA is specifically allowed to utilize any and all pre-June 25, 1929, Muddy River water rights to create Tributary Conservation ICS regardless of the water rights history of use after 1928.

The Muddy River originates from regional springs in the Muddy River Springs Area in Nevada and flows into the Overton Arm of Lake Mead (Figure 1). Muddy River flows are relatively constant, because the springs that form the river emanate from the regional carbonate aquifer system of eastern Nevada. The average annual flow of the Muddy River at U.S. Geological Survey (USGS) gaging station 09419000 *Muddy River near Glendale, Nevada* (Glendale gage) for Water Years 1950 through 2012 was 30,560 acre-feet per year (afy).

On the Muddy River, water rights were decreed in 1920, and the decree allocated the entire flow of the Muddy River (Appendix D). The Order of Determination, attached to the decree as Exhibit A, explicitly outlines the Place-of-Use (POU) for the water rights and established summer and winter diversion rates. For the most part, the summer season is May 1 to September 30 with a diversion rate of 1 cubic-foot per second (cfs) per 70 acres of land and the winter season is October 1 to April 30 with a diversion rate of 1 cfs per 100 acres of land. These diversion rates equate to an annual rate of 8.54 afy per acre (afy/acre).

Water rights on the upper reach of the Muddy River, from the Muddy River Springs to the Glendale gage, are owned and controlled by individual right holders. On the Lower Muddy River, downstream of the Glendale gage, water rights are held by the Muddy Valley Irrigation Company (MVIC) for use by its shareholders. In Calendar Year (CY) 2012, SNWA owned and leased individual water rights on the Upper Muddy River and owned and leased shares of stock (shares) in MVIC on the Lower Muddy River.

The decreed Muddy River surface water rights owned and leased by SNWA are no longer being utilized for agriculture and are being conveyed to Lake Mead. The pre-June 25, 1929, water rights conveyed to Lake Mead represent the full right that is and has been historically used for agriculture or could have otherwise been diverted from the Muddy River and fully consumed by SNWA within Nevada.

Muddy River rights conveyed to Lake Mead passed through their historic points of diversion and either flowed through the irrigation company ditches and returned to the mainstream of the Muddy River further downstream or remained in the mainstream of the Muddy River. The full rights owned and leased by SNWA, documented to flow to Lake Mead, have been accounted for as Tributary Conservation ICS.

Figure 1 - Map of the Upper and Lower Reaches of the Muddy River Divided by the Glendale Gage

Summary of Results for CY 2012

The total volume of Muddy River water for which SNWA created Tributary Conservation ICS in CY 2012 under the Guidelines was 17,313 af, prior to any overrun payback and one-time deduction of 5% for the benefit of additional system storage in Lake Mead, as outlined in the Guidelines (Table 1). This volume is within the 20,000 af outlined in the approved ICS Plan. Detailed data and calculations are described in subsequent sections of this report.

Table 1 - Summary of SNWA Muddy River CY 2012 Tributary Conservation ICS Credits

Muddy River 2012 ICS

Water Right	Acre Feet Conserved in 2012
Muddy Valley Irrigation Company	7,384
Paiute Lease	3,378
LDS Church Rights Lease	2,001
NV Energy Lease	2,704
Hidden Valley Dairy	924
Knox and Holmes	811
SNWA Acquired Cox Right	85
SNWA Acquired Mitchell Right	26
SNWA Muddy River ICS Credit	**17,313**

SNWA Conservation of Muddy River Rights

On the Muddy River, there are two distinct reaches divided by the United States Geological Survey (USGS) gaging station *09419000 Muddy River Near Glendale, NV* (Glendale gage). By controlling water rights on the Muddy River within these two reaches, SNWA successfully conserved Muddy River water in CY 2012 that was conveyed to Lake Mead for Tributary Conservation ICS credits. The sections below describe the water rights and conservation of the rights.

Verification Process of Fallowed Land

Within the agricultural areas, fields were digitized using the 2006 National Agricultural Imagery Program data. Since 2008, SNWA funded aerial photography flights specifically for the purpose of Tributary Conservation ICS verification. These flights have been strategically scheduled 3-times per year to assure they are capturing the agricultural activities during the summer and winter seasons over a calendar year. These flights are flown at a resolution of 6-inches per pixel. This high quality photography allows for more accurate determinations of fallowed vs. active agricultural fields. An example of the level of detail to which the high resolution aerial photography provides for classifying and delineating crops can be seen on Figure 2.

Aerial photography flights were performed in February, August, and November of 2012 to effectively capture lands being flood irrigated or fallowed during the winter and summer irrigation seasons. Since the summer irrigation season spans May through September, the August photography captures areas that are actually being irrigated, since by August most of the natural vegetation that is not receiving irrigation company water has died back.

Water rights on the Muddy River have defined POU maps and many have subsequent Proof-of-Beneficial-Use (PBU) maps, showing the locations where the decreed and permitted water rights were beneficially used within the defined POU. These POU and PBU maps, when compared to recent aerial photography, serve as the baseline for proof of fallowed lands, demonstrating conservation of the water. In some instances, the recent digitized polygons of the current fields

do not exactly match the fields on the POU or PBU maps from decades prior. This is due to improved mapping capabilities and changes in land/water right ownership resulting in divided/combined fields. However, since the water rights can be used anywhere within the defined POU, the breakdown of the fields is not as important as the total irrigated acreage within the POU.

Some of the fields on the aerial photography depict vegetation even though they are not being actively irrigated. This is due to the fact that many of the fallowed fields historically contained perennial alfalfa, which receive periodic water from winter rains that temporarily turn the fields green. Many of the fields that appear to have some green in the aerial photography flown in the cooler months are brown in the August aerial photography.

Figure 2 - Example of Detailed 6-inch Aerial Photography on the Lower Muddy River

Upper Muddy River Rights

Background

The Upper Muddy River, for the purposes of this report, is defined as the reach from the Muddy River Springs Area to the Glendale gage. Within this reach, decreed water rights are individually owned with specific POUs describing the lands irrigated by the rights.

For each of the Upper Muddy River water rights controlled by SNWA, there is a series of figures that illustrates the original POU or PBU map associated with the water right followed by the aerial photography taken over the course of the calendar year. For reference the outline of the quarter-quarter sections of the POU is overlaid on the aerial photography.

No evapotranspiration (ET) losses were deducted from the Upper Muddy River water rights between the springs and the Glendale gage, because the prior existing flows of the Muddy River to the Glendale gage already account for all ET losses – these conveyed water rights "ride on top" of the existing flows.

LDS Church Rights Lease / Cox and Mitchell Right Purchase

In 2006, SNWA in partnership with the Moapa Valley Water District (MVWD) agreed to lease 2,001 af out of 2,046 af of decreed Muddy River water rights held by the Corporation of the Presiding Bishop of the Church of Jesus Christ of Latter-day Saints (LDS Church). This water had been historically used to irrigate approximately 228 acres of agricultural lands in the Muddy River Springs Area, located in the headwaters of the Muddy River. The lease agreement allows MVWD to utilize up to 50% of the water leased based on coordination with SNWA. In CY 2012, MVWD did not exercise their 50% option on the LDS Church lease, and SNWA retained the entire 2,001 af.

In 2007, SNWA purchased the vast majority of land associated with the LDS Church water rights for the primary purpose of restoring the habitat of the Moapa dace, an endangered fish species endemic to the warm waters of the Muddy River Springs. The management of this land, referred to as the Warm Springs Natural Area (WSNA), in combination with the U.S. Fish and Wildlife's management of the adjacent Moapa Wildlife Refuge, will protect the majority of the springs that make up the headwaters of the Muddy River. A key component of activities to preserve the Moapa dace's habitat is leaving the warm water that emanates from the regional springs, which was previously used for agricultural purposes, in the natural channels that meander through the WSNA and the Moapa Wildlife Refuge. This preservation activity supports the creation of Tributary Conservation ICS on the Muddy River.

When SNWA purchased the WSNA in 2007, it also acquired two decreed water rights not related to the 2,001 afy LDS Church lease. These rights were originally decreed to Cox (V01619) and Mitchell (V01631) in 1920 for 85 afy and 26 afy, respectively.

It is important to note that although the land previously irrigated with the 2,001 afy of the LDS Church rights is now owned by SNWA, the LDS Church retained ownership of the water rights and is continuing to lease the rights to SNWA and MVWD.

Figure 3 contains the PBU map filed with the LDS Church water right certificates with Figure 4 through Figure 6 comparing the PBU map for the LDS Church water rights with the aerial photography taken in February, August, and November of 2012, respectively. The POU boundary overlaid on the aerial image depicts land fallowing over the vast majority of the POU.

The fallowed lands are further emphasized on Figure 7, which compares the POU area as of August 2012 with an aerial photograph of the area from 1976. The 1976 map shows cultivated fields indicative of active agricultural irrigation, while the August 2012 photograph demonstrates irrigation has not occurred on much of the lands for several years, including CY 2012, and that some (non-irrigated) natural vegetation has replaced previously cultivated/irrigated fields. These naturally vegetated areas are located in the heart of the Muddy River Springs Area. This vegetation is being supported directly by groundwater seeps and the relatively shallow depths to groundwater. Since acquiring the WSNA property in September 2007, SNWA has ensured that none of the fields associated with either the LDS Church lease or the Cox and Mitchell rights were irrigated during CY 2012.

Figure 3 through Figure 6 demonstrate that lands associated with the 2,001 afy LDS Church lease as well as the 111 afy Cox and Mitchell rights remained fallowed during CY 2012. The 2,112 af of conserved water remained in the mainstream of the Muddy River and flowed downstream to the Glendale gage and then to Lake Mead. The conveyance of these rights from the Glendale gage to Lake Mead is accounted for in the calculations for the Lower Muddy River in subsequent sections of this report.

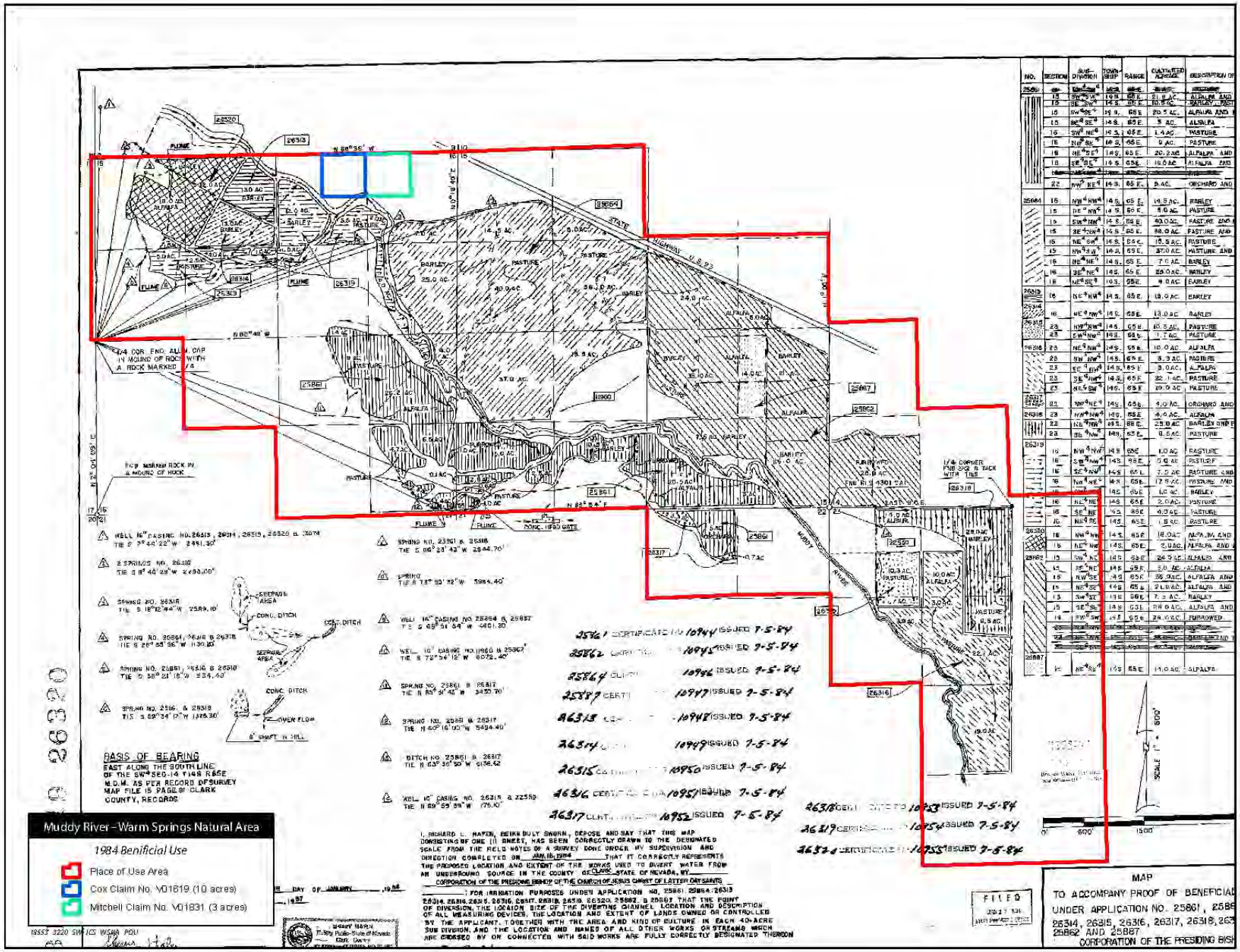


Figure 3 – LDS Church Water Rights 1984 PBU Map; POU Quarter-Quarter Sections for LDS Church Rights Highlighted in Red; Cox and Mitchell Rights Highlighted in Blue and Green, Respectively.

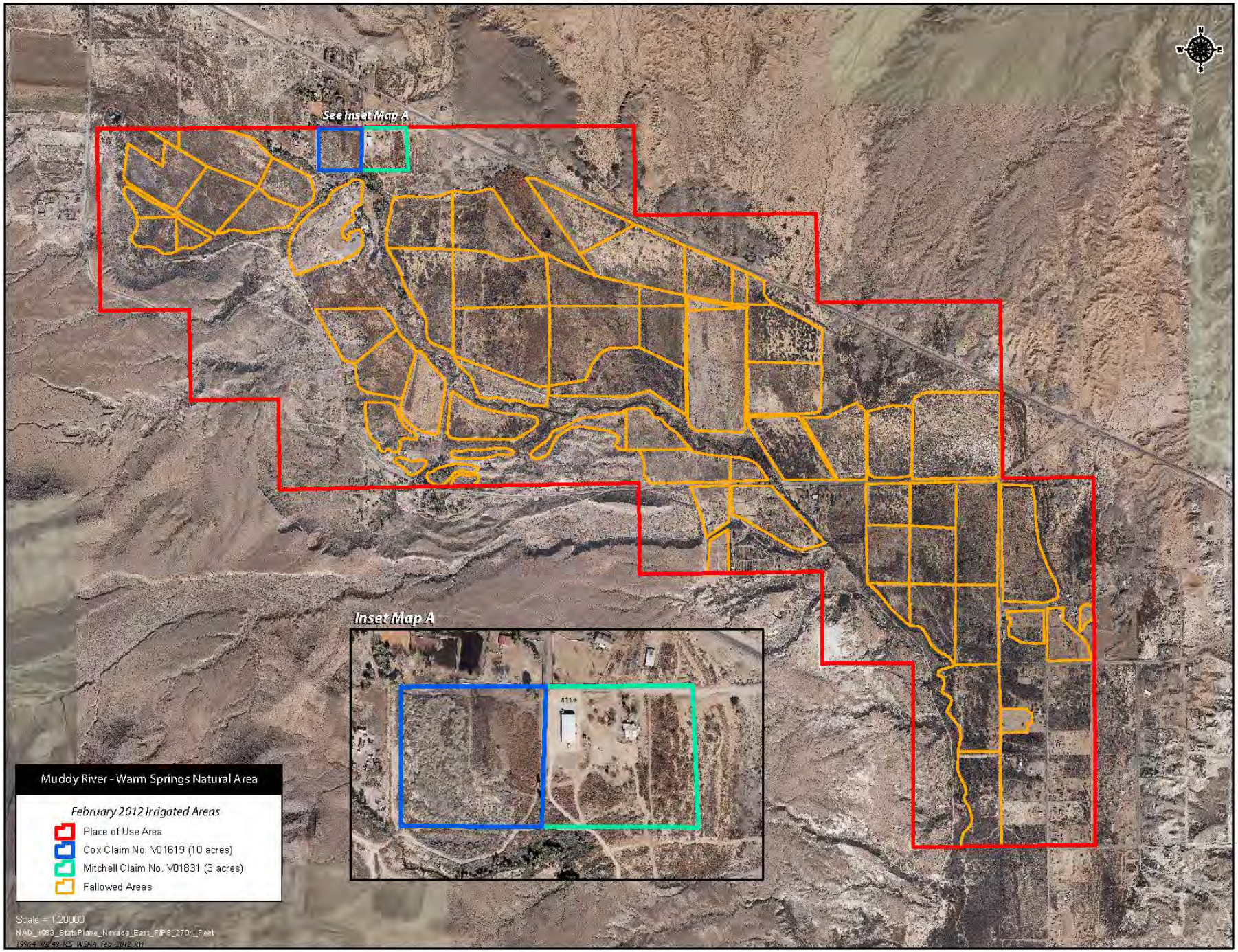


Figure 4 – February 2012 Aerial Photography for LDS Church, Cox, and Mitchell Rights.

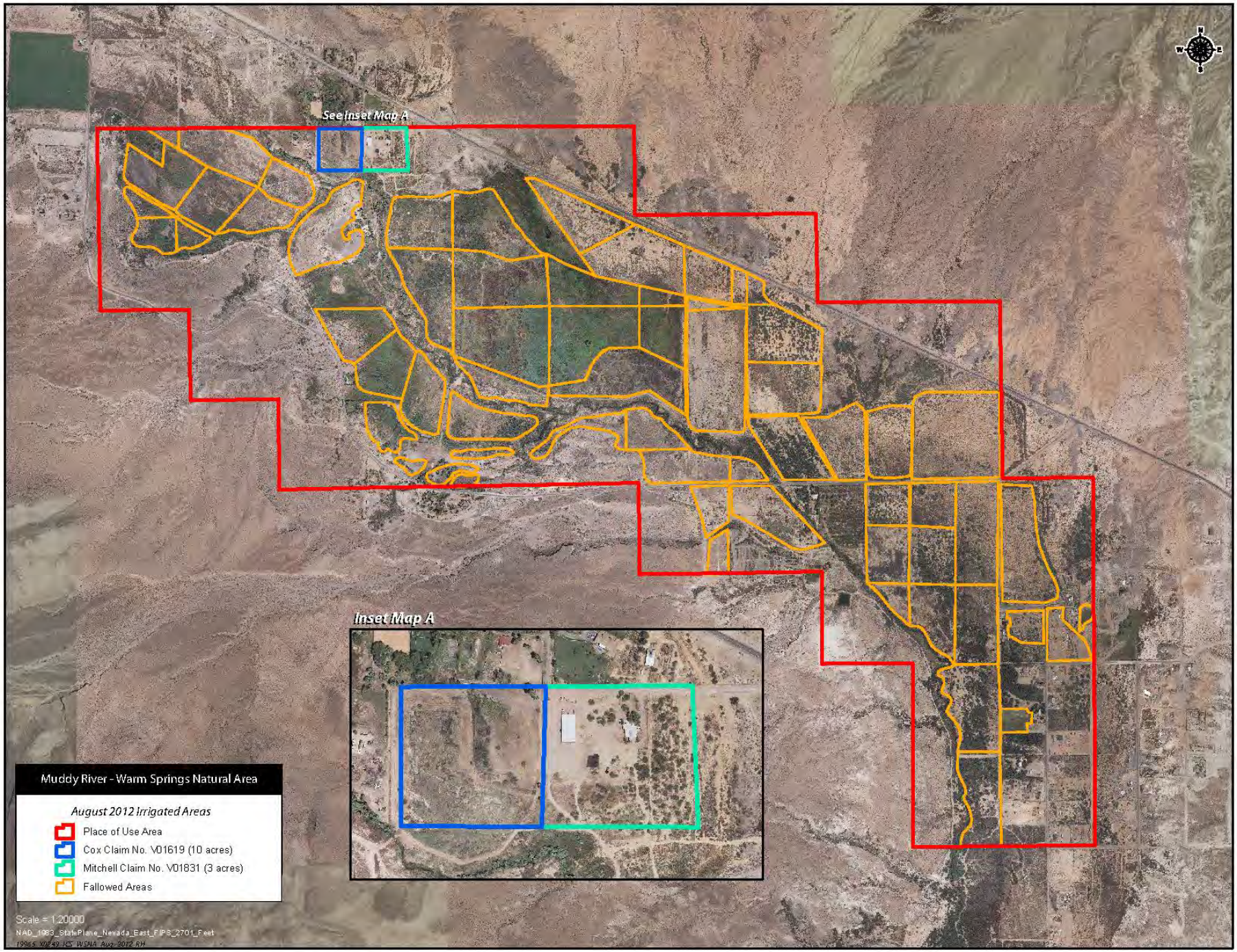


Figure 5– August 2012 Aerial Photography for LDS Church, Cox, and Mitchell Rights.

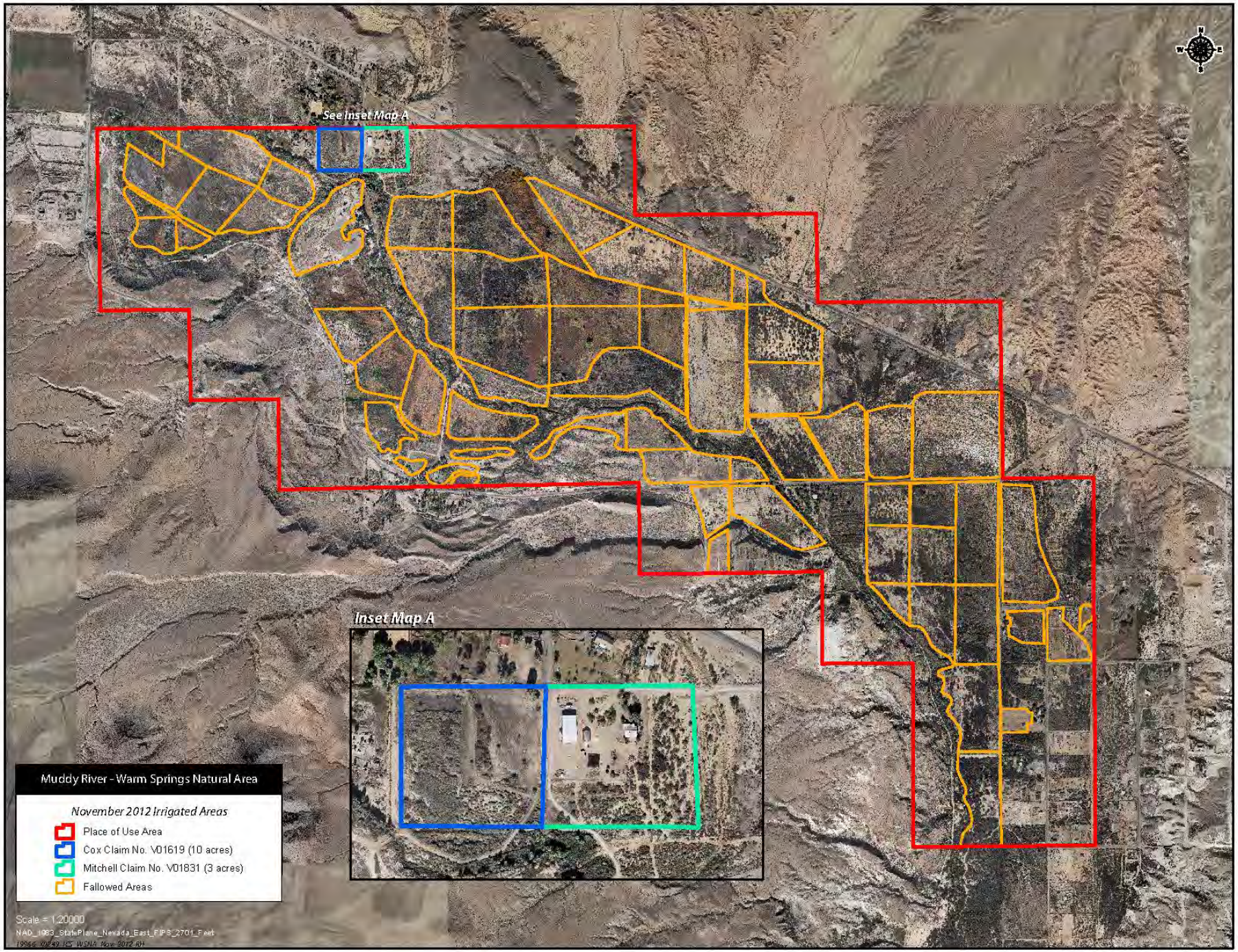
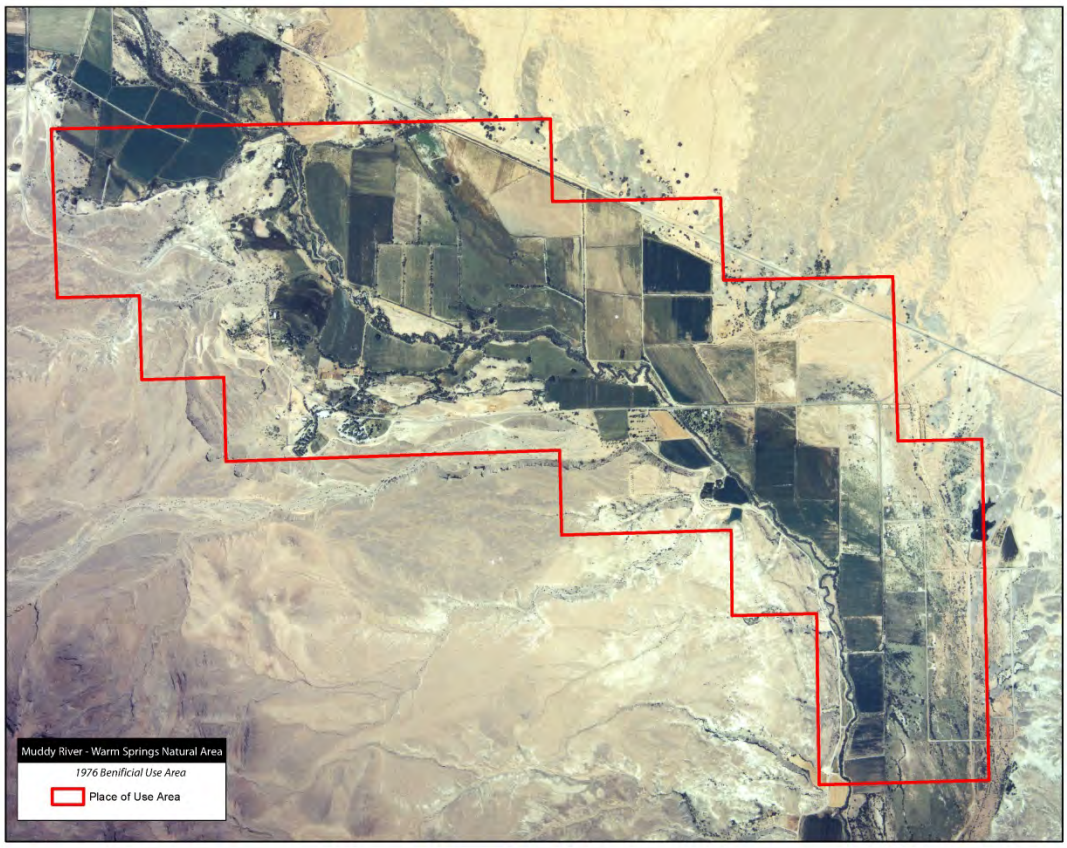


Figure 6 - November 2012 Aerial Photography for LDS Church, Cox, and Mitchell Rights.



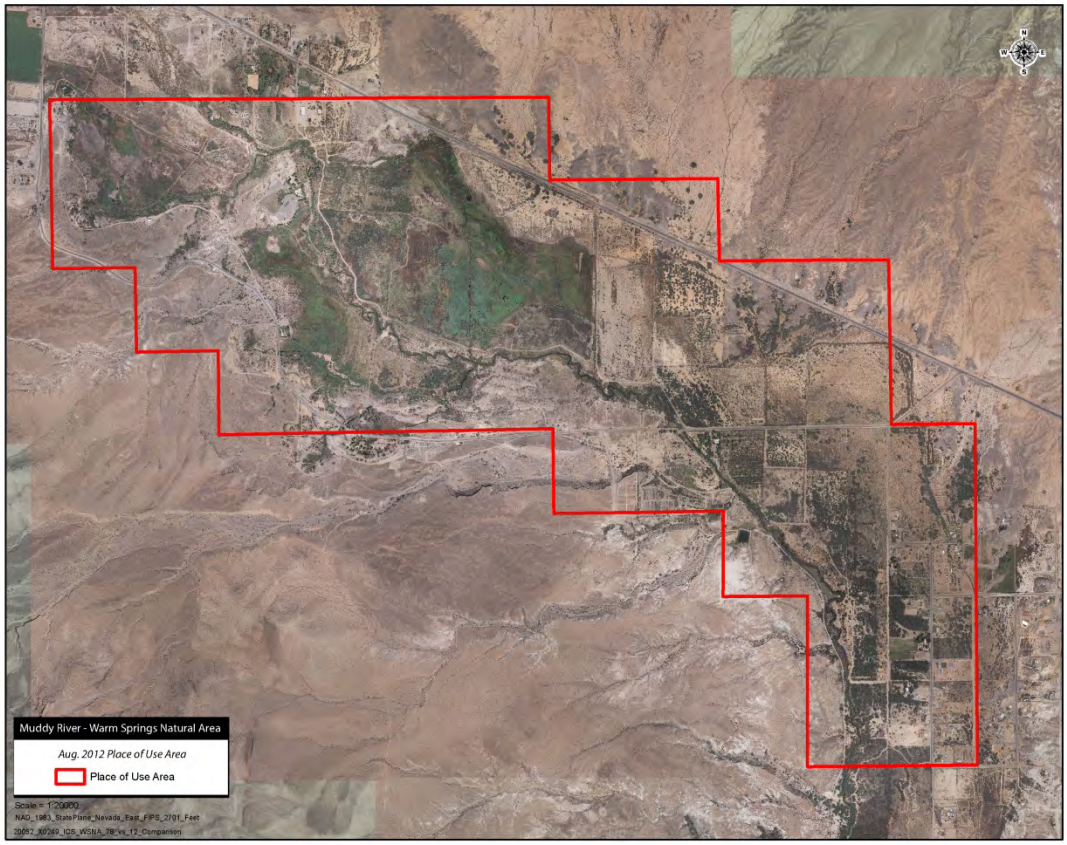


Figure 7 - POU for the LDS Church Water Rights Overlaid on a 1976 Aerial Photograph (Top), and the August 2012 Aerial Photograph (Bottom)

Moapa Band of Paiute Indians Lease

In early 2009, SNWA entered into an agreement with the Moapa Band of Paiute Indians (MBPI) to lease up to 3,700 afy of their pre-BCPA Muddy River consumptive use water rights. The Nevada Division of Water Resources (NDWR) Permits 73482, 73483, and 73695 changed the POU of 3,700 af of consumptive use originally appropriated to the MVIC under Muddy River Decree Certificates 58A, 266, and 274 to the MBPI historically irrigated area of 646 acres. The three MBPI, NDWR Permits state 'consumptive use' is *"…intended to mean diversions less returns of Muddy River Water."*

In 2012 MBPI installed a sprinkler irrigation system with a pressure pump and flow meter. An additional meter was installed at the bottom of the irrigation system where unused diverted water (i.e., water passed through the irrigation system to maintain operations, and not used for irrigation) returns to the Muddy River. In the lease agreement between SNWA and MBPI an estimated 75% of the water used on the fields is being consumptively used. The water used for irrigation based on readings from the two meters and the estimated consumptive use (75% of the diverted water used for irrigation) is presented in Table 2.

Figure 8 through Figure 11 compares the POU for the MBPI lands for which SNWA has leased water with the aerial photography taken in February, August, and November of 2012, respectively.

Table 2 - Moapa Band of Paiutes ICS Credits

Moapa Band of Paiutes Metered Usage													
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	2012 Total
# Days	31	28	31	30	31	30	31	31	30	31	30	31	365
Decree Duty (af per acre)	0.61	0.56	0.61	0.60	0.88	0.85	0.88	0.88	0.85	0.61	0.60	0.61	8.54
Permited Consumptive Use (af)	266.40	240.62	266.40	257.81	380.57	368.30	380.57	380.57	368.30	266.40	257.81	266.40	3,700
Consumptive Use for Irrigation	51.74	6.56	27.42	35.27	20.07	27.36	1.65	15.67	45.69	37.31	42.46	11.28	322
Volume for ICS Credit (af)	214.67	234.06	238.98	222.54	360.51	340.93	378.92	364.90	322.60	229.09	215.35	255.12	**3,378**

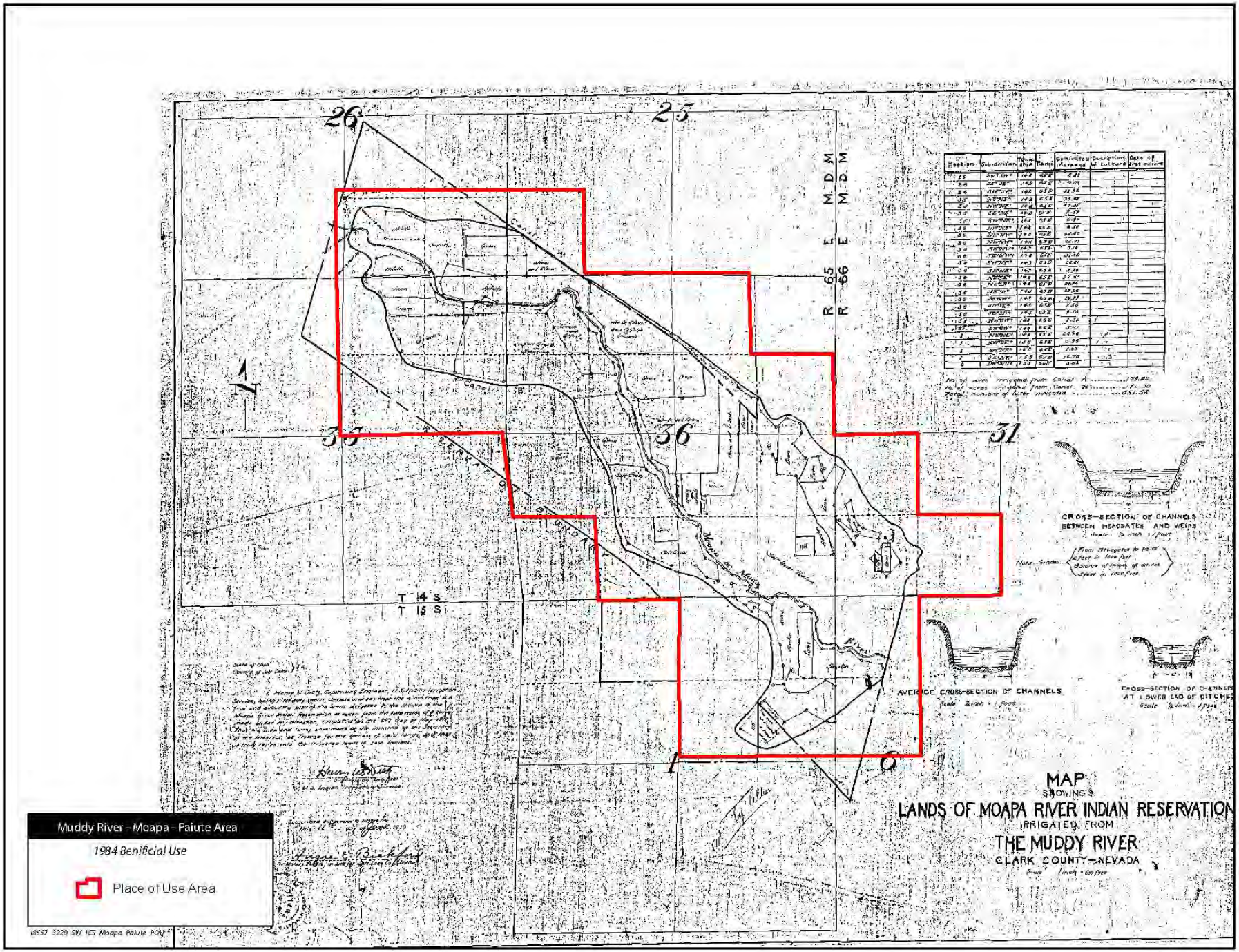


Figure 8 – Moapa Band of Paiutes 1984 PBU Map; POU Quarter-Quarter Sections Highlighted in Red

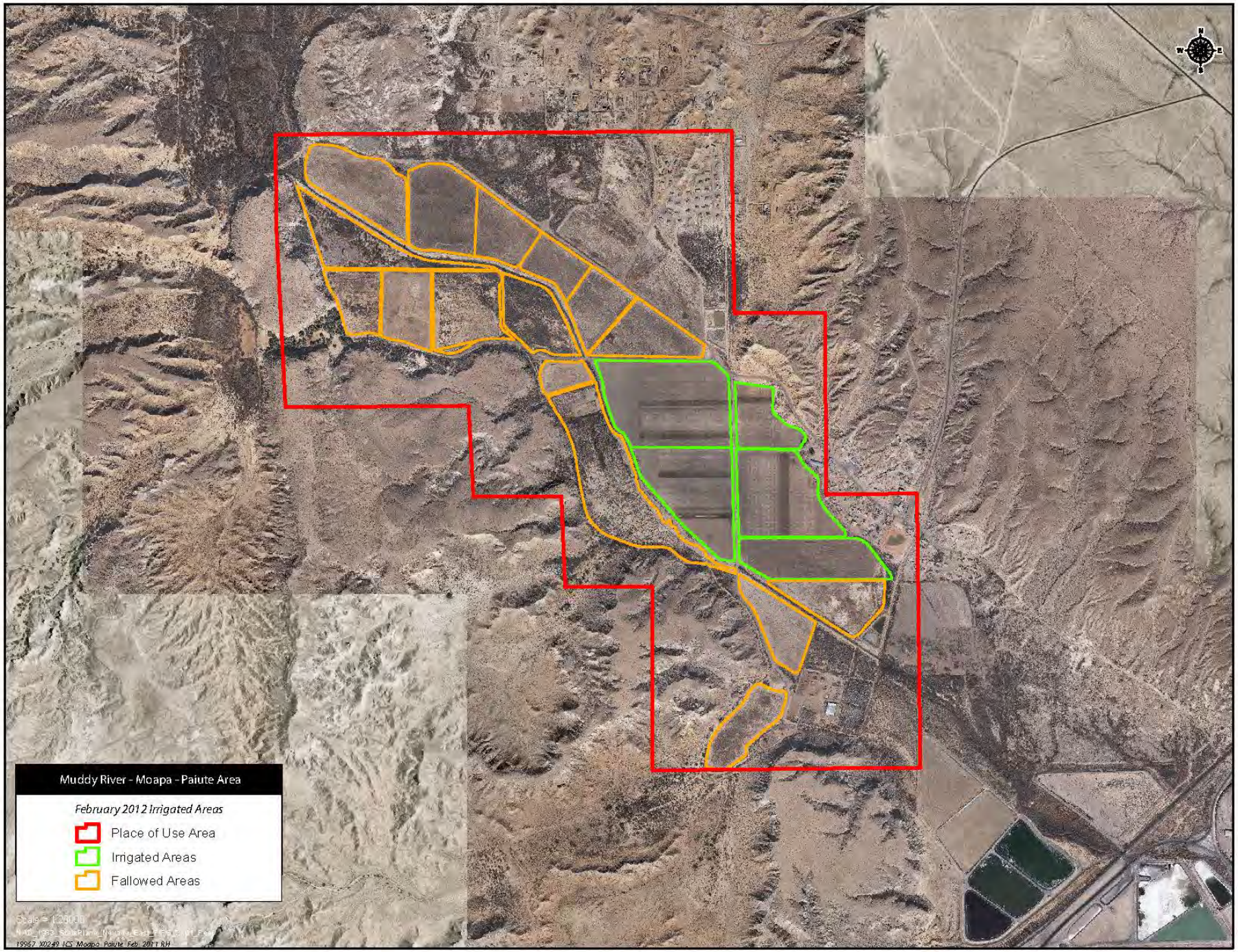


Figure 9 - Moapa Band of Paiutes February 2012 Aerial Photography

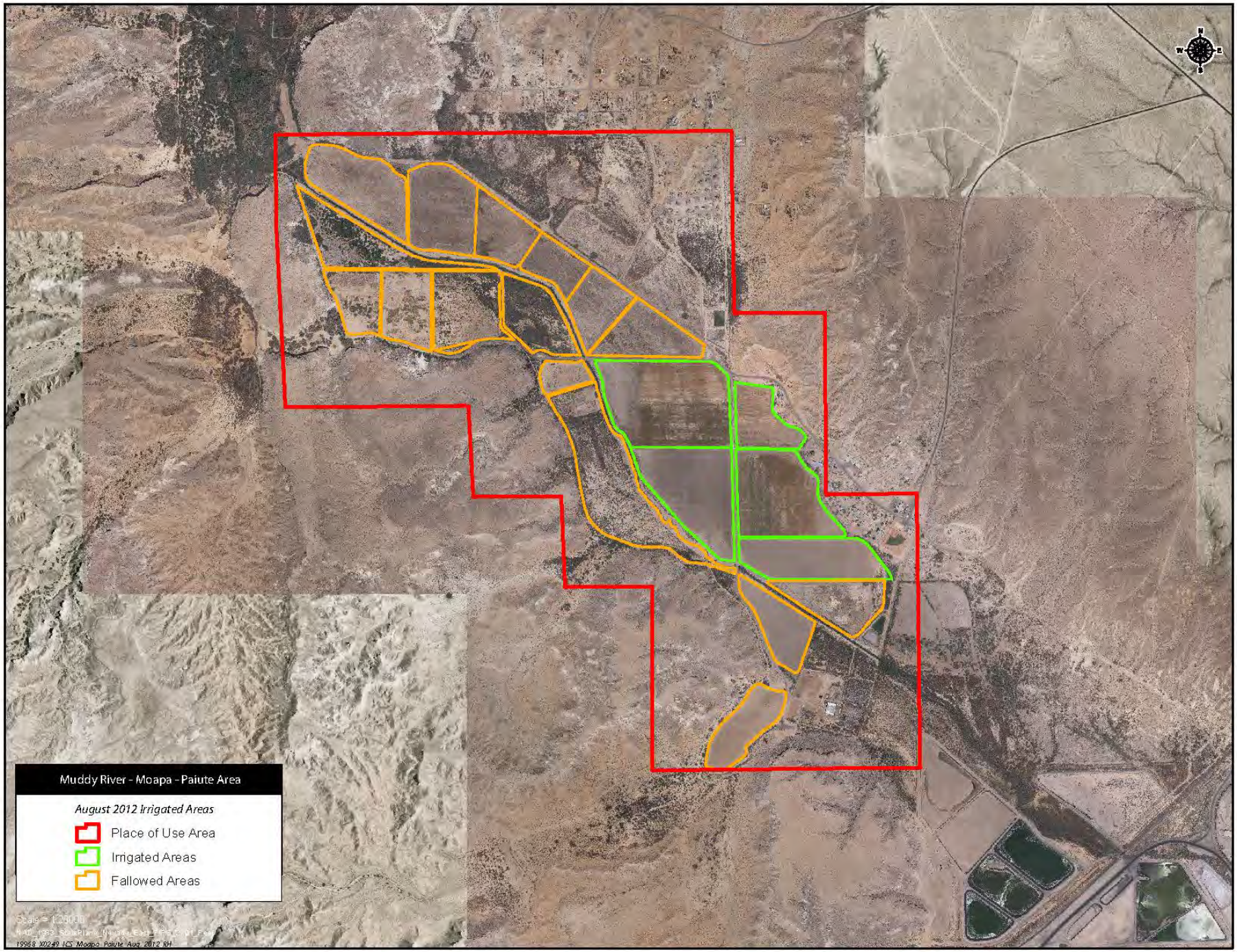


Figure 10 - Moapa Band of Paiutes August 2012 Aerial Photography

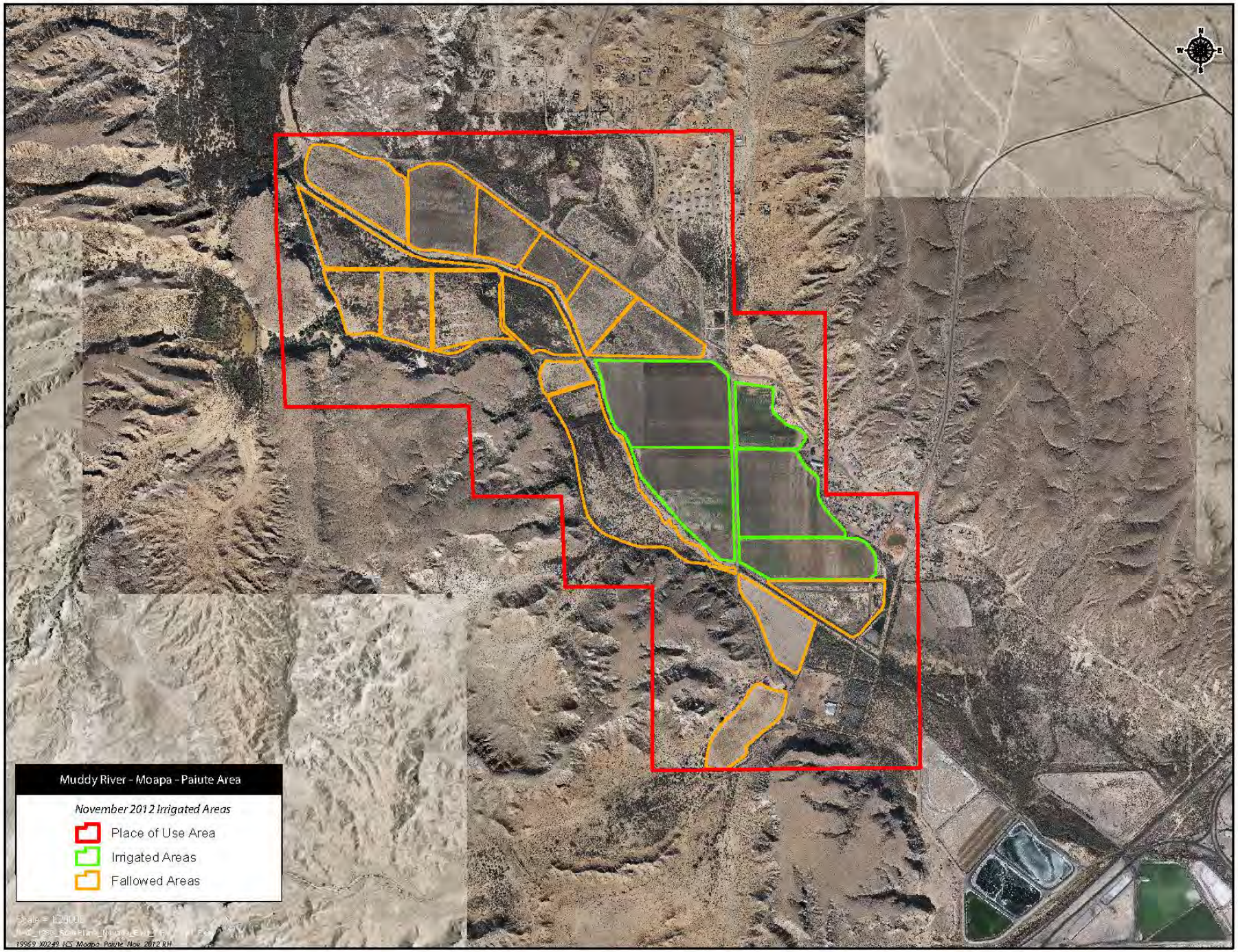


Figure 11 - Moapa Band of Paiutes November 2012 Aerial Photography

Hidden Valley Purchase

In 2008, SNWA purchased 1,040 af of decreed Muddy River water rights along an upper reach of the Muddy River commonly referred to as Hidden Valley. The full volume of water available under the water right certificate is 1,366 af; therefore, the land owner retained approximately 326 af. Figure 12 depicts a 1918 map showing the locations where the water right was originally put to beneficial use. The red outline on the map highlights the Public Land Survey System Quarter-Quarter sections that are included in the POU description in the Muddy River Decree. Figure 13 through Figure 15 compare the POU for the Hidden Valley lands with the aerial photography taken in February, August, and November of 2012, respectively.

Table 3 details the calculations used to determine the monthly duty of water applied to irrigable lands in the Hidden Valley area along with the volume of Muddy River water conserved through non-use. As indicated in Table 3, 924 af of water was conserved in 2012.

Table 3 – Hidden Valley ICS Credits

Notation	Description	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	2012 Total
	# Days	31	28	31	30	31	30	31	31	30	31	30	31	365
A	*Total Permit 75247 POU (acres)*	160.	160.	160.	160.	160.	160.	160.	160.	160.	160.	160.	160.	160.
B	*Duty of Hidden Valley Water Rights (af/acre)*	.6149	.5554	.6149	.5951	.8784	.8501	.8784	.8784	.8501	.6149	.5951	.6149	8.54
C	*Acres Being Irrigated in Permit 75247 POU*	.	.	.	.	84.98	84.98	84.98	84.98	84.98	19.16	19.16	19.16	
D = A - C	*Acres of Fallowed Land in Permit 75247 POU*	160.	160.	160.	160.	75.02	75.02	75.02	75.02	75.02	140.84	140.84	140.84	
E = B * D	*Water Conserved from Fallowed Acreage (af)*	98.3816	88.8608	98.3816	95.208	65.8981	63.7724	65.8981	65.8981	63.7724	86.6004	83.8068	86.6004	963.
F	*Acre-Feet per Month of SNWA's Owned Right*	88.3288	79.7808	88.3288	85.4795	88.3288	85.4795	88.3288	88.3288	85.4795	88.3288	85.4795	88.3288	1,040.
E > F	*Is conservation > than SNWA rights*	Yes	Yes	Yes	Yes	No	No	No	No	No	No	No	No	
	Total ICS Created (af)	**88.3288**	**79.7808**	**88.3288**	**85.4795**	**65.8981**	**63.7724**	**65.8981**	**65.8981**	**63.7724**	**86.6004**	**83.8068**	**86.6004**	**924.**

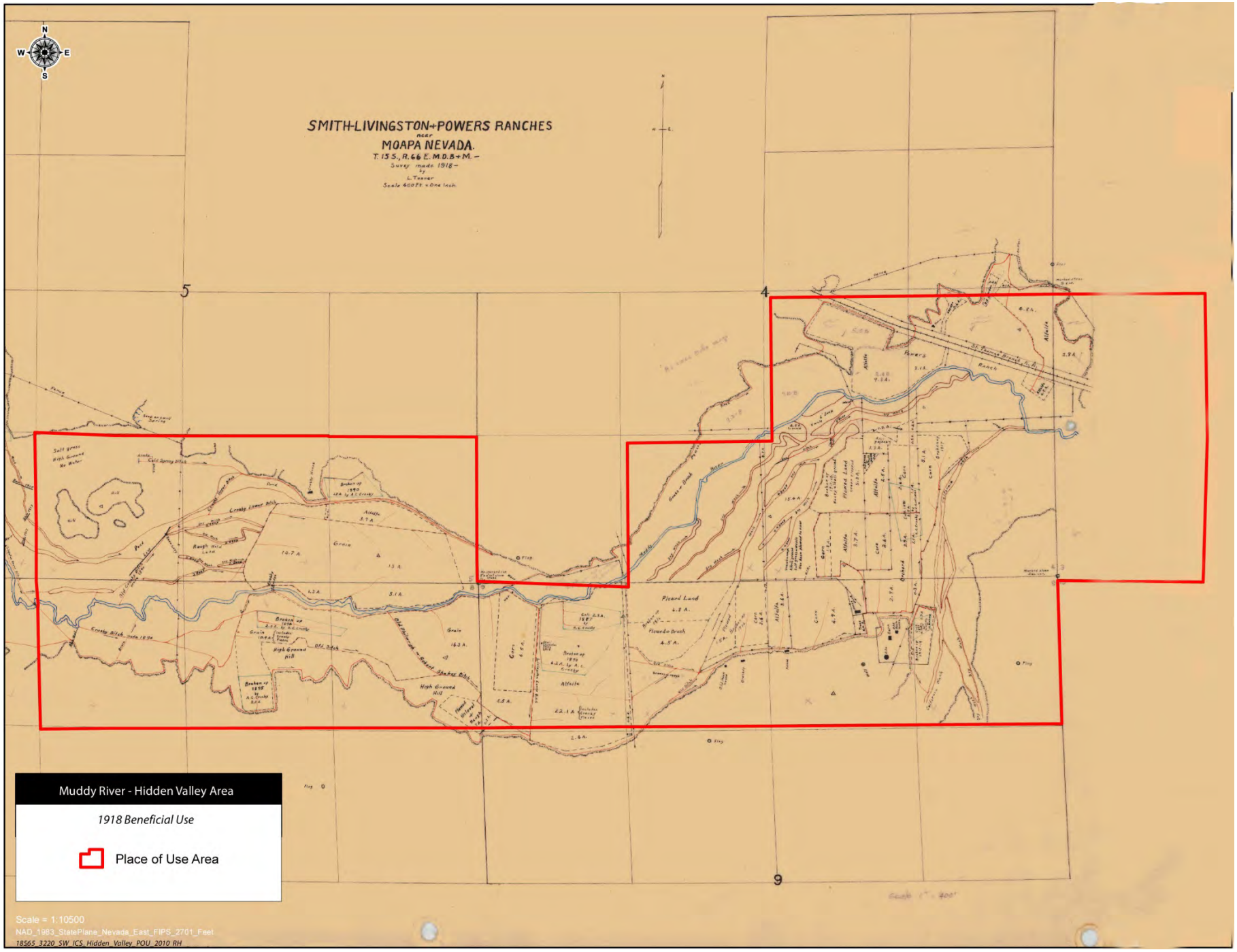


Figure 12 - Hidden Valley PBU Map, POU Quarter-Quarter Sections Highlighted in Red

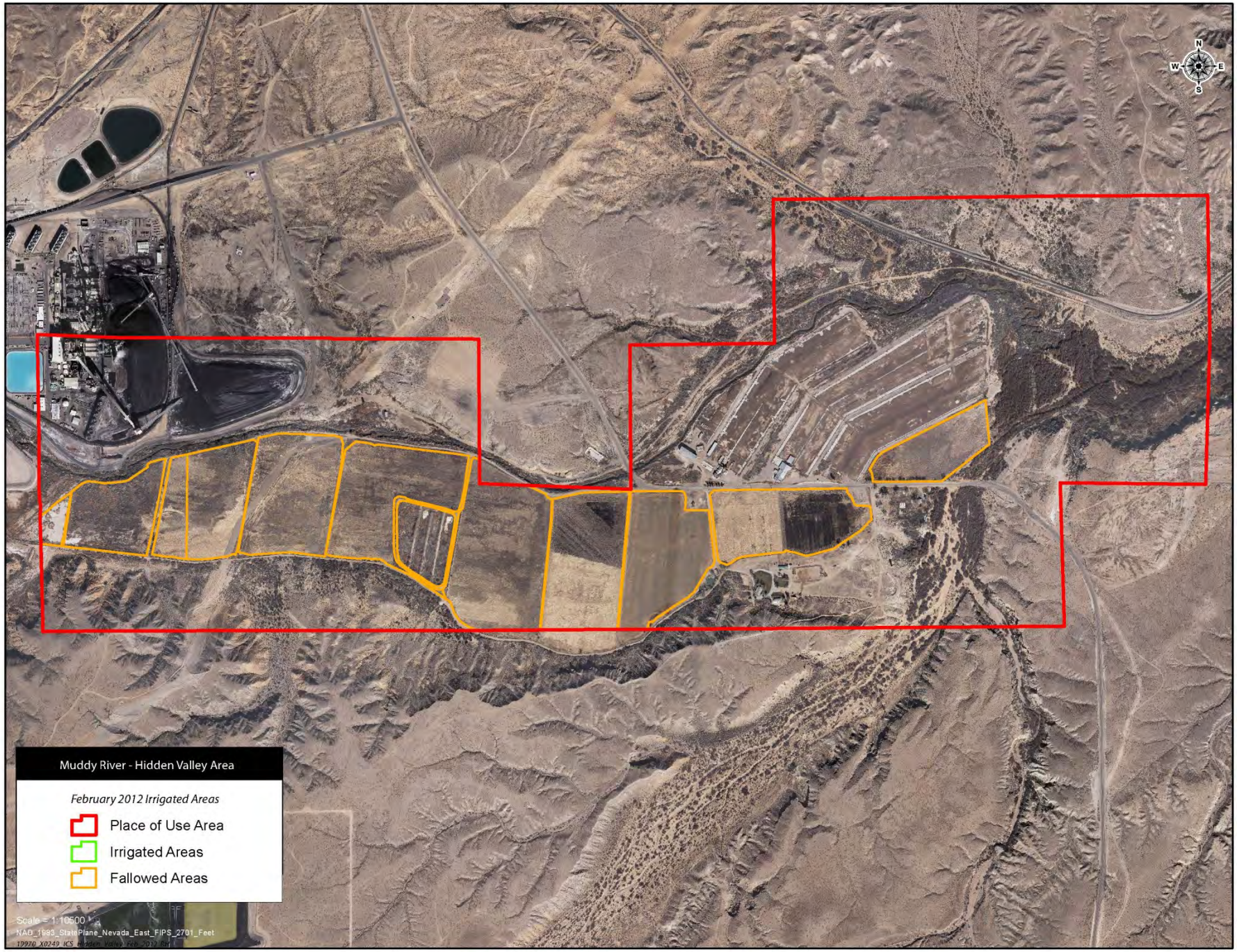


Figure 13 - Hidden Valley February 2012 Aerial Photography

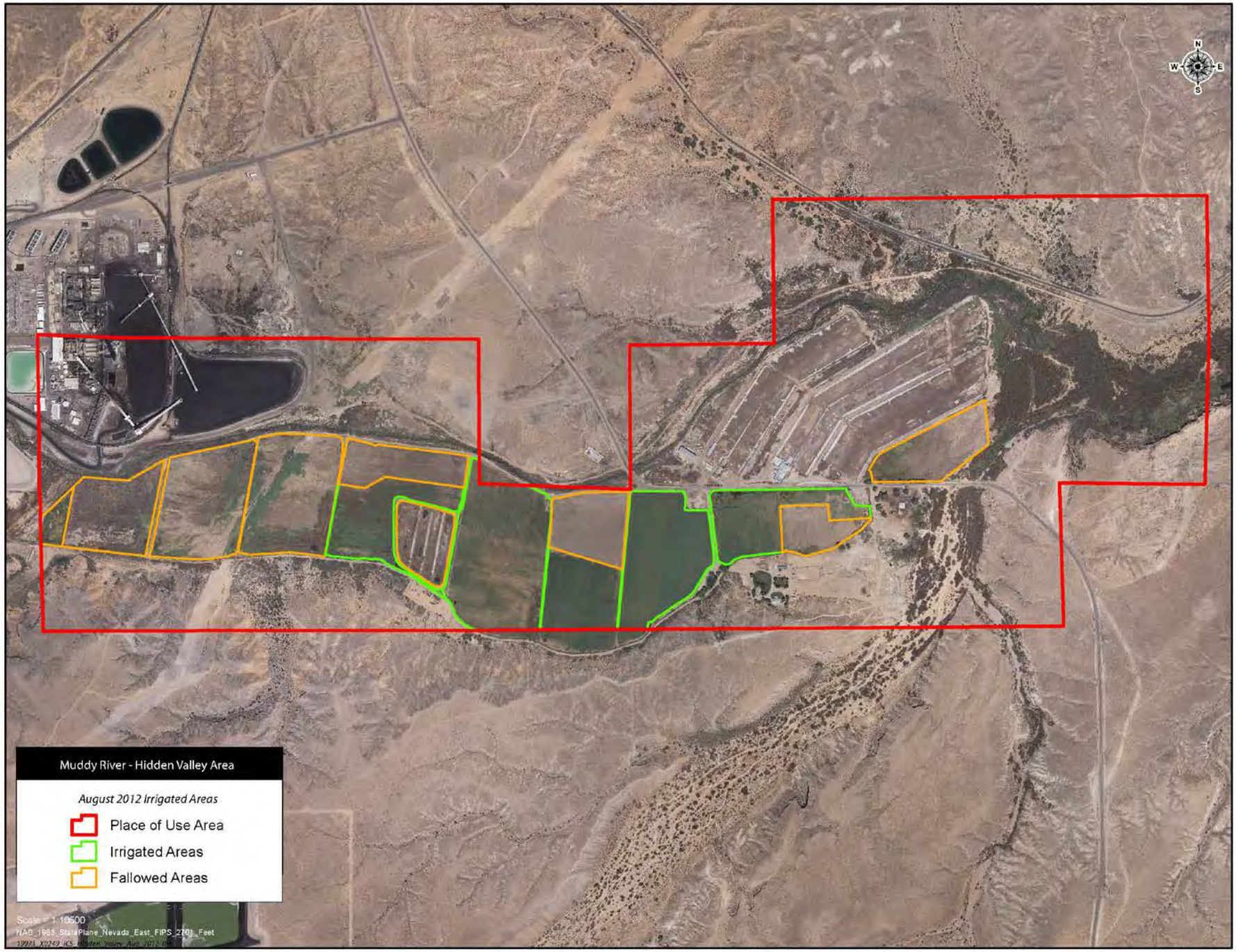


Figure 14 - Hidden Valley August 2012 Aerial Photography

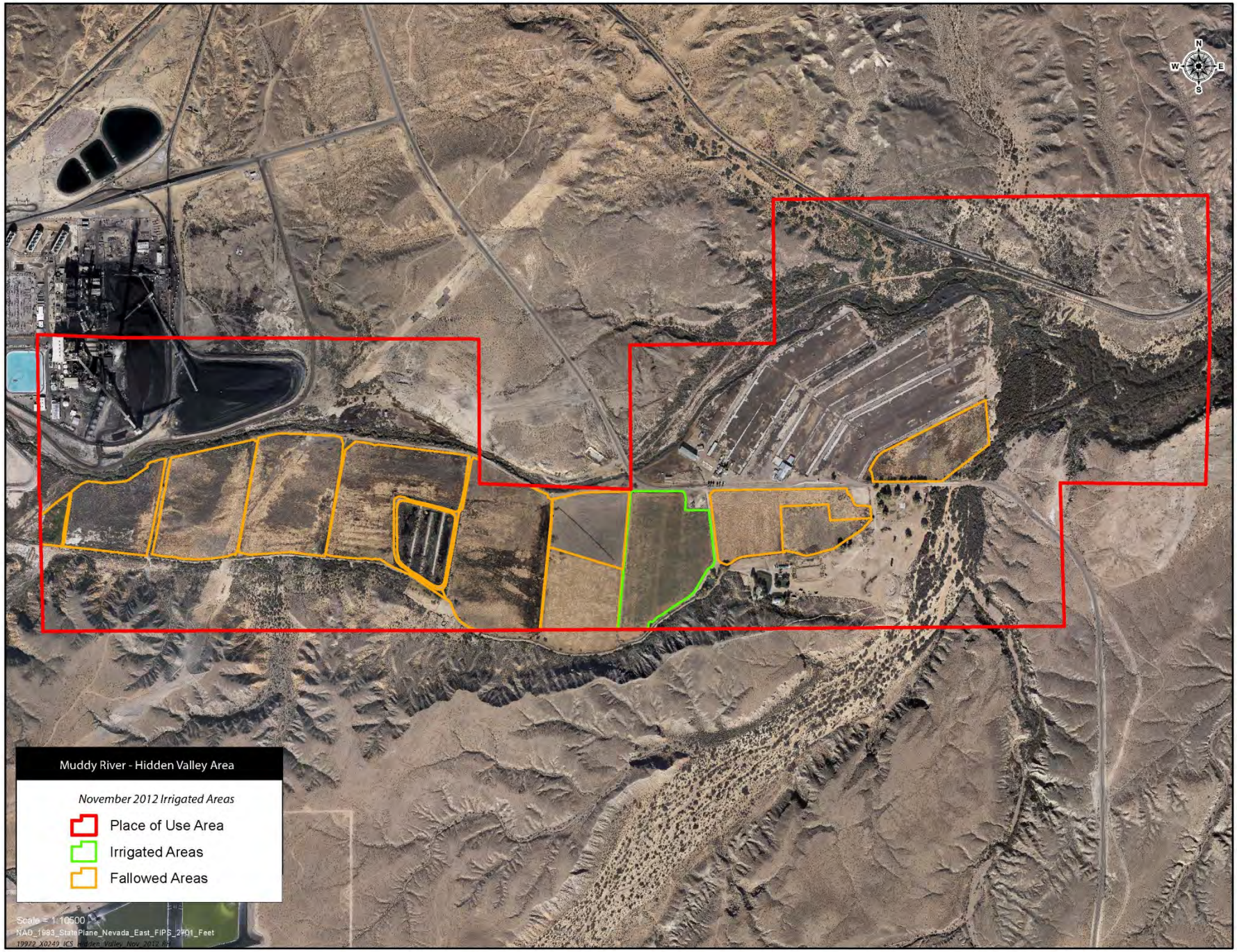


Figure 15 - Hidden Valley November 2012 Aerial Photography

NV Energy Lease

Since 2009, SNWA has leased 3,000 afy of winter (October-April) water rights from MVIC, and subleased a portion of the rights to NV Energy (NVE). The 3,000 afy had been previously leased from MVIC directly by NVE, from 1967 to 2009, for use at the NVE Reid Gardner Generating Station (Reid Gardner) located near Moapa, NV. Under agreements between SNWA, MVIC, and NVE, the 3,000 afy of MVIC water rights are assigned to SNWA, who then sub-leasing the water to NVE. The lease agreements give NVE the ability to take only the amount of water that they need and the remainder stays in the Muddy River as SNWA controlled water rights which are eligible for ICS credits.

The change in the POU for the 3,000 afy from MVIC to Reid Gardner is documented under NDWR Certificates 7316 and 13851 and required the fallowing of agricultural land within MVIC equivalent to the 3,000 afy transfer. NVE's diversion of the subleased water rights is located at the Reid Gardner Muddy River diversion just upstream of the USGS gaging station *09416000 Muddy River near Moapa, NV.*

During the winter seasons, NVE submits monthly meter readings and lease payments to SNWA demonstrating the amount of water that NVE diverted from the river. Table 4 shows these diversion values. The diversion values are subtracted from the total potential amount of water that can be diverted for that month under the water right. The difference (Row E) of 2,704 af for CY 2012 is the amount of SNWA controlled water that remained in the Muddy River and is eligible for ICS credit. The water right certificates associated with the meter data received from NVE can be found in Appendix E.

Table 4 – NV Energy Lease ICS Credits

Notation	Description	Jan	Feb	Mar	Apr		Oct	Nov	Dec	2012 Total
	# Days	31	28	31	30	No Summer Diversions	31	30	31	212
A	*Cert 7316 Volume (af)*	292.4528	264.1509	292.4528	283.0189		292.4528	283.0189	292.4528	2,000.
B	*Cert 13851 Volume (af)*	146.2264	132.0755	146.2264	141.5094		146.2264	141.5094	146.2264	1,000.
C = A + B	*Total Volume (af)*	438.6792	396.2264	438.6792	424.5283		438.6792	424.5283	438.6792	3,000.
D	*Water Use by NVE (af)*	242.49	35.35	.	.		9.48	.	8.53	296.
E = C - D	*Water to Lake Mead for ICS (af)*	196.1892	360.8764	438.6792	424.5283		429.1992	424.5283	430.1492	**2,704.**

Knox and Holmes Water Right Purchase

In 2008 SNWA purchased 811.28 afy of Muddy River decreed water rights which are documented in the decree as Vested Proof No. 01620 under the names Knox and Holmes. Until 1975 these water rights were used for agricultural irrigation on the decreed POU as depicted in Figure 16. In 1975, the decreed agricultural rights were leased by NVE for use at Reid Gardner and a change application was filed with the NDWR to change the POU of the Knox and Holmes right to Reid Gardner. Subsequently, the NDWR issued Permit No.29295 and corresponding Certificate No. 9609 based on the change application.

In 1985, the owners of the land previously irrigated with the Knox and Holmes Muddy River surface water rights applied for and were granted groundwater rights to irrigate the same land. In 2000, NDWR approved beneficial use of the groundwater rights based on pumping data and a

field investigation by NDWR staff. Documents associated the permitted groundwater rights are in Appendix E.

The aerial images on Figure 16 through Figure 19 depict the fields and POU's fallowed as a result of the NVE lease and which are now irrigated with groundwater under groundwater Permit 48763. Under Nevada Revised Statutes the POU under Permit 48763 can only be irrigated with groundwater. Therefore, water represented by the Muddy River decreed Knox and Holmes surface water rights purchased by SNWA remain in the Muddy River and are eligible for ICS credits.

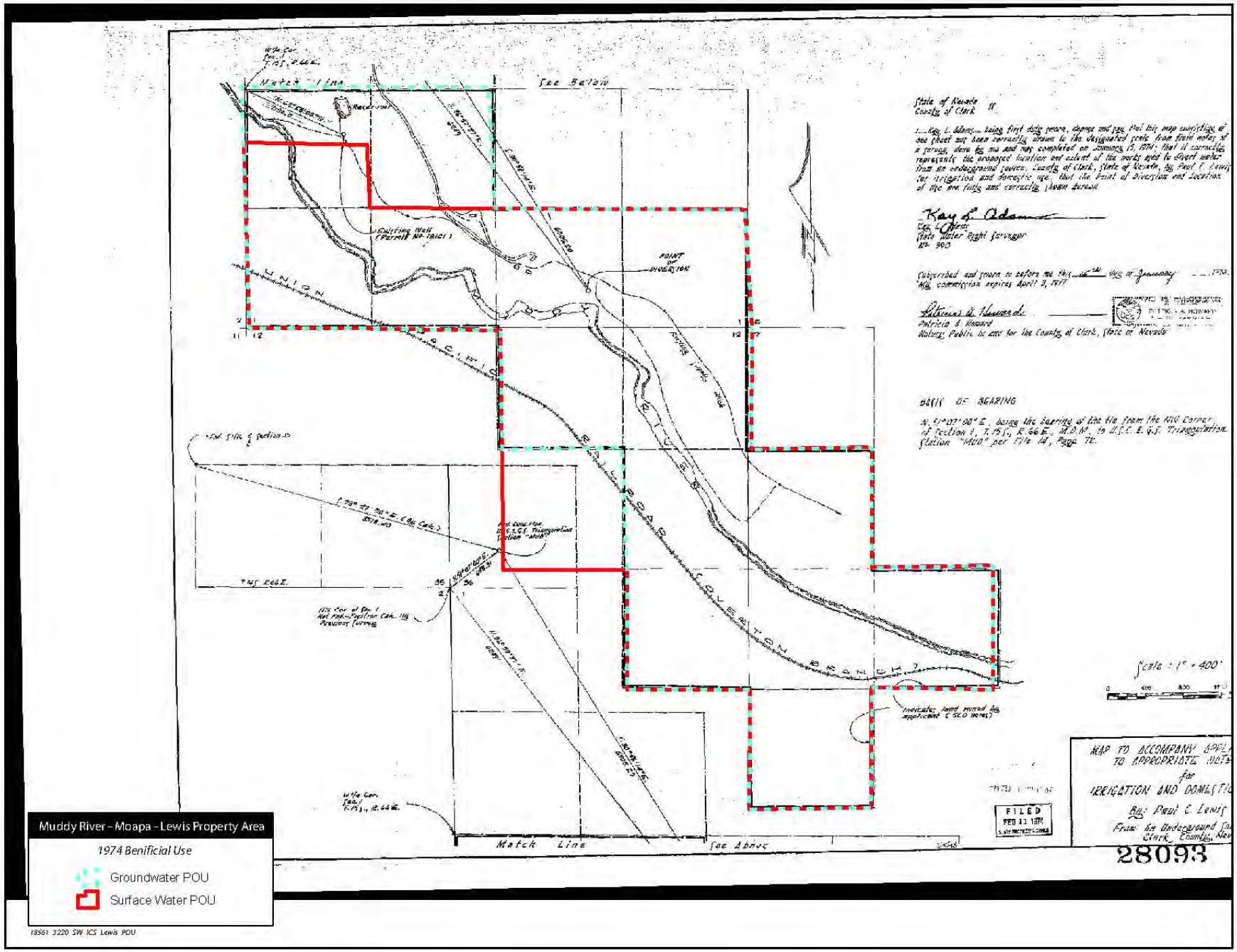


Figure 16 –Former Surface Water POU for Permit 29295 and Current Groundwater POU for 48763

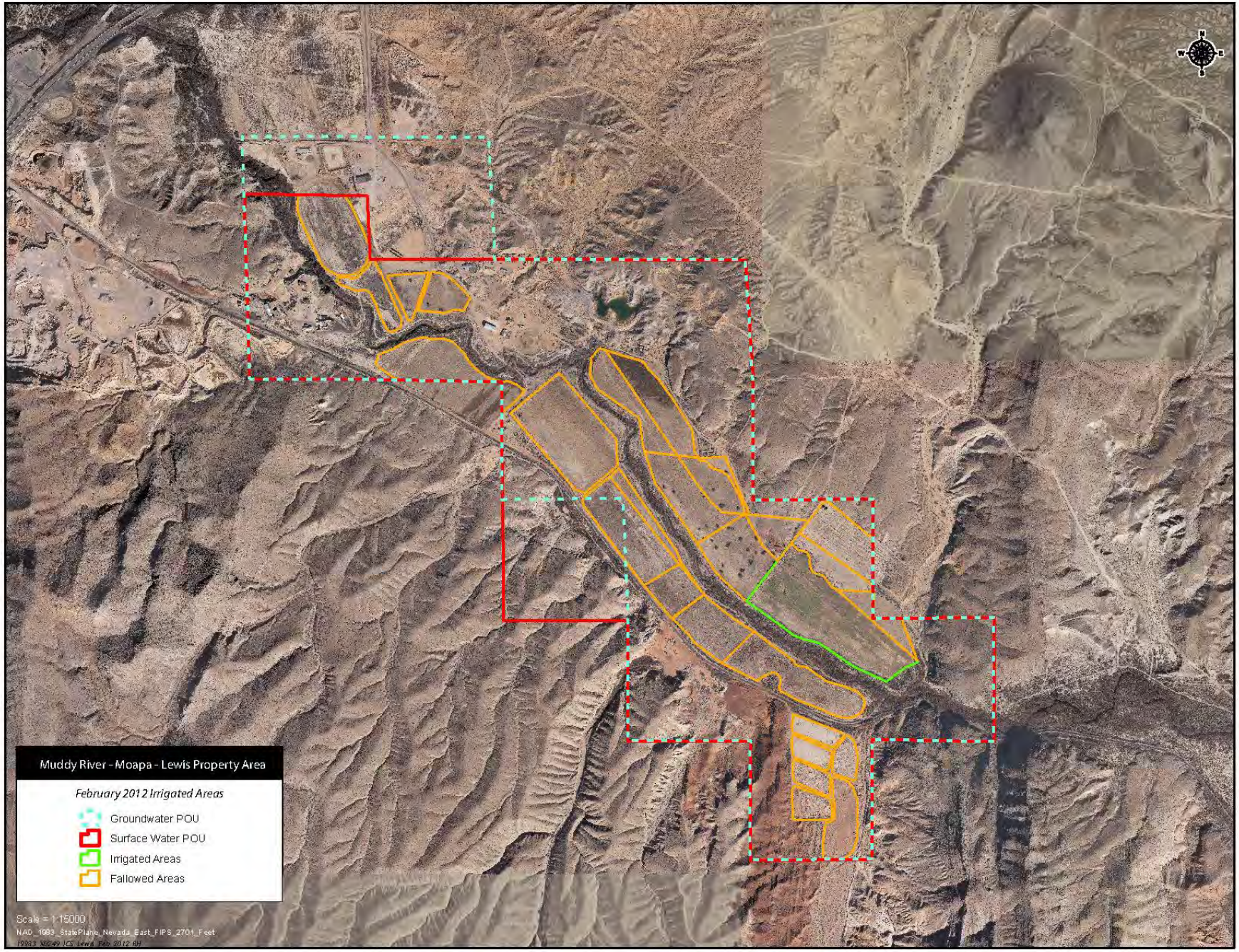


Figure 17 – Knox and Holmes February 2012 Aerial Photography

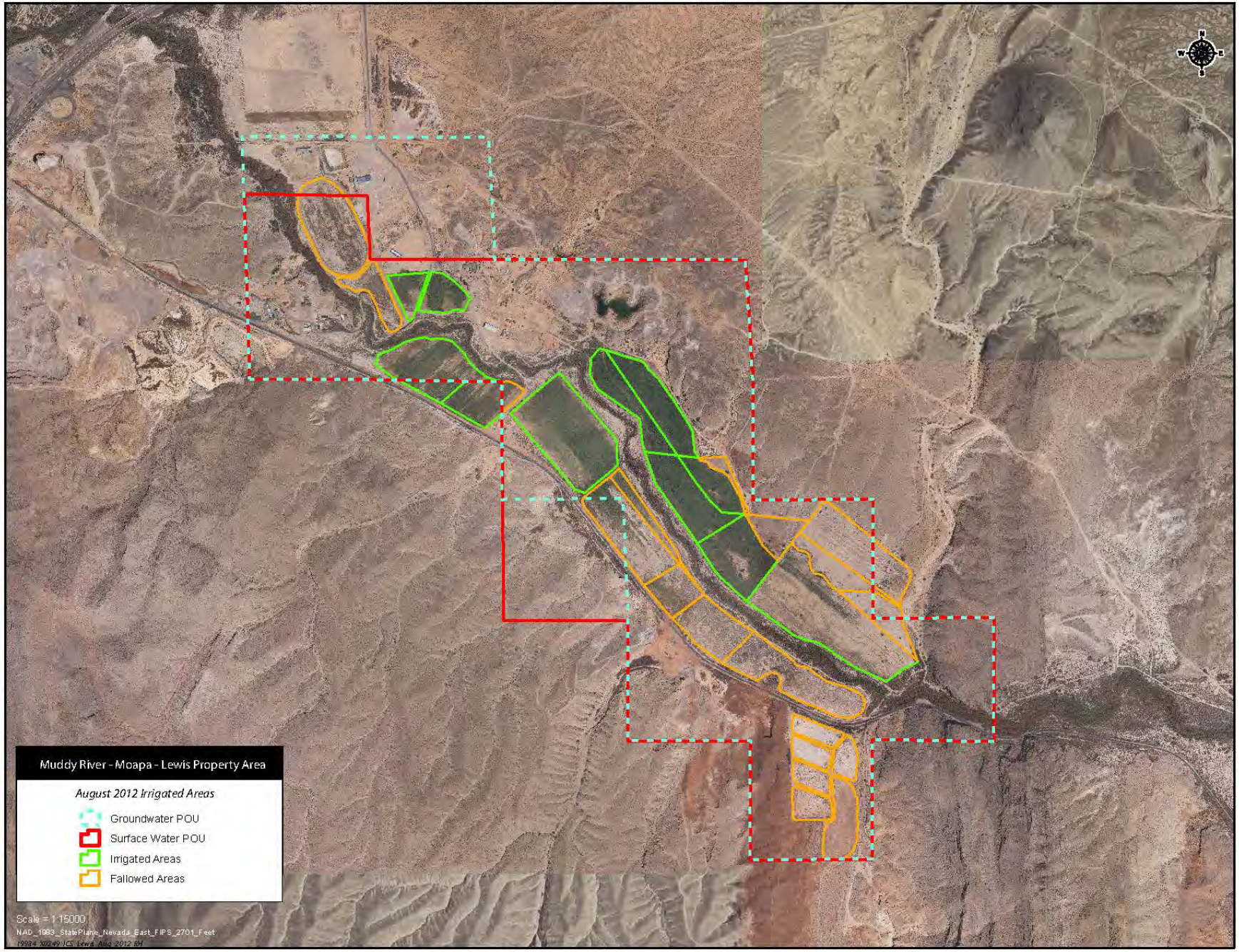


Figure 18 – Knox and Holmes August 2012 Aerial Photography

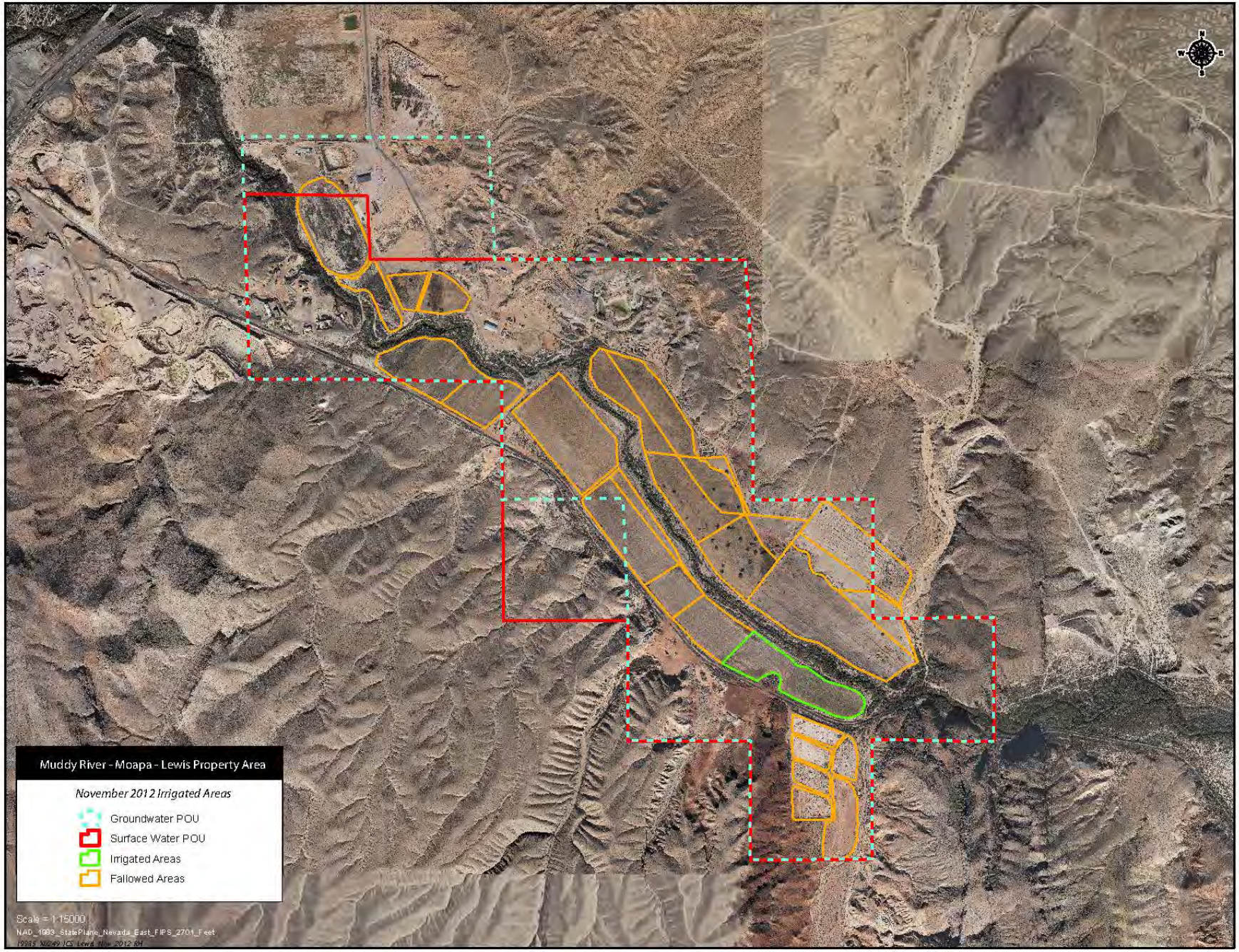


Figure 19 – Knox and Holmes November 2012 Aerial Photography

Upper Muddy River Water Rights Summary

Table 5 summarizes the Upper Muddy River water rights controlled by SNWA in CY 2012. Included in the calculations for the LDS Church rights is the 45 afy that the LDS Church continues to hold, which was subtracted from the total LDS Church right to derive the SNWA controlled 2,001 afy. The current Certificates leased by SNWA are in Appendix E.

Table 5 – Summary of SNWA Upper Muddy River Water Right ICS Credits

Upper Muddy River ICS Water Rights

Water Right	Data Source	Jan	Feb	Mar	Apr	May	June	Jul	Aug	Sept	Oct	Nov	Dec	Total (afy)
	# Days	31	28	31	30	31	30	31	31	30	31	30	31	365
	Permit 6419	8.61	7.78	8.61	8.33	12.30	11.90	12.30	12.30	11.90	8.61	8.33	8.61	119.57
	Permit 25861	70.10	63.31	70.10	67.84	99.61	96.40	99.61	99.61	96.40	70.10	67.84	70.10	971.00
	Permit 26316	51.02	46.09	51.02	49.38	51.02	49.38	51.02	51.02	49.38	51.02	49.38	51.02	600.76
LDS Lease	Permit 26317	2.46	2.22	2.46	2.38	3.50	3.39	3.50	3.50	3.39	2.46	2.38	2.46	34.12
	Permit 26318	23.06	20.83	23.06	22.31	32.96	31.89	32.96	32.96	31.89	23.06	22.31	23.06	320.35
	Held by LDS	(3.24)	(2.93)	(3.24)	(3.14)	(4.63)	(4.48)	(4.63)	(4.63)	(4.48)	(3.24)	(3.14)	(3.24)	(45.00)
	LDS Lease Total	*152.01*	*137.30*	*152.01*	*147.10*	*194.77*	*188.48*	*194.77*	*194.77*	*188.48*	*152.01*	*147.10*	*152.01*	*2,001*
Cox	Decree	6.15	5.55	6.15	5.95	8.78	8.50	8.78	8.78	8.50	6.15	5.95	6.15	85
Mitchell	Decree	1.84	1.67	1.84	1.79	2.64	2.55	2.64	2.64	2.55	1.84	1.79	1.84	26
Paiute Lease	Table 2	214.67	234.06	238.98	222.54	360.51	340.93	378.92	364.90	322.60	229.09	215.35	255.12	3,378
HV Dairy	Table 3	88.33	79.78	88.33	85.48	65.90	63.77	65.90	65.90	63.77	86.60	83.81	86.60	924
NVE Lease	Table 4	196.19	360.88	438.68	424.53						429.20	424.53	430.15	2,704
Knox and Holmes	Decree	58.41	52.76	58.41	56.53	83.45	80.76	83.45	83.45	80.76	58.41	56.53	58.41	811
Upper Total (af)		*717.60*	*871.99*	*984.41*	*943.92*	*716.04*	*685.00*	*734.45*	*720.43*	*666.67*	*963.31*	*935.06*	*990.29*	*9,929*

SNWA's Lower Muddy River Rights

Background

The Lower Muddy River, for the purposes of this report, is defined as the reach from the Glendale gage to Lake Mead. Within this reach water rights are held by MVIC, which holds the largest quantity of decreed rights on the Muddy River. MVIC's service area begins downstream of the Glendale gage where MVIC diverts their decreed Muddy River water rights, along with unused Upper Muddy River rights, at their Wells Siding diversion structure (Wells Siding). MVIC delivers water to its shareholders through a network of concrete lined ditches and pipes.

MVIC decreed Muddy River water rights are owned by the MVIC shareholders through ownership of preferred and common MVIC shares. There are 2,432 preferred shares and 5,044 common shares in MVIC. Each share represents a pro-rata apportionment of the Muddy River decreed rights available to MVIC for diversion at Wells Siding.

The SNWA began purchasing shares in MVIC in 1997 with the most recent request for purchases and leases (Appendix F) being effective October 1, 2008, and the leases extending beyond the end of CY 2012.

MVIC Water Rights Summary

This section summarizes the decreed Muddy River water rights owned by MVIC and the water represented by preferred and common shares.

In 1974, MVIC filed PBU maps for their decreed rights utilized along the Lower Muddy River. The certificates issued in 1974, based on the proofs can be found in Appendix G. Although these certificates were issued in 1974, they retain their original pre-1920 priority date. These PBU maps, when compared to recent aerial photography, serve as the baseline for proof of fallowed lands, demonstrating conservation of water supporting SNWA's accounting of Tributary Conservation ICS on the Lower Muddy River.

The irrigable lands along the Lower Muddy River under the 1974 PBU maps totaled 3,498.86 acres; however, the amount of land that can be irrigated under MVIC's water rights cannot exceed 2,784.75 acres with a decreed annual duty of 8.54 af/acre.

In addition to these decreed and certificated rights, the Muddy River decree states that the MVIC can divert any additional unused Muddy River flows that reach their diversion structure on the Muddy River. This makes the actual water that MVIC splits among its shareholders vary from year to year based on the actual 'divertible flows' that reach Wells Siding.

MVIC's water rights are tied to their service area and not individually owned parcels. Therefore, the water rights associated with MVIC shares can be used anywhere within the MVIC service area, regardless of land ownership. So, the location of individual fields being irrigated is not as important as the total irrigated acreage within the MVIC POU.

Since the 1974 PBU maps were filed, land use along the Lower Muddy River has undergone a gradual transformation from predominately agricultural to a mix of residential and commercial property interspersed among the agriculture. This gradual urbanization can be seen on Figure 20, which compares aerial photography of the Lower Muddy River from 1953 with aerial photography from November 2012.

The MVIC has and is leasing a portion of their decreed rights to users on the Upper Muddy River such as water leased to the MVWD, which diverts the water from spring boxes in the Muddy

River Springs Area for potable use. These leased rights are diverted and not returned to the Muddy River. Therefore, the flows measured at the Glendale gage account for these leased rights, since the water reaching the gage and Wells Siding have been depleted by these leases. In the same respect, unused water from MVIC's leases is also measured by the Glendale gage and is available for diversion by MVIC.

MVIC's operations and covenants define preferred shares as 100% of the Muddy River summer flow (May – September) plus 75% of the winter flow (October – April). Common shares represent the remaining 25% of the winter flow. The amount of water represented by preferred and common shares, therefore, varies slightly from year to year based on changes in river flow due to changes in unused Upper Muddy River rights and unused MVIC leases that reach Wells Siding. SNWA's Upper Muddy River rights are not divertible by MVIC and are excluded from the af/shares calculations.

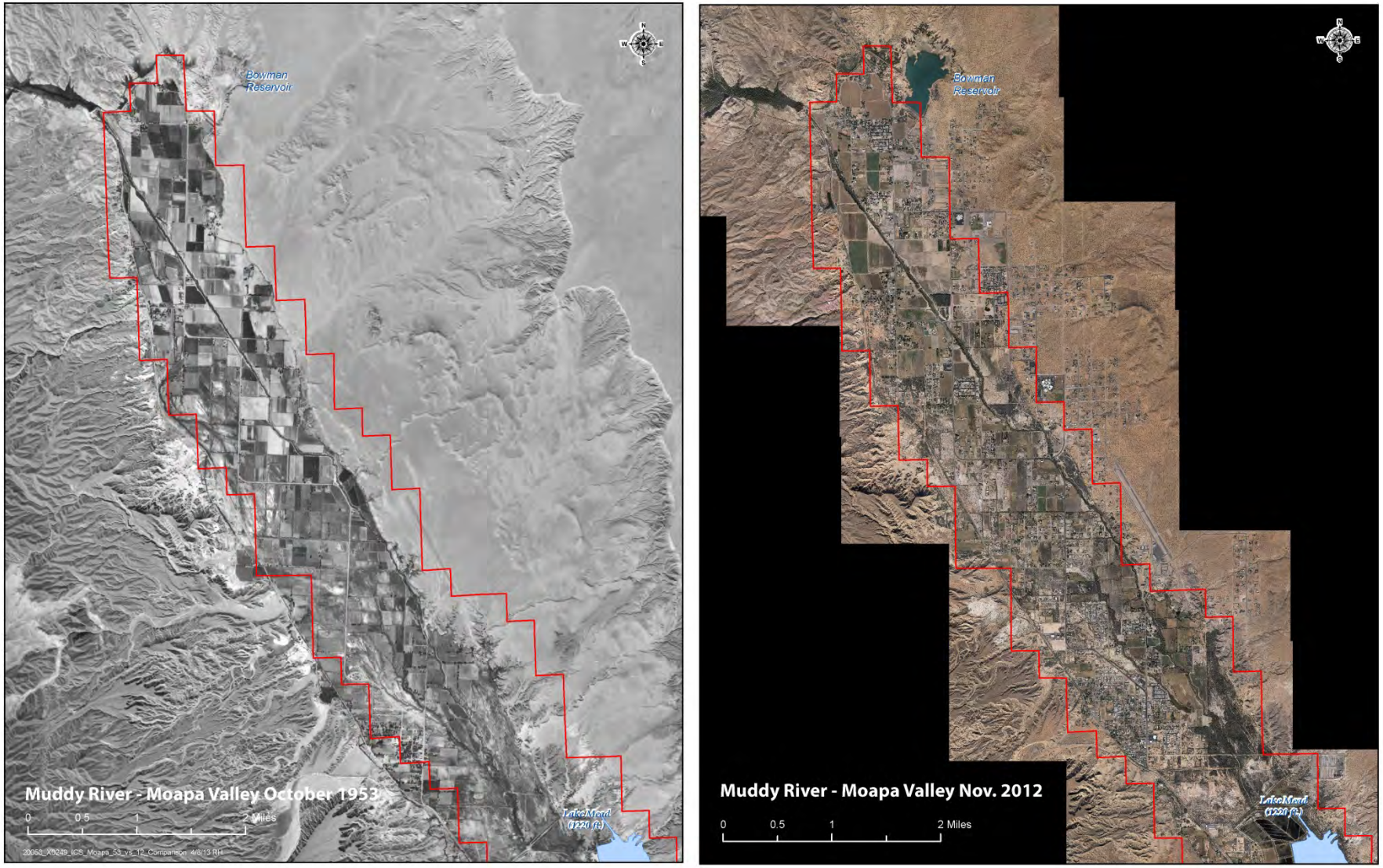


Figure 20 - Lower Moapa Valley 1953 (left) and November 2012 (right)

Quantification of SNWA MVIC Water Rights

By the end of CY 2012, SNWA controlled a total of 989.8260 preferred and 2,899.5850 common MVIC shares. Since the amount of water represented by a share can vary annually, the volume of water that SNWA holds in MVIC can vary as well. To calculate the amount of water represented by each share in MVIC during CY 2012, the volume of water rights available to MVIC (referred to as divertible flows) must be determined, and this volume then distributed to each preferred and common share. This section details these calculations.

Divertible flows by MVIC at Wells Siding

The Glendale gage, which is located just upstream of Wells Siding, has been used to accurately derive the amount of divertible water that reaches the diversion. The divertible flows at Wells Siding, equate to the flows at the Glendale gage (Table 6) less: 1) channel losses from ET between the Glendale gage and Wells Siding; 2) flood flows that exceed the Wells Siding capacity of about 70 cfs; and 3) SNWA Upper Muddy River rights being conveyed to Lake Mead for Tributary Conservation ICS credit (Table 5).

The ET losses between the Glendale gage and Wells Siding were determined to be 1,149 af, as discussed in subsequent sections. To subtract non-divertible flood flows, mean daily flows greater than 70 cfs were identified and replaced with 70 cfs, the maximum diversion rate at Wells Siding. Monthly and annual flow statistics were then recalculated with the non-divertible flood flows removed.

The non-divertible Upper Muddy River rights being conveyed to Lake Mead for Tributary Conservation ICS credit which pass through the Glendale gage and Wells Siding were subtracted from the Glendale gage data on a monthly time-step. The flows for many of the upper rights were broken into monthly diversion volumes based on the decreed water right. In the case where diversions were metered, the actual monthly amount conserved was used in the table. These monthly rates representing SNWA Upper Muddy River rights were subtracted from the Glendale gage flows prior to estimating the amount of water pro-rated to the MVIC shares.

The annual Glendale gage flows for CY 2012 were therefore reduced by 1,149 af for ET and 9,929 af for SNWA's Upper Muddy River rights (Table 7).

Table 6 – Glendale Gage, CY 2012 Record (cfs)

USGS Muddy River near Glendale Gage (09419000)

Day	Jan-12	Feb-12	Mar-12	Apr-12	May-12	Jun-12	Jul-12	Aug-12	Sep-12	Oct-12	Nov-12	Dec-12	Total
1	37	40	46	43	35	36	37	61	36	36	37	37	
2	38	40	45	42	36	36	37	56	35	36	37	39	
3	38	40	45	42	37	36	37	34	35	36	37	38	
4	38	40	46	43	37	36	36	33	35	36	36	38	
5	38	40	46	42	37	36	36	30	35	36	37	38	
6	39	40	45	42	37	37	36	30	35	36	37	37	
7	39	40	45	42	36	38	36	31	35	37	37	36	
8	39	40	46	42	37	39	35	31	35	37	36	37	
9	37	41	46	42	37	39	36	32	36	37	36	37	
10	37	42	45	42	37	39	36	33	38	37	37	38	
11	36	42	46	41	37	37	36	33	550	37	37	38	
12	36	43	46	41	36	37	35	33	52	37	37	39	
13	37	43	46	41	36	36	35	33	39	36	37	39	
14	37	44	45	43	36	37	35	32	39	37	37	42	
15	38	43	45	43	36	37	36	33	39	38	37	48	
16	38	44	45	42	37	37	68	32	39	38	37	45	
17	37	44	45	42	37	36	35	32	38	38	38	43	
18	37	44	46	42	37	37	34	32	38	37	38	43	
19	38	44	45	41	37	37	34	31	38	37	38	42	
20	38	44	45	41	37	37	34	36	38	38	38	42	
21	39	44	44	41	36	37	34	59	38	38	38	42	
22	41	44	44	41	36	37	33	60	38	38	37	41	
23	40	44	44	40	36	37	33	59	38	38	37	41	
24	41	45	44	38	36	37	35	38	38	38	37	41	
25	40	45	43	37	36	36	36	37	39	38	37	41	
26	41	46	44	37	36	36	36	37	39	38	37	41	
27	41	45	43	37	37	36	35	36	38	38	37	41	
28	41	45	44	36	36	36	36	36	38	38	37	40	
29	40	45	44	36	36	36	35	37	37	38	37	40	
30	40	--	43	36	36	37	35	36	37	38	36	41	
31	41	--	42	--	36	--	36	36	--	37	--	40	
Mean	39	43	45	41	36	37	36	38	55	37	37	40	
Median	38	44	45	42	36	37	36	33	38	37	37	40	
Count	31	29	31	30	31	30	31	31	30	31	30	31	
Minimum	36	40	42	36	35	36	33	30	35	36	36	36	
Maximum	41	46	46	43	37	39	68	61	550	38	38	48	
Acre-Feet	**2,370**	**2,460**	**2,750**	**2,420**	**2,240**	**2,190**	**2,240**	**2,320**	**3,260**	**2,290**	**2,200**	**2,470**	**29,210**

Table 7 – Glendale Gage, Flood Flows Removed (cfs)

Glendale Gage with 70 cfs Limit

Day	Jan-12	Feb-12	Mar-12	Apr-12	May-12	Jun-12	Jul-12	Aug-12	Sep-12	Oct-12	Nov-12	Dec-12	Total
1	37	40	46	43	35	36	37	61	36	36	37	37	
2	38	40	45	42	36	36	37	56	35	36	37	39	
3	38	40	45	42	37	36	37	34	35	36	37	38	
4	38	40	46	43	37	36	36	33	35	36	36	38	
5	38	40	46	42	37	36	36	30	35	36	37	38	
6	39	40	45	42	37	37	36	30	35	36	37	37	
7	39	40	45	42	36	38	36	31	35	37	37	36	
8	39	40	46	42	37	39	35	31	35	37	36	37	
9	37	41	46	42	37	39	36	32	36	37	36	37	
10	37	42	45	42	37	39	36	33	38	37	37	38	
11	36	42	46	41	37	37	36	33	70	37	37	38	
12	36	43	46	41	36	37	35	33	52	37	37	39	
13	37	43	46	41	36	36	35	33	39	36	37	39	
14	37	44	45	43	36	37	35	32	39	37	37	42	
15	38	43	45	43	36	37	36	33	39	38	37	48	
16	38	44	45	42	37	37	68	32	39	38	37	45	
17	37	44	45	42	37	36	35	32	38	38	38	43	
18	37	44	46	42	37	37	34	32	38	37	38	43	
19	38	44	45	41	37	37	34	31	38	37	38	42	
20	38	44	45	41	37	37	34	36	38	38	38	42	
21	39	44	44	41	36	37	34	59	38	38	38	42	
22	41	44	44	41	36	37	33	60	38	38	37	41	
23	40	44	44	40	36	37	33	59	38	38	37	41	
24	41	45	44	38	36	37	35	38	38	38	37	41	
25	40	45	43	37	36	36	36	37	39	38	37	41	
26	41	46	44	37	36	36	36	37	39	38	37	41	
27	41	45	43	37	37	36	35	36	38	38	37	41	
28	41	45	44	36	36	36	36	36	38	38	37	40	
29	40	--	44	36	36	36	35	37	37	38	37	40	
30	40	--	43	36	36	37	35	36	37	38	36	41	
31	41	--	42	--	36	--	36	36	--	37	--	40	
Mean	39	43	45	41	36	37	36	38	39	37	37	40	
Count	31	28	31	30	31	30	31	31	30	31	30	31	
Minimum	36	40	42	36	35	36	33	30	35	36	36	36	
Maximum	41	46	46	43	37	39	68	61	70	38	38	48	
Acre-Feet	2,370	2,370	2,750	2,420	2,240	2,190	2,240	2,320	2,310	2,290	2,200	2,470	28,170
Phreatophyte Consumptive Use Glendale to Wells Siding (af)	18	21	37	76	160	202	191	173	141	86	31	13	1,149
SNWA Upper Rights (af)	740	849	984	944	716	685	734	720	667	963	935	990	9,929
Acre-Foot / Share Basis (af)	**1,611**	**1,500**	**1,729**	**1,400**	**1,364**	**1,303**	**1,314**	**1,427**	**1,502**	**1,240**	**1,234**	**1,467**	**17,092**

MVIC Acre-Feet per Share Calculations

Table 8 summarizes the percent of divertible flows available to each MVIC share class. Using the divertible flows derived for CY 2012 in the previous section, the acre-foot per share value for preferred and common shares has been calculated in Table 9.

Table 8 – MVIC Share Classes and Divertible Flow Percentages

Share Type	Number of Shares	Percent of Summer Flow	Percent of Winter Flow
		(May - September)	*(October - April)*
Preferred	2,432	100%	75%
Common	5,044	0%	25%

Table 9 - Acre-Foot per Share Calculation Results

Calendar Year	*Jan-Apr and Oct-Dec Flows (af)*	*May-Sep Flows (af)*	*100% Summer and 75% Winter Flow (af)*	*25% Winter Flow (af)*	*Preferred-af divided by 2,432 shares (af / share)*	*Common-af divided by 5,044 shares (af / share)*
2012	10,181	6,911	14,546	2,545	5.9813	0.5046

MVIC Water Controlled by SNWA

The amount of MVIC water controlled by SNWA is calculated using the derived acre-foot per share values from Table 9. To account for month-to-month variability in SNWA controlled MVIC water rights due to purchases, leases, and leasebacks of purchased shares to original sellers, Table 10 derives SNWA's controlled water rights in af/month. A letter of concurrence signed by Scott Millington, MVIC General Manager (Appendix H) verifies that SNWA controlled the number of shares outlined in Table 10 during CY 2012. The preferred and common acre-foot per share values were divided by the number of months in which they can be used; 12-months for preferred shares and 7-months for common shares. The shares controlled by SNWA during each month (using only the number of shares controlled for the entire month) are multiplied by the acre-foot per share per month to obtain an acre-foot value of MVIC water controlled by SNWA per month for CY 2012.

The MVIC shares controlled by SNWA were either not diverted into the MVIC distribution system at Wells Siding, thus staying in the Muddy River, or allowed to be diverted into the MVIC system for the purpose of maintaining head on the ditches before being returned back to the mainstream of the Muddy River. Any water represented by SNWA controlled shares, which was diverted at Wells Siding, is included on MVIC's seasonal (winter and summer) water schedules (Appendix I). Based on these schedules, SNWA received a "turn" on the various ditches, and SNWA's shares were delivered to the Muddy River channel.

Table 10 - SNWA Controlled MVIC Shares in CY 2012

	January	February	March	April	May	June	July	August	September	October	November	December	Total
Water Availiable to MVIC (AF From Table 7)	1,634.08	1,477.07	1,728.95	1,400.17	1,364.28	1,303.44	1,314.45	1,426.80	1,501.98	1,240.31	1,233.53	1,466.62	17,092
Acre-Feet Per Share Per Month													
Common (af/share)	0.0810	0.0732	0.0857	0.0694	0	0	0	0	0	0.0615	0.0611	0.0727	0.5046
Preferred (af/share)	0.5039	0.4555	0.5332	0.4318	0.5610	0.5360	0.5405	0.5867	0.6176	0.3825	0.3804	0.4523	5.9813
Owned by SNWA													
Common Shares	2,839.1267	2,839.1267	2,839.1267	2,839.1267	2,839.1267	2,839.1267	2,839.1267	2,839.1267	2,839.1267	2,839.1267	2,839.1267	2,839.1267	
Preferred Shares	1,009.0847	1,009.0847	1,009.0847	1,009.0847	1,009.0847	1,009.0847	1,009.0847	1,009.0847	1,009.0847	1,009.0847	1,009.0847	1,009.0847	
Leased Back to Seller													
Common Shares	406.7917	406.7917	406.7917	406.7917	406.7917	406.7917	406.7917	406.7917	406.7917	406.7917	406.7917	406.7917	
Preferred Shares	228.0417	228.0417	228.0417	228.0417	228.0417	228.0417	228.0417	228.0417	228.0417	228.0417	228.0417	228.0417	
Leased by SNWA													
Common Shares	467.2500	467.2500	467.2500	467.2500	467.2500	467.2500	467.2500	467.2500	467.2500	467.2500	467.2500	467.2500	
Preferred Shares	208.7830	208.7830	208.7830	208.7830	208.7830	208.7830	208.7830	208.7830	208.7830	208.7830	208.7830	208.7830	
Controlled = (Owned - Leased Back + Leased)													
Common Shares	2,899.5850	2,899.5850	2,899.5850	2,899.5850	2,899.5850	2,899.5850	2,899.5850	2,899.5850	2,899.5850	2,899.5850	2,899.5850	2,899.5850	
Preferred Shares	989.8260	989.8260	989.8260	989.8260	989.8260	989.8260	989.8260	989.8260	989.8260	989.8260	989.8260	989.8260	
Water Controlled (af) = (Shares Controlled x Acre Foot Per Share)													
Common (af)	234.8410	212.2762	248.4748	201.2248	0	0	0	0	0	178.2506	177.2766	210.7753	1,463
Preferred (af)	498.8037	450.8759	527.7621	427.4028	555.2629	530.5011	534.9836	580.7081	611.3059	378.6053	376.5366	447.6880	5,920
Total (af)	733.6447	663.1521	776.2369	628.6276	555.2629	530.5011	534.9836	580.7081	611.3059	556.8559	553.8131	658.4632	**7,384**

Land Fallowing within MVIC's POU

The February, August, and November 2012 6-inch aerial photography has been used to determine the fallowed and irrigated acreage within MVIC's service area during the summer and winter seasons of CY 2012. For the January through April 2012 portion of the winter season, aerial photography from February 2012 was used to calculate the irrigated acreage within MVIC. The August 2012 imagery was used for the summer 2012 irrigation season (May 1 to September 30). For the winter irrigation season (October 1 to December 31), aerial photography from November 2012 was used to accurately determine irrigated acreage.

Figure 21 illustrates MVIC's service area and depicts the extent of the 1974 PBU map which is composed of three individual maps. Figure 22 through Figure 24 depicts these PBU maps, and Figure 25 through Figure 33 depict the February, August, and November 2012 aerial photography overlaid with the ground-truthed fallowed and irrigated acreage.

Table 11 details the irrigated and fallowed acreage by season (on a monthly basis) and crop type as measured and ground-truthed by SNWA. This acreage was verified by MVIC's General Manager during various meetings. Lands classified as not irrigated are a combination of land that is fallowed and also lands that are not irrigable due to urbanization. The acreage of lands not irrgated was derived by subtracting the measured irrigated and fallowed lands from the certificated maximum acreage within MVIC's POU of 2,784.75 acres.

Table 11 – Agricultural Land Status within MVIC's POU (Acres)

	2012											
	January	February	March	April	May	June	July	August	September	October	November	December
MVIC Ag (acres)	-	-	-	-	-	-	-	-	-	-	-	-
Alfalfa	248.56	248.56	248.56	248.56	333.47	333.47	333.47	333.47	333.47	149.45	149.45	149.45
Small Vegetables	3.26	3.26	3.26	3.26	3.26	3.26	3.26	3.26	3.26	3.70	3.70	3.70
Bermuda w/ Rye	88.69	88.69	88.69	88.69	303.07	303.07	303.07	303.07	303.07	188.91	188.91	188.91
Orchard	27.10	27.10	27.10	27.10	28.10	28.10	28.10	28.10	28.10	28.10	28.10	28.10
Moist Soil Unit	-	-	-	-	10.54	10.54	10.54	10.54	10.54	-	-	-
Total Ag	*367.62*	*367.62*	*367.62*	*367.62*	*678.45*	*678.45*	*678.45*	*678.45*	*678.45*	*370.16*	*370.16*	*370.16*
Not Irrigated	2,417.13	2,417.13	2,417.13	2,417.13	2,106.30	2,106.30	2,106.30	2,106.30	2,106.30	2,414.59	2,414.59	2,414.59
Total POU	2,784.75	2,784.75	2,784.75	2,784.75	2,784.75	2,784.75	2,784.75	2,784.75	2,784.75	2,784.75	2,784.75	2,784.75

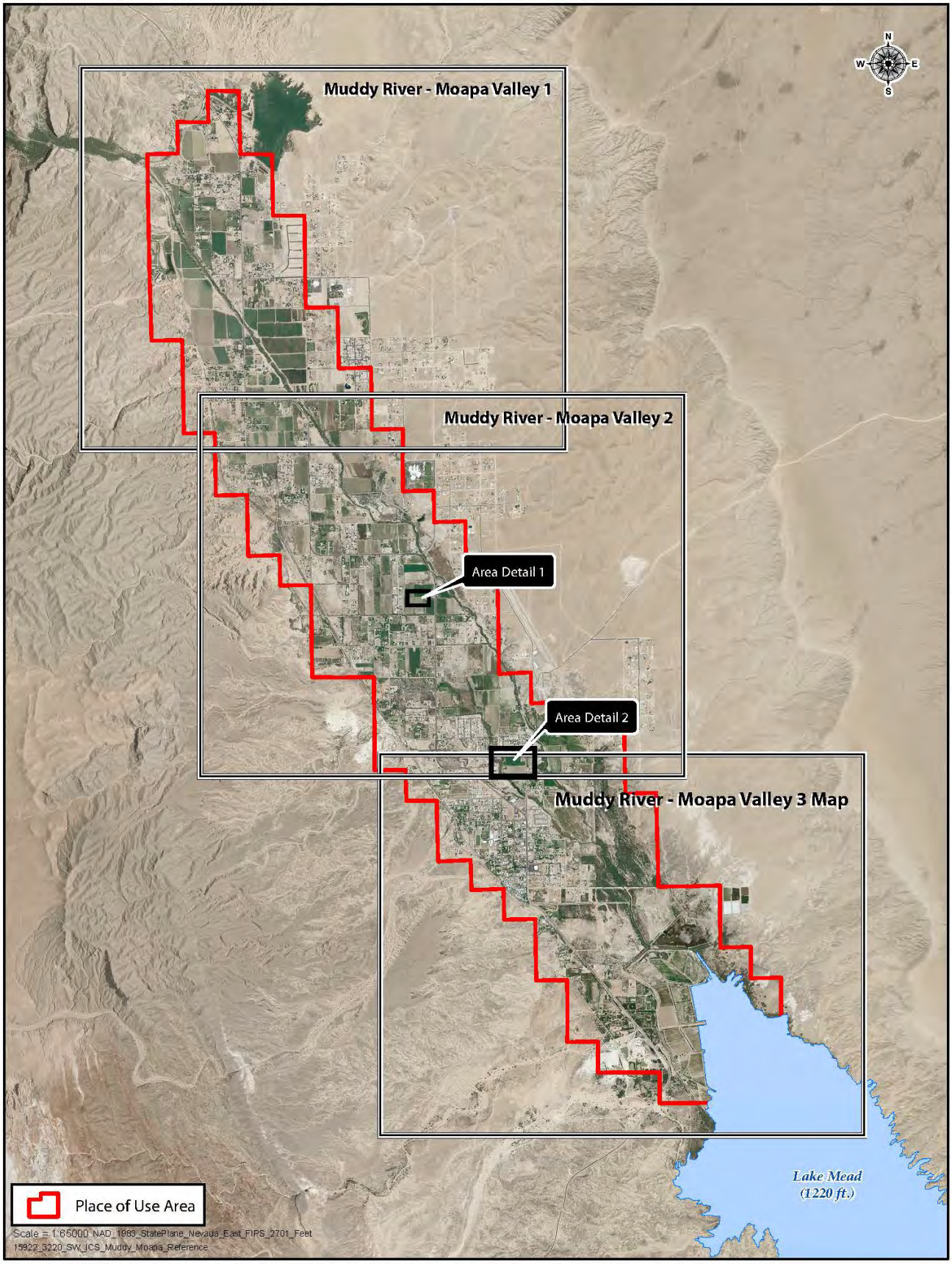


Figure 21 - MVIC Service Area and Extent of PBU Maps and Location of the Detailed Photography on Figure 2

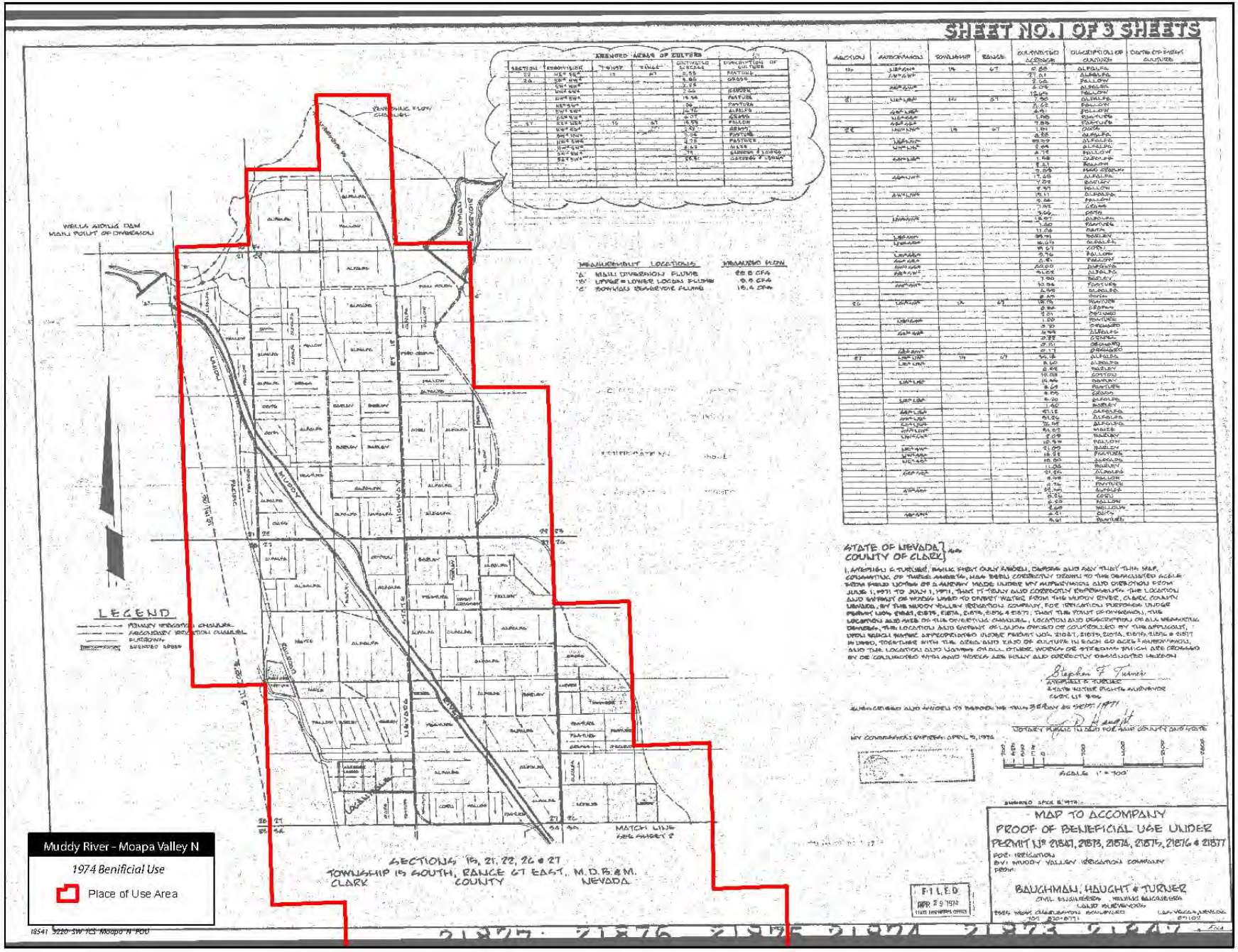


Figure 22 - Upper Section of the MVIC Service Area Showing 1974 PBU. POU Quarter-Quarter Sections Highlighted in Red

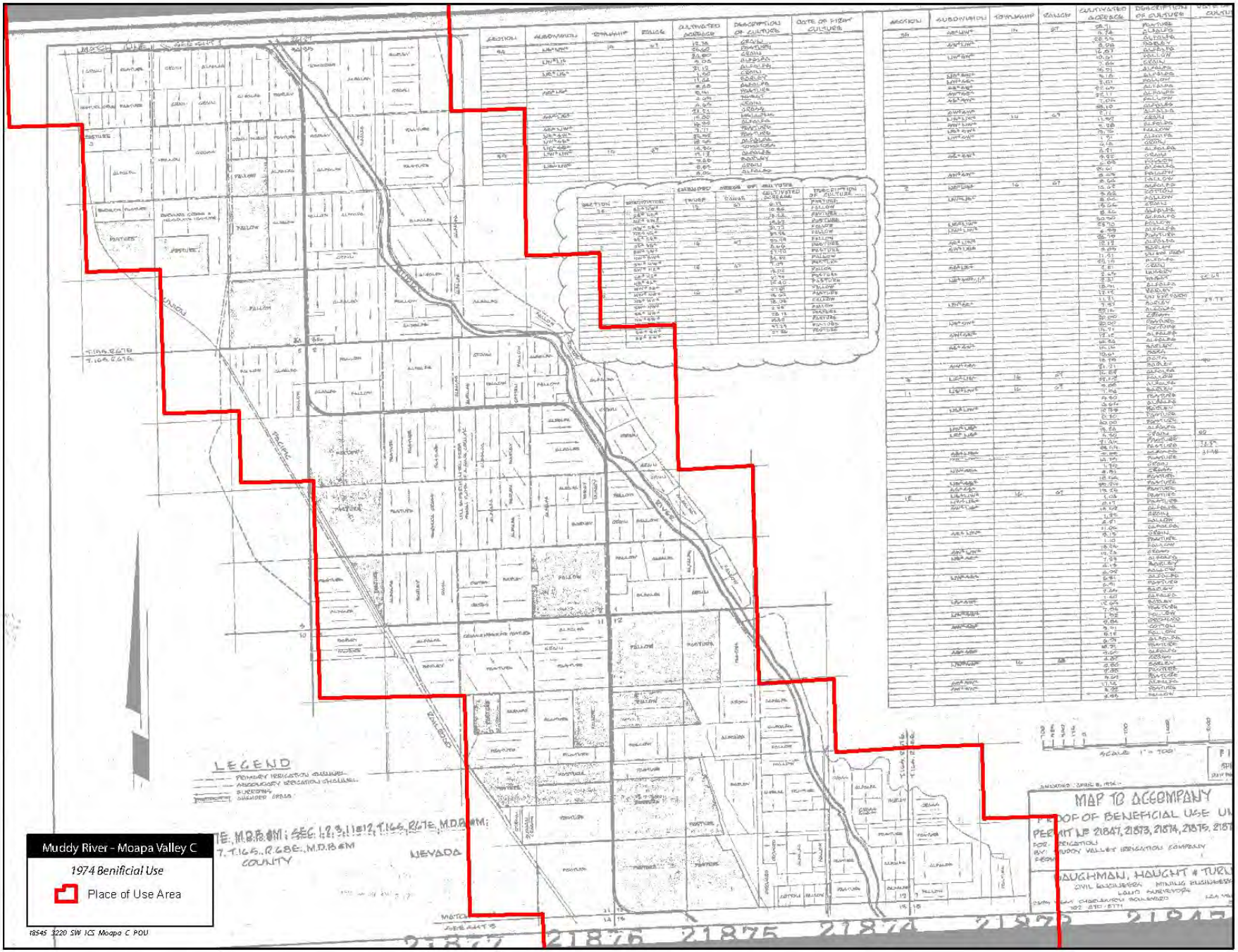


Figure 23- Middle Section of the MVIC Service Area Showing 1974 PBU. POU Quarter-Quarter Sections Highlighted in Red

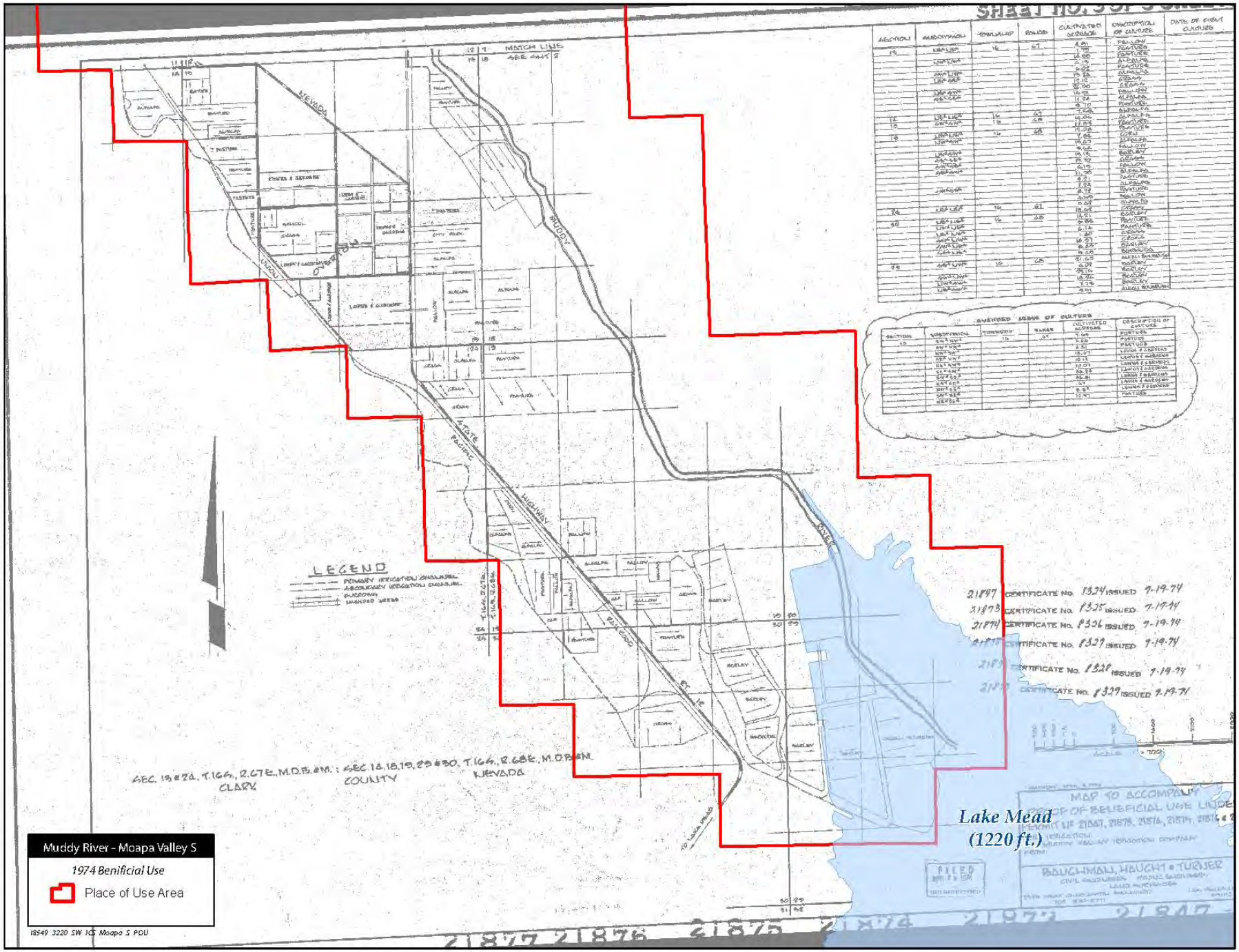


Figure 24 - Lower Section of the MVIC Service Area Showing 1974 PBU. POU Quarter-Quarter Sections Highlighted in Red

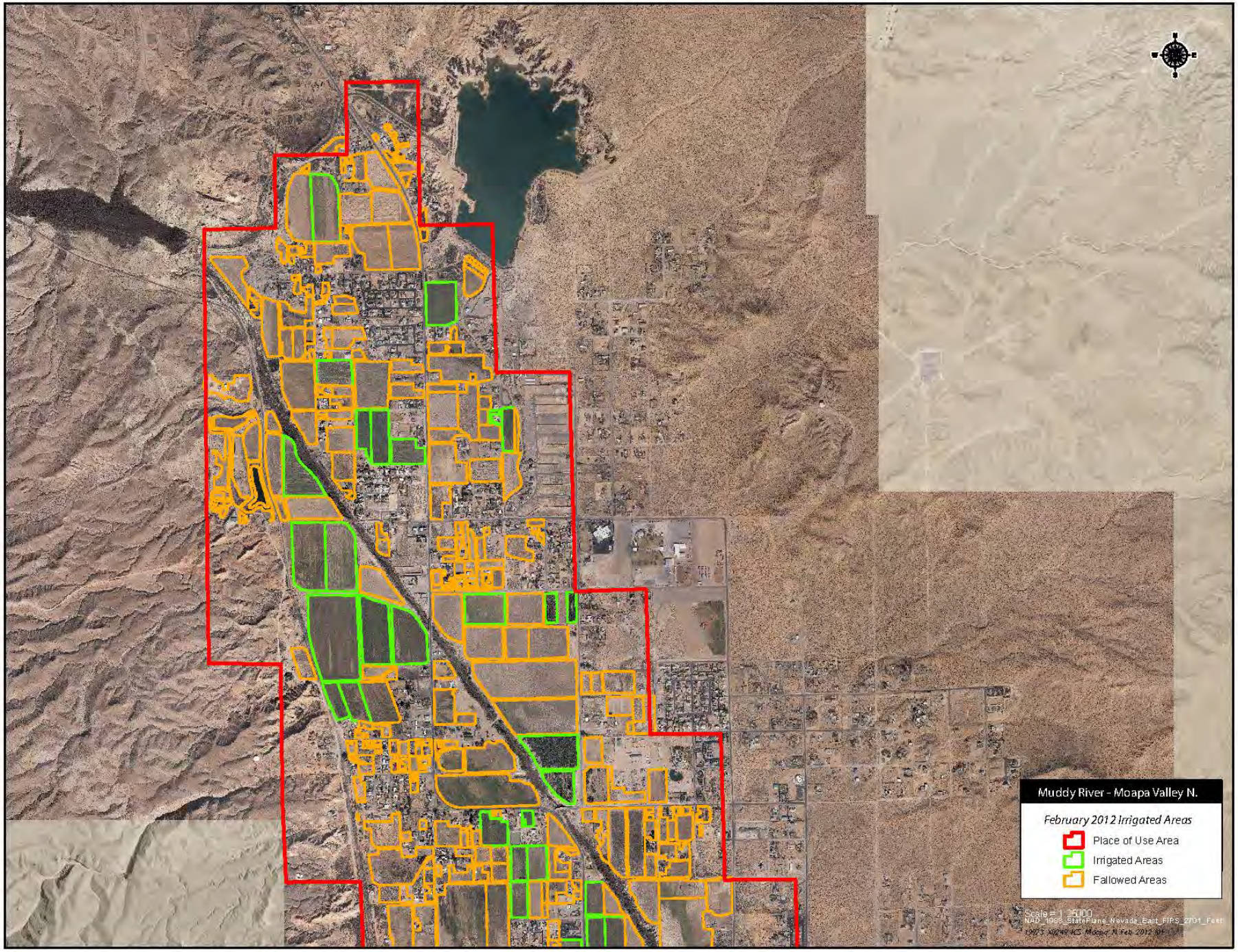


Figure 25 - Upper Section of the MVIC Service Area February 2012 Aerial Photography

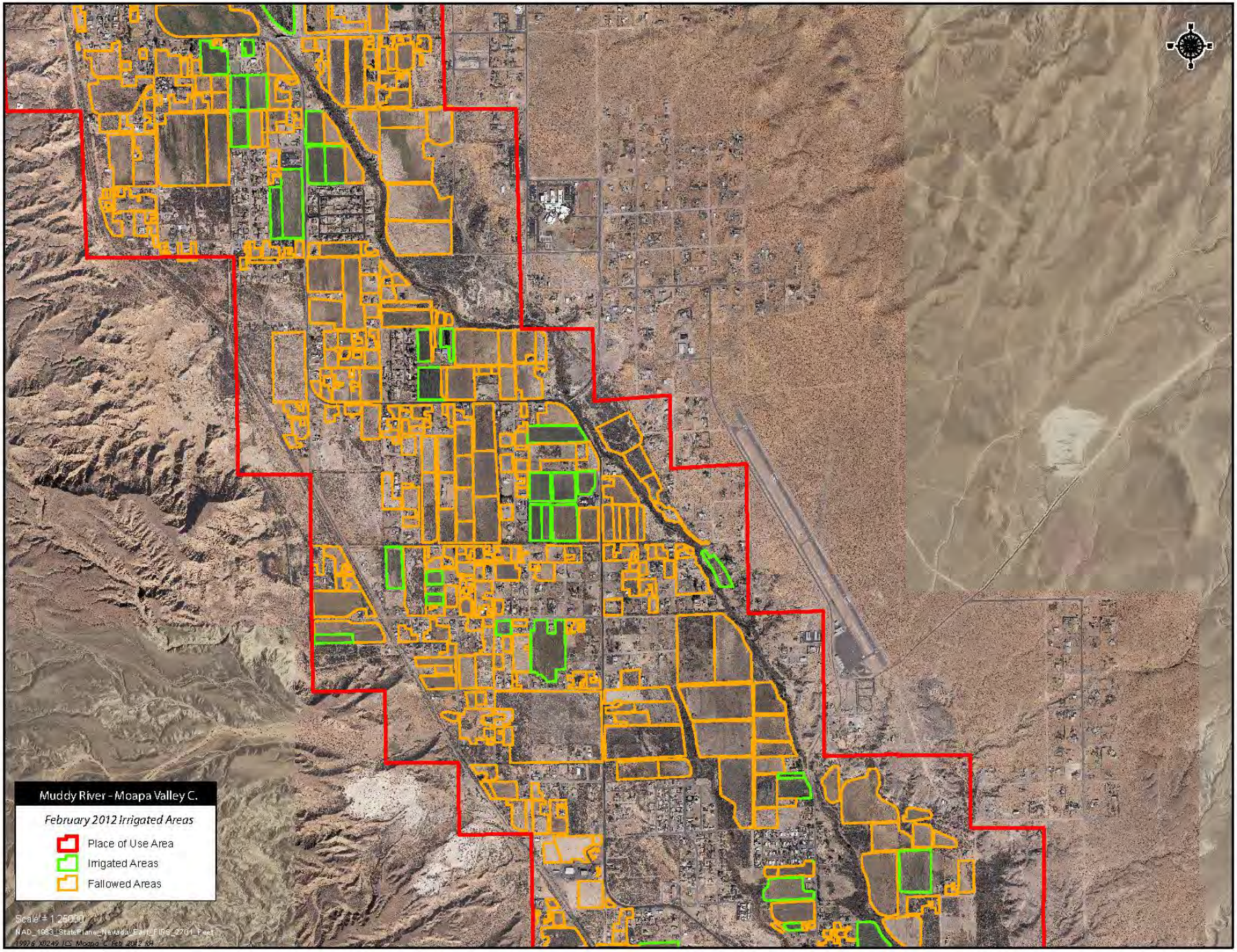


Figure 26 - Middle Section of the MVIC Service Area February 2012 Aerial Photography

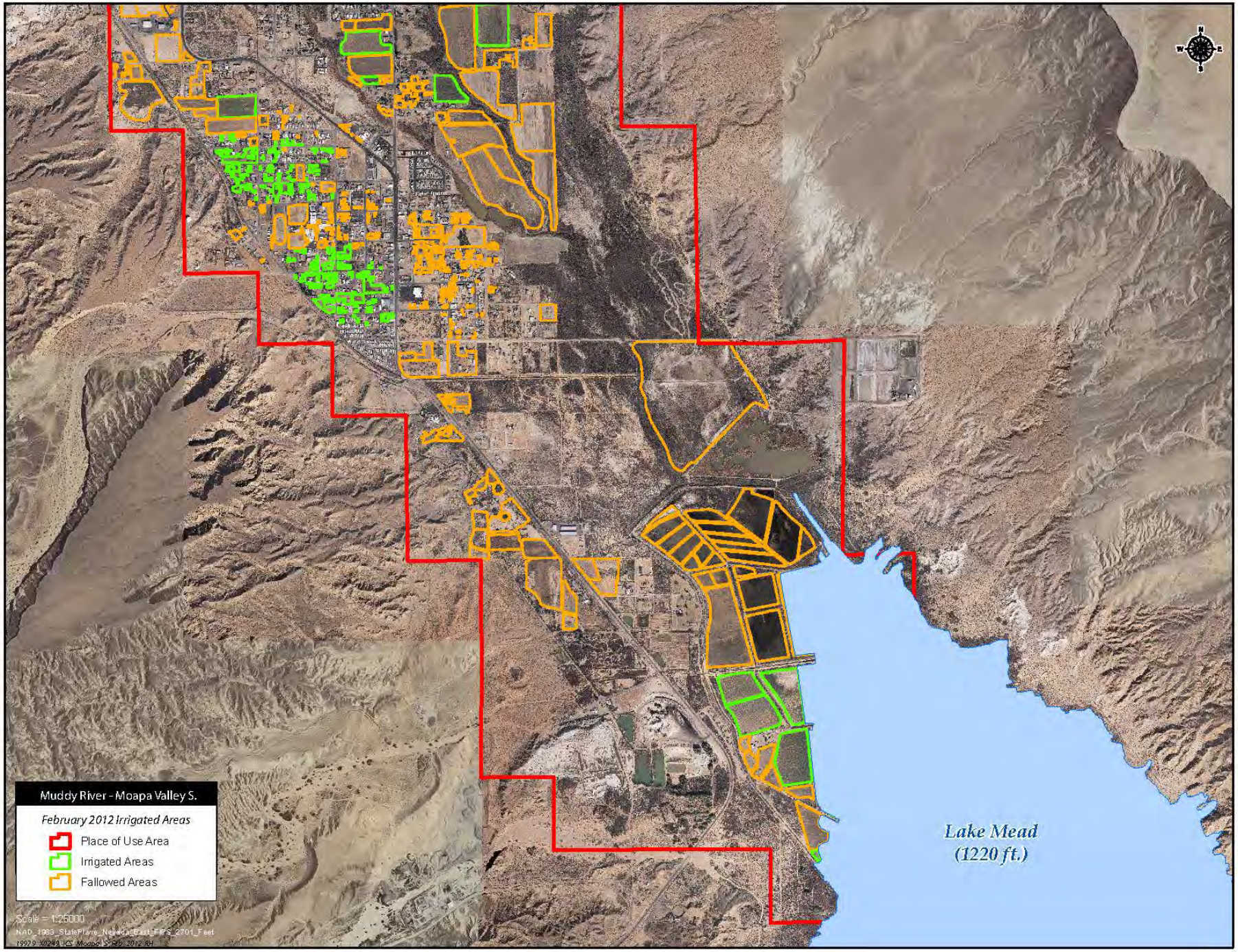


Figure 27 - Lower Section of the MVIC Service Area February 2012 Aerial Photography

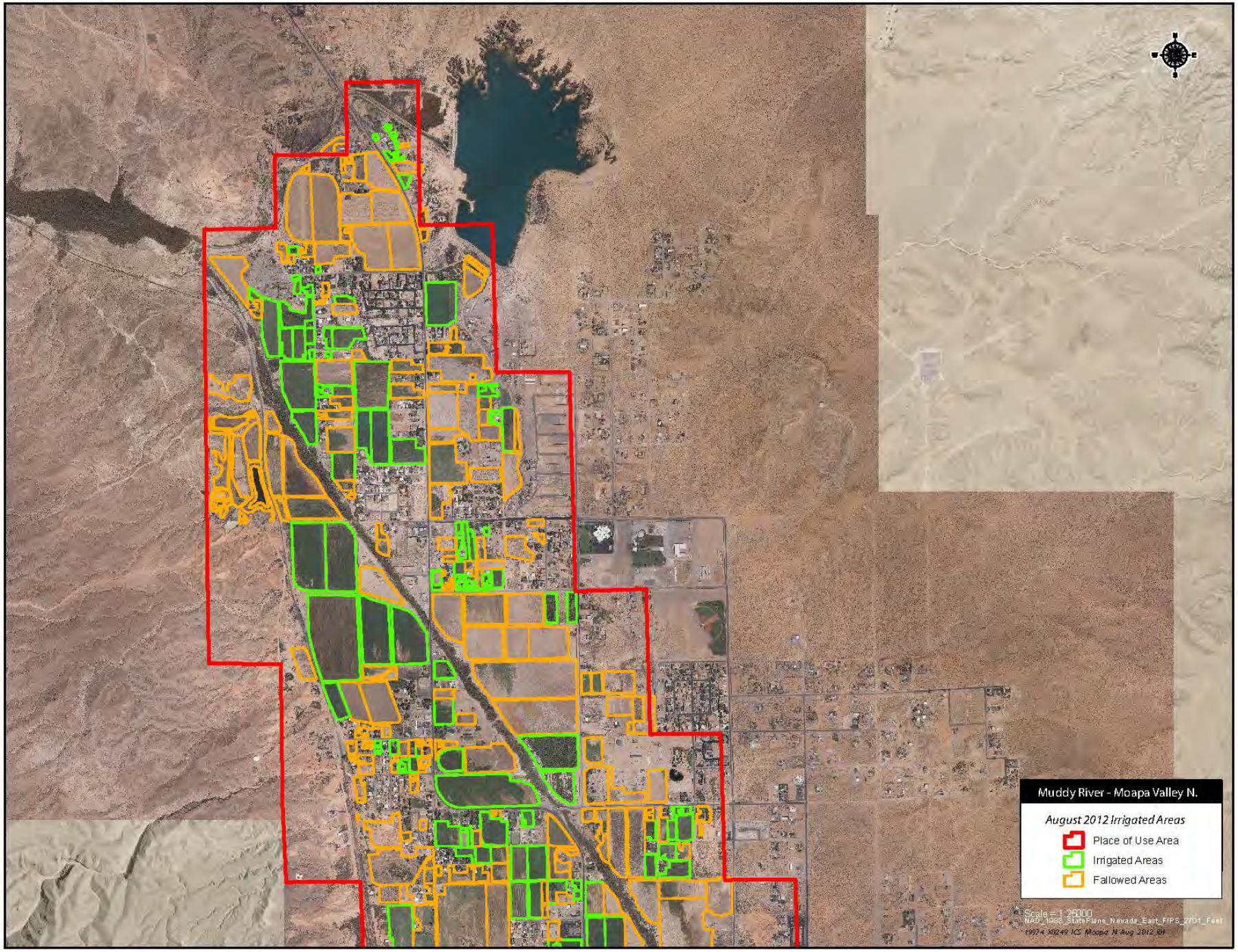


Figure 28 - Upper Section of the MVIC Service Area August 2012 Aerial Photography

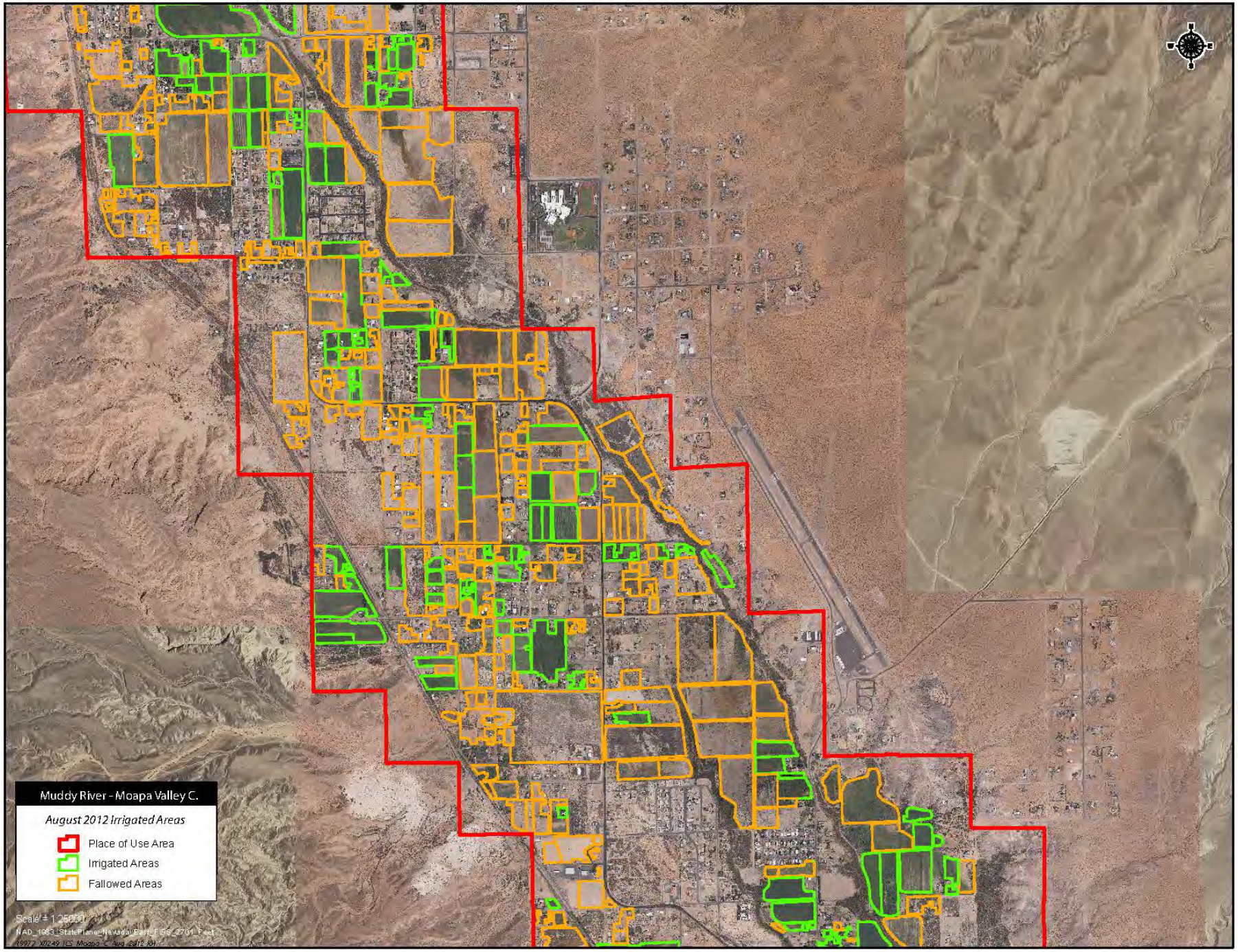


Figure 29- Middle Section of the MVIC Service Area August 2012 Aerial Photography

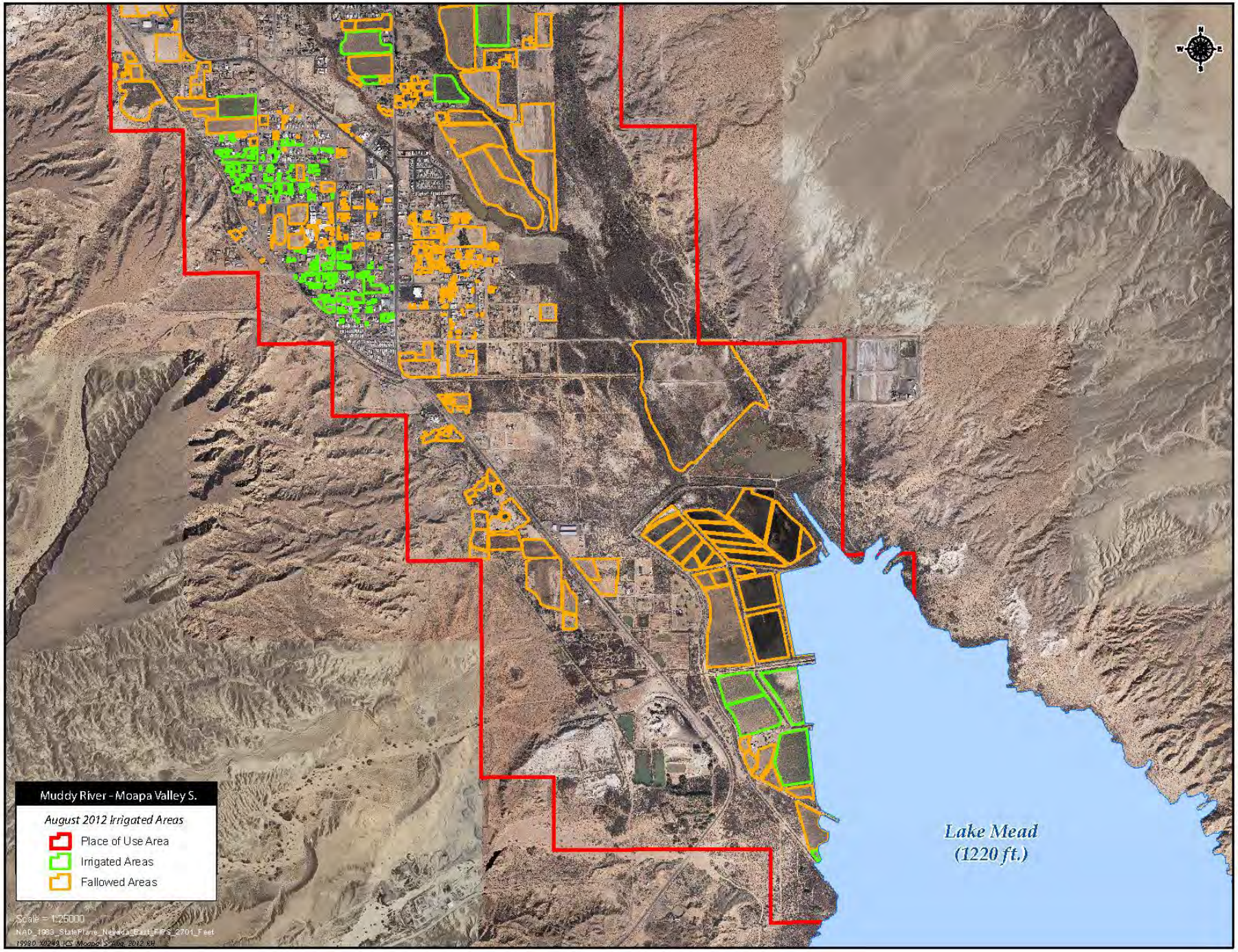


Figure 30 - Lower Section of the MVIC Service Area August 2012 Aerial Photography

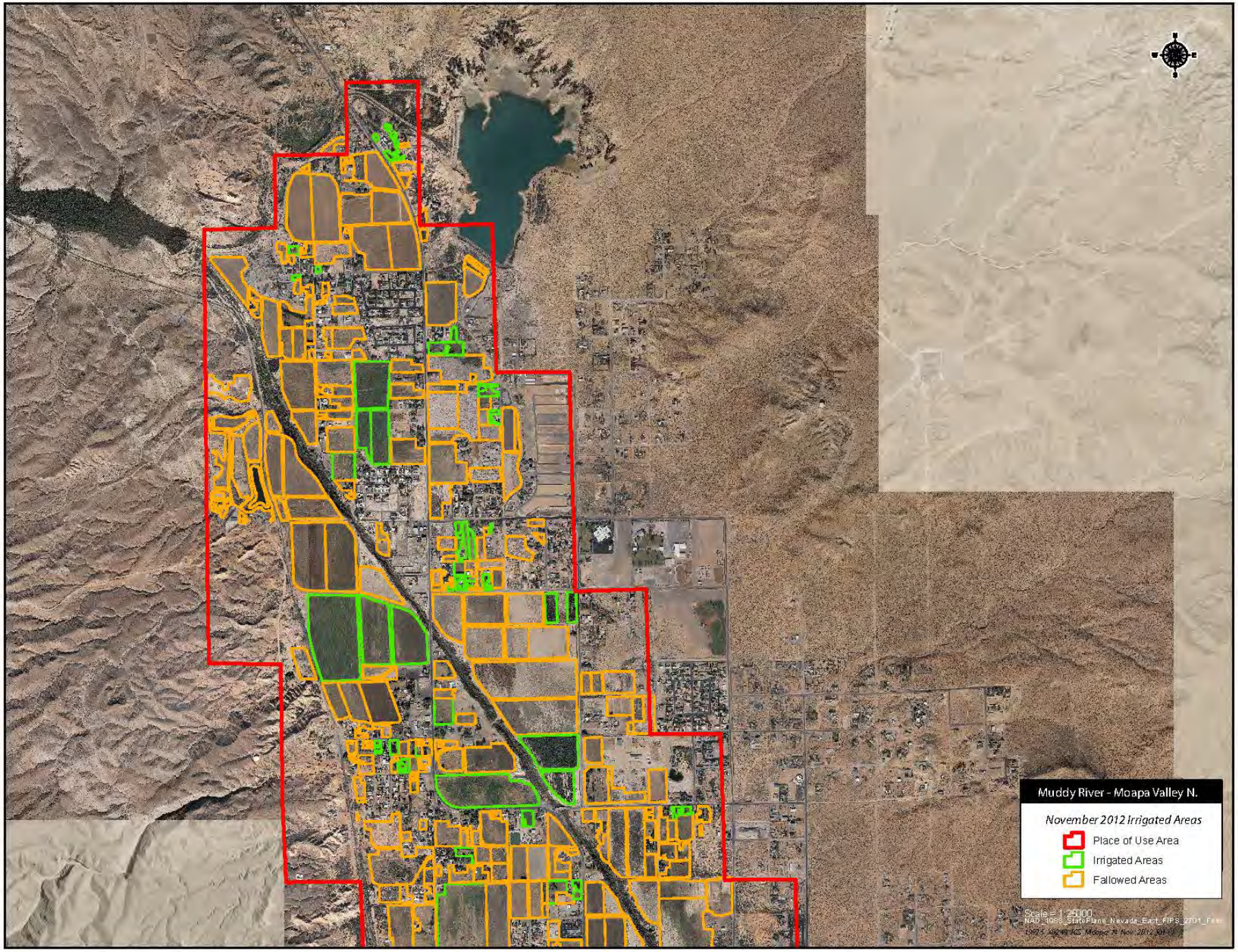


Figure 31 - Upper Section of the MVIC Service Area November 2012 Aerial Photography

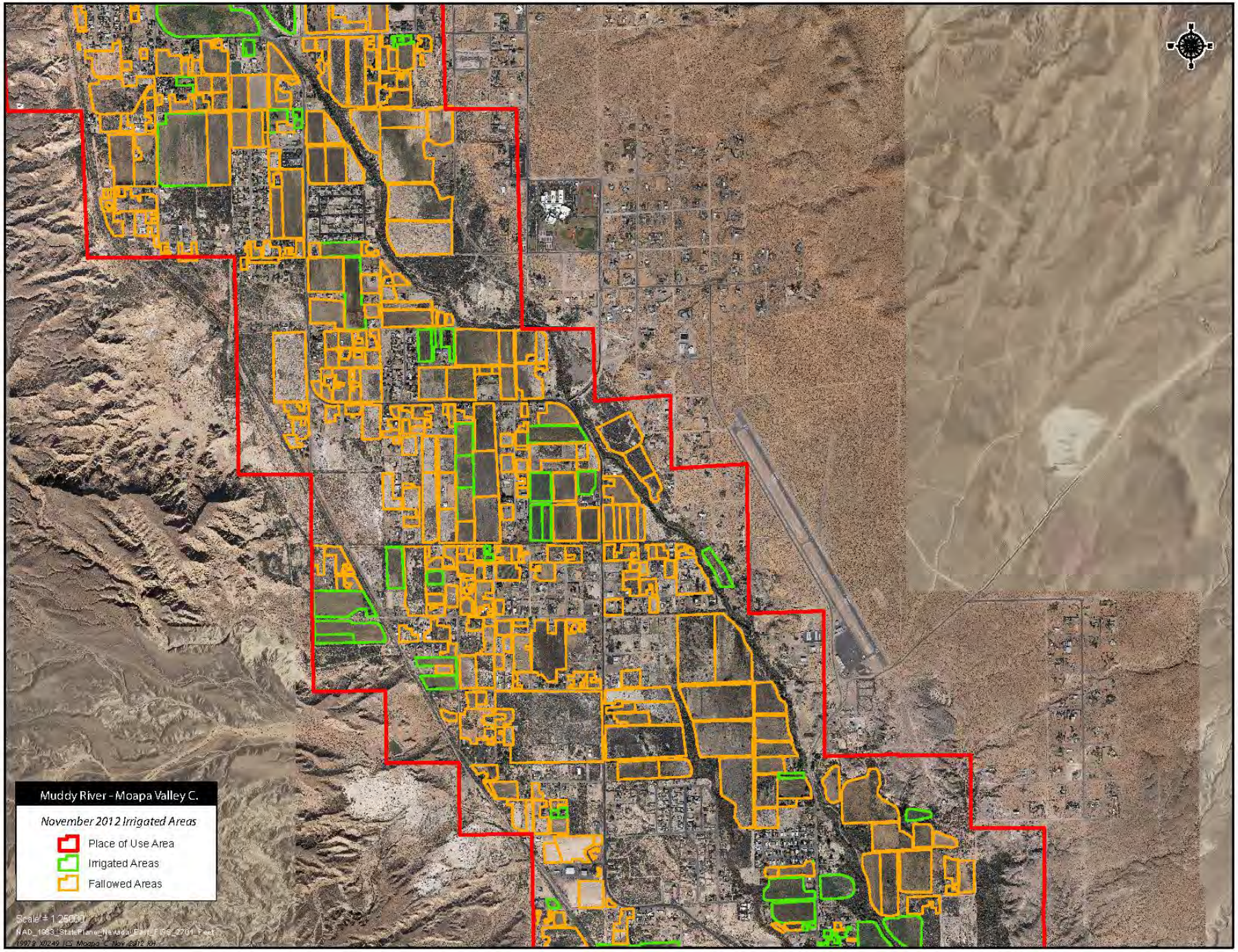


Figure 32 - Middle Section of the MVIC Service Area November 2012 Aerial Photography

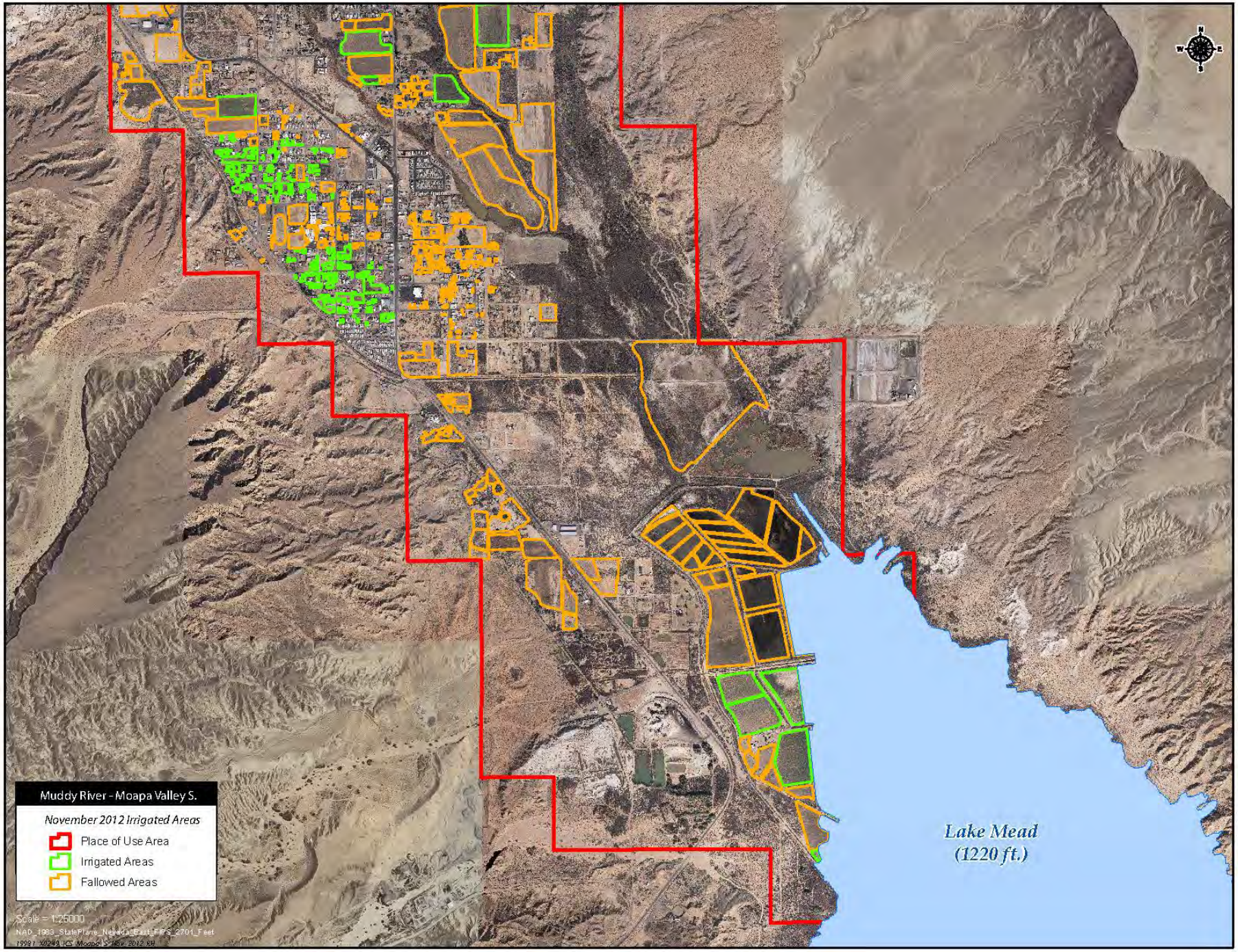


Figure 33 - Lower Section of the MVIC Service Area November 2012 Aerial Photography

Verification of ICS Water Reaching Lake Mead

Since the entire flow of the Muddy River is decreed, it is important to perform a water balance on the Lower Muddy River to verify that the water to which SNWA is claiming Tributary Conservation ICS credits is reaching Lake Mead. This water balance is outlined in Exhibit A of the Forbearance Agreement and approved ICS Plan as follows:

Flows measured by USGS at the Glendale gage
- (minus) consumptive uses by agriculture below the Glendale gage
- (minus) direct uses by industry below the Glendale gage
- (minus) channel evapotranspiration below Glendale gage to Lake Mead
- (minus) evapotranspiration from the managed acreage on the Overton Wildlife Management Area (OWMA)

= Total Flow to Lake Mead (Elevation 1,220 AMSL)

This comprehensive water balance uses the Muddy River at Glendale gage as the input, which was also used to calculate the af/share associated with MVIC shares. To account for consumptive uses in the riparian corridor and agricultural areas, detailed GIS coverages delineating the ground-truthed fields and mapped riparian corridors, combined with Lower Colorado River Accounting System (LCRAS) data were used to derive consumptive uses by crops and plants influenced by the Muddy River. Other consumptive uses by industry and open water evaporation were also calculated. The resulting outflow is a combination of surface flow measured at the USGS gage *09419507 Muddy River at Lewis Avenue near Overton Nevada* (Lewis Avenue gage) and underflow to Lake Mead, bypassing this gage. Downstream of the Lewis Avenue gage, consumptive uses of Muddy River water by the Nevada Division of Wildlife's Overton Wildlife Management Area (OWMA) are deducted from the total flows to Lake Mead. A final comparison is then made to ensure that the conserved Muddy River water reaching Lake Mead exceeds or is equal to the volume of Muddy River water controlled by SNWA.

An itemized seasonal calculation of the water balance is presented in Table 17. The following sub-sections describe each component of the water balance. When data used in the water balance is described, a reference is given to the row in Table 17 where the data was applied.

Glendale Gage Flows

As previously discussed in the Section "Divertible Flows by MVIC at Wells Siding", the water used by MVIC equals the Glendale gage flows minus: 1) flood flows; 2) consumptive uses by phreatophytes in the riparian corridor between the Glendale gage and Wells Siding; and 3) Upper Muddy River rights owned or leased by SNWA. This "divertible flow" is used as the inflow component of the water balance verification.

The Glendale gage, for the purposes of calculating Tributary Conservation ICS credits, is believed to capture all surface water flows entering the lower reach of the Muddy River. The gage is located in a narrow cut of carbonate rocks that are tilted almost vertically due to a thrust fault. Any shallow alluvial underflow is thought to ramp up and be measured by the gage. Downstream of the narrows, the Muddy River enters the lower reach of the Muddy River and the floodplain begins to widen, until reaching Wells Siding. The Muddy River, downstream of Wells Siding, is an incised narrow channel that has artificially been constrained to facilitate

farming on the river's historic floodplain, and act a flood channel. The Glendale gage, Wells Siding, vegetated areas, and open water bodies discussed in this section are shown on Figure 34.

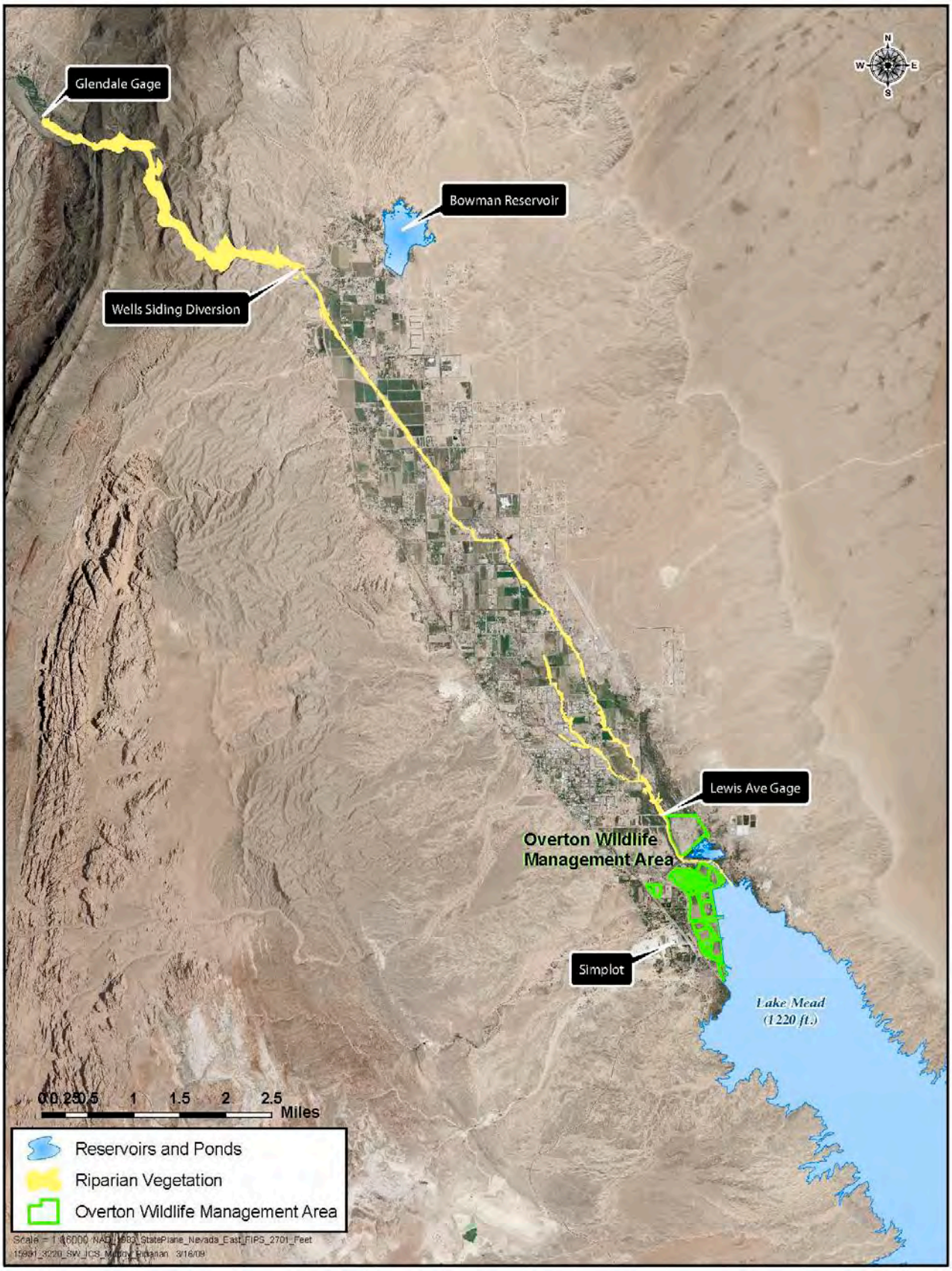


Figure 34 - Map of Lower Muddy River Riparian Area, Open Water, and the OWMA

Crop, Phreatophyte, and Open Water Consumptive Use

Lower Colorado River Accounting System (LCRAS)

To calculate ET demands by crops and phreatophytes on the Muddy River, a literature search for ET data with a long period-of-record and monthly time-step data was performed. The LCRAS was chosen because it contained monthly data in a similar climate for a relatively long period, 1995-2007.

The LCRAS is conducted annually by Reclamation to assist with determining consumptive water use along the Lower Colorado River. The LCRAS ET rates are determined by collecting data from meteorological towers, determining potential ET, and applying various crop coefficients to the ET values.

The LCRAS data chosen for use in this analysis utilize data collected from two Arizona Meteorological Network (AZMET) stations located in the Mohave Valley in Arizona, which are used to calculate local phreatophyte and crop ET (Figure 35). This is the most northern area examined in LCRAS and most closely represents climatic conditions of the Lower Muddy River. The Mohave Valley is, however, at a lower elevation and experiences higher temperatures than the Lower Muddy River, resulting in higher ET values. This makes the Mohave Valley ET values conservative, overestimating the actual ET demand in the Lower Muddy River.

Application of LCRAS to the Lower Muddy River

Phreatophyte vegetation on the Lower Muddy River was mapped and classified using the Anderson-Ohmart classification system. LCRAS uses a classification system that slightly differs from the Anderson-Ohmart system. To apply ET rates from LCRAS to the Lower Muddy River, the two vegetation classification systems were correlated. Table 12 shows an SNWA derived correlation between the two classification systems.

The LCRAS "Sc-low" phreatophyte classification was used for all of the salt-cedar classifications in the Anderson-Ohmart classification and is supported by a USGS Scientific Investigations Report 2008-5116 titled *Quantifying Ground-Water and Surface-Water Discharge from Evapotranspiration Processes in 12 Hydrographic Areas of the Colorado Regional Ground-Water Flow System, Nevada, Utah, and Arizona*. The purpose of the report was to estimate ground and surface water discharge from 12 hydrographic basins via ET. For the study the USGS placed ET measurement sites in various locations in Utah, Arizona, and Nevada including the Upper Muddy and Lower Virgin Rivers. The Virgin River ET station was placed in a "dense woodland vegetation" area which was predominantly salt cedar. The Virgin River site measured an annual ET rate of 3.9 ft/yr without subtracting precipitation. This rate is less than the LCRAS Sc-low value of 4.39 ft/yr using LCRAS Mohave Valley data. The USGS's Muddy River ET site was located in a stand of mesquite trees, in the Upper Muddy River. The USGS value of 3.6 ft/yr (without subtracting precipitation) is more than 1 ft less than the LCRAS "Ms-high" value of 5.0 ft/yr.

The USGS study demonstrates that by correlating the LCRAS Sc-low and Ms-high classifications to salt cedar and mesquite on the Lower Muddy River, a conservative estimate of ET can be determined. These variations in ET rates demonstrate the challenges of trying to estimate ET over large areas, as ET can only be physically measured at a single point. Conditions such as soil type, depth to groundwater below land surface, and calculation method used can all affect ET rates greatly. Comparison of the LCRAS rates used by SNWA (Sc-low) in

the water balance (in this analysis) to the measurements performed by the USGS show that using the LCRAS rates tends to slightly overestimate ET along the Lower Muddy River based these recent reports.

The equation used in this analysis for calculating ET by phreatophytes is:

Phreatophyte ET Demand in af = (Riparian Phreatophyte Acreage) x (Correlated LCRAS ET Rate)

The agricultural crop types in LCRAS were directly correlated with crop types on the Muddy River. Water use by crop type in LCRAS is adjusted for precipitation by using an effective precipitation coefficient. To more accurately represent conditions on the Lower Muddy River, provisional precipitation data recorded for CY 2012 by the Overton Nevada Community Environmental Monitoring Program (CEMP) Weather Station (http://www.cemp.dri.edu/) was used for calculating the effective precipitation used to derive crop consumptive uses. The equation for calculating Crop ET is listed below. The crop rates adjusted to Overton Nevada Precipitation are shown in Table 13.

Crop ET Demand in af = (Crop Acreage) x [(Correlated LCRAS ET Rate) – (Overton CEMP Effective Precipitation)]

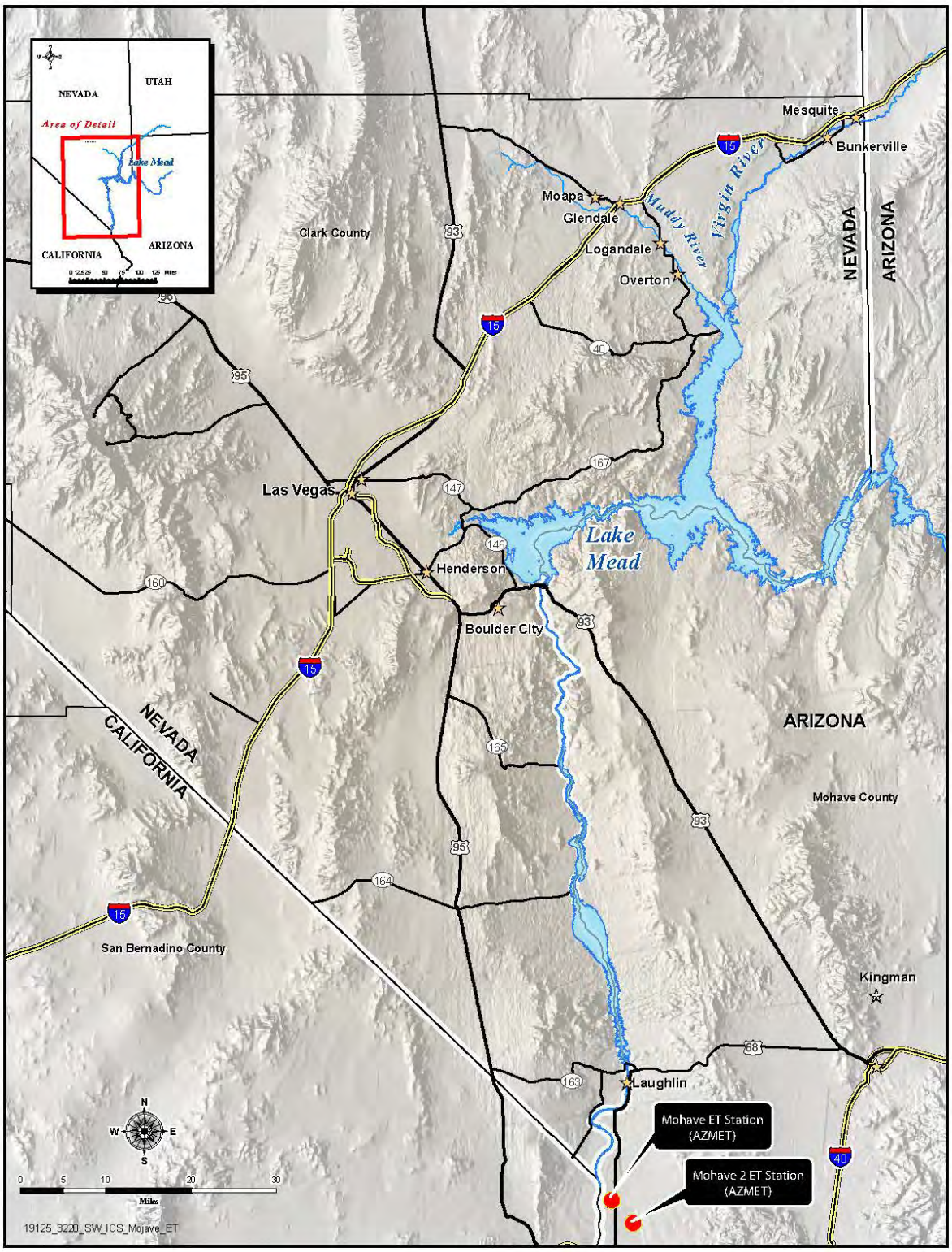


Figure 35 – Mohave Valley AZMET ET Stations

Table 12 – Anderson Ohmart to LCRAS Vegetation Classification Correlation

Anderson Ohmart Mapped Class	Correlating LCRAS Class
A	Low Veg
AW	AW
Acacia	Ms-high
Baccharis	Low Veg
C	CW
CW	CW
HM	Ms-high
I	Ms-high
L	Ms-high
MA	Marsh
RIV	Open Water
SC	Sc-low
SM	Sc/ms

Table 13 through Table 15 in this section details the calculations performed to estimate the amount of consumptive uses by crops, phreatophytes, and open water. The Mohave Valley monthly ET rates for the crops and phreatophytes adjusted to local precipitation collected at DRI's Overton Nevada Community Environmental Monitoring Program station.

The measured acreages of each vegetation type and open water are in Table 14. Vegetation mapping of the Muddy River riparian corridor was performed in 2006. In 2010, the survey data was updated to reflect removal of vegetation due to the construction of a bridge crossing the Muddy River. Given the incised nature of the channel, the total vegetated acreage along the riparian corridor has remained the same and is anticipated to remain the same into the future. The phreatophyte acreages were mapped in the field by biologists and verified using the high resolution 6-in aerial photography. The measured acreage values for the phreatophytes and crops are shown in Table 14. The final consumptive use calculations for the phreatophytes and crops are shown monthly in Table 15 and these results are then shown seasonally on Rows B, F, and H in Table 17.

Vegetation acreage mapped for OWMA is also shown in Table 14. OWMA is the downstream extent of MVIC's service area and is located immediately above the full pool elevation of Lake Mead. Water use by OWMA is described in the subsequent sections of this report.

Future ET Studies

To enhance the accuracy of ET consumptive use calculations along the Lower Muddy River, SNWA has installed a meteorological (MET) tower adjacent to an alfalfa field in the Lower Muddy River. With the cooperation of the Moapa Valley High School Future Farmers of America Farm, SNWA was able to place the MET tower in an area with the ideal fetch and agricultural conditions for measuring the meteorological parameters necessary to calculate reference ET using the ASCE Standardized Reference ET Equation –a similar method used by The Arizona Meteorological Network (AZMET) and California Irrigation Management Information System (CIMIS) for the LCRAS program. The reference ET calculated from the MET tower could then be multiplied by the LCRAS crop coefficients to obtain a more accurate ET consumptive use estimate for the Lower Muddy River, once data from the site is reviewed.

In addition to SNWA's data collection efforts, the NDWR recently published a report titled *Evapotranspiration and Net Irrigation Requirements for Nevada*. The report and ET database can be found on the NDWR website (http://water.nv.gov/NVET/). Since there are not many MET stations collecting ET data under ideal conditions, data from National Weather Service Cooperative Observer Program weather stations was used to approximate reference ET. The NDWR report also modified standard crop curves to the climate and agricultural practices of Nevada. Using the NDWR database (http://water.nv.gov/NVET/ET.html), the calculated alfalfa ET for the Lower Moapa Valley is 4.9 ft per year. This value is lower than the Mohave Valley value of 5.7 ft. These lower values are to be expected as the Muddy River is at a higher elevation and latitude than Mohave Valley. AZ. SNWA will continue collecting MET data and may use the data collected from the Moapa Valley High School MET tower, possibly with the modified crop curves from the NDWR report in future ICS Certification Reports.

Open Water Evaporation

Open water bodies on the Lower Muddy River include Bowman Reservoir, the Muddy River channel, and a few small ponds on the OWMA. Bowman Reservoir is used by MVIC to augment irrigation flows during the summer irrigation season. The reservoir is also where SNWA's Coyote Spring Valley Imported ICS is delivered. Historically the 3,000 to 4,000 af

capacity reservoir was filled in the winter months from the Muddy River via gravity flow and then a pump to reach higher storage volumes. The reservoir storage was then used to augment the summer irrigation season. Since the end of CY 2010, the majority of the water in Bowman Reservoir was delivered via the MVWD distribution system as opposed to coming from MVIC diversions from the Muddy River. This addition of water from the MVWD system is discussed in greater detail in the report *Coyote Spring Valley Imported Intentionally Created Surplus Certification Report Calendar Year 2012*.

The open water evaporation rate used for Bowman Reservoir, the Muddy River channel, and the ponds on the OWMA was 7.50 ft/yr. This value is the open water evaporation rate determined and published by the USGS for Lake Mead. The monthly average evaporation data was published in the USGS SIR 2006-5252 titled *Evaporation from Lake Mead, Arizona, and Nevada, 1997-99*. The average monthly evaporation data from the report can be found in Table 13. The surface area of Bowman Reservoir and other open water on the Lower Muddy River can be found in Table 14, and the total evaporative loss can be found in Table 15 and in Row G of Table 17. Changes in storage in Bowman Reservoir along with inflows from SNWA's Imported ICS project are shown in Rows J and K of Table 17. Monthly water level elevations in Bowman Reservoir were manually recorded by MVIC personnel utilizing a surveyed stage measurement gage located on the side of the reservoir. A stage capacity curve was created by SNWA using high resolution LiDAR data collected when the reservoir was empty. This allows MVIC and SNWA to obtain a very accurate reservoir storage volume at any given reservoir elevation. Month-to-month Bowman Reservoir volumes were used to calculate changes in storage in the reservoir which translated to inflows and outflows of the reservoir.

Table 13 - ET Rates in Feet for the Lower Muddy River from LCRAS, USGS, and CEMP

	January	February	March	April	May	June	July	August	September	October	November	December	Total
Crops:													
Alfalfa Perennial	0.22	0.33	0.42	0.56	0.68	0.73	0.69	0.66	0.56	0.39	0.25	0.23	5.70
Alfalfa-Annual	0.16	0.28	0.34	0.39	0.65	0.50	0.57	0.29	0.23	0.24	0.13	0.17	3.93
Small Grain	0.26	0.38	0.58	0.68	0.27	0.00	0.00	0.00	0.00	0.00	0.02	0.07	2.25
Orchard	0.15	0.18	0.28	0.45	0.66	0.70	0.67	0.64	0.51	0.37	0.25	0.14	4.98
Melons (Fall)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.09	0.32	0.42	0.31	0.14	1.27
Small Vegetables	0.30	0.35	0.43	0.15	0.00	0.00	0.00	0.00	0.08	0.15	0.20	0.21	1.85
Bermuda Grass w/ Rye	0.27	0.31	0.37	0.28	0.64	0.69	0.66	0.62	0.48	0.21	0.26	0.20	4.97
Seasonal Wetland	0.31	0.36	0.37	0.34	0.33	0.21	0.40	0.41	0.33	0.43	0.29	0.21	3.97
Moist Soil Unit	0.58	0.81	0.24	0.36	0.31	0.84	0.26	0.46	0.43	0.27	0.45	0.37	5.36
Phreatophytes:													
AW	0.08	0.10	0.20	0.41	0.69	0.80	0.76	0.68	0.51	0.31	0.12	0.07	4.73
CW	0.08	0.10	0.21	0.44	0.74	0.84	0.79	0.71	0.53	0.33	0.13	0.07	4.97
Low Veg	0.09	0.10	0.20	0.37	0.61	0.67	0.67	0.59	0.50	0.32	0.14	0.07	4.33
Marsh	0.07	0.08	0.37	0.74	0.92	0.96	0.91	0.82	0.67	0.27	0.07	0.06	5.94
Ms-High	0.08	0.10	0.21	0.43	0.71	0.82	0.77	0.70	0.57	0.38	0.16	0.07	5.00
Sc-ms	0.08	0.10	0.20	0.46	0.81	0.95	0.89	0.80	0.61	0.36	0.14	0.07	5.47
Sc-Low	0.07	0.08	0.14	0.29	0.61	0.77	0.73	0.66	0.54	0.33	0.12	0.05	4.39
Open Water Evaporation [1]	0.30	0.40	0.60	0.60	0.80	0.80	0.80	0.70	0.80	0.70	0.60	0.40	7.50
Precipitation [2]	0.00	0.01	0.03	0.04	0.00	0.00	0.01	0.10	0.04	0.06	0.00	0.09	0.37

Table 14 - Measured Acreages of Crops, Phreatophytes, and Open Water on the Lower Muddy River

	2012 (acres)											
	January	February	March	April	May	June	July	August	September	October	November	December
Bowman Reservoir	108.82	135.32	150.76	154.62	150.76	147.02	147.02	135.32	127.56	112.58	98.20	101.57
Riparian:												
Sc_Low above Wells Siding	261.77	261.77	261.77	261.77	261.77	261.77	261.77	261.77	261.77	261.77	261.77	261.77
AW	7.85	7.85	7.85	7.85	7.85	7.85	7.85	7.85	7.85	7.85	7.85	7.85
CW	6.73	6.73	6.73	6.73	6.73	6.73	6.73	6.73	6.73	6.73	6.73	6.73
Ms-High	7.92	7.92	7.92	7.92	7.92	7.92	7.92	7.92	7.92	7.92	7.92	7.92
Low Veg	16.90	16.90	16.90	16.90	16.90	16.90	16.90	16.90	16.90	16.90	16.90	16.90
Marsh	20.00	20.00	20.00	20.00	20.00	20.00	20.00	20.00	20.00	20.00	20.00	20.00
Sc-Low	97.73	97.73	97.73	97.73	97.73	97.73	97.73	97.73	97.73	97.73	97.73	97.73
Sc/ms	8.94	8.94	8.94	8.94	8.94	8.94	8.94	8.94	8.94	8.94	8.94	8.94
Open Water	2.11	2.11	2.11	2.11	2.11	2.11	2.11	2.11	2.11	2.11	2.11	2.11
Subtotal Below Wells Siding	168.18	168.18	168.18	168.18	168.18	168.18	168.18	168.18	168.18	168.18	168.18	168.18
Total	*429.95*	*429.95*	*429.95*	*429.95*	*429.95*	*429.95*	*429.95*	*429.95*	*429.95*	*429.95*	*429.95*	*429.95*
MVIC Ag:												
Alfalfa	248.56	248.56	248.56	248.56	333.47	333.47	333.47	333.47	333.47	149.45	149.45	149.45
Small Vegetables	3.26	3.26	3.26	3.26	3.26	3.26	3.26	3.26	3.26	3.70	3.70	3.70
Bermuda w/ Rye	88.69	88.69	88.69	88.69	303.07	303.07	303.07	303.07	303.07	188.91	188.91	188.91
Orchard	27.10	27.10	27.10	27.10	28.10	28.10	28.10	28.10	28.10	28.10	28.10	28.10
Melons (Fall)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Small Grain	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Moist Soil Unit	0.00	0.00	0.00	0.00	10.54	10.54	10.54	10.54	10.54	0.00	0.00	0.00
Total	*367.62*	*367.62*	*367.62*	*367.62*	*678.45*	*678.45*	*678.45*	*678.45*	*678.45*	*370.16*	*370.16*	*370.16*
OWMA:												
Alfalfa	31.67	31.67	31.67	31.67	52.35	52.35	52.35	52.35	52.35	40.07	40.07	40.07
Small Grain	0.00	0.00	0.00									
Seasonal Wetland	155.16	155.16	155.16	155.16	0.00	0.00	0.00	0.00	0.00	155.16	155.16	155.16
Sudan	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	31.02	31.02
Open Water	31.88	31.88	31.88	31.88	31.88	31.88	31.88	31.88	31.88	31.88	31.88	31.88
Total	*218.71*	*218.71*	*218.71*	*218.71*	*84.23*	*84.23*	*84.23*	*84.23*	*84.23*	*227.11*	*258.13*	*258.13*

Table 15 - Acre-Foot Values for Consumptive Uses of Crops, Phreatophytes, and Open Water on the Lower Muddy River

	2012 (af)												
	January	February	March	April	May	June	July	August	September	October	November	December	Total
Bowman Reservoir	32.65	53	87	87	121	118	116	81	97	72	59	32	954
Riparian:													
Sc_Low above Wells Siding	18.32	20.94	36.65	75.91	159.68	201.56	191.09	172.77	141.36	86.38	31.41	13.09	1,149
AW	0.63	0.78	1.57	3.22	5.42	6.28	5.96	5.34	4.00	2.43	0.94	0.55	37
CW	0.54	0.67	1.41	2.96	4.98	5.65	5.32	4.78	3.57	2.22	0.87	0.47	33
Ms-High	0.63	0.79	1.66	3.40	5.62	6.49	6.10	5.54	4.51	3.01	1.27	0.55	40
Low Veg	1.52	1.69	3.38	6.25	10.31	11.33	11.33	9.97	8.45	5.41	2.37	1.18	73
Marsh	1.40	1.60	7.40	14.80	18.40	19.20	18.20	16.40	13.40	5.40	1.40	1.20	119
Sc-Low	6.84	7.82	13.68	28.34	59.62	75.25	71.34	64.50	52.77	32.25	11.73	4.89	429
Sc/ms	0.71	0.89	1.79	4.11	7.24	8.49	7.95	7.15	5.45	3.22	1.25	0.63	49
Open Water	0.63	0.82	1.21	1.19	1.69	1.69	1.66	1.26	1.60	1.36	1.26	0.66	15
Subtotal Below Wells Siding	13	15	32	64	113	134	128	115	94	55	21	10	795
Total	**31**	**36**	**69**	**140**	**273**	**336**	**319**	**288**	**235**	**142**	**53**	**23**	**1,944**
MVIC Ag:													
Alfalfa	54.68	80.95	103.15	139.19	226.76	243.44	230.10	220.09	186.74	57.89	37.36	33.63	1,614
Small Vegetables	0.98	1.13	1.39	0.49	-	-	-	-	0.26	0.54	0.74	0.76	6
Bermuda w/ Rye	23.95	27.11	32.37	24.83	193.97	209.12	200.03	187.90	145.47	39.17	49.12	36.84	1,170
Orchard	4.06	4.76	7.45	12.19	18.55	19.67	18.83	17.99	14.33	10.32	7.03	3.79	139
Melons (Fall)	-	-	-	-	-	-	-	-	-	-	-	-	-
Sm Grain	-	-	-	-	-	-	-	-	-	-	-	-	-
Moist Soil Unit	-	-	-	-	6.96	7.38	7.06	6.75	5.38	-	-	-	-
Total	**83.67**	**114**	**144**	**177**	**446**	**480**	**456**	**433**	**352**	**108**	**94**	**75**	**2,963**
OWMA:													
Alfalfa	6.97	10.31	13.14	17.74	35.59	38.21	36.12	34.55	29.31	15.52	10.02	9.02	256
Small Grain	-	-	-	-	-	-	-	-	-	-	-	-	-
Seasonal Wetland	48.10	55.19	56.63	52.75	-	-	-	-	-	66.31	45.00	31.81	356
Sudan	-	-	-	-	-	-	-	-	-	-	6.20	6.36	13
Open Water	9.56	12.41	18.33	17.93	25.50	25.50	25.13	19.10	24.20	20.51	19.13	9.96	227
Total	**65**	**78**	**88**	**88**	**61**	**64**	**61**	**54**	**54**	**102**	**80**	**57**	**852**

Industrial Consumptive Use

A portion of MVIC's shares have been purchased and leased by Simplot, a sand and minerals operation in Overton, Nevada, which is using the water represented by shares they control for slurrying and washing sand for glass production. The water is 100% consumptively used, so the water represented by the shares controlled by Simplot is subtracted in its entirety from the water balance.

In 2012, Simplot controlled up to 215.67 preferred and 287.67 common shares (personal communication with Scott Millington, MVIC General Manager, May 2012). Using the acre-foot per share values of 5.9813 af/share preferred and 0.5046 af/share common, Simplot consumptively used 1,435 af of MVIC water in CY 2012. While the water delivered to Simplot is not directly measured, they are located at the end of the ditch and are subject to all users upstream obtaining their rights. Even SNWA's rights are taken on turn and returned to the natural channel above Simplot. Therefore, calculating their use at 100% of their controlled shares ensures a conservative estimate for their annual use. The monthly breakdown of Simplot's consumptive use is shown in Row E of the Water Budget Table 17.

Total Flows Passing Lewis Avenue Gage

Lewis Avenue in Overton is generally considered to be the lower most extent of agricultural uses within MVIC's service area. The OWMA is located downstream of the Lewis Avenue gage and abuts Lake Mead. Discharge data for CY 2012 at the Lewis Avenue gage is shown in Table 16 (data is provisional from October through December), which measured approximately 20,971 af in CY 2012. The flow data from this gage was not filtered for flood flows since the flow data only represents an intermediate measurement point between the Glendale gage and Lake Mead and is not a direct input into the water balance.

Table 16 – Lewis Avenue Gage Record for CY 2012

09419507 Muddy River at Lewis Avenue at Overton, NV - Units cfs													
Day	Jan-12	Feb-12	Mar-12	Apr-12	May-12	Jun-12	Jul-12	Aug-12	Sep-12	Oct-12	Nov-12	Dec-12	Total
1	40	14	11	22	22	34	27	22	17	35	38	27	
2	42	16	12	32	33	30	25	28	37	36	34	28	
3	42	15	14	36	33	28	16	15	37	31	29	25	
4	45	15	16	33	33	21	14	35	34	30	22	25	
5	45	17	19	30	29	10	16	35	31	28	29	34	
6	37	15	21	28	21	13	30	32	27	18	41	39	
7	20	13	18	28	13	32	32	37	17	12	42	38	
8	21	8	13	27	13	33	30	38	14	27	42	37	
9	19	11	16	24	33	30	27	15	31	35	34	37	
10	13	12	16	37	35	26	24	12	39	35	35	35	
11	12	15	15	33	30	23	17	32	72	35	23	33	
12	7	19	20	33	28	14	15	31	637	42	23	37	
13	11	24	17	33	26	14	31	30	49	28	37	38	
14	15	24	19	35	14	27	32	31	27	25	39	41	
15	12	23	18	33	11	24	31	29	22	36	40	43	
16	16	20	16	33	29	24	31	17	36	39	39	44	
17	15	15	11	27	32	24	33	12	39	42	46	40	
18	12	18	10	31	29	22	15	27	33	39	44	43	
19	10	19	22	34	27	14	15	37	32	36	41	42	
20	5	17	22	32	28	16	23	42	30	30	41	43	
21	14	14	21	29	15	23	35	31	18	23	38	42	
22	16	13	17	21	10	27	34	57	13	25	41	42	
23	16	17	18	15	21	31	26	64	18	34	42	42	
24	15	13	15	24	30	25	27	45	34	36	41	42	
25	14	8	14	33	30	26	17	34	37	36	41	41	
26	15	15	30	34	28	13	12	38	34	34	40	42	
27	13	16	39	32	29	8	17	36	31	33	36	38	
28	17	34	37	32	19	14	29	34	22	24	34	36	
29	22	27	38	27	12	27	31	36	15	23	35	36	
30	19	--	38	19	23	29	29	26	17	41	34	37	
31	18	--	33	--	34	--	30	16	--	41	--	38	
					4								
Mean	20	17	20	30	25	23	25	31	50	32	37	38	
Cnt	31	29	31	30	31	30	31	31	30	31	30	31	
Min	5	8	10	15	10	8	12	12	13	12	22	25	
Max	45	34	39	37	35	34	35	64	637	42	46	44	
Acre Feet	**1,230**	**965**	**1,241**	**1,760**	**1,530**	**1,352**	**1,529**	**1,930**	**2,980**	**1,960**	**2,184**	**2,310**	**20,971**

Overton Wildlife Management Area

The OWMA is located just above the Muddy River's confluence with Lake Mead, downstream of the Lewis Avenue gage. OWMA is managed for migrating birds, hunting, and most recently, a refugia for Razorback suckers in a small impoundment called Honey Bee Pond. The managed part of the facility, located above Lake Mead, is about 280 acres in size and consists of a series of seasonal wetlands that are flooded in the winter for migrating waterfowl, along with several fields of Alfalfa, Sudan grass, and Bermuda grass for bird habitat and minor farming, along with Honey Bee Pond and a couple other small impoundments.

The OWMA receives most of its water directly from the Muddy River and is permitted to do so under tail-water permits. In addition to the tail-water rights, OWMA owns shares in MVIC. In 2012, OWMA owned 347 afy of MVIC rights represented by 51.25 preferred and 80.50 common shares (personal communication with Scott Millington, MVIC General Manager, May 2012). MVIC water delivered to OWMA is diverted at Wells Siding and travels via ditch to OWMA, therefore bypassing the Lewis Avenue gage.

The managed area of OWMA above Lake Mead uses approximately 852 afy (Row P of Table 17) in addition to the 347 afy from MVIC shares, based on the type of vegetation/management practices for OWMA lands above Lake Mead. Aerial photography and discussions with OWMA management were used to determine the appropriate LCRAS Vegetation ET rates to apply to the managed areas.

Flows Entering Lake Mead and SNWA Tributary Conservation ICS

After the OWMA consumptive uses from the Muddy River are subtracted from the total flows measured at the Lewis Avenue gage, the total outflows to Lake Mead as both surface- and under-flows can be derived (Row Q of Table 17). As outlined in Table 17, 23,652 af of Muddy River water entered Lake Mead in CY 2012. In CY 2012, SNWA controlled 17,313 af of Muddy River water rights (Row T).

In addition, SNWA delivered 3,918 af of Coyote Spring Valley Imported ICS (Imported) water to the Lower Muddy River for conveyance to Lake Mead (Row U). Since the Imported water is discharged into the Lower Muddy River at Bowman Reservoir (Row J), it must be accounted for in the water balance of the Lower Muddy River in Table 17. The total amount of SNWA Muddy River and Imported rights is totaled in Row V. More detail of SNWA's Coyote Springs Imported ICS Project is provided in the separate report titled *Coyote Spring Valley Imported Intentionally Created Surplus Certification Report Calendar Year 2012*.

The difference between the total outflows to Lake Mead and Tributary Conservation and Imported rights held by SNWA is 2,421 af (Row W). Since SNWA's rights fall within the total flow volume of water reaching Lake Mead, SNWA created Tributary Conservation ICS with the full volume of rights owned and controlled on the Muddy River – 17,313 af prior to overrun payback and the one-time deduction of 5% for the benefit of additional system storage in Lake Mead.

Table 18 applies the results shown in Table 17 in the format of the Water Balance from Exhibit A of the Forbearance Agreement.

Table 17 - 2012 Muddy River Intentionally Created Surplus Water Balance Sheet

2012 Muddy River Intentionally Created Surplus Water Balance Sheet (all units in Acre-Feet)						
		Winter (Jan - Apr)	Summer (May-Sep)	Winter (Oct-Dec)	Total	Row Reference
Total Inflows To Lower Muddy River	Muddy River at Glendale Gage	9,910.00	11,300.00	6,960.00	28,170.00	A
	Phreatophyte Consumptive Use to Wells Siding	151.83	866.46	130.89	1,149.17	B
	Leased Upper Muddy River Water Rights	3,517.91	3,522.59	2,888.65	9,929.15	C
	Acre-feet per Share Basis	**6,240.26**	**6,910.95**	**3,940.47**	**17,092**	D = A - B - C
Consumptive Uses Above Lewis Avenue	Simplot	512.93	537.48	384.70	1,435.12	E
	MVIC Crop Use	518.70	2,166.77	277.18	2,962.65	F
	Bowman Reservoir Evaporation	258.97	532.04	163.09	954.10	G
	Phreatophyte Consumptive Use (Wells Siding to Lake Mead)	124.37	584.23	86.52	795.12	H
	MVIC Consumptive Uses above Lewis Ave	1,414.97	3,820.52	911.49	6,147	I = E + F + G + H
Bowman Reservoir Operations						
	Coyote Springs Imported ICS	351.48	2,253.06	1,313.77	3,918	J
	Net Muddy River Water In (+) or Out (-) of Bowman	1,725.57	(3,240.51)	(2,114.42)	(3,629)	K
	Total Change in Bowman Reservoir Storage	2,077.05	(987.44)	(800.66)	289	L=J+K
Outflows from MVIC Service Area	Total Calculated Flows Passing Lewis Avenue	6,617.64	9,853.53	8,032.05	24,503	M=A-B-I+J-L
	Flows Measured at USGS Lewis Avenue Gage	5,196.00	9,321.00	6,454.00	20,971	N
	Calculated Unmeasured Sub-Surface Flows	1,421.64	532.53	1,578.05	3,532	O=M-N
	Total Calculated Flows Passing Lewis Avenue	**6,618.00**	**9,854.00**	**8,032.00**	**24,504**	M
Overton Wildlife Management Area Water Use	OWMA Consumptive Use	319.07	293.23	239.83	852	P
	Total Flows to Lake Mead	6,298.93	9,560.77	7,792.17	23,652	Q=M-P
SNWA Water Rights	Upper Muddy River Water Rights	3,517.91	3,522.59	2,888.65	9,929	R
	MVIC Rights	2,801.66	2,812.76	1,769.13	7,384	S
	Muddy River Water Rights Controlled by SNWA	**6,319.57**	**6,335.35**	**4,657.78**	**17,313**	T
	Coyote Spring Imported ICS	351.48	2,253.06	1,313.77	3,918	U
	Total Muddy River and Coyote Spring Water Rights Controlled by SNWA	**6,671.05**	**8,588.42**	**5,971.55**	**21,231**	V=T+U
Flow Check	Difference Between total Flows to Lake Mead and SNWA Water Rights	(372.12)	972.35	1,820.63	2,421	W=Q-V
	Is conservation > than SNWA rights	Yes	Yes	Yes	Yes	Q > V

Table 18 - Exhibit A from the Forbearance Agreement with CY 2012 Results

	Water Balance from Exhibit A of Forbearance Agreement with CY 2012 Data (afy)	
	Flows measured by USGS at the Glendale gage	28,170
-	consumptive uses by agriculture below the Glendale gage	(4,625)
-	direct uses by industry below the Glendale gage	1,435
-	channel evapotranspiration below Glendale gage to Lake Mead	2,898
-	evapotranspiration from the managed acreage on the Overton Wildlife Management Area (OWMA)	852
=	Total Flow to Lake Mead (Elevation 1,220 AMSL)	27,609
-	Total Muddy River Water Rights Controlled by SNWA	**17,313**
=	**Total Flows to Lake Mead are greater than SNWA Water Rights** ---------->	**YES**

References

Anderson, B. and R. Ohmart. 1984. Lower Colorado River Riparian Methods of Quantifying Vegetation Communities to prepare Type Maps. Arizona State University, Tempe, Arizona.

Bureau of Reclamation, 2007, Lower Colorado River Accounting System evapotranspiration and evaporation calculations calendar year 2007: Boulder City, Nev., Bureau of Reclamation, Lower Colorado River Region.

DeMeo, G.A., Smith, J.L., Damar, N.A., and Darnell, Jon, 2008, Quantifying ground-water and surface-water discharge from evapotranspiration processes in 12 hydrographic areas of the Colorado Regional Ground-Water Flow System, Nevada, Utah, and Arizona: U.S. Geological Survey Scientific Investigations Report 2008-5116, 22 p.

Huntington, J.L., Allen, R.G., 2010, Evapotranspiration and Net Irrigation Water Requirements for Nevada, Nevada Division of Water Resources 96 p.

Westenburg, C.L., DeMeo G.A., and Tanko, D.J., 2006, Evaporation from Lake Mead, Arizona and Nevada, 1997–99: U.S. Geological Survey Scientific Investigations Report 2006-5252, 24 p.

Appendices on CD

Appendix A	Muddy River Exhibit A from Forbearance Agreement
Appendix B	Plan of Creation Submitted to the Bureau of Reclamation and Letter of Acceptance
Appendix C	Nevada State Engineer Order 1194
Appendix D	Copy of Muddy River Decree and Order of Determination
Appendix E	Certificates and Diversion Data for SNWA Controlled Upper Muddy River Water Rights
Appendix F	SNWA Request for Offers to Purchase or Lease MVIC Shares
Appendix G	Water Right Certificates Held by MVIC
Appendix H	MVIC Letter of Concurrence
Appendix I	Muddy Valley Irrigation Company Water Schedule

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Exhibit A
Southern Nevada Water Authority
Virgin and Muddy Rivers Tributary Conservation,
Intentionally Created Surplus (ICS) Project

Summary: Nevada state water rights that predate the Boulder Canyon Project Act (BCPA) on the Virgin River have a priority date of pre-1905 and were decreed by the Nevada Supreme Court in 1927. The decree allocated 17,785 acre-feet per year (afy) to the Bunkerville and Mesquite Irrigation Companies, which represents approximately 10% of the annual average flow in the Virgin River above the Irrigation Companies.[1] The Southern Nevada Water Authority (SNWA) currently owns shares in the Bunkerville Irrigation Company representing approximately 3,700 afy of surface water rights.

On the Muddy River, water rights were decreed in 1920 and that decree allocated the entire flow of the Muddy River. On the Lower Muddy River, the entire flow of the river is diverted by the Muddy Valley Irrigation Company (MVIC) for agricultural use. SNWA currently owns shares in the Muddy Valley Irrigation Company representing approximately 7,000 afy of surface water rights and leases approximately 2,000 afy from the LDS Church, which are not represented by MVIC shares. The LDS Church lease is for a term of 20 years, with the option to renew the lease for an additional 20 years.

SNWA anticipates acquiring a total of approximately 30,000 afy of pre-BCPA water rights from entities with rights on the Virgin and Muddy Rivers. Approximately one-third of this amount is expected to come from the Virgin River and two-thirds from the Muddy River. This is consistent with the flow volumes that were analyzed in the Final Environmental Impact Statement, Colorado River Interim Guidelines for Lower Basin Shortages and Coordinated Operations for Lake Powell and Lake Mead and in the analysis for Lake Mead for the Lower Colorado River Multi-Species Conservation Program.

Retired agricultural water rights will be conveyed to Lake Mead's Overton Arm. The pre-BCPA water rights conveyed to Lake Mead represent the full right that is and has been historically used for agricultural purposes and could have otherwise been diverted from the Virgin or Muddy River and fully consumed by SNWA for municipal purposes.

Virgin and Muddy River rights conveyed to Lake Mead will either pass through their historic points of diversion, flow through the irrigation company ditches and return to the mainstream of the Virgin or Muddy River further downstream or will remain in the mainstream of the Virgin or Muddy River. The full right documented to flow to Lake Mead will be accounted for as Tributary Conservation ICS.

Virgin and Muddy River water rights that will be utilized to create Tributary Conservation pursuant to this Exhibit A of this Forbearance Agreement include both decreed Nevada state water rights that have been in continuous use since at least 1927 and decreed Nevada state water rights with an established history of use prior to 1927 but that have experienced periods of non-

[1] Annual average Virgin River flow for water years 1931 to 2006 at the U.S. Geological Survey (USGS) Virgin River at Littlefield, AZ gage, No. 09415000 was 176,000 afy.

use in the interim. Per this Exhibit A of this Forbearance Agreement, SNWA is specifically allowed to utilize any and all pre-BCPA Virgin and Muddy River water rights decreed by a Nevada State Court prior to 1928 to create Tributary Conservation ICS regardless of those water rights history of use after 1928.

Specific Water Rights: The sources of water that would create Tributary Conservation ICS credits covered by these two projects include:

i. Estimated 5,702 afy pursuant to 682 preferred shares in the Muddy Valley Irrigation Company[2]

ii. Estimated 1,460 afy pursuant to 1,921 common shares in the Muddy River Irrigation Company

iii. 2,001 afy pursuant to Certificate Nos. 6419, 25861, 26316, 26317 and 26318 (decreed Muddy River right not represented by MVIC shares).

iv. 3,710 afy pursuant to 350 shares of Bunkerville Irrigation Company stock[3]

v. Any other water rights represented by shares in the Bunkerville, Mesquite and Muddy Valley Irrigation Companies and other pre-1929 decreed rights to the Muddy and Virgin Rivers purchased or contractually acquired by SNWA.

Annual variations in the flow of the Muddy River from any cause will cause fluctuations in the quantity of water available per share in the Muddy Valley Irrigation Company and reduce or increase the quantity of Tributary Conservation ICS that is available.

Nevada State Approval: SNWA will acquire necessary approvals from the Nevada Division of Water Resources to allow the Nevada state water rights to be conveyed to Lake Mead to create Tributary Conservation ICS.

Plan for Creation and Verification of ICS: Pursuant to Sections 3.B. and 3.D. of the Interim Guidelines for the Operation of Lake Powell and Lake Mead, SNWA shall annually submit a plan to the Secretary of Interior. The annual plan will demonstrate the volume of water rights

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[2] Muddy River water rights were decreed in 1920 by the Tenth (now Eighth) Judicial District Court. Water rights on the lower Muddy River are divided into 2,432 preferred and 5,044 common shares of stock in the Muddy Valley Irrigation Company.

[3] Uses of surface water in Nevada prior to the water law of 1905 are considered vested rights, the quantification of which can only be judicially determined by a Nevada District Court in an adjudication proceeding. The Virgin River surface water uses prior to 1905 have been adjudicated by the Virgin River Decree pursuant to Proof No. 02038 filed by the Bunkerville Irrigation Company, and Proof No. 01968 filed by the Mesquite Irrigation Company. The Virgin River Decree was entered by the Tenth (now Eighth) Judicial District Court on May 14, 1927.

The Decree adjudicated water rights to Virgin River surface flow for irrigation of 1,963.08 acres for a total of 17,785.50 acre feet per year (AFY). The summer duty equals 1.0 cfs of flow for each 70 acres and the winter duty equals 1.0 cfs of flow for each 100 acres for a total duty of 9.06 afy per acre. The summer period is the months of March through September and the winter period is the months of October through February.

owned and/or contractually controlled by SNWA on the Virgin and Muddy Rivers, including any water rights in addition to those specified above that SNWA acquires subsequent to the execution of this Forbearance Agreement. The annual plan will also demonstrate how the Tributary Conservation ICS, as described in this Exhibit A will be created and accounted for to Lake Mead. Such verification plan will, at a minimum, include:

Muddy River

The 1920 Muddy River Decree allocated the entire flow of the Muddy River; therefore it is anticipated that accounting for Muddy River water at Lake Mead will require an annual accounting of the rights owned by SNWA based on actual USGS gage flows and a water budget of the flows on the Lower Muddy River as follows:

A. *Muddy River Rights Owned by SNWA:*

1. Upper Muddy River rights owned or contractually controlled by SNWA as quantified in the Muddy River Decree.

2. Shares of the Muddy Valley Irrigation Company owned or contractually controlled by SNWA. MVIC shares are quantified based on a percentage of the total flows (divided by total shares) in the Muddy River at the USGS Muddy River near Glendale, NV gage less the Upper Muddy River rights owned or controlled by SNWA that reach the gage.

3. Nos. 1 and 2 represent the water SNWA would release into the Lower Muddy River for the creation of ICS credits.

B. *Muddy River Flows reaching Lake Mead will be calculated as follows:*

Flows measured by USGS at Muddy River near Glendale, NV gage
- (minus) consumptive uses by agriculture below the Glendale gage
- (minus) direct uses by industry below the Glendale gage
- (minus) channel evapotranspiration below Glendale gage to Lake Mead
- (minus) evapotranspiration from the managed acreage on the Overton Wildlife Management Area (WMA)

= Total Flow to Lake Mead

C. If the total amount represented in A is equal to or greater than the amount calculated to reach Lake Mead in B, then SNWA shall be credited with the amount in B.

D. If the total amount in A is less than the amount in B, SNWA shall be credited with the amount in A.

E. Because the total volume of water SNWA currently owns and controls on the Muddy River represents a relatively small percentage of the total flow, conveyance losses of SNWA's current rights are negligible.

F. The total Muddy River flow reaching Lake Mead as calculated in B Above includes flows at the USGS Muddy River at Lewis Avenue at Overton, NV gage located just upstream of the Overton Wildlife Management Area and unmeasured underflow.

Virgin River

Because the Virgin River Decree allocated just 10% of the average annual flow in the Virgin River (17,785.50 afy) to irrigate 1,963.08 acres, Tributary Conservation ICS from the Virgin River can be calculated based on the reduction in agricultural acreage as follows:

Virgin River Calculation:

Decrease in total agricultural acreage decreed in the Bunkerville or Mesquite Irrigation Companies calculated using remote sensing and a Geographic Information System (as limited by the shares controlled by SNWA and the acreage it represents)
x the decreed duty per acre (9.06 acre-feet per acre)
= Flows to Lake Mead

Maximum ICS Created Under this Exhibit: Maximum amount of ICS that may be created by SNWA from these projects in one calendar year is limited to 50,000 acre-feet of Virgin and Muddy River water.

Use of SNWA 1989 Virgin River Rights: SNWA will not use Permit Nos. 54077 and 58591 (Nevada state permits for combined duty of 113,000 afy) in the future to support new development on the lands being fallowed near the Virgin River, excepting 5,000 acre-feet of such rights that SNWA is obligated to transfer to the Virgin Valley Water District and which SNWA cannot encumber.

In Witness of this Exhibit A to the Forbearance Agreement executed contemporaneously herewith, the Parties affix their official signatures below, acknowledging approval of this document on the 13th day of December, 2007.

Approved as to form:

By: W. Patrick Schiffer
Chief Counsel

THE STATE OF ARIZONA acting through the ARIZONA DEPARTMENT OF WATER RESOURCES

By: Herbert Guenther
Director

Attest:

By: _____
Edward W. Smith
General Manager

PALO VERDE IRRIGATION DISTRICT

By: _____
Charles VanDyke
Chair

Attest and Approved:

By: _____
John Penn Carter
Legal Counsel

IMPERIAL IRRIGATION DISTRICT

By: _____
Stella Altamirano-Mendoza
President

Approved as to form:

By: _____
Robert Hargreaves
City Attorney

THE CITY OF NEEDLES

By: _____
Jeff Williams
Mayor

Approved as to form:

By: _____
Steven B. Abbott
Legal Counsel

COACHELLA VALLEY WATER DISTRICT

By: _____
Steven B. Robbins
General Manager/Chief Engineer

Approved as to form:

By: _____
Karen L. Tachiki
General Counsel

THE METROPOLITAN WATER DISTRICT OF SOUTHERN CALIFORNIA

By: _____
Jeffrey Kightlinger
General Manager

Approved as to form:

By: _____
John J. Entsminger
Deputy General Counsel

SOUTHERN NEVADA WATER AUTHORITY

By: _____
Patricia Mulroy
General Manager

Approved as to form:

By: _____
Jennifer T. Crandell
Deputy Attorney General

COLORADO RIVER COMMISSION OF NEVADA

By: _____
George M. Caan
Executive Director

SOUTHERN NEVADA WATER AUTHORITY
100 City Parkway, Suite 700 • Las Vegas, NV 89106
MAILING ADDRESS: P.O. Box 99956 • Las Vegas, NV 89193-9956
(702) 862-3400 • snwa.com

June 30, 2011

Ms. Lorri Lee-Gray, Regional Director
Bureau of Reclamation
Lower Colorado Regional Office
P.O. Box 61470
Boulder City, Nevada 89006

Dear Ms. Lee-Gray:

SUBJECT: SOUTHERN NEVADA WATER AUTHORITY PLANS OF CREATION FOR MUDDY AND VIRGIN RIVER TRIBUTARY CONSERVATION AND COYOTE SPRING VALLEY IMPORTED INTENTIONALLY CREATED SURPLUS CALENDAR YEAR 2012

Enclosed are Southern Nevada Water Authority's (Authority) 2012 Plans of Creation (Plans) for Tributary Conservation Intentionally Created Surplus (ICS) for the Muddy and Virgin Rivers in Nevada, and Imported ICS from Coyote Spring Valley groundwater. Our Plans describe how we intend to meet all the requirements as outlined in Section 3 of the *Colorado River Interim Guidelines Lower Basin Shortages and the Coordinated Operations for Lake Powell and Lake Mead* (Guidelines). Calendar Year 2012 represents the 5th year in which the Authority will create ICS under the Guidelines.

As you know, the Guidelines require a Contractor to enter into a Delivery Agreement with the United States and a Forbearance Agreement with Lower Colorado River Basin Contract holders to create and take Tributary Conservation and Imported ICS. The Authority and Colorado River Commission (CRC) entered into a Delivery Agreement with the United States and a Forbearance Agreement with Lower Basin Contract holders on December 13, 2007. Exhibit A of the Forbearance Agreement describes the surface water rights on the Muddy and Virgin Rivers, pre-dating June 25, 1929, which the Authority plans to use to create Tributary Conservation ICS, and describes how the flows reaching Lake Mead will be calculated. Exhibit B of the Forbearance Agreement describes the groundwater rights from Coyote Spring Valley, which the Authority plans to use to create Imported ICS and how the imported water reaching Lake Mead will be calculated.

The enclosed Plans of Creation are consistent with the Guidelines, Forbearance Agreement, and Delivery Agreement. The Authority anticipates creating Tributary Conservation ICS and Imported ICS during Calendar Year 2012 as indicated below:

Calendar Year	**Potential Volume, in acre-feet/year** Cited in Plans of Creation		
	Virgin River	Muddy River	Coyote Spring Valley
2012	17,000	20,000	7,000

If you have any questions, please contact Jeff Johnson at 702-862-3748.

Sincerely,

for

William E. Rinne, Director
Surface Water Resources Department

WR:JJ:lmv

Enclosures (3)

c: Jayne Harkins, Director, Colorado River Commission of Nevada
Steve Hvinden, Office Director, Lower Colorado River Regional Office, Bureau of Reclamation w/enclosures
Paul Matuska, Manager, Water Conservation and Accounting Group, Lower Colorado River Regional Office, Bureau of Reclamation w/enclosures

Virgin River Intentionally Created Surplus (ICS) Tributary Conservation Plan of Creation Calendar Year 2012

Introduction

The Secretary of Interior (Secretary) issued a Record of Decision for *Colorado River Interim Guidelines for Lower Basin Shortages and the Coordinated Operations for Lake Powell and Lake Mead* (Guidelines) on December 13, 2007, which established criteria for the development and delivery of Intentionally Created Surplus (ICS). One type of ICS is Tributary Conservation, which allows a Contractor[1] to increase tributary flows into the mainstream of the Colorado River within its state for ICS credits. The conservation of tributary flows into the mainstream of the Colorado River is limited to water rights that have been used for a significant period of years and were perfected prior to June 25, 1929, the effective date of the Boulder Canyon Project Act (Pre-BCPA Water Rights).

To generate ICS, the Guidelines require a Contract holder to enter into a Delivery Agreement with the United States of America and a Forbearance Agreement with Lower Basin Contract holders. The Southern Nevada Water Authority (SNWA) and Colorado River Commission of Nevada (CRC) entered into a Forbearance Agreement with Lower Basin Contract holders on December 13, 2007. Exhibit A of the Forbearance Agreement describes the surface water rights on the Muddy and Virgin Rivers, pre-dating June 25, 1929, which SNWA plans to use to create Tributary Conservation ICS, and how the Virgin River flows reaching Lake Mead will be calculated.

The SNWA and CRC entered into a Delivery Agreement with the United States of America on December 13, 2007. Exhibit A from the Forbearance Agreement is attached to the Delivery Agreement.

The Guidelines, Forbearance Agreement, and Delivery Agreement require a plan for the creation of ICS (ICS Plan) be submitted to the Secretary of Interior demonstrating how all requirements of the Guidelines will be met. Section G.3.B.1 of the Guidelines outline that an ICS Plan will consist of, at a minimum, the following information:

a. Project Description including what extraordinary measures will be taken to conserve or import the water

b. Term of Activity

c. Estimate of the amount of water that will be conserved

[1] "Contractor" in the Guidelines "shall mean an entity holding an entitlement to Mainstream water under (a) the Consolidated Decree, (b) a water delivery contract with the United States through the Secretary, or (c) a reservation of water by the Secretary, whether the entitlement is obtained under (a), (b), or (c) before or after the adoption of the Guidelines.

d. Proposed methodology for verification of the amount of water conserved

e. Documentation regarding any state or federal permits or other regulatory approvals that have already been obtained by the Contractor or that need to be obtained prior to the creation of ICS

The following sections document each of these requirements. It is important to note that the majority of the information presented below is reiterated from Exhibit A of the Forbearance Agreement and Delivery Agreement.

Project Description

Virgin River water rights that will be utilized to create Tributary Conservation pursuant to this ICS Plan and Exhibit A of the Forbearance Agreement are decreed and permitted Nevada state water rights with an established history of use prior to 1927, but that have experienced periods of non-use in the interim. Per Exhibit A of the Forbearance Agreement, SNWA is specifically allowed to utilize any and all pre-June 25, 1929, Virgin River water rights to create Tributary Conservation ICS regardless of those water rights history of use after 1928.

The Virgin River begins in southwestern Utah, flows through Arizona and Nevada, and terminates in Lake Mead (Figure 1). The average annual flow of the Virgin River at U.S. Geological Survey gaging station *09415000 Virgin River at Littlefield, AZ* for water years 1931 to 2010 was 173,100 acre-feet per year (afy).

Nevada state water rights that pre-date the Boulder Canyon Project Act (BCPA) on the Virgin River are comprised of pre-1905 priority surface water rights decreed by the Nevada Supreme Court in 1927 for 17,785 afy to the Bunkerville and Mesquite Irrigation Companies, and additional permitted and certificated rights authorized by the Nevada Division of Water Resources (NDWR).

Retired agricultural water rights acquired by SNWA will be conveyed to Lake Mead along Lake Mead's Overton Arm. The pre-June 25, 1929, water rights conveyed to Lake Mead represent the full right that is and has been historically used for agricultural or could have otherwise been diverted from the Virgin River and fully consumed by the SNWA in Nevada.

Virgin River rights conveyed to Lake Mead will pass through their historic points of diversion and either flow through the irrigation company ditches and return to the mainstream of the Virgin River further downstream or will remain in the mainstream of the Virgin River. The full rights controlled by SNWA to flow to Lake Mead will be accounted for as Tributary Conservation ICS.

Term of Activity

The term of activity for this ICS Plan is Calendar Year 2012. SNWA anticipates receiving Tributary Conservation ICS credit for Virgin River water into the foreseeable

future. As more water rights are acquired and more land is fallowed, the amount of water claimed as Tributary Conservation ICS is anticipated to increase. Subsequent ICS Plans will be updated to reflect the acquired pre-June 25, 1929, water rights.

Leases of shares in the Bunkerville and Mesquite Irrigation Companies are on a water year basis; therefore, the number of shares leased after September 2012, may change. For planning purposes, the number of leased shares in January 2012, are estimated to be leased for the full calendar year.

Estimate of Water Conserved

SNWA currently owns or controls the following Virgin River rights:

- Bunkerville Irrigation Company: Approximately 948 shares representing approximately 7,500 afy of surface water rights. These shares are owned and leased by SNWA. The lease contracts are based on water years (October 1 to September 30).

- Mesquite Irrigation Company: Approximately 870 shares representing approximately 7,500 afy of surface water rights. These shares are owned and leased by SNWA. The lease contracts are based on water years (October 1 to September 30).

- A portion of Certificate 1153 with a priority date of 1914 for 601.97 afy designated to irrigate a portion of 177.044 acres of land (Figure 2).

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For Calendar Year 2012, SNWA anticipates creating up to 17,000 acre-feet (af) of Tributary Conservation ICS with the above rights which pre-date June 25, 1929.

Methodology

Because the acreage represented by the water rights SNWA controls a small percentage (< 15%) of the total annual flow of the Virgin River, Tributary Conservation ICS on the Virgin River can be calculated based on the reduction in agricultural acreage as follows:

Virgin River Calculation:

Decrease in total agricultural acreage permitted by the Nevada Division of Water Resources calculated using remote sensing & GIS
x The duty per acre specified by the water right

= Flows to Lake Mead (Elevation 1,220 AMSL)

A. Proof of Fallowed Land

To demonstrate the fallowing of land and the conservation of water, aerial photography will be flown, ground-truthed, and analyzed periodically during the calendar year. A Geographic Information System (GIS) will be used to compare the current irrigated acreage with acreage defined by the water rights as approved by the Nevada Division of Water Resources. On the attached maps, the original Place of Use (POU) is shown as a red polygon. Subsequent Proof of Beneficial Use (PBU) maps were submitted in support of additional permits to NDWR and are included as yellow polygons on the maps for reference.

B. Certification Report

i. In compliance with Section G.3.D of the Guidelines, a Certification Report will be submitted for the Secretary's review and verification, demonstrating the amount of ICS created and that the method of creation was consistent with this ICS Plan, the Forbearance Agreement, and Delivery Agreement. The Certification Report will be submitted to the Secretary in the year following the creation of the ICS.

ii. The Certification Report, at a minimum, will include:

- Proof of acreage fallowed using aerial photography and GIS
- Documentation and calculations of the amount of the pre-June 25, 1929, water rights reaching Lake Mead owned or controlled by SNWA
- Letter from NDWR verifying the quantity of water conveyed through the Virgin River to the Colorado River mainstream for the purpose of creating ICS

Regulatory Approvals

Tributary Conservation ICS on the Virgin River was evaluated in the Environmental Impact Statement and Record of Decision (dated December 13, 2007) for the Guidelines. Similarly, compliance for Virgin River Tributary Conservation ICS was also obtained under section 7 of the Endangered Species Act through formal consultation with the U.S. Fish and Wildlife Service. The Final Biological Opinion for the Guidelines was issued December 12, 2007.

The NDWR issued State Engineer Order 1193 on July 15, 2008, regarding Tributary Conservation ICS on the Virgin River. The Order outlines the Nevada water rights on the Virgin River and the following process for verification of Virgin River rights being conveyed to the Colorado River mainstream:

> Nevada State Engineer Order 1193 states… "An entity with an ICS Delivery Contract, which uses water rights adjudicated under the Virgin River Decree or water rights on the Virgin River issued by the State Engineer with a priority date prior to June 25, 1929 for the creation of ICS, shall file an annual report with the State Engineer's Office. The annual report shall give a full accounting of water rights on the Virgin River owned or controlled by the entity with an ICS Delivery Contract, which have been conveyed through the Virgin River system to the Colorado River mainstream for the creation of ICS. After review of the annual report, the State Engineer shall issue a letter verifying the quantity of water conveyed through the Virgin River system to the Colorado River mainstream for the purpose of creating ICS."

Figure 1. Lower Virgin River showing Places of Use (red) for Pre-BCPA Water Rights

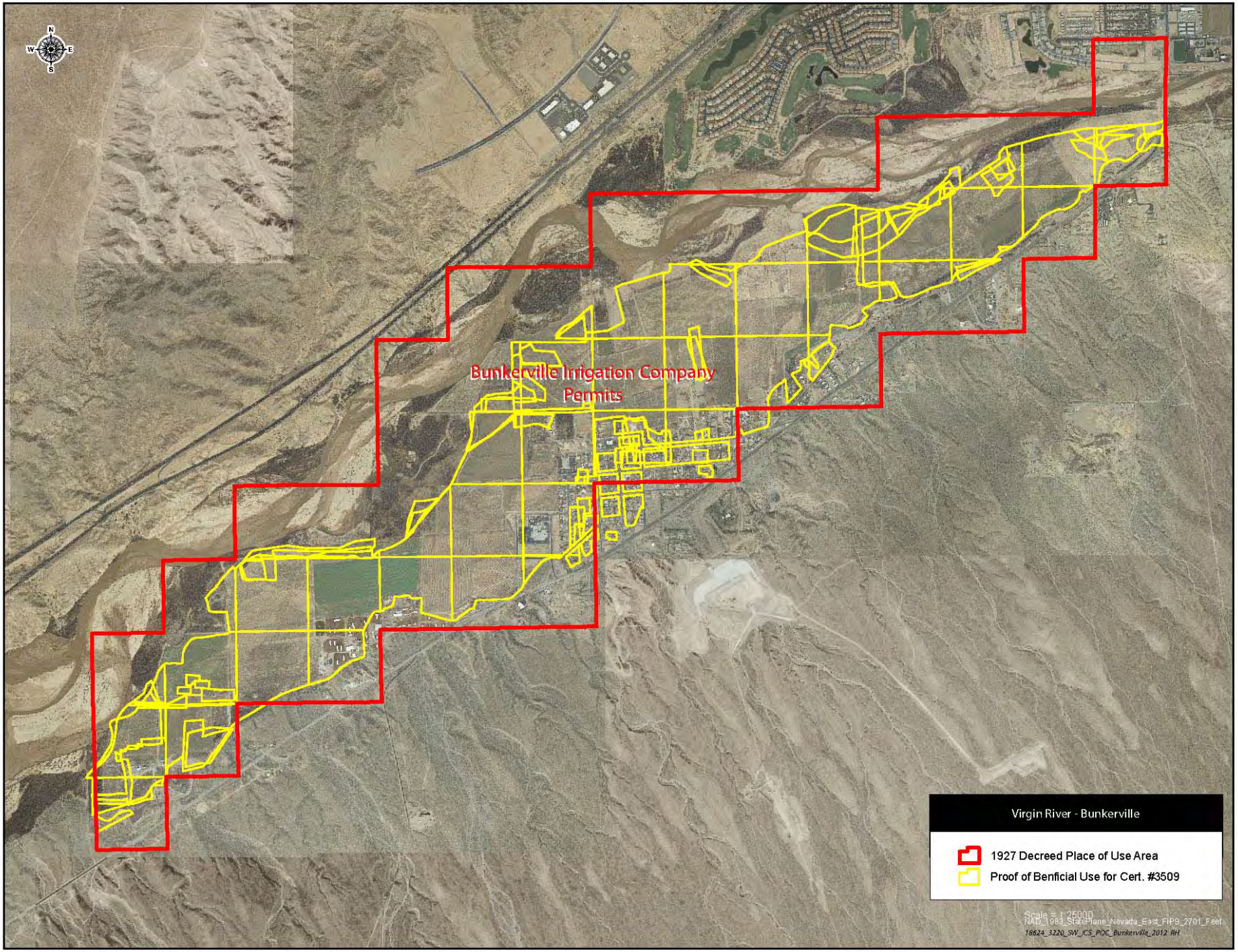

Figure 2 - Bunkerville Decreed Place of Use (red) and Proof of Beneficial Use (yellow). Aerial Photography February 2011

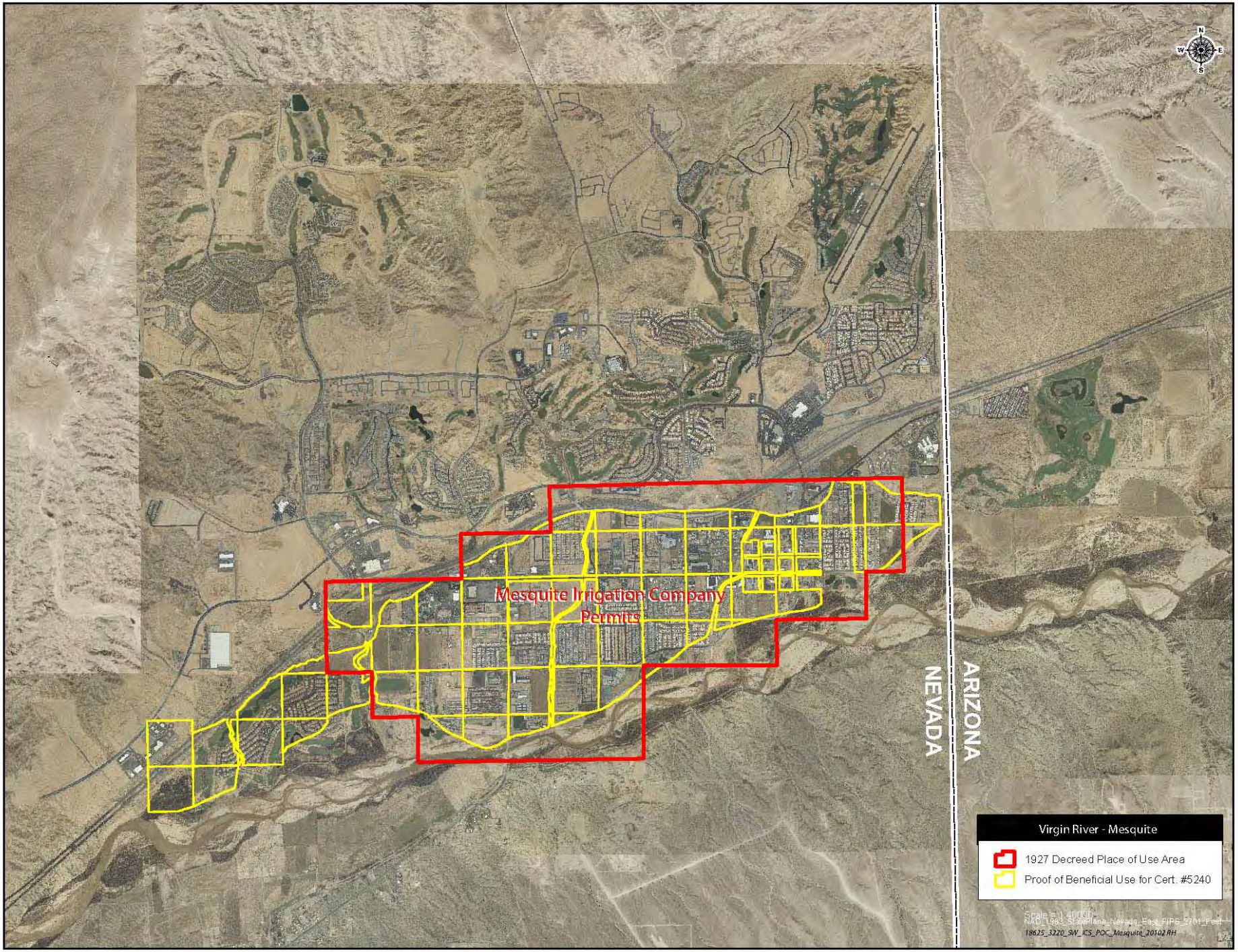

Figure 3 - Mesquite Decreed Place of Use (red) and Proof of Beneficial Use (yellow). Aerial Photography February 2011

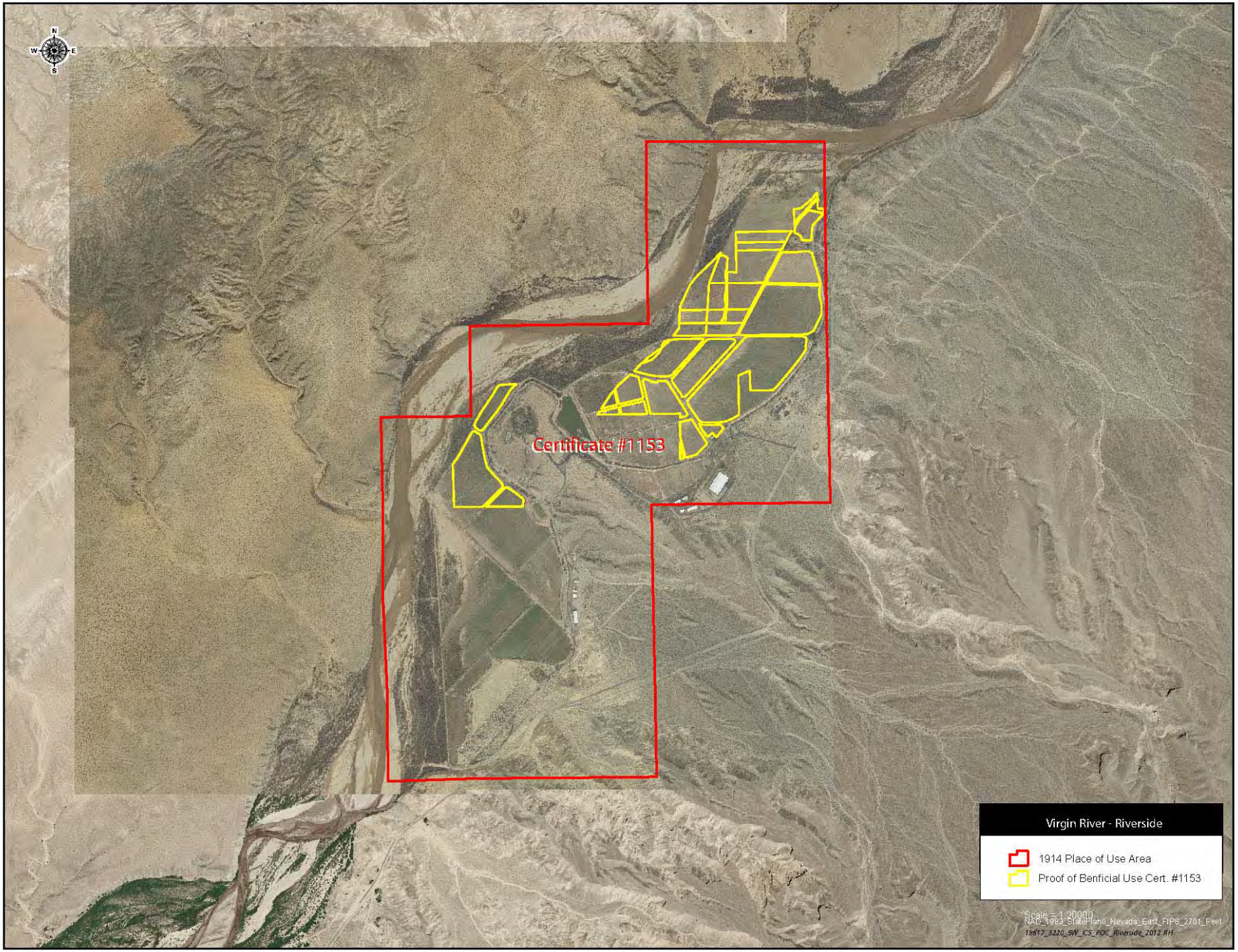

Figure 4 – Riverside Certificate 1153 Decreed Place of Use (red) and Proof of Beneficial Use (yellow). Aerial Photography February 2011

Muddy River Intentionally Created Surplus (ICS) Tributary Conservation Plan of Creation Calendar Year 2012

Introduction

The Secretary of Interior (Secretary) issued a Record of Decision for *Colorado River Interim Guidelines for Lower Basin Shortages and the Coordinated Operations for Lake Powell and Lake Mead* (Guidelines) on December 13, 2007, which established criteria for the development and delivery of Intentionally Created Surplus (ICS). One type of ICS is Tributary Conservation, which allows a Contractor[1] to increase tributary flows into the mainstream of the Colorado River within its state for ICS credits. The conservation of tributary flows into the mainstream of the Colorado River is limited to water rights that have been used for a significant period of years and were perfected prior to June 25, 1929, the effective date of the Boulder Canyon Project Act.

To generate ICS, the Guidelines require a Contract holder to enter into a Delivery Agreement with the United States of America and a Forbearance Agreement with Lower Basin Contract holders. The Southern Nevada Water Authority (SNWA) and Colorado River Commission of Nevada (CRC) entered into a Forbearance Agreement with Lower Basin Contract holders on December 13, 2007. Exhibit A of the Forbearance Agreement describes the surface water rights on the Muddy and Virgin Rivers, pre-dating June 25, 1929, which SNWA plans to use to create Tributary Conservation ICS, and how the Muddy River flows reaching Lake Mead will be calculated.

SNWA and CRC entered into a Delivery Agreement with the United States of America on December 13, 2007. Exhibit A from the Forbearance Agreement is attached to the Delivery Agreement.

The Guidelines, Forbearance Agreement, and Delivery Agreement require a plan for the creation of ICS (ICS Plan) be submitted to the Secretary of Interior demonstrating how all requirements of the Guidelines will be met. Section G.3.B.1 of the Guidelines outline that an ICS Plan will consist of, at a minimum, the following information:

a. Project Description including what extraordinary measures will be taken to conserve or import the water

b. Term of Activity

c. Estimate of the amount of water that will be conserved

[1] "Contractor" in the Guidelines "shall mean an entity holding an entitlement to Mainstream water under (a) the Consolidated Decree, (b) a water delivery contract with the United States through the Secretary, or (c) a reservation of water by the Secretary, whether the entitlement is obtained under (a), (b), or (c) before or after the adoption of the Guidelines.

d. Proposed methodology for verification of the amount of water conserved

e. Documentation regarding any state or federal permits or other regulatory approvals that have already been obtained by the Contractor or that need to be obtained prior to the creation of ICS

The following sections document each of these requirements. It is important to note that the majority of the information presented below is reiterated from Exhibit A of the Forbearance Agreement and Delivery Agreement.

Project Description

Muddy River water rights that will be utilized to create Tributary Conservation pursuant to this ICS Plan and Exhibit A of the Forbearance Agreement are decreed Nevada state water rights with an established history of use prior to 1927, but that have experienced periods of non-use in the interim. Per Exhibit A of the Forbearance Agreement, SNWA is specifically allowed to utilize any and all pre-June 25, 1929, Muddy River water rights to create Tributary Conservation ICS regardless of those water rights history of use after 1928.

The Muddy River originates from regional springs in the Muddy Springs Area in Nevada and flows into the Overton Arm of Lake Mead (Figure 1). Muddy River flows are relatively constant because the springs that form the river discharge water from the regional carbonate aquifer system of eastern Nevada. The average annual flow of the Muddy River at U.S. Geological Survey (USGS) gaging station 09419000 *Muddy River near Glendale, NV* for water years 1950 to 2010 was 30,450 acre-feet per year (afy).

On the Muddy River, water rights were decreed in 1920 and the decree allocated the entire flow of the Muddy River. On the Lower Muddy River, the entire flow of the river is diverted by the Muddy Valley Irrigation Company (MVIC) for agricultural use. SNWA owns and is leasing shares in MVIC. In addition, SNWA leases and owns decreed Muddy River water rights on the upper reach of the Muddy River, which are not represented by MVIC shares.

Retired agricultural water rights controlled by SNWA will be conveyed to Lake Mead along Lake Mead's Overton Arm. The pre-June 25, 1929, water rights conveyed to Lake Mead represent the full right that is and has been historically used for agricultural or could have otherwise been diverted from the Muddy River and fully consumed by SNWA within Nevada.

Muddy River rights conveyed to Lake Mead will pass through their historic points of diversion and either flow through the irrigation company ditches and return to the mainstream of the Muddy River further downstream or will remain in the mainstream of the Muddy River. The full rights controlled by SNWA to flow to Lake Mead will be accounted for as Tributary Conservation ICS.

Term of Activity

The term of activity for this ICS Plan is Calendar Year 2012. SNWA anticipates receiving Tributary Conservation ICS credit for Muddy River water into the foreseeable future. As more water rights are acquired and more land is fallowed, the amount of water claimed as Tributary Conservation ICS is anticipated to increase. Subsequent ICS Plans will be updated to reflect the acquired pre-June 25, 1929, water rights.

Estimate of Water Conserved

SNWA currently owns or controls the following Muddy River water rights:

1. *MVIC Shares*. The volume of water represented by MVIC shares is quantified based on a percentage of the total flows (divided by total shares) in the Muddy River at the USGS gage *Muddy River near Glendale, NV* (Glendale gage) less the Upper Muddy River rights owned or controlled by SNWA that reach the gage (Figure 2).

    a. Owned MVIC shares[2]

        i. 1,009 preferred shares in the MVIC estimated to represent approximately 6,500 afy in 2012.

        ii. 2,839 common shares in the MVIC estimated to represent approximately 2,000 afy in 2012.

        iii. If additional shares are acquired, the water rights represented by the shares will be included in the year-end Certification Report.

        iv. Some shares purchased by SNWA have a provision for the seller to lease the shares back from SNWA for agricultural use. The amount of water being leased-back by sellers varies by year and is not known until just before the beginning of the water year when sellers must notify SNWA of their intention to lease the water back for agricultural use. As an example, in 2010 approximately 1,600 acre-feet (af) of purchased shares were leased back to the seller.

[2] Muddy River water rights were decreed in 1920 by the Tenth (now Eighth) Judicial District Court. Water rights on the Lower Muddy River are divided into 2,432 preferred and 5,044 common shares of stock in the Muddy Valley Irrigation Company.

b. Leased MVIC shares[3]

The lease contracts for both preferred and common shares in MVIC are on a water year schedule, therefore the amount of leased shares may change at the beginning of water year 2012 (October 2011) depending on renewal of leases.

i. Approximately 238 preferred shares are expected to be leased in the MVIC from January to September 2012. For planning purposes the lease of 239 preferred shares for CY 2012 are estimated to represent about 1,700 af.

ii. Approximately 560 common shares are expected to be leased in the MVIC from January to September 2012. . For planning purposes the lease of 560 common shares for CY 2012 are estimated to represent about 500 af.

2. Up to 2,001 afy leased from the Church of Latter Day Saints (LDS Lease) pursuant to Certificate Nos. 6795, 10944, 10951, 10952, and 10953 (decreed Muddy River rights not represented by MVIC shares) in 2012 (Figure 3) being leased by SNWA.

3. Muddy River decree proofs V01619 and V01631 also referred to as the Cox and Mitchell Rights for a total of 111 afy that SNWA acquired with the purchase of the Warm Springs Natural Area (Figure 3).

4. Up to 1,040 afy pursuant to the Muddy River decree owned by SNWA (not represented by MVIC shares, commonly referred to as the Hidden Valley rights) (Figure 4).

5. Up to 3,700 afy pursuant to Permits 73482, 73483, and 73695 held by the Moapa Band of Paiutes. These rights are being leased by SNWA from the Moapa Band of Paiutes (Figure 5).

6. Up to 811 afy of decreed Muddy River water under Certificate 9609 which was acquired by SNWA (referred to as the Knox and Holmes right in this document) (Figure 6).

7. Up to 3,000 afy pursuant to Certificates 7316 and 13851 held by MVIC and being leased by SNWA.

For Calendar Year 2012, SNWA anticipates creating up to 20,000 af of Tributary Conservation ICS from these pre-June 25, 1929, water rights.

[3] SNWA has entered into lease agreements with individual share holders for terms ranging between 1 and 10 years.

Methodology

Muddy River Flows reaching Lake Mead will be calculated as follows:

Flows measured by USGS at the Glendale gage
- (minus) consumptive uses by agriculture below the Glendale gage
- (minus) direct uses by industry below the Glendale gage
- (minus) channel evapotranspiration below Glendale gage to Lake Mead
- (minus) evapotranspiration from the managed acreage on the Overton Wildlife Management Area (WMA)

= Total Flow to Lake Mead (Elevation 1,220 AMSL)

- To calculate the consumptive uses of crops and phreatophytes in the Lower Muddy River, a combination of data from the Lower Colorado River Accounting Study (LCRAS), Nevada Division of Water Resource's *Evapotranspiration and Net Irrigation Requirements for Nevada* report and locally measured reference ET data will be used.

- If the total amount of water represented by the rights controlled by SNWA described in this ICS Plan and documented in the Certification Report (described below) is found to be equal to or less than the amount of water calculated to reach Lake Mead, then SNWA shall be credited with the full amount of water rights described in the ICS Plan.

- If the total amount of water rights described in this ICS Plan and documented in the Certification Report is more than the amount calculated to reach Lake Mead, SNWA shall be credited with only the amount calculated to reach Lake Mead.

- The total Muddy River flow reaching Lake Mead as calculated above includes flows at the USGS gage *Muddy River at Lewis Avenue at Overton, NV* located just upstream of the WMA and unmeasured underflow.

A. Proof of Fallowed Land:

To demonstrate the fallowing of land and the conservation of water, aerial photography will be flown, ground-truthed, and analyzed during the calendar year. A Geographic Information System (GIS) will be used to compare the current irrigated acreage with acreage defined by the water rights as approved by the Nevada Division of Water Resources and the Muddy River decree. On the attached maps, the original Place of Use (POU) is shown as a red polygon. If a subsequent Proof of Beneficial Use (PBU) map was submitted to NDWR, the PBU boundaries are included as yellow polygons for reference. PBU maps were not filed for all decreed rights, since it is not required for vested rights; implying

beneficial use was initiated prior to the establishment of Nevada Water Law in 1905.

B. Certification Report

i. In compliance with Section G.3.D of the Guidelines, a Certification Report will be submitted for the Secretary's review and verification, demonstrating the amount of ICS created and that the method of creation was consistent with this ICS Plan, the Forbearance Agreement, and Delivery Agreement. The Certification Report will be submitted to the Secretary in the year following the creation of the ICS.

ii. The Certification Report, at a minimum, will include:

- Proof of acreage fallowed using aerial photography and GIS
- Calculations of the amount of pre-June 25, 1929, water rights reaching Lake Mead, including gage records of Muddy River flows as required
- Documentation and calculations of the amount of pre-June 25, 1929, water rights reaching Lake Mead owned or controlled by SNWA
- Letter from the Nevada Division of Water Resources verifying the quantity of water conveyed through the Muddy River system to the Colorado River mainstream for the purpose of creating ICS

Regulatory Approvals

Tributary Conservation ICS on the Muddy River was evaluated in the Environmental Impact Statement and Record of Decision (dated December 13, 2007) for the Guidelines. Similarly, compliance for Muddy River Tributary Conservation ICS was also obtained under section 7 of the Endangered Species Act through formal consultation with the U.S. Fish and Wildlife Service. The Final Biological Opinion for the Guidelines was issued December 12, 2007.

The NDWR issued State Engineer Order 1194 on July 15, 2008, regarding Tributary Conservation ICS on the Muddy River. The Order outlines the Nevada water rights on the Muddy River and the following process for verification of Muddy River rights being conveyed to the Colorado River mainstream:

> Nevada State Engineer Order 1194 states… "An entity with an ICS Delivery Contract, which uses water rights adjudicated under the Muddy River Decree for the creation of ICS, shall file an annual report with the State Engineer's Office. The annual report shall give a full accounting of adjudicated water rights on the Muddy River or its tributaries owned or controlled by the entity with an ICS Delivery Contract, which have been conveyed through the Muddy River system to the Colorado River mainstream for the creation of ICS. After review of the annual report, the State Engineer shall issue a letter verifying the quantity of water conveyed through the Muddy River system to the Colorado River mainstream for the purpose of creating ICS."

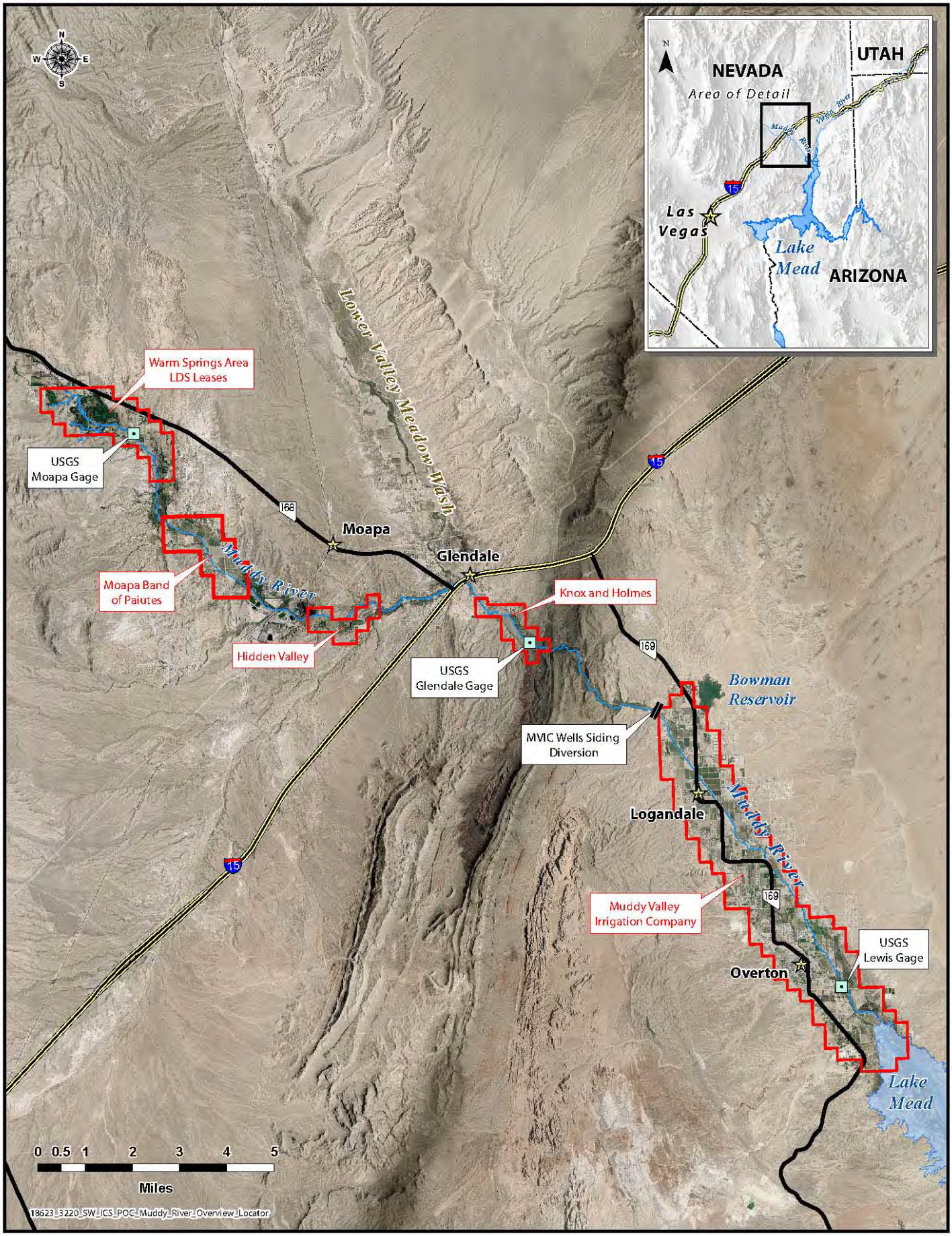

Figure 1- Muddy River

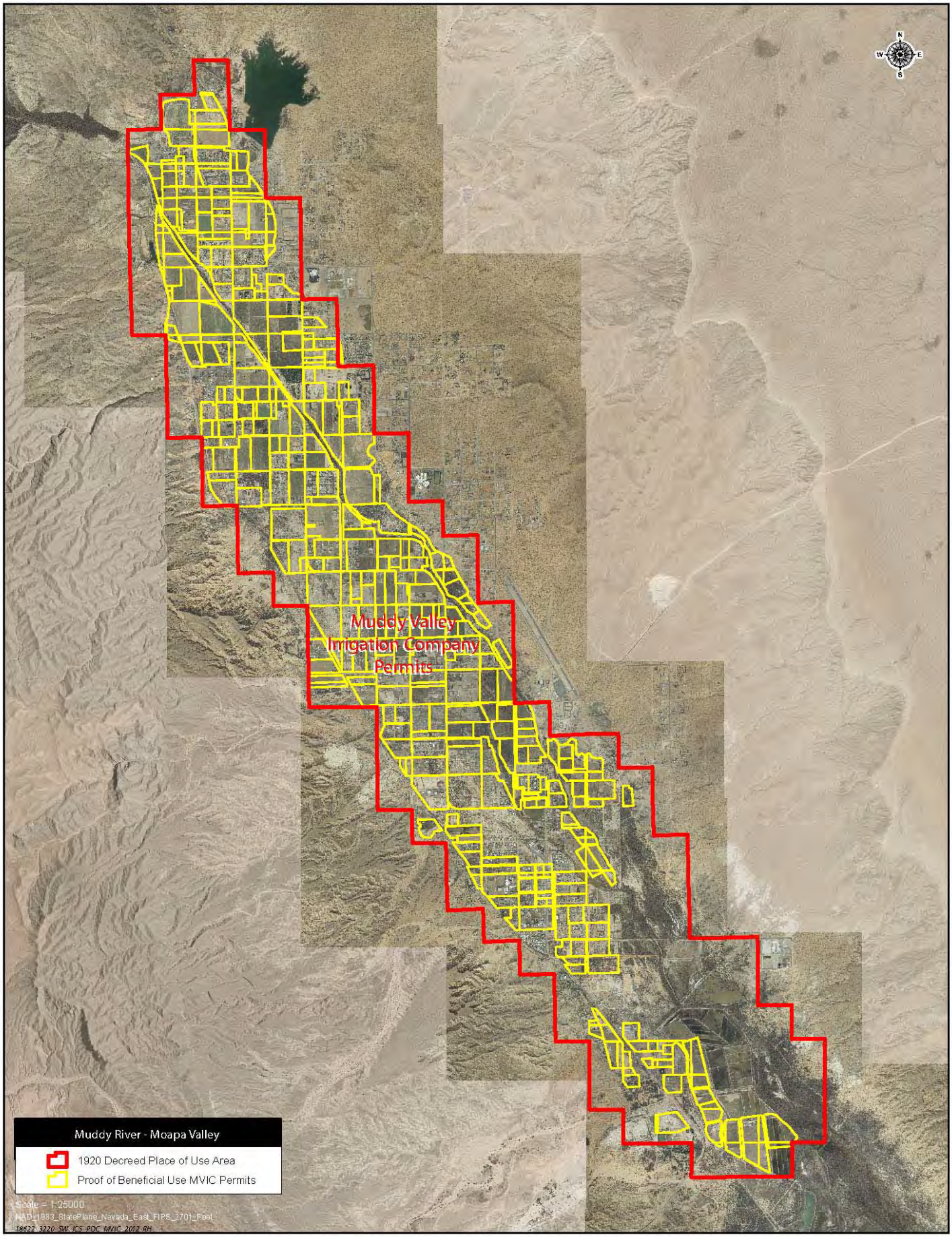

Figure 2- MVIC Decreed POU and PBU. Aerial Photography February 2011

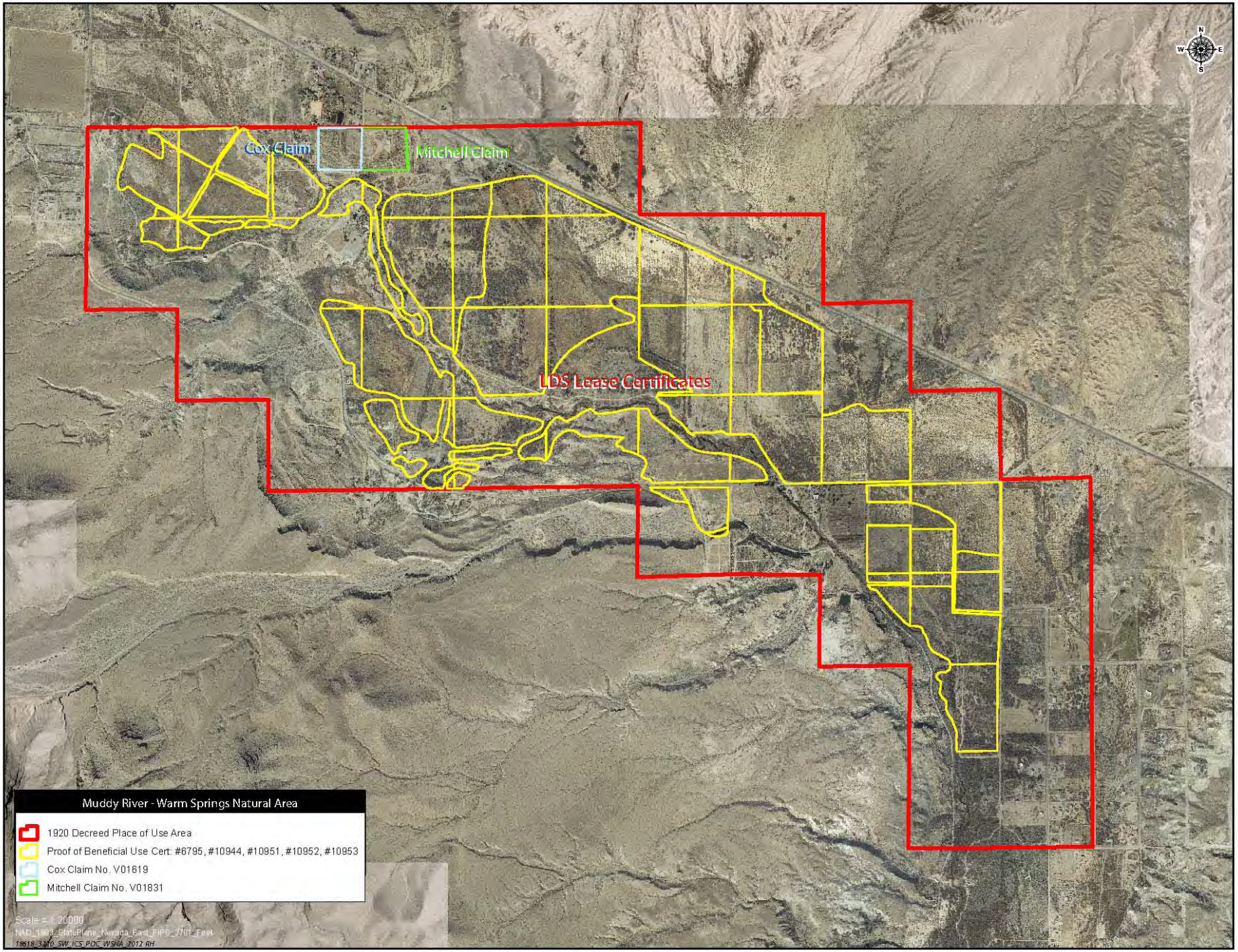

Figure 3- LDS Water Rights POU and PBU and Cox and Mitchell POU Aerial Photography February 2011

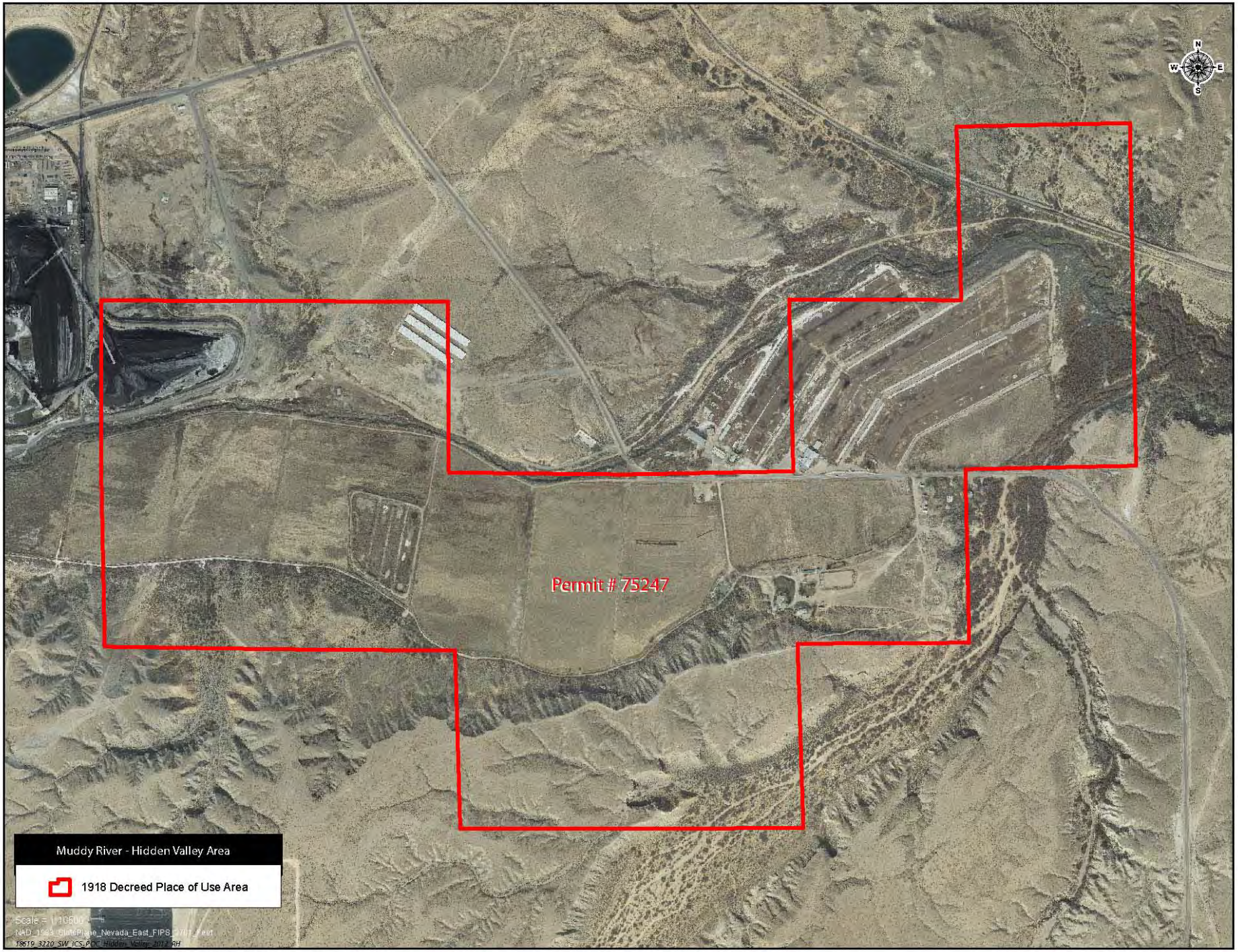

Figure 4- Hidden Valley Decreed Water Right POU. Aerial Photography February 2011

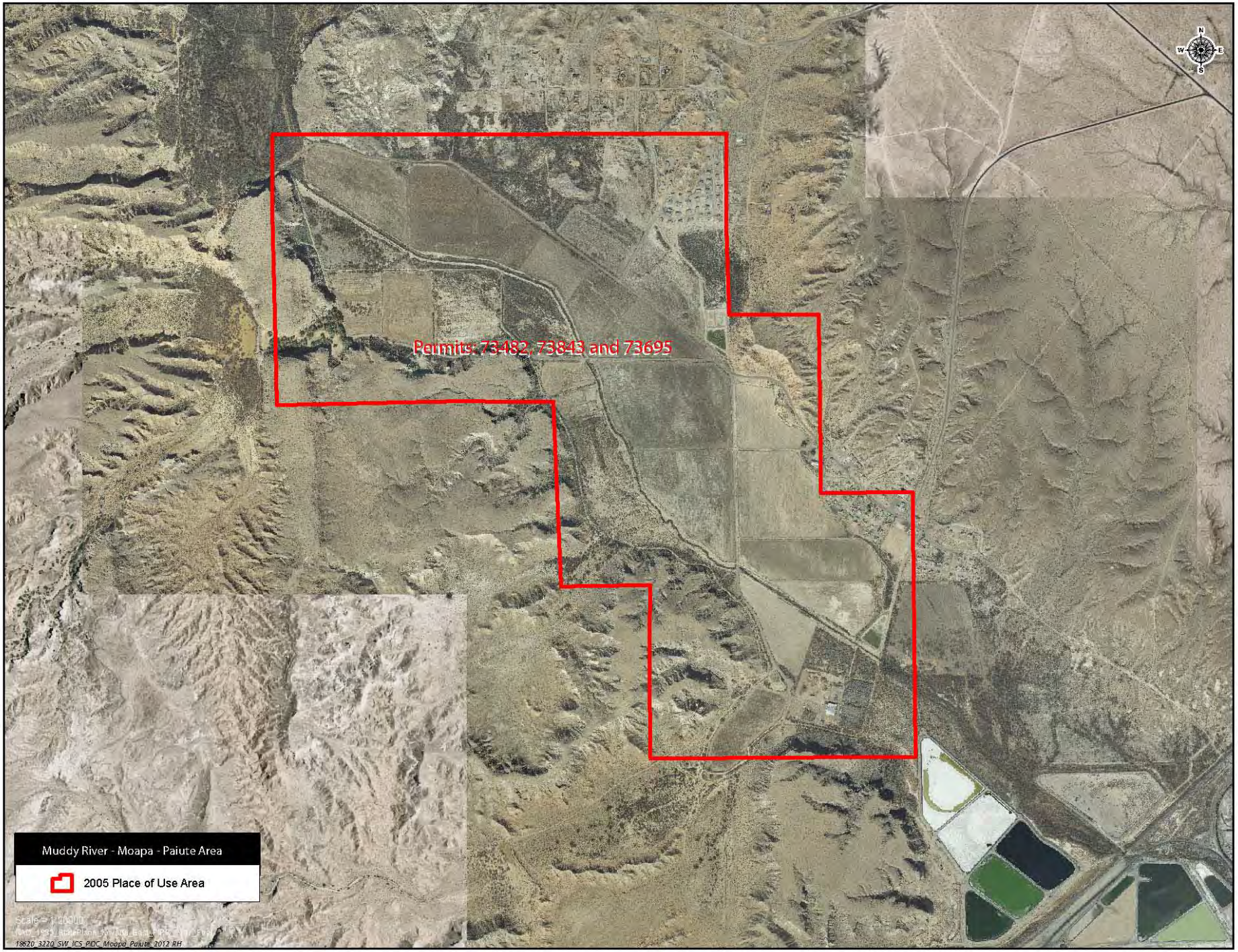

Figure 5- Moapa Band of Paiutes POU. Aerial Photography February 2011

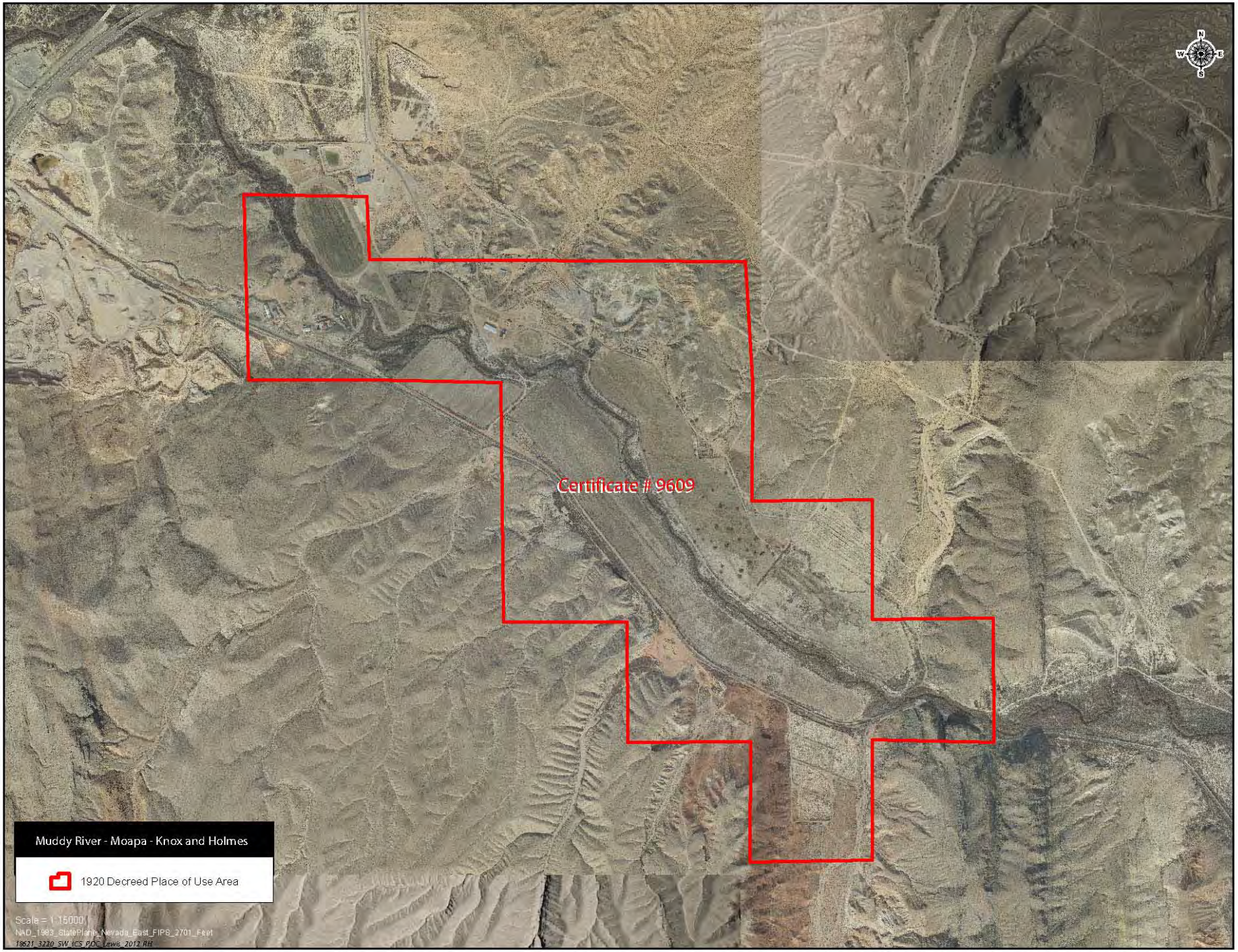

Figure 6– Knox and Holmes Decreed Water Right POU. Aerial Photography February 2011

Coyote Spring Valley Intentionally Created Surplus (ICS)
Imported ICS Plan of Creation
Calendar Year 2012

Introduction

The Secretary of Interior (Secretary) issued a Record of Decision for *Colorado River Interim Guidelines for Lower Basin Shortages and the Coordinated Operations for Lake Powell and Lake Mead* (Guidelines) on December 13, 2007, which established criteria for the development and delivery of Intentionally Created Surplus (ICS). One type of ICS is Imported ICS, which allows a Contractor[1] to introduce non-Colorado River System water from the Contractor's state into the mainstream of the Colorado River for ICS credits.

To generate ICS, the Guidelines require a Contract holder to enter into a Delivery Agreement with the United States of America and a Forbearance Agreement with Lower Basin Contract holders. The Southern Nevada Water Authority (SNWA) and Colorado River Commission of Nevada (CRC) entered into a Forbearance Agreement with Lower Basin Contract holders on December 13, 2007. Exhibit B of the Forbearance Agreement describes the State of Nevada groundwater rights in Coyote Spring Valley which SNWA plans to use to create Imported ICS, and how the Coyote Spring Valley groundwater conveyed to Lake Mead will be calculated.

The SNWA and CRC entered into a Delivery Agreement with the United States of America on December 13, 2007. Exhibit B from the Forbearance Agreement is attached to the Delivery Agreement.

The Guidelines, Forbearance Agreement, and Delivery Agreement require a plan for the creation of ICS (ICS Plan) be submitted to the Secretary of Interior demonstrating how all requirements of the Guidelines will be met. Section G.3.B.1 of the Guidelines outline that an ICS Plan will consist of, at a minimum, the following information:

a. Project Description including what extraordinary measures will be taken to conserve or import the water

b. Term of Activity

c. Estimate of the amount of water that will be imported

d. Proposed methodology for verification of the amount of water imported

[1] "Contractor" in the Guidelines "shall mean an entity holding an entitlement to mainstream water under (a) the Consolidated Decree, (b) a water delivery contract with the United States through the Secretary, or (c) a reservation of water by the Secretary, whether the entitlement is obtained under (a), (b), or (c) before or after the adoption of the Guidelines.

e. Documentation regarding any state or federal permits or other regulatory approvals that have already been obtained by the Contractor or that need to be obtained prior to the creation of ICS

The following sections document each of these requirements. It is important to note that the majority of the information presented below is reiterated from Exhibit B of the Forbearance Agreement and Delivery Agreement.

Project Description

Coyote Spring Valley groundwater rights that will be utilized to create Imported ICS pursuant to this ICS Plan and Exhibit B of the Forbearance Agreement are groundwater rights permitted by the Nevada Division of Water Resources.

Coyote Spring Valley is located approximately 50 miles north of the Las Vegas Valley and lies within Clark and Lincoln counties. SNWA will convey permitted groundwater rights and possibly additional groundwater rights granted by the Nevada Division of Water Resources through the recently constructed SNWA Coyote Spring transmission system. (Figure 1). The groundwater will then be conveyed through the Moapa Valley Water District's (MVWD) municipal supply system and discharged to the Muddy Valley Irrigation Company's irrigation system and the Muddy River. The water will then be allowed to flow down the Muddy River to Lake Mead. The metered groundwater rights that flow to Lake Mead will be accounted for as Imported ICS.

Term of Activity

The term of activity for this ICS Plan is Calendar Year 2012. SNWA anticipates receiving Imported ICS credit for Coyote Spring Valley groundwater conveyed to Lake Mead into the foreseeable future. As operational changes occur and if additional water rights are permitted, the amount of water claimed as Imported ICS may change. Subsequent ICS Plans will be updated to reflect any changes.

Estimate of Water Imported

Based on current operational limitations and water rights, SNWA is planning to convey up to 7,000 acre-feet (af) of Coyote Spring Valley groundwater rights to Lake Mead in Calendar Year 2012.

As outlined in Exhibit B of the Forbearance Agreement, the maximum amount of Imported ICS that may be created by SNWA from Nevada state water rights in one year is limited to 15,000 af from the following:

1. 9,000 acre-feet per year pursuant to Permit Nos. 49414, 49660 to 49662 and 49978 to 49987.

2. Water permitted for appropriation by the Nevada State Engineer pursuant to Application Nos. 54055 through 54059, inclusive.

3. Any effluent generated by the direct use of water rights specified in paragraphs 1 and 2 above by the MVWD or other municipal agency outside of the Las Vegas Valley and treated and discharged to Lake Mead in accordance with all applicable state and federal laws.

Methodology

Coyote Spring Valley groundwater introduced into the Muddy River channel (downstream of the U.S. Geological Survey (USGS) Glendale gage) in Lower Moapa Valley will be metered and will be in addition to SNWA Muddy River Tributary Conservation ICS water already in the channel, as determined from Muddy River flows at the USGS Glendale gage. Consumptive use by evapotranspiration in the Muddy River channel and Overton Wildlife Management Area will be accounted for in the Muddy River Certification Report for the Tributary Conservation ICS.

In compliance with Section G.3.D of the Guidelines, a Certification Report will be submitted for the Secretary's review and verification, demonstrating the amount of Imported ICS created and that the method of creation was consistent with this ICS Plan, the Forbearance Agreement, and Delivery Agreement. The Certification Report will be submitted to the Secretary in the year following the creation of the ICS. The Certification Report, at a minimum, will include:

- Documentation of metered discharge into the Muddy River
- Summary of Tributary Conservation ICS on the Muddy River accounting for evapotranspiration in the Muddy River channel and the Overton Wildlife Management Area
- Letter from the Nevada Division of Water Resources verifying the quantity of water conveyed from Coyote Spring Valley and discharged into the lower Muddy River system and to the Colorado River mainstream for the purpose of creating ICS

Regulatory Approvals

The SNWA will acquire necessary approvals from the Nevada Division of Water Resources to develop and convey Nevada state water rights to Lake Mead to create Imported ICS. The Coyote Spring Well and Moapa Transmission System Project were evaluated under the National Environmental Policy Act in the Environmental Assessment and Finding of No Significant Impact/Decision Record dated June 22, 2007. In addition, compliance under Section 7 of the Endangered Species Act was obtained through formal consultation with the U.S. Fish and Wildlife Service. The Final Biological Opinion for the Coyote Spring Well and Moapa Transmission System Project was issued May 9, 2007. SNWA has obtained a National Pollutant Discharge Elimination System (NPDES) permit for discharge of Coyote Spring Valley groundwater into the Muddy River from the Nevada Division of Environmental Protection.

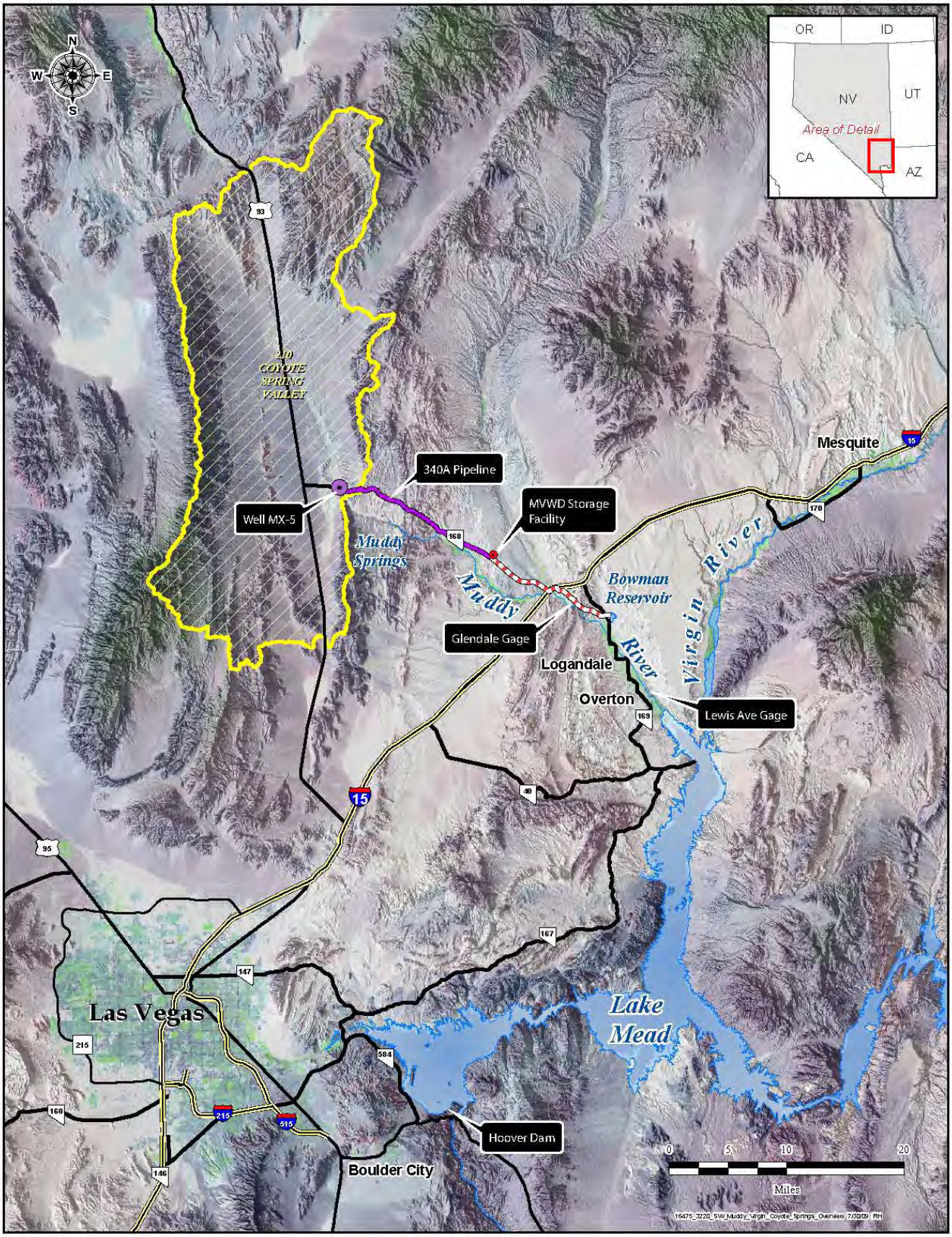

Figure 1. Location Map of Coyote Spring Valley

IN THE OFFICE OF THE STATE ENGINEER

OF THE STATE OF NEVADA

1193

ORDER

REGARDING TRIBUTARY CONSERVATION INTENTIONALLY CREATED SURPLUS FOR THE VIRGIN RIVER

WHEREAS, the Nevada State Engineer is designated by the Nevada Legislature to perform duties related to the management and appropriation of the water resources belonging to the people of the State of Nevada;[1]

WHEREAS, pursuant to Nevada Revised Statute (NRS) chapter 533, the Nevada State Engineer acts as an officer of the court for administration and distribution of water from a stream system that has been adjudicated by a district court decree;

WHEREAS, the Virgin River Decree was entered on May 14, 1927, by the Tenth (now Eighth) Judicial District Court, Clark County, Nevada;

WHEREAS, under the Virgin River Decree, the Bunkerville Irrigation Company (BIC) and Mesquite Irrigation Company (MIC) own water rights on the Virgin River and said water is distributed by BIC and MIC to the individual shareholders of said irrigation companies;

WHEREAS, in addition to the Virgin River Decree, other water rights for the diversion of the waters of the Virgin River have been granted through the permitting and certification process administered by the Nevada State Engineer;

WHEREAS, pursuant to NRS 533.060 rights to the use of surface water cannot be lost through forfeiture;

WHEREAS, pursuant to NRS 533.060 a surface water right that is appurtenant to land formerly used primarily for agricultural purposes is not subject to abandonment if the land has been converted to urban use or the water right has been acquired by a water purveyor for municipal use;

WHEREAS, pursuant to NRS 538.171 any appropriation or use of the waters of the Colorado River by the Colorado River Commission of Nevada or an entity with whom the Colorado River Commission of Nevada has contracted is not subject to regulation by the State Engineer;

WHEREAS, the Attorney General of the State of Nevada determined in Attorney General Opinion Number 88-16 that a permit from the State Engineer is not required for appropriation and use of Colorado River water for entities that have water delivery contracts with the Secretary of the Interior (Secretary), nor is a permit from the State Engineer necessary for use of such water merely to provide the State Engineer with information regarding such use if information is timely supplied upon request;

WHEREAS, pursuant to Section 2 of Chapter 393 of the Statutes of Nevada 1995, the powers, duties, rights and obligations of the State of Nevada and the Colorado River Commission of Nevada relating to contracts for delivery of Colorado River water were assumed by the Southern Nevada Water Authority;

WHEREAS, the Boulder Canyon Project Act (BCPA), 43 U.S.C. § 617, became effective on June 25, 1929;

WHEREAS, the Secretary of the Interior (Secretary) has a broad and unique legal role in managing the lower Colorado River system in accordance with federal law, including the Boulder Canyon Project Act of 1928, the 1963 decision of the U.S. Supreme court in *Arizona v. California*, the 2006 Consolidated Decree of the U.S. Supreme Court in *Arizona v. California*, the Colorado River Basin Project Act of 1968, and other applicable provisions of federal law. Within this legal framework, the Secretary makes annual determinations regarding the availability of water to be delivered to Colorado River contract holders from Lake Mead;

WHEREAS, on December 13, 2007, the Secretary adopted the Colorado River Interim Guidelines for Lower Basin Shortages and the Coordinated Operations for Lake Powell and Lake Mead (Guidelines). The Guidelines provide for the creation and delivery of Tributary Conservation Intentionally Created Surplus and Developed Shortage Supply (for convenience, both referred to hereinafter as ICS) to entities with a contract or entitlement to Colorado River water with the Bureau of Reclamation provided said entities have also entered into a delivery agreement with the Bureau of Reclamation for delivery of ICS (ICS Delivery Contract);

WHEREAS, pursuant to Sections 3 and 4 of the Guidelines, the holder of a valid ICS Delivery Contract who purchases documented water rights on a tributary of the Colorado River, perfected prior to June 25, 1929, (the effective date of the BCPA) may convey said water to the Colorado River mainstream so that said water may be diverted from the Colorado River mainstream by the ICS Delivery Contract holder as Tributary Conservation ICS;

WHEREAS, the Guidelines and the consolidated decree in *Arizona v. California*, 547 U.S. 150 (2006), define the Colorado River mainstream to include the reservoirs located on the Colorado River downstream from Lee Ferry within the United States; and

WHEREAS, Lake Mead is located on the Colorado River mainstream downstream from Lee Ferry and full pool elevation of Lake Mead is 1,220 feet above mean sea level.

NOW THEREFORE, the State Engineer finds that:

1. The Judgment and Decree in the Matter of the Determination of the Relative Rights in and to the Waters of the Virgin River (Virgin River Decree) was entered on May 14, 1927 by the Tenth (now Eighth) Judicial District Court, Clark County, Nevada.
2. All water rights adjudicated in the Virgin River Decree were acquired by valid appropriation prior to March 1, 1905, and were determined to be in good standing and in use prior to March 1, 1905 as affirmed by the Virgin River Decree.
3. That Permit No. 3085 (Certificate No. 1153) is for the diversion of the waters of the Virgin River with a priority date of August 17, 1914 and was acquired by valid appropriation prior to June 25, 1929.
4. Permit No. 6061 (Certificate No. 1408) is for the diversion of the waters of the Virgin River with a priority date of April 21, 1920 and was acquired by valid appropriation prior to June 25, 1929.
5. Permit No. 7624 (Certificate No. 4509) is for the diversion of the waters of the Virgin River with a priority date of January 21, 1926 and was acquired by valid appropriation prior to June 25, 1929.
6. The Virgin River Decree and issuance of subsequent permits and certificates by the State Engineer have appropriated the entire flow of the Virgin River, and that there is insufficient flow in the Virgin River to grant any new appropriations.
7. As of the date of this Order there has been no declaration or finding of forfeiture or abandonment regarding any water rights adjudicated under the Virgin River Decree or certificated by the State Engineer for the diversion of the waters of the Virgin River.

8. As of the date of this Order, no proceedings for forfeiture or abandonment have been initiated regarding any water rights adjudicated under the Virgin River Decree or certificated by the State Engineer for the diversion of the waters of the Virgin River.
9. In accordance with NRS 538.171 and Attorney General Opinion 88-16 a permit is not required for the creation or use of Tributary Conservation ICS when an ICS Delivery Contract exists with the Secretary.
10. The creation of ICS as defined in the current Guidelines promulgated by the Secretary and as those Guidelines may hereinafter be amended, is beneficial to the state of Nevada.

NOW THEREFORE, the State Engineer orders:

1. The Virgin River is closed to new appropriations.
2. An entity with an ICS Delivery Contract, which uses water rights adjudicated under the Virgin River Decree or water rights on the Virgin River issued by the State Engineer with a priority date prior to June 25, 1929 for the creation of ICS, shall file an annual report with the State Engineer's Office. The annual report shall give a full accounting of water rights on the Virgin River owned or controlled by the entity with an ICS Delivery Contract, which have been conveyed through the Virgin River system to the Colorado River mainstream for the creation of ICS. After review of the annual report, the State Engineer shall issue a letter verifying the quantity of water conveyed through the Virgin River system to the Colorado River mainstream for the purpose of creating ICS.

TRACY TAYLOR, P.E.
State Engineer

Dated at Carson City, Nevada
this 15 day of July, 2008.

Report No. 1

Analysis of Existing
Surface and Underground Water Rights and Applications
for Permits within the
Virgin River Drainage Area of Nevada

1992

Prepared by:

State of Nevada
Department of Conservation and Natural Resources
Division of Water Resources

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RECEIVED
JAN 25 1993
Div. of Water Resources
Branch Office - Las Vegas, NV

January 20, 1993

Bill Quinn
State Engineer's Office
1515 E. Tropicana, Suite 375
Las Vegas NV 89119

RE: Virgin River

Dear Bill:

As we discussed last week, distribution of Nevada's Report No. 1 on the Virgin River probably should include the following:

(By L. Linser)
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Arizona Department of Water Resources
15 South 15th Avenue
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C. Laurence Linser, Deputy Director
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(By L. Anderson)
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State of Utah Department of Natural Resources
1636 West North Temple
Salt Lake City Utah 84116-3156

D. Larry Anderson, Division Director
State of Utah Department of Natural Resources
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Rosalyn Mike, Chairperson
Moapa Tribe
P.O. Box 340
Moapa NV 89025

~~Rick Hafen~~ Mike Winters
Mesquite Farmstead Association
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Mesquite NV 89024

Paul Henderson, City Manager
City of Mesquite
P.O. Box 69
Mesquite NV 89024

Patricia Mulroy
Southern Nevada Water Authority
1850 E. Flamingo Road, Ste 234
Las Vegas NV 89119

Director, Utah Wilderness Alliance

Roger M. Bunker, President
Bunkerville Irrigation Co.
P.O. Box 7337
Bunkerville NV 89007

Courtney Jensen, President
Mesquite Irrigation Co.
P.O. Box 303
Mesquite NV 89024

Sincerely,

Bob Marshall

Bob Marshall

RWM/jd

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Figure 3	Irrigated Lands of the Mesquite Irrigation Company

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Table 1(a)	Virgin River Decree - Bunkerville Irrigation Company Tabulation.
Table 1(b)	Virgin River Decree - Mesquite Irrigation Company Tabulation.
Table 2	Summary of Applications, Permits and Certificates in Nevada for Virgin River Surface Water.
Table 3	Abstract of Applications, Permits and Certificates for Ground Water in the Virgin River Basin of Nevada.
Table 4	Summary of Applications, Permits, Certificates and Proofs in Nevada for Beaver Dam Wash Surface Water.
Table 5	Virgin River Irrigation Use in Arizona, Adjacent to Mesquite, Nevada.

FOREWORD

The purpose of Report No. 1 is to satisfy a commitment on behalf of the State of Nevada to the States of Arizona and Utah in accordance with a Memorandum of Understanding, dated May of 1992.

This report is the first in a series of three and outlines the total appropriated water rights in the Virgin River Basin in Nevada. This information is based on records of the Nevada State Engineer as of November, 1992.

NEVADA REPORT NO. 1 ON VIRGIN RIVER USES, INCLUDING BEAVER DAM WASH IN NEVADA

The State of Nevada presents this Report No. 1 on Virgin River and Beaver Dam Wash water uses in Nevada pursuant to the terms of the Virgin River Memorandum of Understanding (M.O.U.) between the States of Arizona, Nevada and Utah. Report No. 1 covers past and present uses and pending applications for use of Virgin River surface water, Beaver Dam Wash surface flows and Virgin River underground basin water as revealed from the records of the Water Resources Division of the Nevada Department of Conservation and Natural Resources and the records of the Eighth Judicial District Court of the State of Nevada in and for Clark County, Nevada.

Figure No. 1 is a map showing the Virgin River in Nevada and adjacent Arizona, including the communities of Mesquite, Bunkerville and Riverside.

Uses of surface water in Nevada prior to the water law of 1905 are considered vested rights, the quantification of which can only be judicially determined by a Nevada District Court in an adjudication proceeding. The Virgin River surface uses prior to 1905 have been adjudicated by the Virgin River Decree pursuant to Proof No. 02038 filed by the Bunkerville Irrigation Company, and Proof No. 01968 filed by the Mesquite Irrigation Company. The Virgin River Decree was entered by the Tenth (now Eighth) Judicial District Court on May 14, 1927.

The Decree adjudicated water rights to Virgin River surface flow for irrigation of 1963.08 acres for a total of 17,785.50 acre feet per year (AFY). The summer duty equals 1.0 cubic feet per second (c.f.s.) of flow for each 70 acres and the winter duty equals 1.0 c.f.s. of flow for each 100 acres for a total duty of 9.06 AFY per acre. The summer period is the months of March through September and the winter period is the months of October through February. 9.06 ac.ft/yr * 1967.08 AC = 17785.5048 AF/

A tabulation of the water rights and uses set forth in the Virgin River Decree is attached as Table 1.

After the water law was enacted in 1905 a water right to surface waters could only be perfected under Nevada law by obtaining a permit from the State Engineer and then by putting the water to beneficial use at which time a certificate is issued. The permitting process is initiated by filing an application with the State Engineer, which is pending until a permit is issued.

Certificates for Virgin River surface water placed to beneficial use for irrigation subsequent to 1905 aggregate 5518.39 AFY. In addition, there are three applications to appropriate surface water pending action by the State Engineer: one for M & I use with a diversion rate of 500 c.f.s., limited to the yield of the Virgin River, one for industrial use (power production) for 30,000 AFY and one for irrigation for 1114.8 AFY.

Table 2 details the surface flow certificates and applications.

Subsequent to the water law of 1913 (1939 as to percolating waters) a right to ground water could be only obtained by following the permitting process with the obtaining of a certificate on placing the water to beneficial use.

Table 3 lists the ground water permits and certificates and pending applications for ground water in the Virgin River basin within Nevada.

There are three existing certificates for use in Nevada of surface water from the Beaver Dam Wash. One is for irrigation for 186 AFY, one is for stockwater for 4.36 AFY and one is for recreational use in connection with Schroeder Lake for 272 AFY. These total 462.36 AFY. In addition, there are claims of vested rights for irrigation of 42 acres. The amount of water has not been adjudicated. There are three pending applications by the Mesquite Farmstead Association for M & I use, totaling 1000 c.f.s. of flow on a year round basis. The point of diversion for two of these applications is the State of Utah. The Beaver Dam Wash uses and applications are set forth on Table 4.

For informational purposes, Virgin River surface uses for irrigation in Arizona adjacent to Mesquite, are set forth in Table 5. These uses are revealed from maps filed in connection with Permit Nos. 7624 and 15619 and aggregate 1465 AFY. These uses are not included in the Virgin River Decree nor in any of the certificates which have been issued by the Nevada State Engineer.

Copies of maps showing the Bunkerville Irrigation Company and Mesquite Irrigation Company irrigated lands are included as Figures 2 and 3 respectively. These maps are historic maps and may not show all irrigated areas under all filings.

A future study, Report No. 2 will detail Nevada's projected needs of water from the Virgin River source, both in the Mesquite area as well as in the Las Vegas Valley and the possible methods proposed to utilize such water.

Several studies have been conducted, or are ongoing, which bear upon the interaction between Virgin River surface flows and the ground water system of the Virgin River Basin of Nevada. Nevada recognizes that there may be interaction between the river and the ground water system. This likelihood will be the subject of Report No. 3.

Documentation furnishing the basis of the information contained in this report will be available to representatives of Arizona and Utah on request at a time and place mutually agreed on.

Submitted this 17th day of November, 1992.

Nevada Department of Conservation and Natural Resources, Division of Water Resources, Office of the State Engineer.

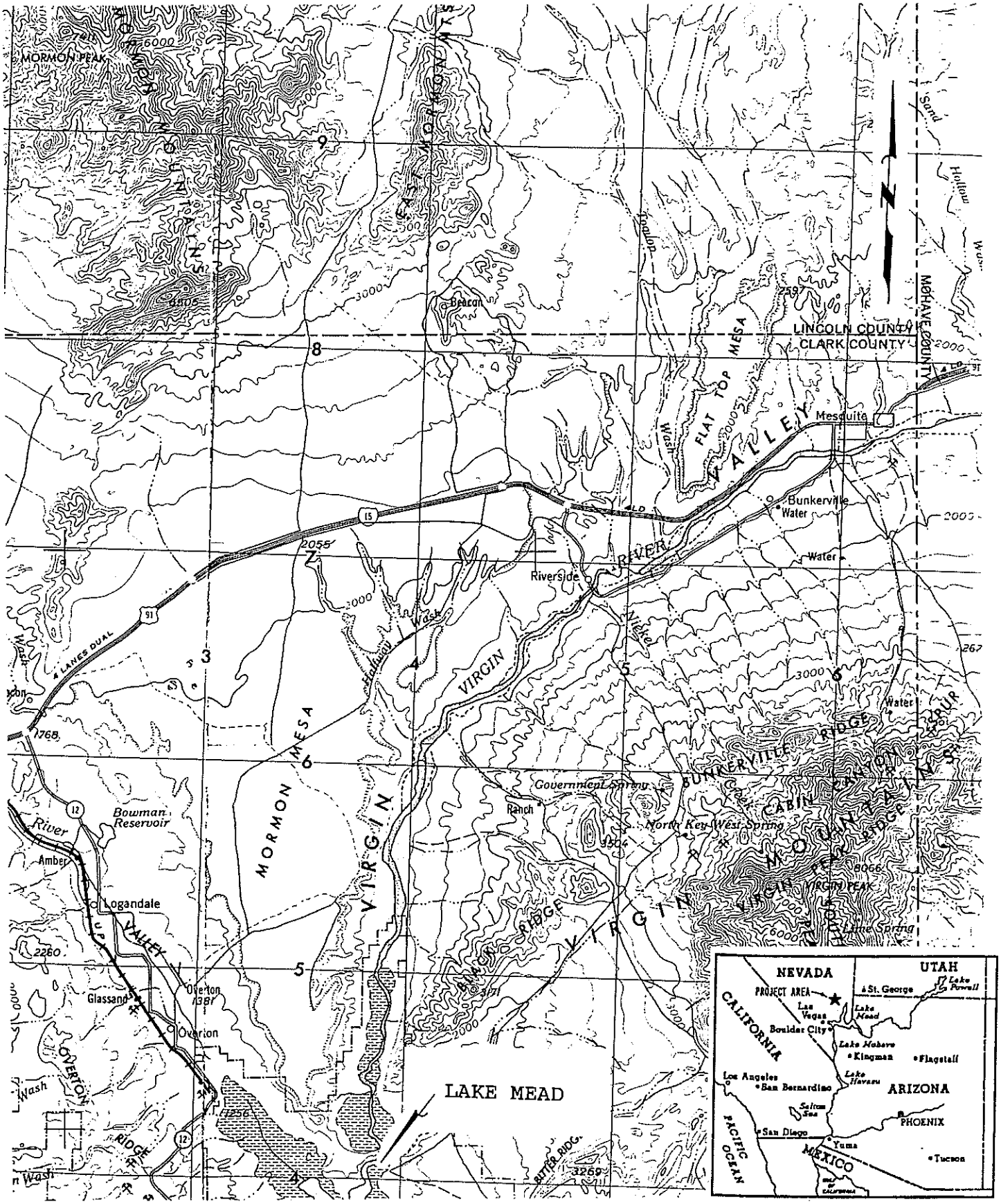


Figure 1
Virgin River Location Map
Scale: 1" = Approximately 4 Miles

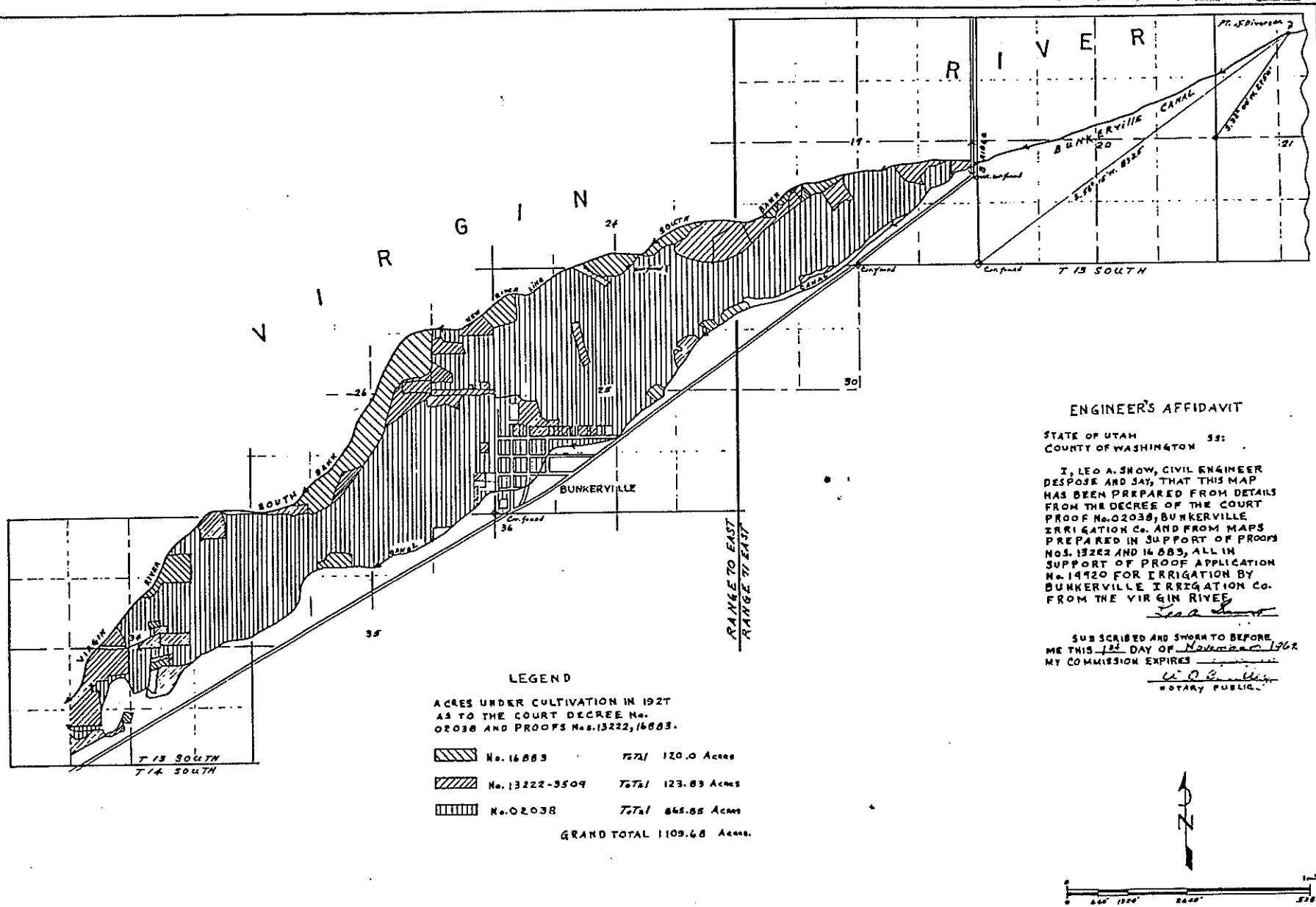

VIRGIN RIVER
BUNKERVILLE CANAL
SOUTH BANK
NEW BANK
BUNKERVILLE
T 13 SOUTH
T 14 SOUTH
RANGE 70 EAST
RANGE 71 EAST
LEGEND
ACRES UNDER CULTIVATION IN 1927 AS TO THE COURT DECREE No. 02038 AND PROOFS No.s. 13222, 16883.
No. 16883 TOTAL 120.0 Acres
No. 13222-3509 TOTAL 123.83 Acres
No. 02038 TOTAL 865.85 Acres
GRAND TOTAL 1109.68 Acres.
ENGINEER'S AFFIDAVIT
STATE OF UTAH
COUNTY OF WASHINGTON ss:
I, LEO A. SNOW, CIVIL ENGINEER DESPOSE AND SAY, THAT THIS MAP HAS BEEN PREPARED FROM DETAILS FROM THE DECREE OF THE COURT PROOF No. 02038, BUNKERVILLE IRRIGATION Co. AND FROM MAPS PREPARED IN SUPPORT OF PROOFS NOS. 13222 AND 16883, ALL IN SUPPORT OF PROOF APPLICATION No. 19920 FOR IRRIGATION BY BUNKERVILLE IRRIGATION Co. FROM THE VIRGIN RIVER
SUBSCRIBED AND SWORN TO BEFORE ME THIS 1st DAY OF November 1962
MY COMMISSION EXPIRES
NOTARY PUBLIC
N
MAP
TO ACCOMPANY PROOF
OF
BENEFICIAL USE UNDER
APPLICATION No. 19920 FOR
IRRIGATION
BY BUNKERVILLE IRRIGATION
Co. FROM VIRGIN RIVER.

Figure 2

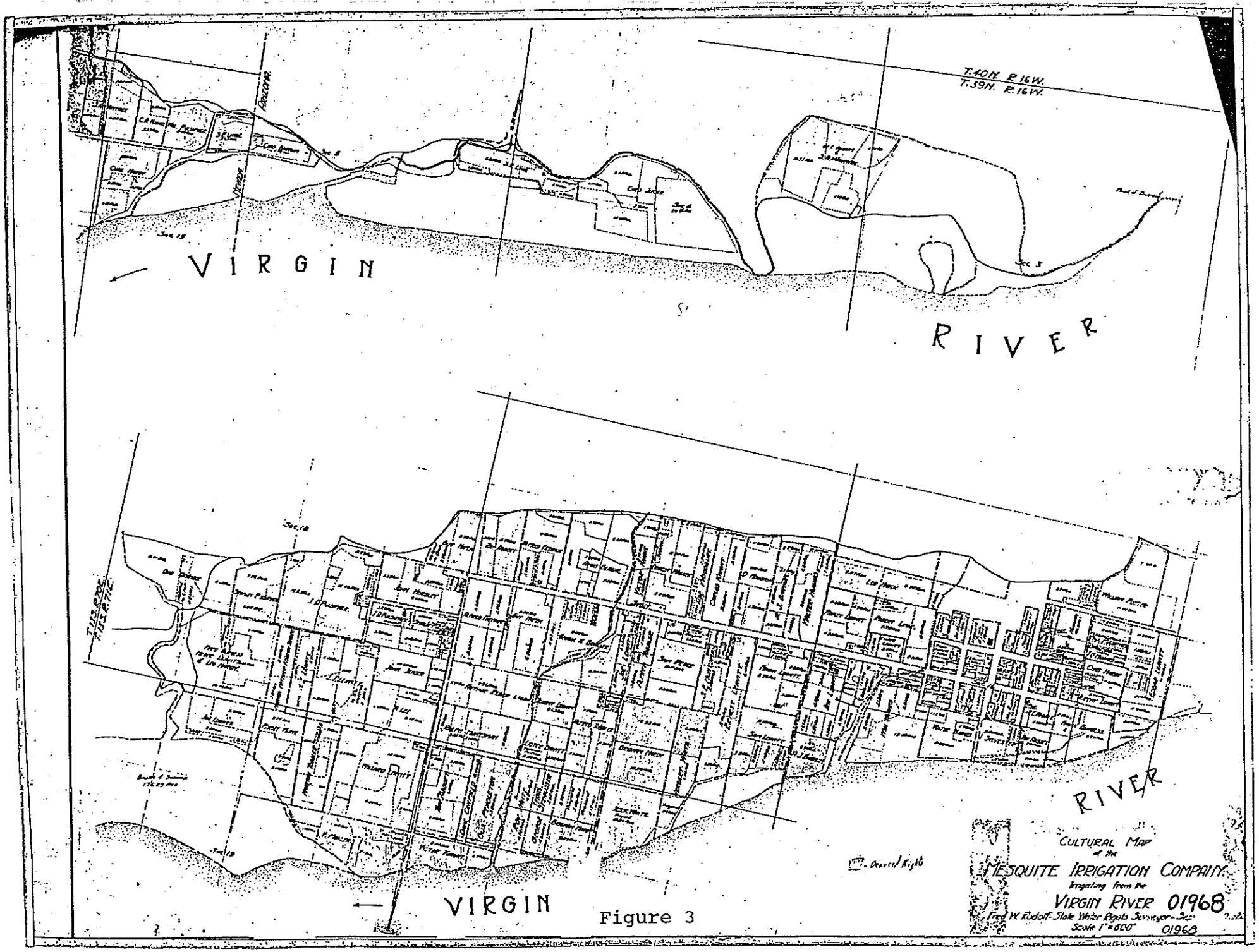

T.40N. R.16W.
T.39N. R.16W.
VIRGIN
RIVER
VIRGIN
RIVER
CULTURAL MAP
of the
MESQUITE IRRIGATION COMPANY
Irrigating from the
VIRGIN RIVER 01968
Fred W. Rudolf - State Water Rights Surveyor - Sec.
Scale 1" = 600'
01968

Figure 3

VIRGIN RIVER DECREE
Tenth (now Eighth) Judicial District Court of Nevada
in and for Clark County
May 14, 1927

Summary

Bunkerville Irrigation Co.	(Proof No. 02038)	8,115.94 AFY
Mesquite Irrigation Co.	(Proof No. 01968)	9,669.56 AFY
TOTAL		17,785.50 AFY

Table 1

VIRGIN RIVER DECREE
Bunkerville Irrigation Co.
Proof No. 02038

Name	Acres	Twnsp, Rge (S.,E.)	Seasonal Duty Acre Feet Totals: Winter Duty	Seasonal Duty Acre Feet Totals: Summer Duty
1. James S. Abbott	2.69	13, 70	8.07	16.30
	6.47	13, 70	19.41	39.21
	7.19	13, 70	21.57	43.57
	0.24 (T.L.)*	13, 70	0.72	1.45
	16.59		49.77	100.53
2. Conrad Adams	0.31 (T.L.)	13, 70	0.93	1.88
	0.31		0.93	1.88
3. Harley Adams	9.90	13, 70	29.70	59.99
	5.80	13, 70	17.40	35.15
	7.66	13, 70	22.98	46.42
	5.14	13, 70	15.42	31.15
	1.08	13, 70	3.42 VRD (3.24 Actual)	6.54
	0.61 (T.L.)	13, 70	1.83	3.70
	30.19		90.57	182.95
4. Milo Adams	5.50	13, 70	16.50	33.33
	2.13	13, 70	6.39	12.91
	19.06	13, 70	57.18	115.50
	5.64	13, 70	16.92	34.18
	0.51 (T.L.)	13, 70	1.53	3.09
	32.84		98.52	199.01

*T.L. Stands for Town Lot

Table 1(a)

Name	Acres	Townsp, Rge (S.,E)	Seasonal Duty Acre Feet Totals: Winter Duty	Seasonal Duty Acre Feet Totals: Summer Duty
5. Thomas Adams	12.19	13, 70	36.57	73.87
	2.30	13, 70	6.90	13.94
	12.73	13, 70	38.19	77.14
	0.41	13, 70	1.23	2.48
	11.21	13, 70	33.63	67.93
	0.77(T.L.)	13, 70	2.31	4.67
	39.61		118.83	240.03
6. M.E. Bowman	5.07	13, 70	15.21	30.72
	0.11	13, 70	0.33	0.67
	0.27(T.L.)	13, 70	0.81	1.64
	0.20(T.L.)	13, 70	0.60	1.21
	5.65		16.95	34.24
7. W.C. Bowman	6.41	13, 70 &71	19.23	38.84
	6.03	13, 70	18.09	36.54
	0.61	13, 70	1.83	3.70
	0.53	13, 70	1.59	3.21
	1.04	13, 70	3.12	6.30
	14.62		43.86	88.59
8. Hector Bunker	0.62(T.L.)	13, 70	1.86	3.75
	0.62		1.86	3.75
9. Hugh Bunker	0.86	13, 70	2.58	5.21
	3.36	13, 70	10.08	20.36
	5.86	13, 70	17.58	35.51
	8.08	13, 70	24.24	48.96
	9.06	13, 70	27.18	54.90
	0.24(T.L.)	13, 70	0.72	1.45
	27.46		82.38	166.39

Name	Acres	Twnsp, Rge (S.,E.)	Seasonal Duty Acre Feet Totals: Winter Duty	Summer Duty
10. Anne E. Cox	0.92(T.L.)	13, 70	2.76	5.58
	0.92		2.76	5.58
11. Ed I. Cox	10.72	13, 70	32.16	64.96
	0.88(T.L.)	13, 70	2.64	5.33
	4.41	13, 70	13.23	26.72
	0.91	13, 70	2.73	5.51
	10.91	13, 70	32.73	66.11
	15.84	13, 70	47.52	95.99
	14.05	13, 71	42.15	85.14
	0.43(T.L.)	13, 70	1.29	2.61
	58.15		174.45	352.37
12. Mary E. Hafen	12.05	13, 71	36.15	73.02
	0.86(T.L.)	13, 70	2.58	5.21
	0.33	13, 70	0.99	2.00
	0.31	13, 70	0.93	1.88
	13.55		40.65	82.11
13. Heber Hardy	1.06	13, 70	3.18	6.42
	5.07	13, 70	15.21	30.72
	8.00	13, 70	24.00	48.48
	17.21	13, 70	51.63	104.29
	1.23	13, 71	3.69	7.45
	15.25	13, 71	45.75	92.42
	2.59	13, 71	7.77	15.70
	1.90(T.L.)	13, 70	5.70	11.51
	52.31		156.93	316.99

Name	Acres	Twnsp, Rge (S.,E.)	Seasonal Duty Acre Feet Totals: Winter Duty	Summer Duty
14. Joe Hardy	4.71	13, 70	14.13	28.54
	7.52	13, 70 & 71	22.56	45.57
	0.88(T.L.)	13, 70	2.64	5.33
	13.11		39.33	79.44
15. Warren Hardy	15.28	13, 70	45.84	92.60
	15.28		45.84	92.60
16. George Hunt	5.42	13, 70	16.26	32.85
	7.88	13, 70	23.64	47.75
	0.88(T.L.)	13, 70	2.64	5.33
	0.57(T.L.)	13, 70	1.71	3.45
	14.75		44.25	89.38
17. Nephi Hunt	0.69	13, 70	2.07	4.18
	1.14	13, 70	3.42	6.91
	1.83		5.49	11.09
18. Parley Hunt	0.22	13, 70	0.66	1.33
	3.12	13, 70	9.36	18.91
	10.35	13, 70	31.05	62.72
	3.84	13, 70	11.52	23.27
	17.53		52.59	106.23
19. Albert Leavitt	23.98	13, 71	71.94	145.32
	13.85	13, 70	41.55	83.93
	0.41	13, 70	1.23	2.48
	0.15(T.L.)	13, 70	0.45	0.91
	0.68(T.L.)	13, 70	2.04	4.12
	0.81(T.L.)	13, 70	2.43	4.91
	39.88		119.64	241.67

Name	Acres	Twnsp, Rge (S.,E.)	Seasonal Duty Acre Feet Totals: Winter Duty	Summer Duty
20. Alma Leavitt	1.05(T.L.)	13, 70	3.15	6.36
	1.05		3.15	6.36
21. Lena Leavitt	2.19	13, 70	6.57	13.27
	5.37	13, 70	16.11	32.54
	14.59		43.77	88.42
	22.15		66.45	134.23
22. Dudley Leavitt	7.58	13, 70	22.74	45.93
	7.58		22.74	45.93
23. D.H. Leavitt	0.37	13, 70	1.11	2.24
	9.43	13, 70	28.29	57.15
	0.59	13, 70	1.77	3.58
	2.64	13, 70	7.92	16.00
	11.07	13, 71	33.21	67.08
	4.45	13, 71	13.35	26.97
	1.07(T.L.)		3.21	6.48
	29.62		88.86	179.50
24. Elmer Leavitt	8.21	13, 70	24.36 VAD (24.63)	49.75
	7.37	13, 70	22.11	44.66
	0.41(T.L.)	13, 70	1.23	2.48
	15.99		47.97	96.89

Name	Acres	Twnsp, Rge (S., E.)	Seasonal Duty Acre Feet Totals: Winter Duty	Seasonal Duty Acre Feet Totals: Summer Duty
25. John Leavitt	2.66	13, 70	7.98	16.12
	3.99	13, 70	11.97	24.18
	6.75	13, 71	20.25	40.91
	0.42(T.L.)	13, 70	1.26	2.55
	0.16(T.L.)	13, 70	0.48	0.97
	0.11(T.L.)	13, 70	0.33	0.67
	0.48(T.L.)	13, 70	1.44	2.91
	14.57		43.71	88.31
26. Lawrence Leavitt	0.52(T.L.)	13, 70	1.56	3.15
	0.52		1.56	3.15
27. Lemuel Leavitt	20.48	13, 71	61.44	124.11
	0.43	13, 70	1.29	2.61
	0.20	13, 70	0.60	1.21
	6.21	13, 70	18.63	37.63
	7.15	13, 70	21.45	43.33
	0.61	13, 70	1.83	3.70
	35.08		105.24	212.59
28. Mary E. Leavitt	0.69(T.L.)	13, 70	2.07	4.18
	0.69		2.07	4.18
29. Myron Leavitt	0.55(T.L.)	13, 70	1.65	3.33
	0.55		1.65	3.33
30. Thirza Leavitt	0.71(T.L.)	13, 70	2.13	4.30
	0.71		2.13	4.30

Name	Acres	Twnsp, Rge (S.,E.)	Seasonal Duty Acre Feet Totals: Winter Duty	Summer Duty
31. Thomas Leavitt, Jr.	7.45	13, 70	22.35	45.15
	23.98	13, 70	71.94	145.32
	23.98	13, 70	71.94	145.32
	6.89	13, 70	20.67	41.75
	0.63(T.L.)	13, 70	1.89	3.82
	62.93		188.79	381.36
32. Thomas Leavitt, Sr.	5.93	13, 71	17.79	35.94
	8.52	13, 70	25.56	51.63
	26.06	13, 70	78.18	157.92
	3.90	13, 70	11.70	23.63
	0.87(T.L.)	13, 70	2.61	5.27
	45.28		135.84	274.39
33. Will Leavitt	10.38	13, 70	31.14	62.90
	0.99(T.L.)	13, 70	2.97	6.00
	11.37		34.11	68.90
34. Randall Lunt	0.57	13, 70	1.71	3.45
	2.48	13, 70	7.44	15.03
	1.08	13, 70	3.24	6.54
	4.13		12.39	25.02
35. Roy Neagle	0.77(T.L.)	13, 70	2.31	4.67
	0.34(T.L.)	13, 70	1.02	2.06
	1.11		3.33	6.73
36. Ruth Nealge	4.92	13, 70	14.76	29.82
	8.95	13, 70	26.85	54.24
	0.14(T.L.)	13, 70	0.42	0.85
	0.16(T.L.)	13, 70	0.48	0.97
	14.17		42.51	85.88

Name	Acres	Twnsp, Rge (S.,E.)	Seasonal Duty Acre Feet Totals: Winter Duty	Summer Duty
37. Andrew Pulsipher	9.39	13, 70	28.17	56.90
	0.31(T.L.)	13, 70	0.93	1.88
	0.82(T.L.)	13, 70	2.46	4.97
	10.52		31.56	63.75
38. Harmon Tobbler	0.30	13, 70	0.90	1.82
	5.35	13, 70	16.05	32.42
	2.41	13, 70	7.23	14.60
	2.10	13, 70	6.30	12.73
	0.97(T.L.)	13, 70	2.91	5.88
	0.20(T.L.)	13, 70	0.60	1.21
	11.33		33.99	68.66
39. Valley Supply Co.	0.10(T.L.)	13, 70	0.30	0.61
	0.10		0.30	0.61
40. Herbert Waite	19.70	13, 71	59.10	119.38
	1.26	13, 70	3.78	7.64
	20.96		62.88	127.02
41. Jesse Waite	4.46	13, 70	13.38	27.03
	5.43	13, 70	16.29	32.91
	0.83	13, 70	2.49	5.03
	10.72		32.16	64.97
42. Roy Waite	5.73	13, 70	17.19	34.72
	2.62	13, 70	7.86	15.88
	0.38(T.L.)	13, 70	1.14	2.30
	0.56(T.L.)	13, 70	1.68	3.39
	9.29		27.87	56.29

Name	Acres	Twnsp, Rge (S., E.)	Seasonal Duty Acre Feet Totals: Winter Duty	Summer Duty
43. Albert Wittwer	9.51	13, 70	28.53	57.63
	3.71	13, 70	11.13	22.48
	0.68	13, 70	2.04	4.12
	0.24	13, 70	0.72	1.45
	1.55	13, 70	4.65	9.39
	68.87	13, 70	206.61	417.35
	84.56		253.68	512.42
44. Harmon Wittwer	18.23	13, 70	54.69	110.47
	8.20	13, 70	24.60	49.69
	0.82	13, 70	2.46	4.97
	2.32	13, 70	6.96	14.06
	8.58	13, 70	25.74	51.99
	13.01	13, 70	39.03	78.84
	3.47	13, 70	10.41	21.03
	54.63		163.89	331.05
45. Samuel Wittwer	0.23(T.L.)	13, 70	0.69	1.39
	0.28(T.L.)	13, 70	0.84	1.70
	0.51		1.53	3.09
46. Will Wittwer	17.62	13, 70	52.86	106.78
	12.57	13, 70	37.71	76.17
	0.29(T.L.)	13, 70	0.87	1.76
	30.48		91.44	184.71
TOTALS:	895.80		2,687.40	5,428.54 5428.45
COMBINED AFY TOTAL			8,115.94 (8115.85)	

VIRGIN RIVER DECREE
Mesquite Irrigation Co.
Proof No. 01968

Name	Acres	Twnsp, Rge (S.E.)	Seasonal Duty Acre Feet Totals Winter Duty	Summer Duty
1. Dave Abbott	0.90	13,71	2.70	5.45
	0.84	13,71	2.52	5.09
	1.74		5.22	10.54
2. Ray Abbott	8.27	13,71	24.81	50.12
	4.82	13,71	14.46	29.21
	0.12	13,71	0.36	0.73
	0.35	13,71	1.05	2.12
	0.43	13,71	1.29	2.61
	2.80	13,71	8.40	16.97
	0.44	13,71	1.32	2.67
	17.23		51.69	104.43
3. Tom Abbott	6.00	13,71	18.00	36.36
	1.10	13,71	3.30	6.67
	11.22	13,71	33.66	67.99
	18.32		54.96	111.02
4. W.E. Abbott	3.80	13,71	11.40	23.03
	0.33	13,71	10.99 (0.99 VAD)	2.00
	4.13		12.39	25.03

Table 1(b)

(Mesquite Irrigation Co.)
Page 2

Name	Acres	Twnsp, Rge (S.E.)	Winter Duty	Summer Duty
5. Joe Anderson	0.27	13,71	0.81	1.64
	1.74	13,71	5.22	10.54
	2.01 ✓		6.03 ✓	12.18 ✓
6. A.J. Barnum	3.85	13,71	11.55	23.33
	2.67	13,71	8.01	16.18
	1.73	13,71	5.19	10.48
	1.57	13,71	4.71	9.51
	6.91	13,71	20.73	41.87
	16.73 ✓		50.19 ✓	101.37 ✓
7. J.A. Barnum	0.39	13,71	1.17	2.36
	0.39 ✓		1.17 ✓	2.36 ✓
8. John H. Barnum	0.89	13,71	2.67	5.39
	0.89 ✓		2.67 ✓	5.39 ✓
9. Robert Barnum	0.60	13,71	1.80	3.64
	0.60 ✓		1.80 ✓	3.64 ✓
10. Amos Berghe	7.52	13,71	22.56	45.57
	1.47	13,71	4.41	8.91
	8.03	13,71	24.09	48.66
	17.02 ✓		51.06 ✓	103.14 ✓

(Mesquite Irrigation Co.)

Name	Acres	Twnsp, Rge (S.E.)	Winter Duty	Summer Duty
11. Geo. H. Bouller	10.56	13,71	31.68	63.99
	8.82	13,71	26.46	53.45
	2.19	13,71	6.57	13.27
	1.03	13,71	3.09	6.24
	22.60		67.80	136.95
12. Frank Burgess	2.80	13,71	8.40	16.97
	1.38	13,71	4.14	8.36
	0.35	13,71	1.05	2.12
	1.37	13,71	4.11	8.30
	5.90		17.70	35.75
13. Fred Burgess	7.49	13,71	22.47	45.39
Heber Leavitt	8.13	13,71	24.39	49.27
Leo Hardy	2.33	13,71	6.99	14.12
	17.95		53.85	108.78
14. Dave Canfield	4.00	13,71	12.00	24.24
	4.00		12.00	24.24
15. Alfred Frehner	9.19	13,71	27.57	55.69
	2.18	13,71	6.54	13.21
	0.76	13,71	2.28	4.61
	3.06	13,71	9.18	18.54
	6.65	13,71	19.95	40.30
	12.51		37.53	75.81
	34.35		103.05	208.16

(Mesquite Irrigation Co.)

Name	Acres	Twnsp, Rge (S.E.)	Winter Duty	Summer Duty
16. George Granger	4.51	13,71	13.53	27.33
	4.51		13.53	27.33
17. Guy Hafen	3.86	13,71	11.58	23.39
	8.28	13,71	24.48	50.18
	8.23	13,71	24.69	49.87
	9.92	13,71	29.76	60.12
	30.29		90.51	183.56
18. Brigham Hardy	12.90	13,71	38.70	78.17
	12.93	13,71	38.79	78.36
	0.55	13,71	1.65	3.33
	1.11	13,71	3.33	6.73
	1.61	13,71	4.83	9.76
	11.98	13,71	35.94	72.60
	4.17	13,71	12.51	25.27
	3.00	13,71	9.00	18.18
	48.25		144.75	292.40
19. Charles Hardy	6.04	13,71	18.12	36.60
	0.72	13,71	2.16	4.36
	8.70	13,71	26.10	52.72
	2.13	13,71	6.39	12.91
	4.12	13,71	12.36	24.97
	0.28	13,71	0.84	1.70
	0.98	13,71	2.94	5.94
	22.97		68.91	139.20
20. Leo Hardy	0.90	13,71	2.70	5.45
	7.97	13,71	23.91	48.30
	8.72	13,71	26.16	52.84
	0.84	13,71	2.52	5.09
	18.43		55.29	111.68

Name	Acres	Twnsp, Rge (S.E.)	Winter Duty	Summer Duty
21. John Horsley	0.62	13,71	1.86	3.76
	7.14	13,71	21.42	43.27
	0.15	13,71	0.45	0.91
	5.20	13,71	15.60	31.51
	13.11		39.33	79.45
22. Dewey Hort	0.36	13,71	1.08	2.18
	1.15	13,71	3.45	6.97
	1.51		4.53	9.15
23. D. Houston	4.70	13,71	14.10	28.48
	9.51	13,71	28.53	57.63
	0.12	13,71	0.36	0.73
	14.33		42.99	86.84
24. C.A. Hughes	0.70	13,71	2.10	4.24
	0.35	13,71	1.05	2.12
	0.37	13,71	1.11	2.24
	2.36	13,71	7.08	14.30
	4.62	13,71	13.86	28.00 (25.82)
	5.39	13,71	16.17	32.66 (35.69)
	2.39	13,71	7.13 (7.17 VRD)	14.18 (14.48)
	16.18		48.54	98.04 (98.89)
25. Elmer Hughes	0.81	13,71	2.43	4.91
	0.81		2.43	4.91
26. Jas. E. Hughes	1.65	13,71	4.95	10.00
	0.64	13,71	1.92	3.88
	1.31	13,71	3.93	7.94
	1.56	13,71	4.68	9.45
	5.16		15.48	31.27

Name	Acres	Twnsp, Rge (S.E.)	Winter Duty	Summer Duty
27. Walter Hughes	9.00	13,71	27.00	54.54
	1.96	13,71	5.88	11.88
	2.64	13,71	7.92	16.00
	1.60	13,71	4.80	9.70
	1.92	13,71	5.76	11.64
	8.89	13,71	26.67	53.87
	1.48	13,71	4.44	8.97
	27.49		82.47	166.60
28. Will Hughes	13.45	13,71	40.35	81.51
	2.81	13,71	8.43	17.03
	1.62	13,71	4.86	9.82
	17.88		53.64	108.36
29. Parley Hunt	5.75	13,71	17.25	34.85
	0.97	13,71	2.91	5.88
	6.72		20.16	40.73
30. Ralph Huntsman	3.23	13,71	9.69	19.57
	5.84	13,71	17.52	35.39
	1.69	13,71	5.07	10.24
	10.76		32.28	65.20
31. S.E. Huntsman	1.81	13,71	5.43	10.97
	1.08	13,71	3.24	6.54
	5.40	13,71	16.20	32.72
	0.80	13,71	2.40	4.85
	9.09		27.27	55.08

Name	Acres	Twnsp, Rge (S.E.)	Decree Winter	Summer Duty
32. John Jensen	15.20	13,71	45.60	92.11
	5.15	13,71	15.45	31.21
	1.73	13,71	5.19	10.48
	0.51	13,71	1.53	3.09
	22.59 ✓		67.77 ✓	136.89 ✓
33. Carlos Knight	9.50	13,71	28.50	57.57
	3.66	13,71	10.98 (10.99)	22.18
	0.53	13,71	1.59	3.21
	0.08	13,71	0.24	0.48
	13.77 ✓		41.31 (111.32)	83.44 ✓
34. Victor Knight	8.44	13,71	25.32	51.15
	3.03	13,71	9.09	18.36
	11.47 ✓		34.41 ✓	69.51 ✓
35. Edgar Leavitt	10.10	13,71	30.30	61.21
	1.57	13,71	4.71	9.51
	5.47	13,71	16.41	33.15
	3.95	13,71	11.85	23.94
	1.57	13,71	4.71	9.51
	1.46	13,71	4.38	8.85
	24.12 ✓		72.36 ✓	146.17 ✓
36. Ernest Leavitt	4.36	13,71	13.08	26.42
	8.46	13,71	25.38	51.27
	6.41	13,71	19.23	38.84 (37.21 VRD)
	19.23 ✓		57.69 ✓	116.53 (114.96)

(Mesquite Irrigation Co.)

Name	Acres	Twnsp, Rge (S.E.)	Decree Winter	Summer Duty
37. Frank Leavitt	8.96	13,71	26.88	54.30
	5.10	13,71	15.30	30.91
	2.82	13,71	8.46	17.09
	0.73	13,71	2.19	4.42
	0.69	13,71	2.07	4.18
	18.30 ✓		54.90 ✓	110.90 ✓
38. H.E. Leavitt	4.16	13,71	12.48	25.21
	3.51	13,71	10.53	21.27
	7.67 ✓		23.01 ✓	46.48 ✓
39. Hubert Leavitt	0.82	13,71	2.46	4.97
	0.82 ✓		2.46 ✓	4.97 ✓
40. Ira Leavitt	1.28	13,71	3.84	7.76
	2.43	13,71	7.29	14.73
	4.43	13,71	13.29	26.85
	2.01	13,71	6.03	12.18
	8.22	13,71	24.66	49.81
	0.43	13,71	1.29	2.61
	18.80 ✓		56.40 ✓	113.94 ✓
41. Jeremy Leavitt	8.63	13,71	25.89	52.30
	3.01	13,71	9.03	18.24
	0.30	13,71	0.90	1.82
	0.30	13,71	0.90	1.82
	12.24 ✓		36.72 ✓	74.18 ✓
42. J.J. Leavitt	4.42	13,71	13.26	26.79
	0.92	13,71	2.76 (2.26 YRD)	5.58
	6.89	13,71	20.67	41.75
	8.13	13,71	24.39	49.27
	20.36 ✓		61.08 (60.58 YRD)	123.39 ✓

Name	Acres	Twnsp, Rge (S.E.)	Decree Winter	Summer Duty
43. Joe Leavitt	6.24	13,71	18.72	37.81
	7.71	13,71	23.13	46.72
	2.30	13,71	6.90	13.94
	2.45	13,71	7.35	14.85
	0.57	13,71	1.71	3.45
	0.33	13,71	0.99	2.00
	19.60		58.80	118.77
44. Lister Leavitt	2.87	13,71	8.61	17.39
	4.28	13,71	12.84	25.94
	5.40	13,71	16.20	32.72
	12.55		37.65	76.05
45. Parley Leavitt	4.54	13,71	13.62	27.51
	4.53	13,71	13.59	27.45
	0.55	13,71	1.65	3.33
	9.62		28.86	58.29
46. Sam Leavitt	3.84	13,71	11.52	23.27
	1.77	13,71	5.31	10.73
	3.21	13,71	9.63	19.45
	9.09	13,71	27.27	55.09
	0.96	13,71	2.88	5.82
	1.09	13,71	3.27	6.61
	0.65	13,71	1.95	3.94
	20.61		61.83	124.91
47. Willard Levitt	8.41	13,71	25.83	50.96
	0.76	13,71	2.28	4.61
	14.46	13,71	43.38	87.63
	23.63		70.89	143.20

Name	Acres	Twnsp, Rge (S.E.)	Decree Winter	Summer Duty
48. A. Lee	6.67	13,71	20.01	40.42
	1.77	13,71	5.31	10.73
	0.65	13,71	1.95	3.94
	9.09		27.27	55.09
49. Robert Linge	5.50	13,71	16.50	33.33
	1.38	13,71	4.14	8.36
	6.88		20.64	41.69
50. S.R. Linge	5.65	13,71	16.95	34.24
	5.65		16.95	34.24
51. V. Mokler	13.79	13,71	41.37	83.57
	2.10	13,71	6.30	12.73
	7.19	13,71	21.57	43.57
	1.03	13,71	3.09	6.24
	24.11		72.33	146.11
52. Gus Pendleton	13.50	13,71	40.50	81.81
	13.50		40.50	81.81
53. William Potter	1.13	13,71	3.39	6.85
	3.12	13,71	9.36	18.91
	0.60	13,71	1.80	3.64
	0.45	13,71	1.35	2.73
	7.18	13,71	21.54	43.51
	11.82	13,71	35.46	71.63
	24.30		72.90	147.27

Name	Acres	Twnsp, Rge (S.E.)	Decree Winter	Summer Duty
54. J.D. Pulsipher	17.11	13,71	51.33	103.69
	15.46	13,71	46.38	93.69
	0.44	13,71	1.32	2.67
	1.20	13,71	3.60	7.27
	1.02	13,71	3.06	6.18
	4.08	13,71	12.24	24.72
	0.39	13,71	1.17	2.36
	39.70		119.10	240.58
55. J.L. Pulsipher	35.35	13,70	106.05	214.22
	1.67	13,70	5.01	10.12
	0.92	13,70	2.76	5.58
	12.98	13, 70 & 71	38.94	78.66
	0.49	13,70	1.47	2.97
	1.17	13,71	3.51	7.09
	52.58		157.74	318.64
56. Stanley Pulsipher	1.97	13,71	5.91	11.94
	0.39	13,71	1.17	2.36
	0.21	13,71	0.63	1.27
	0.53	13,71	1.59	3.21
	7.72	13,71	23.16	46.78
	4.09	13,71	12.27	24.79
	5.14	13,71	15.42	31.15
	6.25	13,71	18.75	37.88
	26.30		78.90	159.38

Name	Acres	Twnsp, Rge (S.E.)	Decree Winter	Summer Duty
57. William Pulsipher	3.04	13,71	9.12	18.42
	1.39	13,71	4.17	8.42
	1.68	13,71	5.04	10.18
	0.38	13,71	1.14	2.30
	1.67	13,71	5.01	10.12
	9.40	13,71	28.20	56.96
	17.56		52.68	106.40
58. Arthur Reber	5.31	13,71	15.93	32.18
	7.76	13,71	23.28	47.03
	13.07		39.21	79.21
59. Sam Reber	10.11	13,71	30.33	61.27
	1.46	13,71	4.38	8.85
	5.82	13,71	17.46	35.27
	0.91	13,71	2.73	5.51
	1.60	13,71	4.80	9.70
	19.90		59.70	120.60
60. Geo. Strausser	4.64	13,71	13.92	28.12
	3.52	13,71	10.56	21.33
	1.47	13,71	4.41	8.91
	1.57	13,71	4.71	9.51
	11.20		33.60	67.87
61. J. Sylvester	5.00	13,71	15.00	30.30
	1.42	13,71	4.26	8.61
	0.26	13,71	0.78	1.58
	6.68		20.04	40.49

Name	Acres	Twnsp, Rge (S.E.)	Decree Winter	Summer Duty
62. Alfred Tobler	9.90	13,71	29.70	59.99
	7.87	13,71	23.61	47.69
	1.45	13,71	4.35	8.79
	3.80	13,71	11.40	23.03
	3.89	13,71	11.67	23.57
	26.91		80.73	163.07
63. Harmon Tobbler	4.55	13,71	13.65	27.57
	1.71	13,71	5.13	10.36
	2.17	13,71	6.51	13.15
	0.38	13,71	1.14	2.30
	8.81		26.43	53.38
64. Herbert Waite	6.03	13,71	18.09	36.54
	2.82	13,71	8.46	17.09
	6.80	13,71	20.40	41.21
	15.65		46.95	94.84
65. Jesse Waite	0.98	13,71	2.94	5.94
	18.20	13,71	54.60	110.29
	19.18		57.54	116.23
66. Roy Waite	4.88	13,71	14.64	29.57
	4.90	13,71	14.70	29.69
	9.78		29.34	59.26
67. Ernest Walker	11.30	13,71	33.90	68.48
	0.65	13,71	1.95	3.94
	6.25	13,71	18.75	37.88
	0.92	13,71	2.76	5.58
	19.12		57.36	115.88
68. S.A. Waymire	5.90	13,71	17.70	35.75
	12.13	13,71	36.39	73.51
	18.03		54.09	109.26

Name	Acres	Twnsp, Rge (S.E.)	Decree Winter	Summer Duty
69. Harmon Wittwer	3.87	13,71	11.61	23.45
Harmon Tobbler	3.87		11.61	23.45
70. Abe Woodbury	3.98	13,71	11.94	24.12
	1.26	13,71	3.78	7.64
	2.06	13,71	6.18	12.48
	0.86	13,71	2.58	5.21
	0.52	13,71	1.56	3.15
	8.68		26.04	52.60
TOTAL	1,067.28		3,201.84	6,467.72

VIRGIN RIVER SURFACE WATER
SUMMARY OF APPLICATIONS, PERMITS & CERTIFICATES IN NEVADA

Permit No.	Certificate	Priority Date	Use	AFY
3085	1153	August 17, 1914	Irrigation	1,062.26
6061	1408	April 21, 1920	Irrigation	228.00
7624	4509	January 21, 1926	Irrigation	2,106.00
10544	4485	August 2, 1940	Irrigation	246.13
11504	3611	February 28, 1946	Irrigation	380.00
13222	3509	January 3, 1950	Irrigation	896.00
16883	5343	March 21, 1956	Irrigation	600.00
Total AFY				5,518.39

Applications (Pending)	Priority Date	Use	AFY
28142	February 25, 1974	Ind.	30,000
57643	October 17, 1989	M & I	500 c.f.s. (361,900.00)*
54383	January 21, 1990	Irrigation	1,114.80
Total AFY			393,014.80

*limited to amount of available flow in the river

Table 2

NEVADA DIVISION OF WATER RESOURCES
WATER RIGHTS DATABASE

HYDROGRAPHIC BASIN ABSTRACT
GROUND WATER

RUN DATE: 11/17/1992

HYDROGRAPHIC BASIN: 222 VIRGIN RIVER VALLEY

HYDROGRAPHIC REGION: 13 COLORADO RIVER BASIN

APP#	CHANGE OF APP#	CERT#	FILING DATE	STAT	SRC	POINT OF DIVERSION QQ	QTR	SEC	TWP	RNG	DIV RATE (CFS)	TYPE OF USE	SUP	ACRES IRRIGATED	ANNUAL DUTY	CO	OWNER OF RECORD
12934		4018	05/27/1949	ABR	UG	SW	SW	20	13S	71E	0.000	MUN		0.00	0.00	MGA CL	MESQUITE FARMSTEAD WATER ASSOC.
CHANGE BY:	52015			-PER													
14347		7270	06/23/1952	CER	UG	SW	SW	20	13S	71E	0.200	MUN	Y	0.00	47.17	MGA CL	MESQUITE FARMSTEAD WATER ASSOC.
14471		4358	08/04/1952	CER	UG	SE	SW	35	13S	70E	0.100	DOM		0.00	23.59	MGA CL	BUNKERVILLE WATER USERS ASSOC.
17833		5495	02/18/1959	CER	UG	NW	SE	21	13S	71E	0.300	MUN	Y	0.00	70.75	MGA CL	MESQUITE FARMSTEAD WATER ASSOC.
19451		5556	01/16/1961	CER	UG	NE	NW	02	14S	70E	0.500	MUN		0.00	117.95	MGA CL	BUNKERVILLE WATER USERS ASSOCIATIO
20361		5922	03/12/1962	CER	UG	SW	SW	20	13S	71E	0.300	MUN	Y	0.00	54.75	MGA CL	MESQUITE FARMSTEAD WATER ASSOC.
21884		6936	03/20/1964	CER	UG	NE	SW	21	05S	71E	0.010	REC		0.00	2.35	MGA LI	PARKS DIVISION-NEVADA
21885		6937	03/20/1964	CER	UG	NW	NE	17	05S	71E	0.010	REC		0.00	2.35	MGA LI	DIVISION OF PARKS-NEVADA
22406		7917	02/01/1965	CER	UG	NW	NE	23	14S	69E	2.810	IRR		118.22	591.11	AFA CL	ARRIBA VERDE RANCH
25304		9038	10/01/1969	CER	UG	NW	SE	25	13S	70E	0.750	MUN		0.00	176.93	MGA CL	BUNKERVILLE WATER USERS ASSOCIATIO

Table 3

HYDROGRAPHIC BASIN: 222 VIRGIN RIVER VALLEY

HYDROGRAPHIC REGION: 13 COLORADO RIVER BASIN

APP#	CHANGE OF APP#	CERT#	FILING DATE	STAT	SRC	POINT OF DIVERSION QQ	QTR	SEC	TWP	RNG	DIV RATE (CFS)	TYPE OF USE	SUP	ACRES IRRIGATED	ANNUAL DUTY	CO	OWNER OF RECORD
26370		8182	10/20/1971	CER	UG	NW	NE	23	14S	69E	0.100	STK		0.00	1.64 MGA	CL	ARRIBA VERDE RANCH
27808		10680	10/03/1973	CER	UG	SW	SW	25	13S	70E	0.110	MUN		0.00	25.94 MGA	CL	BUNKERVILLE WATER USERS ASSOCIATON
27816		10681	10/09/1973	CER	UG	SW	SW	25	13S	70E	0.110	MUN		0.00	25.94 MGA	CL	BUNKERVILLE WATER USERS ASSOCIATIO
41120			04/17/1980	PER	UG	NW	NW	29	13S	71E	1.500	MUN	Y	0.00	353.80 MGA	CL	MESQUITE FARMSTEAD WATER ASSOCIATI
41121			04/17/1980	PER	UG	SE	SE	09	13S	71E	1.500	MUN	Y	0.00	353.80 MGA	CL	MESQUITE FARMSTEAD WATER ASSOCIATI
41122			04/17/1980	PER	UG	SE	NW	29	13S	71E	1.500	MUN	Y	0.00	353.80 MGA	CL	MESQUITE FARMSTEAD WATER ASSOCIATI
44704		12440	10/29/1981	CER	UG	SE	SW	04	13S	70E	0.003	STK		0.00	0.73 MGA	CL	LYTLE, FRANCIS
44706		12017	10/29/1981	CER	UG	SE	SW	32	08S	71E	0.016	STK		0.00	3.72 MGA	LI	GUBLER TRUST 507
44739		12018	10/29/1981	CER	UG	NE	NE	14	08S	70E	0.016	STK		0.00	3.72 MGA	LI	GUBLER TRUST 507
46645		12575	02/17/1983	CER	UG	SE	NE	16	13S	71E	0.050	STK		0.00	11.28 MGA	CL	SEPEDA FARIA DAIRY
49680			02/03/1986	PER	UG	SW	NE	25	13S	70E	1.443	MUN		0.00	340.41 MGA	CL	BUNKERVILLE WATER USERS ASSOCIATIO
CHANGE BY:	58036T			-PER													
49707			02/11/1986	RFA	UG	NW	NE	17	13S	71E	1.000	QM		0.00	2.19 MGA	CL	REBER, DE MURREN

HYDROGRAPHIC BASIN: 222 VIRGIN RIVER VALLEY

HYDROGRAPHIC REGION: 13 COLORADO RIVER BASIN

APP#	CHANGE OF APP#	CERT#	FILING DATE	STAT	SRC	POINT OF DIVERSION QQ	QTR	SEC	TWP	RNG	DIV RATE (CFS)	TYPE OF USE	SUP	ACRES IRRIGATED	ANNUAL DUTY	CO	OWNER OF RECORD
50172			09/22/1986	PER	UG	SW	SW	28	13S	71E	2.000	MUN	Y	0.00	471.80 MGA	CL	MESQUITE FARMSTEAD WATER ASSOCIATI
50864			04/29/1987	ABR	UG	SW	NW	21	13S	70E	0.000	MUN		0.00	0.00 MGA	CL	MESQUITE FARMSTEAD WATER ASSN.
CHANGE BY:	56244			-PER													
50865			04/29/1987	PER	UG	NW	SW	21	13S	70E	1.000	MUN	Y	0.00	146.00 MGA	CL	MESQUITE FARMSTEAD WATER ASSN.
51023			06/15/1987	RFA	UG	SE	NE	14	14S	69E	2.228	OTH		0.00	0.00 *	CL	BUREAU OF RECLAMATION - U.S.
51024			06/15/1987	RFA	UG	SW	NW	05	15S	69E	2.228	OTH		0.00	0.00 *	CL	BUREAU OF RECLAIMATION - U.S.
51025			06/15/1987	RFA	UG	SW	NW	31	15S	69E	2.228	OTH		0.00	0.00 *	CL	BUREAU OF RECLAMATION-U.S.
51270			09/03/1987	PER	UG	SE	SW	28	13S	71E	1.000	MUN	Y	0.00	325.85 MGA	CL	MESQUITE FARMSTEAD WATER ASSOCIATI
51271			09/03/1987	PER	UG	SE	SW	28	13S	71E	1.000	MUN	Y	0.00	325.85 MGA	CL	MESQUITE FARMSTEAD WATER ASSOCIATI
51272			09/03/1987	PER	UG	SW	SE	28	13S	71E	1.000	MUN	Y	0.00	325.85 MGA	CL	MESQUITE FARMSTEAD WATER

HYDROGRAPHIC BASIN: 222 VIRGIN RIVER VALLEY

HYDROGRAPHIC REGION: 13 COLORADO RIVER BASIN

APP#	CHANGE OF APP#	CERT#	FILING DATE	STAT	SRC	POINT OF DIVERSION QQ	QTR	SEC	TWP	RNG	DIV RATE (CFS)	TYPE OF USE	SUP	ACRES IRRIGATED	ANNUAL DUTY	CO	OWNER OF RECORD
																	ASSOCIATI
51306			09/16/1987	PER	UG	SE	SW	10	13S	71E	1.000	MUN	Y	0.00	325.85 MGA	CL	MESQUITE FARMSTEAD WATER ASSOCIATI
52015	12934		04/15/1988	PER	UG	SW	SW	20	13S	71E	0.080	MUN	Y	0.00	18.90 MGA	CL	MESQUITE FARMSTEAD WATER ASSOCIATI
52016			04/15/1988	PER	UG	SE	SW	09	13S	71E	2.000	MUN	Y	0.00	471.81 MGA	CL	MESQUITE FARMSTEAD WATER ASSOCIATI
CHANGE BY:	56981			-RFA													
52017			04/15/1988	PER	UG	NE	SE	30	13S	71E	2.000	MUN	Y	0.00	471.81 MGA	CL	MESQUITE FARMSTEAD WATER ASSOCIATI
52333			07/18/1988	PER	UG	NE	SE	21	13S	71E	1.000	MUN	Y	0.00	235.91 MGA	CL	MESQUITE FARMSTEAD WATER ASSOC.
52356			08/01/1988	PER	UG	NE	SW	21	12S	68E	0.010	STK		0.00	2.16 MGA	LI	BLM
52952			02/22/1989	PER	UG	NE	NE	30	13S	71E	1.000	MUN	Y	0.00	235.91 MGA	CL	MESQUITE FARMSTEAD WATER ASSOC.
52995			03/09/1989	PER	UG	SE	SW	34	13S	70E	0.060	COM	Y	0.00	14.15 MGA	CL	BIASI, BRUNO
52996			03/09/1989	PER	UG	SE	SW	34	13S	70E	0.450	COM	Y	0.00	43.80 MGA	CL	BIASI, BRUNO
52997			03/09/1989	PER	UG	NE	SW	34	13S	70E	0.110	COM	Y	0.00	25.95 MGA	CL	BIASI, BRUNO

HYDROGRAPHIC BASIN: 222 VIRGIN RIVER VALLEY

HYDROGRAPHIC REGION: 13 COLORADO RIVER BASIN

APP#	CHANGE OF APP#	CERT#	FILING DATE	STAT	SRC	POINT OF DIVERSION QQ	QTR	SEC	TWP	RNG	DIV RATE (CFS)	TYPE OF USE	SUP	ACRES IRRIGATED	ANNUAL DUTY	CO	OWNER OF RECORD
52998			03/09/1989	PER	UG	NE	SW	34	13S	70E	0.110	COM	Y	0.00	25.95 MGA	CL	BIASI, BRUNO
53026			03/16/1989	PER	UG		LT1003		13S	71E	4.000	MUN	Y	0.00	943.60 MGA	CL	MESQUITE-CITY
53027			03/16/1989	PER	UG	SE	NE	09	13S	71E	4.000	MUN	Y	0.00	943.60 MGA	CL	MESQUITE-CITY
54078			10/17/1989	RFP	UG	NE	SE	11	14S	69E	6.000	MUN		0.00	1,415.46 MGA	CL	LAS VEGAS VALLEY WATER DISTRICT
54079			10/17/1989	RFP	UG	NE	NE	14	14S	69E	6.000	MUN		0.00	1,415.46 MGA	CL	LAS VEGAS VALLEY WATER DISTRICT
54080			10/17/1989	RFP	UG	NW	NW	14	14S	69E	6.000	MUN		0.00	1,415.46 MGA	CL	LAS VEGAS VALLEY WATER DISTRICT
54081			10/17/1989	RFP	UG	NE	SE	15	14S	69E	6.000	MUN		0.00	1,415.46 MGA	CL	LAS VEGAS VALLEY WATER DISTRICT
54082			10/17/1989	RFP	UG	SE	SW	15	14S	69E	6.000	MUN		0.00	1,415.46 MGA	CL	LAS VEGAS VALLEY WATER DISTRICT
54083			10/17/1989	RFP	UG	SW	SE	16	14S	69E	6.000	MUN		0.00	1,415.46 MGA	CL	LAS VEGAS VALLEY WATER DISTRICT
54084			10/17/1989	RFP	UG	SE	NE	21	14S	69E	6.000	MUN		0.00	1,415.46 MGA	CL	LAS VEGAS VALLEY WATER DISTRICT
54085			10/17/1989	RFP	UG	SE	NW	21	14S	69E	6.000	MUN		0.00	1,415.46 MGA	CL	LAS VEGAS VALLEY WATER DISTRICT
54086			10/17/1989	RFP	UG	SW	SE	21	14S	69E	6.000	MUN		0.00	1,415.46 MGA	CL	LAS VEGAS VALLEY WATER DISTRICT
54087			10/17/1989	RFP	UG	SW	NW	28	14S	69E	6.000	MUN		0.00	1,415.46 MGA	CL	LAS VEGAS VALLEY WATER DISTRICT

HYDROGRAPHIC BASIN: 222 VIRGIN RIVER VALLEY

HYDROGRAPHIC REGION: 13 COLORADO RIVER BASIN

APP#	CHANGE OF APP#	CERT#	FILING DATE	STAT	SRC	POINT OF DIVERSION QQ	QTR	SEC	TWP	RNG	DIV RATE (CFS)	TYPE OF USE	SUP	ACRES IRRIGATED	ANNUAL DUTY	CO	OWNER OF RECORD
54088			10/17/1989	RFP	UG	NE	NE	29	14S	69E	6.000	MUN		0.00	1,415.46 MGA	CL	LAS VEGAS VALLEY WATER DISTRICT
54089			10/17/1989	RFP	UG	SE	SE	29	14S	69E	6.000	MUN		0.00	1,415.46 MGA	CL	LAS VEGAS VALLEY WATER DISTRICT
54090			10/17/1989	RFP	UG	NW	NW	32	14S	69E	6.000	MUN		0.00	1,415.46 MGA	CL	LAS VEGAS VALLEY WATER DISTRICT
54091			10/17/1989	RFP	UG	NW	SW	31	14S	69E	6.000	MUN		0.00	1,415.46 MGA	CL	LAS VEGAS VALLEY WATER DISTRICT
54092			10/17/1989	RFP	UG	SE	SE	31	14S	69E	6.000	MUN		0.00	1,415.46 MGA	CL	LAS VEGAS VALLEY WATER DISTRICT
54154			11/09/1989	PER	UG	SE	SE	30	13S	71E	1.000	MUN	Y	0.00	235.91 MGA	CL	MESQUITE FARMSTEAD WATER ASSOCIATI
54175			11/16/1989	RFA	UG	SE	NE	32	13S	70E	1.000	MUN		0.00	235.91 MGA	CL	MESQUITE FARMSTEAD WATER ASSOCIATI
54681			04/23/1990	RFA	UG	NE	SE	26	13S	70E	1.000	MUN		0.00	235.91 MGA	CL	BUNKERVILLE WATER USERS ASSOCIATIO
55282			09/18/1990	RFP	UG	SE	SW	21	05S	71E	20.000	MUN		0.00	4,718.20 MGA	LI	MESQUITE - CITY OF
55283			09/18/1990	RFP	UG	NW	NE	33	05S	71E	10.000	MUN		0.00	2,359.10 MGA	LI	MESQUITE - CITY OF
55284			09/18/1990	RFP	UG	SE	NE	33	05S	71E	20.000	MUN		0.00	4,718.20 MGA	LI	MESQUITE - CITY OF

HYDROGRAPHIC BASIN: 222 VIRGIN RIVER VALLEY

HYDROGRAPHIC REGION: 13 COLORADO RIVER BASIN

APP#	CHANGE OF APP#	CERT#	FILING DATE	STAT	SRC	POINT OF DIVERSION QQ	QTR	SEC	TWP	RNG	DIV RATE (CFS)	TYPE OF USE	SUP	ACRES IRRIGATED	ANNUAL DUTY	CO	OWNER OF RECORD
55289			09/18/1990	RFP	UG	NE	NE	04	07S	71E	5.000	MUN		0.00	1,179.55 MGA	LI	MESQUITE - CITY OF
55290			09/18/1990	RFP	UG	SW	NW	13	08S	70E	10.000	MUN		0.00	2,359.10 MGA	LI	MESQUITE - CITY OF
55291			09/18/1990	RFP	UG	SE	SW	32	08S	71E	10.000	MUN		0.00	2,359.10 MGA	LI	MESQUITE - CITY OF
55292			09/18/1990	RFP	UG	NW	NE	04	09S	71E	10.000	MUN		0.00	2,359.10 MGA	LI	MESQUITE - CITY OF
55293			09/18/1990	RFP	UG	NE	SW	08	09S	71E	10.000	MUN		0.00	2,359.10 MGA	LI	MESQUITE - CITY OF
55294			09/18/1990	RFP	UG	SE	SE	28	09S	71E	10.000	MUN		0.00	2,359.10 MGA	LI	MESQUITE - CITY OF
55295			09/18/1990	RFP	UG	SW	SW	31	10S	71E	10.000	MUN		0.00	2,359.10 MGA	LI	MESQUITE - CITY OF
55296			09/18/1990	RFP	UG	SW	NW	21	05S	71E	10.000	MUN		0.00	2,359.10 MGA	LI	MESQUITE - CITY OF
55297			09/18/1990	RFP	UG	SE	SW	21	11S	71E	5.000	MUN		0.00	1,179.55 MGA	LI	MESQUITE - CITY OF
55298			09/18/1990	RFP	UG	NW	NW	34	11S	71E	5.000	MUN		0.00	1,179.55 MGA	LI	MESQUITE - CITY OF
55943			03/06/1991	RFA	UG	SW	NW	22	15S	70E	2.000	DOM		0.00	471.82 MGA	CL	BUNKERVILLE CULINARY WATER ASSOC.

HYDROGRAPHIC BASIN: 222 VIRGIN RIVER VALLEY

HYDROGRAPHIC REGION: 13 COLORADO RIVER BASIN

APP#	CHANGE OF APP#	CERT#	FILING DATE	STAT	SRC	POINT OF DIVERSION QQ	QTR	SEC	TWP	RNG	DIV RATE (CFS)	TYPE OF USE	SUP	ACRES IRRIGATED	ANNUAL DUTY	CO	OWNER OF RECORD
55944			03/06/1991	RFA	UG	SW	SW	14	15S	70E	2.000	DOM		0.00	471.82 MGA	CL	BUNKERVILLE CULINARY WATER ASSOC.
56244	50864		04/29/1991	PER	UG	NW	NE	30	13S	71E	1.000	QM	Y	0.00	146.00 MGA	CL	MESQUITE FARMSTEAD WATER ASSN.
56793			10/02/1991	RFP	UG		LT0108		13S	71E	5.000	MUN		0.00	1,179.55 MGA	CL	MESQUITE - CITY OF
56828			10/14/1991	RFP	UG	NW	NW	16	13S	71E	5.000	MUN		0.00	1,179.55 MGA	CL	MESQUITE - CITY
56829			10/14/1991	RFP	UG	NE	NW	09	13S	71E	5.000	MUN		0.00	1,179.55 MGA	CL	MESQUITE - CITY
56959			11/25/1991	RFP	UG	NE	SE	12	13S	70E	10.000	MUN		0.00	2,359.10 MGA	CL	MESQUITE, CITY OF
56981	52016		12/06/1991	RFA	UG			16	13S	71E	2.000	MUN		0.00	471.82 MGA	CL	MESQUITE FARMSTEAD WATER ASSOCIATI
58036T	49680		09/03/1992	PER	UG	NE	SE	26	13S	70E	0.557	MUN			131.40 MGA	CL	BUNKERVILLE WATER USER'S ASSOCIATI
V04219			10/11/1984	VST	OGW	SW	SE	14	15S	71E	0.022	STK		0.00	0.29 MGA	CL	TOM, NORMAN

NEVADA DIVISION OF WATER RESOURCES
WATER RIGHTS DATABASE

HYDROGRAPHIC BASIN SUMMARY
BY STATUS FOR ACTIVE GROUNDWATER SOURCES

RUN DATE: 11/17/1992

HYDROGRAPHIC BASIN: 222 VIRGIN RIVER VALLEY

HYDROGRAPHIC REGION: 13 COLORADO RIVER BASIN

STATUS	ANNUAL DUTY UNDERGROUND AF	ANNUAL DUTY UNDERGROUND MG	ANNUAL DUTY GEOTHERMAL AF	ANNUAL DUTY GEOTHERMAL MG	ANNUAL DUTY OTHER GROUNDWATER AF	ANNUAL DUTY OTHER GROUNDWATER MG	ANNUAL DUTY TOTAL AF	ANNUAL DUTY TOTAL MG
VESTED RIGHT	.00	.00	.00	.00	.89	.29	.89	.29
RESERVED RIGHT	.00	.00	.00	.00	.00	.00	.00	.00
APPLICATION	.00	.00	.00	.00	.00	.00	.00	.00
READY FOR ACTION	186,793.87	60,866.97	.00	.00	.00	.00	186,793.87	60,866.97
PERMIT	10,020.22	3,265.10	.00	.00	.00	.00	10,020.22	3,265.10
REVOCABLE PERMIT	.00	.00	.00	.00	.00	.00	.00	.00
CERTIFICATE	2,336.72	761.42	.00	.00	.00	.00	2,336.72	761.42
DECREED	.00	.00	.00	.00	.00	.00	.00	.00

NEVADA DIVISION OF WATER RESOURCES
WATER RIGHTS DATABASE

HYDROGRAPHIC BASIN SUMMARY
BY MANNER OF USE FOR GROUNDWATER SOURCES

RUN DATE: 11/17/92

HYDROGRAPHIC BASIN: 222 VIRGIN RIVER VALLEY

HYDROGRAPHIC REGION: 13 COLORADO RIVER BASIN

MANNER OF USE	ACTIVE ANNUAL DUTY ACRE FEET	ACTIVE ANNUAL DUTY MILL GALLONS	PENDING ANNUAL DUTY * ACRE FEET	PENDING ANNUAL DUTY * MILL GALLONS
COMMERCIAL	134.42	43.80	.00	.00
CONSTRUCTION	.00	.00	.00	.00
DOMESTIC	72.40	23.59	2,895.92	943.64
ENVIRONMENTAL	.00	.00	.00	.00
INDUSTRIAL	.00	.00	.00	.00
IRRIGATION (CAREY ACT)	.00	.00	.00	.00
IRRIGATION (DLE)	.00	.00	.00	.00
IRRIGATION	591.11	192.61	.00	.00
MINING & MILLING	.00	.00	.00	.00
MUNICIPAL	11,473.25	3,738.57	183,891.23	59,921.14
POWER GENERATION	.00	.00	.00	.00
QUASI-MUNICIPAL	.00	.00	6.72	2.19
RECREATION	14.42	4.70	.00	.00
STOCK WATER	72.24	23.54	.00	.00
STORAGE	.00	.00	.00	.00
WILD LIFE	.00	.00	.00	.00
OTHER/DECREED	.00	.00	.00	.00

TOTAL NUMBER OF RECORDS WITH UNDEFINED ANNUAL DUTY: 3
* May include supplemental duties as well as duties associated with applications to change.

BEAVER DAM WASH SURFACE WATER
SUMMARY OF APPLICATIONS, PERMITS, CERTIFICATES AND PROOFS IN NEVADA

PERMITTED RIGHTS

Permit No.	Certificate	Priority Date	Use	AFY
7508	1857	September 19, 1925	Irrigation	186.00
9009	2046	August 12, 1929	Stockwater	4.36
18516	5283	January 11, 1960	Recreation (Schroeder Lake)	272.00
Total				462.36

VESTED RIGHTS
(Unadjudicated)

Proof No.	Priority Date	Use	AFY
00782	September 12, 1910	Irrigation	27 acres
00113	July 6, 1912	Irrigation	15 acres

APPLICATIONS
(Pending)

Application 55987*	Mesquite Farmstead Association	M & I	500 c.f.s.**
Application 55988	Mesquite Farmstead Association	M & I	500 c.f.s.**
Application 56206*	Mesquite Farmstead Association	M & I	(included in Nos. 55987 and 55988)

* diversion point in Utah
** limited by available flow

Table 4

VRIGIN RIVER IRRIGATION USE IN ARIZONA
ADJACENT TO MESQUITE, NEVADA
(As revealed from maps on file with the
Nevada Division of Water Resources)

Permit No.	Certificate	Priority Date	AFY
Mesquite Irrigation Co.			
7624	4509	January 21, 1926	260.7 acres within Sections 3, 4 & 5, T16W, R39N, Mohave County, at 4.5 acre feet per year per acre = 1173.15 afy
Mesquite Irrigation Co.			
15619	5240	April 30, 1954	293 acres within the same land area with a duty of 5 acre feet per year per acre = 1465 afy*

* This total includes the total described above under Application No. 7624. This usage is not included in the Nevada Permits or Certificates.

Table 5

REQUEST FOR OFFERS TO SELL SHARES OF STOCK IN THE MESQUITE IRRIGATION COMPANY

The Southern Nevada Water Authority ("SNWA") requests that owners of shares of stock in the Mesquite Irrigation Company who desire to sell some or all of their shares, submit a completed and signed copy of the attached Offer to Sell Shares of Stock ("OFFER" or "Offer(s) to Sell") to the Southern Nevada Water Authority, 100 City Parkway, Suite 700, Las Vegas, Nevada, ATTENTION: Jeffrey Johnson, SNWA Division Manager, Water Management and Accounting Division, on or before 5:00 p.m. on July 21, 2009. OFFERS may be mailed to P.O. Box 99956, Las Vegas, NV 89193-9956. The signed OFFER must be RECEIVED by SNWA at the above offices on or before 5:00 p.m. on July 21, 2009. Please call Jeff Johnson or Lisa Von Heeder at 702-862-3752 with any questions. SNWA intends to purchase shares in the Mesquite Irrigation Company on a first come, first served basis, subject to appropriation of funds by its Board of Directors for such purposes.

The terms of this Request for Offers to Sell are as follows:

1. SNWA is requesting OFFERS from all Mesquite Irrigation Company shareholders. SNWA will also consider Offers to Sell fractional shares.

2. SNWA will only consider accepting an OFFER if it is made on the attached form with no alterations to the terms contained in it.

3. Each signed OFFER returned to SNWA must also be signed by the Mesquite Irrigation Company certifying that the stock certificates for the number of shares of stock offered for sale are on deposit with the Mesquite Irrigation Company, and are endorsed for transfer by the signature of all owners whose names appear on the stock certificates, and that the certificates do not reflect any liens or encumbrances that would prevent the shareholder from executing the sale and/or prevent SNWA from utilizing the water represented by the shares to its full extent.

4. SNWA requests OFFERS at $71,422.72 per share. Sellers have three payment options to choose from:

   A. Lump sum payment. SNWA will pay all money to the Seller within sixty (60) days of SNWA's acceptance.

B. 5-year payment option. SNWA will pay annual payments no later than September 1 of every year for five (5) years, based on the payment table below. The initial payment amount will be escalated by 3% each year. The Seller will have no right to use the water during the payment period.

Payment Table	
	Five-Year Term
Payment	Payment per Share *
1	$14,284.54
2	$14,713.08
3	$15,154.47
4	$15,609.11
5	$16,077.38
Total	$75,838.58

* Amounts increase at 3% per year.

C. 10-year payment option. SNWA will pay annual payments no later than September 1 of every year for ten (10) years based on the payment table below. The initial payment amount will be escalated by 3% each year. The Seller will have no right to use the water during the payment period.

Payment Table	
	Ten-Year Term
Payment	Payment per Share *
1	$7,142.27
2	$7,356.54
3	$7,577.24
4	$7,804.55
5	$8,038.69
6	$8,279.85
7	$8,528.25
8	$8,784.09
9	$9,047.62
10	$9,319.04
Total	$81,878.14

* Amounts increase at 3% per year.

5. On receipt of notification of SNWA's acceptance of a shareholder's OFFER, the Mesquite Irrigation Company will record the name of Muddy River Water Holdings, Inc. as the record owner of the shares in the Irrigation Company's records and shall deliver stock certificates evidencing the transfer to SNWA.

6. All OFFERS made to SNWA must be signed by all persons whose name(s) appear as owners on the stock certificates for the shares offered for sale.

7. The name of the ditch through which the water represented by the shares offered for sale is conveyed shall be listed in the OFFER.

8. Conveyance to Lake Mead of the water represented by the shares sold may require authorization from the Nevada State Engineer. The Seller expressly agrees not to take any actions to protest or otherwise prevent the conveyance of this water to Lake Mead.

9. The Seller agrees to identify all real property, if any, within the Virgin River Valley that is either currently, or has been historically, irrigated with water represented by the shares sold, together with any documentation, including leases, regarding the use of the Seller's shares during the last five (5) years. Such obligation will be satisfied by completing the "Description of Land and Share Usage" form attached to this Request for Offers to Sell.

10. The Mesquite Irrigation Company will not deliver the water covered by the sold shares for irrigation, but may either leave the water in the Virgin River or divert such water into its diversion ditches and allow such water to pass through its ditches into the Virgin River for discharge into Lake Mead.

11. By returning a signed OFFER to SNWA, each Seller warrants and represents that the shares of stock in the Mesquite Irrigation Company offered for sale are free and clear of all encumbrances and obligations, except for balances owing for prior purchase of shares, and that the Seller(s) have the absolute right to transfer such shares pursuant to the terms of the OFFER and this Request for Offers to Sell. In the event of an encumbrance due to the unpaid purchase price of shares arising from a prior purchase and sale, the person to whom money is owed ("Encumbrancer") shall countersign the OFFER and agree to be bound by the terms of the sale. Both the Seller and the Encumbrancer shall give instructions to SNWA in the space provided on the OFFER regarding payment of funds. In lieu of the Encumbrancer countersigning the OFFER, the Seller(s) may present documentation acceptable to the SNWA showing that the Seller(s) have the absolute right to transfer such shares pursuant to the terms of this Request for Offers to Sell.

12. Each completed OFFER *MUST BE SIGNED BY THE MESQUITE IRRIGATION COMPANY.*

13. For any OFFER received by July 21, 2008, SNWA will notify all persons who submitted an OFFER whether or not their OFFER has been accepted by September 1, 2008. For any OFFER received after July 21, 2008, SNWA will notify all persons who submitted an OFFER whether or not their OFFER has been accepted no later than 60 days after the OFFER was received. No OFFER will be accepted if it is received after July 21,

2009. SNWA will also promptly notify the Mesquite Irrigation Company of the name(s) of the Seller(s) and of the shares for which the OFFER has been accepted. The endorsed stock certificates will be returned by the Mesquite Irrigation Company to the persons whose OFFERS are not accepted.

14. SNWA will pay all stock transfer fees and other Mesquite Irrigation Company costs resulting from an accepted OFFER.

15. SNWA reserves the right to reject an OFFER if in SNWA's sole judgment the aggregate amount of water represented by shares from a particular ditch is not sufficient to enable convenient monitoring of the conveyance of such water through the ditches of the Mesquite Irrigation Company to Lake Mead.

16. For all purposes of this OFFER, endorsed stock certificates will be held by the Mesquite Irrigation Company in accordance with the provisions hereof.

17. No OFFER is a binding sale unless and until accepted by SNWA.

DATED this 8th day of May, 2008.

SOUTHERN NEVADA WATER AUTHORITY
100 City Parkway, Suite 700
Las Vegas, Nevada 89106

By: _____
Authorized Representative

Revised 4.18.08

REQUEST FOR OFFERS TO LEASE SHARES OF STOCK IN THE MESQUITE IRRIGATION COMPANY

The Southern Nevada Water Authority ("SNWA") requests that owners of shares of stock in the Mesquite Irrigation Company ("MESQUITE") who desire to lease some or all of their shares, submit a completed and signed copy of the attached Offer to Lease Shares of Stock ("OFFER") to the Southern Nevada Water Authority, 100 City Parkway, Suite 700, Las Vegas, Nevada 89106, ATTENTION: Jeffrey Johnson, SNWA Division Manager, Water Management and Accounting Division on or before 5:00 p.m. on July 21, 2008. OFFERS may be mailed to P.O. Box 99956, Las Vegas, NV 89193-9956. The signed OFFER must be RECEIVED by SNWA at the above offices on or before 5:00 p.m. on July 21, 2008. Please call Jeff Johnson or Lisa Von Heeder at 702-862-3752 with any questions. SNWA intends to lease shares in MESQUITE on a first come, first served basis, subject to appropriation of funds by its Board of Directors for such purposes.

The terms of this Request for Offers to Lease are as follows:

1. SNWA is requesting OFFERS from all MESQUITE shareholders. No OFFER will be accepted for lease of less than one (1) share.

2. SNWA will only consider accepting an OFFER if it is made on the attached form with no alterations to the terms contained in it.

3. The Lessor may choose to begin the lease either on October 1, 2008 or on October 1, 2009. The term of each Lease will begin on October 1 and end on September 30 of the year specified by the Lessor. The minimum lease term is one year, and all leases must end on or before September 30, 2018.

4. By mutual agreement of the Lessor and SNWA, any lease may be extended on a year-to-year basis, so long as the lease term does not extend after September 30, 2018. The party wishing to extend the lease shall give written notice of that party's desire to extend the lease to the other party no later than July 1 of the year the initial lease term expires. The non-requesting party will notify the party that requested to extend the lease no later than September 1 whether or not that party agrees to extend the lease.

5. The annual rent for the lease and the latest date by which the lease payment will be mailed by SNWA to the Lessor is described in the table below. The initial lease payment amount will be escalated by 3% each year, as shown in the table below.

Year	Date of Annual Lease Payment	Annual Lease Payment per Share
2009 October 1, 2008 – September 30, 2009	9/1/2008	$2,491.41
2010 October 1, 2009 – September 30, 2010	9/1/2009	$2,566.15
2011 October 1, 2010 – September 30, 2011	9/1/2010	$2,643.13
2012 October 1, 2011– September 30, 2012	9/1/2011	$2,722.43
2013 October 1, 2012 – September 30, 2013	9/1/2012	$2,804.10
2014 October 1, 2013 – September 30, 2014	9/1/2013	$2,888.22
2015 October 1, 2014 – September 30, 2015	9/1/2014	$2,974.87
2016 October 1, 2015 – September 30, 2016	9/1/2015	$3,064.12
2017 October 1, 2016 – September 30, 2017	9/1/2016	$3,156.04
2018 October 1, 2017 – September 30, 2018	9/1/2017	$3,250.72

6. The Lessor agrees not to use, order or divert any portion of the water leased to SNWA during the lease term.

7. Each signed OFFER returned to SNWA must also be signed by MESQUITE certifying that all record owners of the stock certificate have signed the OFFER, and that the stock certificates do not reflect any liens or encumbrances that would prevent the shareholder from executing the lease and/or prevent SNWA from utilizing the water represented by the shares to its full extent.

8. All OFFERS made to SNWA must be signed by all persons whose name(s) appear as owners on the stock certificates for the shares offered for lease.

9. The name of the ditch through which the water represented by the shares offered for lease is conveyed shall be listed in the OFFER.

10. Conveyance to Lake Mead of the water represented by the leased shares may require authorization from the Nevada State Engineer. The Lessor expressly agrees not to take any actions to protest or otherwise prevent the conveyance of this water to Lake Mead.

11. The Lessor agrees to identify all real property, if any, within the Virgin River Valley that is either currently, or has been historically, irrigated with water represented by the leased shares, together with any documentation, including leases, regarding the use of the Lessor's shares during the last five (5) years. Such obligation will be satisfied by completing the "Description of Land and Share Usage" form attached to this Request for Offers to Lease.

12. MESQUITE will not deliver the water covered by the leased shares for irrigation, but may either leave the water in the Virgin River or divert such water into its diversion ditches and allow such water to pass through its ditches into the Virgin River for discharge into Lake Mead.

13. By returning a signed OFFER to SNWA, each Lessor warrants and represents that the shares of stock in MESQUITE offered for lease are free and clear of all encumbrances and obligations that would prevent the shareholder from executing the lease and/or prevent SNWA from utilizing the water represented by the shares to its full extent during the lease term.

14. Each completed OFFER *MUST BE SIGNED BY THE MESQUITE IRRIGATION COMPANY.*

15. By September 1, 2008, SNWA will notify all persons who submitted OFFERS whether or not their OFFER has been accepted. SNWA will also promptly notify MESQUITE of the name(s) of the Lessor(s) and of the shares for which the OFFER has been accepted.

16. SNWA will pay any MESQUITE fees and assessments due for each leased share during the lease term.

17. On receipt of notification of SNWA's acceptance of a shareholder's OFFER, MESQUITE will record the name of Muddy River Water Holdings, Inc. as the record lessee of the shares in the Irrigation Company's records and shall deliver stock certificates or other documentation evidencing the lease to SNWA.

18. SNWA reserves the right to reject an OFFER if in SNWA's sole judgment the aggregate amount of water represented by shares from a particular ditch is not sufficient to enable convenient monitoring of the conveyance of such water through the ditches of the MESQUITE to Lake Mead.

19. No OFFER is a binding lease unless and until accepted by SNWA.

DATED this 8th day of May, 2008.

SOUTHERN NEVADA WATER AUTHORITY
100 City Parkway, Suite 700
Las Vegas, Nevada 89106

By: _____
Authorized Representative

Revised 4.24.08

REQUEST FOR OFFERS TO SELL SHARES OF STOCK IN THE BUNKERVILLE IRRIGATION COMPANY

The Southern Nevada Water Authority ("SNWA") requests that owners of shares of stock in the Bunkerville Irrigation Company who desire to sell some or all of their shares, submit a completed and signed copy of the attached Offer to Sell Shares of Stock ("OFFER" or "Offer(s) to Sell") to the Southern Nevada Water Authority, 100 City Parkway, Suite 700, Las Vegas, Nevada, ATTENTION: Jeffrey Johnson, SNWA Division Manager, Water Management and Accounting Division, on or before 5:00 p.m. on July 21, 2009. OFFERS may be mailed to P.O. Box 99956, Las Vegas, NV 89193-9956. The signed OFFER must be RECEIVED by SNWA at the above offices on or before 5:00 p.m. on July 21, 2009. Please call Jeff Johnson or Lisa Von Heeder at 702-862-3752 with any questions. SNWA intends to purchase shares in the Bunkerville Irrigation Company on a first come, first served basis, subject to appropriation of funds by its Board of Directors for such purposes.

The terms of this Request for Offers to Sell are as follows:

1. SNWA is requesting OFFERS from all Bunkerville Irrigation Company shareholders. SNWA will also consider Offers to Sell fractional shares.

2. SNWA will only consider accepting an OFFER if it is made on the attached form with no alterations to the terms contained in it.

3. Each signed OFFER returned to SNWA must also be signed by the Bunkerville Irrigation Company certifying that the stock certificates for the number of shares of stock offered for sale are on deposit with the Bunkerville Irrigation Company, and are endorsed for transfer by the signature of all owners whose names appear on the stock certificates and that the certificates do not reflect any liens or encumbrances that would prevent the shareholder from executing the sale and/or prevent SNWA from utilizing the water represented by the shares to its full extent.

4. SNWA requests OFFERS at $80,056.23 per share. Sellers have three payment options to choose from:

   A. Lump sum payment. SNWA will pay all money to the Seller within sixty (60) days of SNWA's acceptance.

B. 5-year payment option. SNWA will pay annual payments no later than September 1 of every year for five (5) years, based on the payment table below. The initial payment amount will be escalated by 3% each year. The Seller will have no right to use the water during the payment period.

Payment Table	
	Five-Year Term
Payment	Payment per Share *
1	$16,011.25
2	$16,491.58
3	$16,986.33
4	$17,495.92
5	$18,020.80
Total	$85,005.88

* Amounts increase at 3% per year.

C. 10-year payment option. SNWA will pay annual payments no later than September 1 of every year for ten (10) years based on the payment table below. The initial payment amount will be escalated by 3% each year. The Seller will have no right to use the water during the payment period.

Payment Table	
	Ten-Year Term
Payment	Payment per Share *
1	$8,005.62
2	$8,245.79
3	$8,493.17
4	$8,747.96
5	$9,010.40
6	$9,280.71
7	$9,559.13
8	$9,845.91
9	$10,141.28
10	$10,445.52
Total	$91,775.49

* Amounts increase at 3% per year.

5. On receipt of notification of SNWA's acceptance of a shareholder's OFFER, the Bunkerville Irrigation Company will record the name of Muddy River Water Holdings, Inc. as the record owner of the shares in the Irrigation Company's records and shall deliver stock certificates evidencing the transfer to SNWA.

6. All OFFERS made to SNWA must be signed by all persons whose name(s) appear as owners on the stock certificates for the shares offered for sale.

7. The name of the ditch through which the water represented by the shares offered for sale is conveyed shall be listed in the OFFER.

8. Conveyance to Lake Mead of the water represented by the shares sold may require authorization from the Nevada State Engineer. The Seller expressly agrees not to take any actions to protest or otherwise prevent the conveyance of this water to Lake Mead.

9. The Seller agrees to identify all real property, if any, within the Virgin River Valley that is either currently, or has been historically, irrigated with water represented by the shares sold, together with any documentation, including leases, regarding the use of the Seller's shares during the last five (5) years. Such obligation will be satisfied by completing the "Description of Land and Share Usage" form attached to this Request for Offers to Sell.

10. The Bunkerville Irrigation Company will not deliver the water covered by the sold shares for irrigation, but may either leave the water in the Virgin River or divert such water into its diversion ditches and allow such water to pass through its ditches into the Virgin River for discharge into Lake Mead.

11. By returning a signed OFFER to SNWA, each Seller warrants and represents that the shares of stock in the Bunkerville Irrigation Company offered for sale are free and clear of all encumbrances and obligations, except for balances owing for prior purchase of shares, and that the Seller(s) have the absolute right to transfer such shares pursuant to the terms of the OFFER and this Request for Offers to Sell. In the event of an encumbrance due to the unpaid purchase price of shares arising from a prior purchase and sale, the person to whom money is owed ("Encumbrancer") shall countersign the OFFER and agree to be bound by the terms of the sale. Both the Seller and the Encumbrancer shall give instructions to SNWA in the space provided on the OFFER regarding payment of funds. In lieu of the Encumbrancer countersigning the OFFER, the Seller(s) may present documentation acceptable to SNWA showing that the Seller(s) have the absolute right to transfer such shares pursuant to the terms of this Request for Offers to Sell.

12. Each completed OFFER *MUST BE SIGNED BY THE BUNKERVILLE IRRIGATION COMPANY.*

13. For any OFFER received by July 21, 2008, SNWA will notify all persons who submitted an OFFER whether or not their OFFER has been accepted by September 1, 2008. For any OFFER received after July 21, 2008, SNWA will notify all persons who submitted an OFFER whether or not their OFFER has been accepted no later than 60 days after the OFFER was received. No OFFER will be accepted if it is received after July 21,

2009. SNWA will also promptly notify the Bunkerville Irrigation Company of the name(s) of the Seller(s) and of the shares for which the OFFER has been accepted. The endorsed stock certificates will be returned by the Bunkerville Irrigation Company to the persons whose OFFERS are not accepted.

14. SNWA will pay all stock transfer fees and other Bunkerville Irrigation Company costs resulting from an accepted OFFER.

15. SNWA reserves the right to reject an OFFER if in SNWA's sole judgment the aggregate amount of water represented by shares from a particular ditch is not sufficient to enable convenient monitoring of the conveyance of such water through the ditches of the Bunkerville Irrigation Company to Lake Mead.

16. For all purposes of this OFFER, endorsed stock certificates will be held by the Bunkerville Irrigation Company in accordance with the provisions hereof.

17. No OFFER is a binding sale unless and until accepted by SNWA.

DATED this 8th day of May, 2008.

SOUTHERN NEVADA WATER AUTHORITY
100 City Parkway, Suite 700
Las Vegas, Nevada 89106

By: _____
Authorized Representative

Revised 4.18.08

REQUEST FOR OFFERS TO LEASE SHARES OF STOCK IN THE BUNKERVILLE IRRIGATION COMPANY

The Southern Nevada Water Authority ("SNWA") requests that owners of shares of stock in the Bunkerville Irrigation Company ("BUNKERVILLE") who desire to lease some or all of their shares, submit a completed and signed copy of the attached Offer to Lease Shares of Stock ("OFFER") to the Southern Nevada Water Authority, 100 City Parkway, Suite 700, Las Vegas, Nevada 89106, ATTENTION: Jeffrey Johnson, SNWA Division Manager, Water Management and Accounting Division on or before 5:00 p.m. on July 21, 2008. OFFERS may be mailed to P.O. Box 99956, Las Vegas, NV 89193-9956. The signed OFFER must be RECEIVED by SNWA at the above offices on or before 5:00 p.m. on July 21, 2008. Please call Jeff Johnson or Lisa Von Heeder at 702-862-3752 with any questions. SNWA intends to lease shares in BUNKERVILLE on a first come, first served basis, subject to appropriation of funds by its Board of Directors for such purposes.

The terms of this Request for Offers to Lease are as follows:

1. SNWA is requesting OFFERS from all BUNKERVILLE shareholders. No OFFER will be accepted for lease of less than one (1) share.

2. SNWA will only consider accepting an OFFER if it is made on the attached form with no alterations to the terms contained in it.

3. The Lessor may choose to begin the lease either on October 1, 2008 or on October 1, 2009. The term of each Lease will begin on October 1 and end on September 30 of the year specified by the Lessor. The minimum lease term is one year, and all leases must end on or before September 30, 2018.

4. By mutual agreement of the Lessor and SNWA, any lease may be extended on a year-to-year basis, so long as the lease term does not extend after September 30, 2018. The party wishing to extend the lease shall give written notice of that party's desire to extend the lease to the other party no later than July 1 of the year the initial lease term expires. The non-requesting party will notify the party that requested to extend the lease no later than September 1 whether or not that party agrees to extend the lease.

5. The annual rent for the lease and the latest date by which the lease payment will be mailed by SNWA to the Lessor is described in the table below. The initial lease payment amount will be escalated by 3% each year, as shown in the table below.

Year	Date of Annual Lease Payment	Annual Lease Payment per Share
2009 October 1, 2008 – September 30, 2009	9/1/2008	$2,792.56
2010 October 1, 2009 – September 30, 2010	9/1/2009	$2,876.34
2011 October 1, 2010 – September 30, 2011	9/1/2010	$2,962.63
2012 October 1, 2011– September 30, 2012	9/1/2011	$3,051.51
2013 October 1, 2012 – September 30, 2013	9/1/2012	$3,143.05
2014 October 1, 2013 – September 30, 2014	9/1/2013	$3,237.35
2015 October 1, 2014 – September 30, 2015	9/1/2014	$3,334.47
2016 October 1, 2015 – September 30, 2016	9/1/2015	$3,434.50
2017 October 1, 2016 – September 30, 2017	9/1/2016	$3,537.53
2018 October 1, 2017 – September 30, 2018	9/1/2017	$3,643.66

6. The Lessor agrees not to use, order or divert any portion of the water leased to SNWA during the lease term.

7. Each signed OFFER returned to SNWA must also be signed by BUNKERVILLE certifying that all record owners of the stock certificate have signed the OFFER, and that the stock certificates do not reflect any liens or encumbrances that would prevent the shareholder from executing the lease and/or prevent SNWA from utilizing the water represented by the shares to its full extent.

8. All OFFERS made to SNWA must be signed by all persons whose name(s) appear as owners on the stock certificates for the shares offered for lease.

9. The name of the ditch through which the water represented by the shares offered for lease is conveyed shall be listed in the OFFER.

10. Conveyance to Lake Mead of the water represented by the leased shares may require authorization from the Nevada State Engineer. The Lessor expressly agrees not to take any actions to protest or otherwise prevent the conveyance of this water to Lake Mead.

11. The Lessor agrees to identify all real property, if any, within the Virgin River Valley that is either currently, or has been historically, irrigated with water represented by the leased shares, together with any documentation, including leases, regarding the use of the Lessor's shares during the last five (5) years. Such obligation will be satisfied by completing the "Description of Land and Share Usage" form attached to this Request for Offers to Lease.

12. BUNKERVILLE will not deliver the water covered by the leased shares for irrigation, but may either leave the water in the Virgin River or divert such water into its diversion ditches and allow such water to pass through its ditches into the Virgin River for discharge into Lake Mead.

13. By returning a signed OFFER to SNWA, each Lessor warrants and represents that the shares of stock in BUNKERVILLE offered for lease are free and clear of all encumbrances and obligations that would prevent the shareholder from executing the lease and/or prevent SNWA from utilizing the water represented by the shares to its full extent during the lease term.

14. Each completed OFFER *MUST BE SIGNED BY THE BUNKERVILLE IRRIGATION COMPANY.*

15. By September 1, 2008, SNWA will notify all persons who submitted OFFERS whether or not their OFFER has been accepted. SNWA will also promptly notify

BUNKERVILLE of the name(s) of the Lessor(s) and of the shares for which the OFFER has been accepted.

16. SNWA will pay any BUNKERVILLE fees and assessments due for each leased share during the lease term.

17. On receipt of notification of SNWA's acceptance of a shareholder's OFFER, BUNKERVILLE will record the name of Muddy River Water Holdings, Inc. as the record lessee of the shares in the Irrigation Company's records and shall deliver stock certificates or other documentation evidencing the lease to SNWA.

18. SNWA reserves the right to reject an OFFER if in SNWA's sole judgment the aggregate amount of water represented by shares from a particular ditch is not sufficient to enable convenient monitoring of the conveyance of such water through the ditches of BUNKERVILLE to Lake Mead.

19. No OFFER is a binding lease unless and until accepted by SNWA.

DATED this 8th day of May, 2008.

SOUTHERN NEVADA WATER AUTHORITY
100 City Parkway, Suite 700
Las Vegas, Nevada 89106

By: _____
Authorized Representative

Revised 4.24.08

SOUTHERN NEVADA WATER AUTHORITY
100 City Parkway, Suite 700 • Las Vegas, NV 89106
MAILING ADDRESS: P.O. Box 99956 • Las Vegas, NV 89193-9956
(702) 862-3400 • snwa.com

February 25, 2013

Robert Bunker, General Manager
Bunkerville Irrigation Company
P.O. Box 7150
Bunkerville, Nevada 89007

Dear Mr. Bunker:

The Southern Nevada Water Authority (SNWA) would like to confirm the number of Bunkerville Irrigation Company (BIC) shares it owned and leased during Calendar Year (CY) 2012. This letter of concurrence verifying the number of shares controlled will be provided to the Bureau of Reclamation and the Nevada State Engineer's Office in support of SNWA's accounting of its BIC water rights, in lieu of providing them copies of owned share certificates and numerous lease agreements. Please review the number of shares below that SNWA has described it controlled during CY 2012 and sign this letter if BIC concurs with the numbers and time periods of non-use.

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Owned	445 -	445 -	445 -	445 -	445 -	445 -	445 -	445 -	445 -	445 -	445 -	445 -
Leased	503	503	503	503	503	503	503	503	503	503	503	503
Total	948	948	948	948	948	948	948	948	948	948	948	948

Thank you for your assistance. If you have any questions, please contact me at (702) 862-3748 or Sean Collier at (702) 691-5375.

Sincerely,

Jeffrey Johnson, SNWA Division Manager
Water Management and Accounting Division

JJ:lmv

Concurrence by:

4-1-2013

Robert Bunker, General Manager — Date
Bunkerville Irrigation Company

SOUTHERN NEVADA WATER AUTHORITY
100 City Parkway, Suite 700 • Las Vegas, NV 89106
MAILING ADDRESS: P.O. Box 99956 • Las Vegas, NV 89193-9956
(702) 862-3400 • snwa.com

February 25, 2013

Kraig Hafen, Manager
Mesquite Irrigation Company
P.O. Box 142
Mesquite, Nevada 89024

Dear Mr. Hafen:

The Southern Nevada Water Authority (SNWA) would like to confirm the number of Mesquite Irrigation Company (MIC) shares it owned and leased during Calendar Year (CY) 2012. This letter of concurrence verifying the number of shares controlled will be provided to the Bureau of Reclamation and the Nevada State Engineer's Office in support of SNWA's accounting of its MIC water rights, in lieu of providing them copies of owned share certificates and numerous lease agreements. Please review the number of shares below that SNWA has described it controlled during CY 2012 and sign this letter if MIC concurs with the numbers and time periods of non-use.

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Owned	141.333	141.333	141.333	141.333	141.333	141.333	141.333	141.333	141.333	141.333	141.333	141.333
	-	-	-	-	-	-	-	-	-	-	-	-
Leased	731.833	731.833	731.833	731.833	731.833	731.833	731.833	731.833	731.833	731.833	731.833	731.833
Total	873.166	873.166	873.166	873.166	873.166	873.166	873.166	873.166	873.166	873.166	873.166	873.166

Thank you for your assistance. If you have any questions, please contact me at (702) 862-3748 or Sean Collier at (702) 691-5375.

Sincerely,

Jeffrey Johnson, SNWA Division Manager
Water Management and Accounting Division

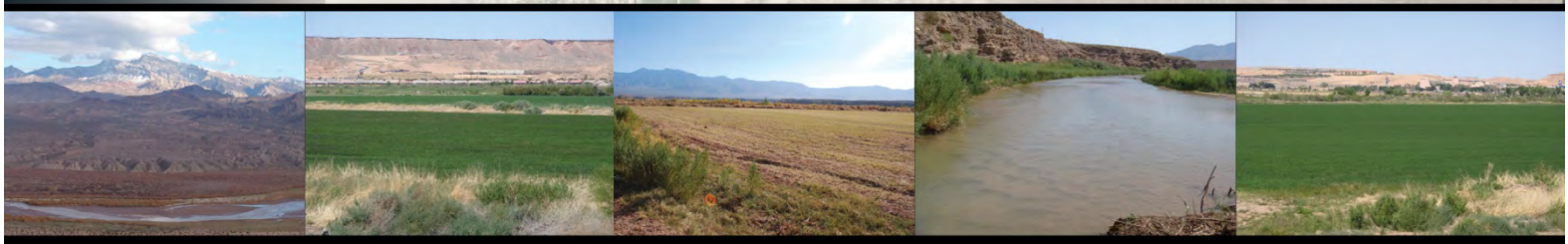
JJ:lmv

Concurrence by:

3-1-13

Kraig Hafen, Manager — Date
Mesquite Irrigation Company

Virgin River Tributary Conservation Intentionally Created Surplus Certification Report Calendar year 2012



SOUTHERN NEVADA WATER AUTHORITY

Cover: Background image is the Lower Virgin River near Riverside, Nevada. Individual photos are throughout the Lower Virgin River in Clark County, Nevada.

Virgin River Tributary Conservation Intentionally Created Surplus Certification Report

Calendar Year 2012

Southern Nevada Water Authority
100 City Parkway, Suite 700
Las Vegas, Nevada 89106

Water and Environmental Resources Department
Water Management and Planning

November 2013

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Acronyms

BIC	Bunkerville Irrigation Company
BCPA	Boulder Canyon Project Act
CY	Calendar Year
ET	Evapotranspiration
ICS	Intentionally Created Surplus
MIC	Mesquite Irrigation Company
PBU	Proof of Beneficial Use
POU	Place of Use
RFO	Request for Offers
SNWA	Southern Nevada Water Authority
USGS	United States Geological Survey
WY	Water Year

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Abbreviations

af	acre-feet
afy	acre-feet per year
cfs	cubic-feet per second
ft	foot
in	inch

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Introduction

The Secretary of Interior (Secretary) issued a Record of Decision for 'Colorado River Interim Guidelines for Lower Basin Shortages and Coordinated Operations for Lake Powell and Lake Mead' (Guidelines) on December 13, 2007, which established criteria for the development and delivery of Intentionally Created Surplus (ICS). One type of ICS is Tributary Conservation, which allows a Contractor, as defined in the Guidelines, to increase tributary flows into the mainstream of the Colorado River within its state for ICS credits. The conservation of tributary flows into the mainstream of the Colorado River is limited to water rights that have been used for a significant period of years and were perfected prior to June 25, 1929, the effective date of the Boulder Canyon Project Act. (BCPA).

To generate ICS, the Guidelines require a Contract holder to enter into a Delivery Agreement with the United States of America and a Forbearance Agreement with Lower Basin Contract holders. On December 13, 2007, the Southern Nevada Water Authority (SNWA) and Colorado River Commission of Nevada entered into a Delivery Agreement with the United States of America and a Forbearance Agreement with Lower Basin Contract holders. Exhibit A of the Forbearance Agreement describes the surface water rights on the Muddy and Virgin Rivers, pre-dating June 25, 1929, which SNWA plans to use to create Tributary Conservation ICS, and how the Virgin River flows reaching Lake Mead will be calculated (Appendix A).

The Guidelines, Forbearance Agreement, and Delivery Agreement require a plan for the creation of ICS (ICS Plan). An ICS Plan for Virgin River Tributary Conservation ICS was submitted to the Bureau of Reclamation (Reclamation) for Calendar Year (CY) 2012 on June 30, 2011. SNWA received a letter from Reclamation dated December 30, 2011, approving the ICS Plans for CY 2012 (Appendix B).

This report satisfies the requirements of the Guidelines and Nevada State Engineer Order 1193 (Appendix C) as follows:

- Under Nevada State Engineer Order 1193, an annual report will be submitted to the Nevada Division of Water Resources giving a "full accounting of adjudicated water rights on the Virgin River or its tributaries owned or controlled by the entity with an ICS Delivery Contract, which have been conveyed through the Virgin River system to the Colorado River mainstream for the creation of ICS." After review of the annual report, the Nevada State Engineer shall issue a letter verifying the quantity of water conveyed through the Virgin River system to the Colorado River mainstream for the purpose of creating ICS.
- Based on the Guidelines, an Annual Certification report will be submitted for the Secretary of Interior's review and verification to demonstrate the amount of Tributary Conservation ICS created in the preceding year, and that the method of creation was consistent with SNWA's approved ICS Plan.
- Intentionally Created Surplus is declared a beneficial use of a Nevada water right under NRS 533.030

Project Description

Virgin River water rights that are being utilized to create Tributary Conservation ICS pursuant to the approved ICS Plan and Exhibit A of the Forbearance Agreement are decreed Nevada state water rights with an established history of use prior to 1929, but have experienced periods of non-use in the interim. Per Exhibit A of the Forbearance Agreement, SNWA is specifically allowed to utilize any and all pre-June 25, 1929, Virgin River water rights to create Tributary Conservation ICS regardless of those water rights history of use after 1928.

The Virgin River begins in southwestern Utah, flows through Arizona and Nevada, and terminates in Lake Mead (Figure 1). Flows in the Virgin River are principally influenced by snowmelt in the mountains in southwestern Utah and flooding from summer monsoonal storms. Additional inflow of about 50 to 60 cfs from springs and seeps occurs near Littlefield, Arizona and ensures year round flows into Nevada. The average annual flow of the Virgin River at U.S. Geological Survey (USGS) gaging station 09415000 *Virgin River at Littlefield, AZ,* located downstream of the springs and seeps and upstream of the three agricultural areas in Nevada for Water Years 1930 through 2012 was 175,200 afy.

On the Virgin River within Nevada, water rights that pre-date the BCPA are comprised of pre-1905 priority surface water rights decreed by the Nevada Supreme Court in 1927 for 17,785.5 afy to the Bunkerville and Mesquite Irrigation Companies and individual pre-June 25, 1929, permitted and certificated rights. (Appendix D)

The surface water rights owned and controlled by SNWA on the Virgin River are no longer being utilized for agriculture and are being conveyed to Lake Mead. The pre-June 25, 1929, water rights conveyed to Lake Mead represent the full right that is and has been historically used for agricultural irrigation or could have otherwise been diverted from the Virgin River and fully consumed by SNWA in Nevada.

Virgin River rights conveyed to Lake Mead passed through their historic points of diversion and either flowed through the irrigation company ditches and returned to the mainstream of the Virgin River further downstream or remained in the mainstream of the Virgin River. The full rights, owned and leased by SNWA, documented to be conserved through land fallowing, and thus increasing flows to Lake Mead, have been accounted for as Tributary Conservation ICS.

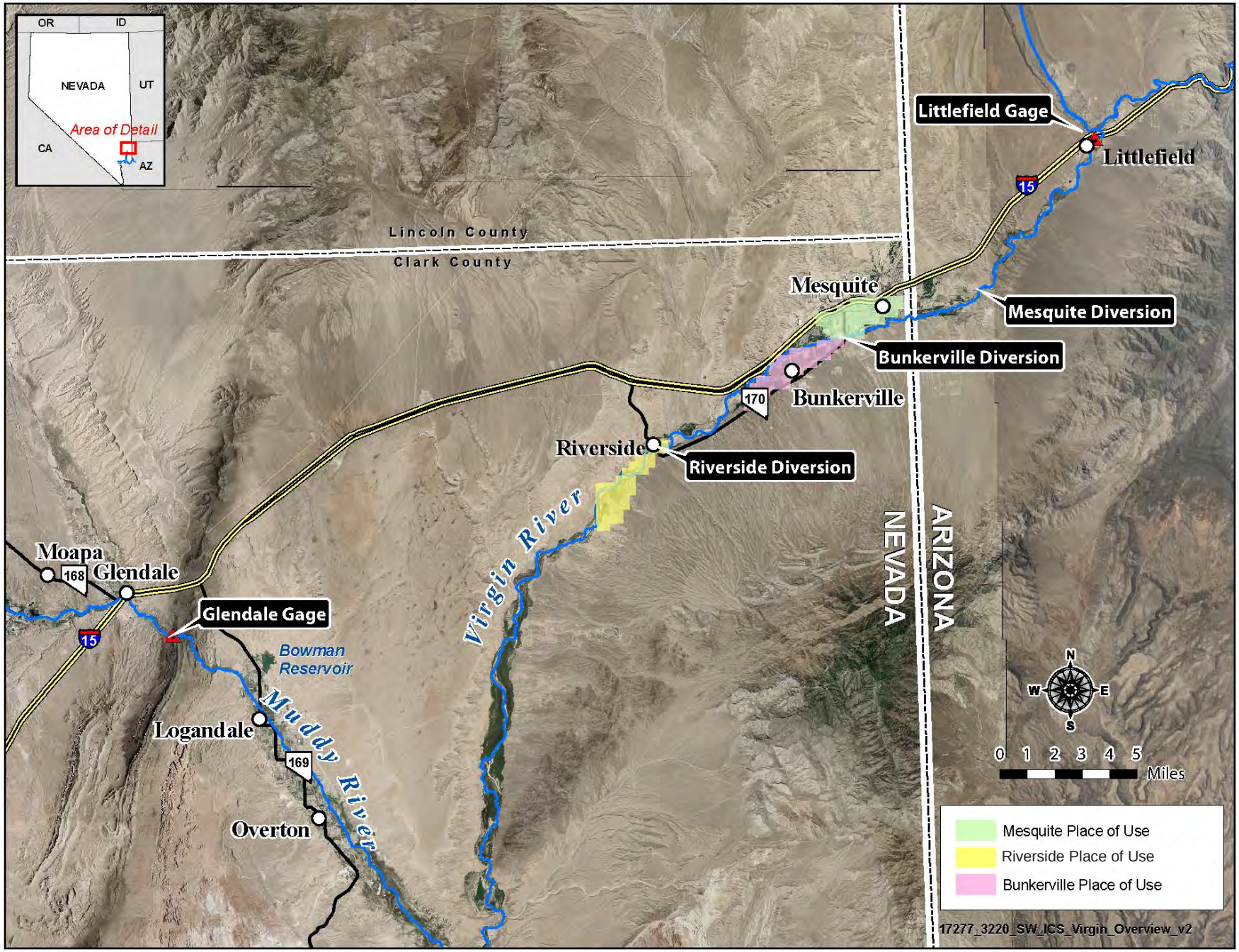

Figure 1 - Overview of Lower Virgin River and Major Agricultural Areas, Which are Highlighted

Summary of Results for CY 2012

The total volume of Virgin River water for which SNWA created Tributary Conservation ICS in CY 2012 under the Guidelines was 14,129 acre-feet (af), prior to any overrun payback and one-time deduction of 5% for the benefit of additional system storage in Lake Mead, as outlined in the Guidelines (Table 1). This volume is within the 17,000 af outlined in the approved ICS Plan. Detailed data and calculations are described in subsequent sections of this report.

Table 1 - Summary of Virgin River Rights Conserved for Tributary Conservation ICS Credit

Water Right	Acre Feet Conserved in 2012
Bunkerville Irrigation Company	7,382
Mesquite Irrigation Company	6,144
Riverside Area	602
Total	**14,129**

SNWA Conservation of Virgin River Rights

On the Lower Virgin River, there are three primary agricultural areas: the Mesquite Irrigation Company (MIC), the Bunkerville Irrigation Company (BIC), and the Riverside area. By controlling water rights on the Virgin River within these three areas, SNWA successfully conserved Virgin River water in CY 2012 that was conveyed to Lake Mead for Tributary Conservation ICS credits. The sections below describe the water rights and conservation of the rights.

Methodology

As described in Exhibit A of the Forbearance Agreement and the approved ICS Plan for CY 2012, conserved water creating Tributary Conservation ICS on the Virgin River is calculated based on the reduction in agricultural acreage as follows:

Virgin River Calculation:

Decrease in total agricultural acreage permitted by the Nevada Division of Water Resources calculated using remote sensing & GIS
x The duty per acre specified by the water right

= Flows to Lake Mead (Elevation 1,220 AMSL)

Verification Process of Fallowed Lands

Within the three primary agricultural areas, fields were digitized using the 2006 National Agricultural Imagery Program data. Since 2008, SNWA funded aerial photography flights specifically for the purpose of Tributary Conservation ICS verification. These flights have been strategically scheduled 3-times per year to assure they are capturing the agricultural activities during the summer and winter seasons over a calendar year. These flights are flown at a resolution of 6-inches per pixel. This high quality photography allows for more accurate determinations of fallowed vs. active agricultural fields. An example of the level of detail to which the high resolution aerial photography provides for classifying and delineating crops can be seen on Figure 2.

The aerial photography combined with ground-truthing and discussions directly with irrigation company managers ensure the highest degree of accuracy in determining the actual irrigated acreage along the Lower Virgin River.

Aerial photography flights were performed in February, August, and November of 2012 to effectively capture lands being flood irrigated or fallowed during the winter and summer irrigation seasons. Since the summer irrigation season spans May through September, the August photography captures areas that are actually being irrigated, since by August most of the natural vegetation that is not receiving irrigation company water has died back.

Water rights on the Lower Virgin River have defined Place-of-Use (POU) maps and many have subsequent Proof-of-Beneficial-Use (PBU) maps, showing the locations where the decreed and permitted water rights were beneficially used within the defined POU. These POU and PBU maps, when compared to recent aerial photography, serve as the baseline for proof of fallowed lands, demonstrating conservation of the water. In some instances, the recent digitized polygons of the current fields do not exactly match the fields on the POU or PBU maps from decades prior. This is due to improved mapping capabilities, the natural movement of the Virgin River across its flood plain, and changes in land ownership resulting in divided/combined fields. However, since the water rights can be used anywhere within the defined POU, the breakdown of the fields is not as important as the total irrigated acreage within the POU.

Some of the fields on the aerial photography depict vegetation even though they are not being actively irrigated. This is due to the fact that many of the fallowed fields historically contained perennial alfalfa, which receive periodic water from winter rains that temporarily turn the fields green. Many of the fields that appear to have some green in the photography flown in the cooler months are brown in the August photography. To ensure the fields were not irrigated, SNWA met with irrigation company managers to review which fields were being irrigated and obtain written verification from the irrigation companies that the shares controlled by SNWA were not being used for irrigation (Appendices F and G). The results of these discussions and documentation are discussed relative to each of the three agricultural areas in subsequent sections.

Figure 2 - Detailed Imagery of Crop Delineation and Classification

Bunkerville Irrigation Company

The BIC service area is located along the left bank of the Lower Virgin River southwest of Mesquite, Nevada. Virgin River water is diverted by BIC upstream of their service area. The POU for BIC's pre-BCPA water rights totals 895.80 acres of irrigable land located on the Virgin River flood plain. Water rights within BIC are owned by its shareholders represented by 1,038 shares of stock (shares).

The SNWA owned a total of 445 shares in BIC during CY 2012. SNWA also leased BIC shares during CY 2012 resulting from the Request for Offers to Purchase and Lease (RFO) BIC (as well as MIC) water rights (Appendix E). As a result of the RFO, SNWA acquired control of 503 additional BIC shares bringing the total number of controlled shares from January 1, 2012 through December 31, 2012, to 948 shares.

Water Rights Summary and Documentation of Conserved Water

Agricultural irrigation in Bunkerville has been occurring since the 1800's and the rights were decreed by the State of Nevada on May 14, 1927. The decree lists BIC water rights under Proof No. 02038 and they have a vested priority date of pre-1905. BIC was adjudicated a duty of 9.06 acre-feet per acre (af/acre) to irrigate 895.80 acres of land with a total volume of 8,115.94 afy. The 9.06 af/acre duty is based on 1 cfs per 100 acres in the winter (October through February) and 1 cfs per 70 acres in the summer (March through September).

The BIC owns additional water rights which are post-June 25, 1929, these water rights were not used for the creation of Tributary Conservation ICS. Figure 3 contains an image of the 1968 PBU map, which shows three of the BIC water rights used for irrigating lands in the BIC service area. The decreed POU where SNWA receives ICS credit for fallowing land is highlighted in red.

The acre-foot per share value for creating Tributary Conservation ICS from BIC is determined by dividing the total decreed volume of 8,115.94 afy by the total number of BIC shares, 1,038, resulting in an annual acre-foot per share value of 7.82 af/share. Table 2 lists the acre-foot per share value on a monthly time-step.

The BIC original POU has undergone little change since the water rights were decreed in the 1920s. The area has remained agricultural, with minimal urbanization. Agricultural acreage within BIC for CY 2012 was verified using 6-in pixel resolution aerial photography, ground-truthing, and direct conversations with the BIC Manager. The irrigated acreage documented in CY 2012 is listed in Table 2. The comparison of irrigated acreage by season can be seen on Figure 4 through Figure 6 which compare the 1968 PBU map for BIC water rights on Figure 3 to observed fallowed and irrigated lands in February, August, and November 2012, respectively. There are some fields being irrigated outside of the decreed POU, utilizing the other water rights held by BIC. The acreages of agricultural land being irrigated outside the decreed POU, while noted on the map, are not factored into the land fallowing calculations for ICS.

Appendix F includes a letter of concurrence signed by the BIC Manager, documenting SNWA's control of BIC shares in CY 2012, and BIC's concurrence that the SNWA controlled shares were not used for irrigation.

Table 2 also accounts for the total volume of pre-1929 rights being conserved within BIC on a monthly and annual time-step by multiplying the duty by the total number of acres fallowed. This value of total conserved pre-1929 rights within BIC must be greater than or equal to the

acre-feet of water represented by SNWA's shares in BIC that were conserved. The total amount of pre-1929 water rights controlled by SNWA in CY 2012 is represented by 948 total controlled shares from January 1 to December 31, 2012. Based on the calculations in Table 2, these shares in CY 2012 equate to 7,411 af. During this same period the fallowed lands conserved more water than what was controlled by SNWA for most months. However, from October through December there was not enough fallowed land for SNWA to receive credit for their shares. As a result of not enough land being fallowed for a portion of the CY 2012, only 7,382 af out of SNWA's controlled 7,411 af of BIC water rights can be accounted for as Tributary Conservation ICS created by SNWA in Lake Mead.

Table 2 - Calculated Volume of Conserved BIC Water Rights Controlled by SNWA in CY 2012

Notation	Description	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
A	*# Days*	31	28	31	30	31	30	31	31	30	31	30	31	365
B	*Pre-1928 POU (acres)*	895.8	895.8	895.8	895.8	895.8	895.8	895.8	895.8	895.8	895.8	895.8	895.8	895.8
C = A * (S or W)	*Decree Acre-Feet Per Acre / Month*	.6149	.5554	.8784	.8501	.8784	.8501	.8784	.8784	.8501	.6149	.5951	.6149	9.06
D = B * C	*Total Pre-1929 Rights AF / Month*	550.814	497.5094	786.8771	761.494	786.8771	761.494	786.8771	786.8771	761.494	550.814	533.0458	550.814	8,115.
E	*Measured Acres of AG each Month*	91.79	91.79	91.79	29.94	29.94	29.94	29.94	29.94	29.94	69.22	69.22	69.22	
F = B - E	*Fallowed Acreage each Month*	804.01	804.01	804.01	865.86	865.86	865.86	865.86	865.86	865.86	826.58	826.58	826.58	
H = C * F	*Water Conserved by Fallowed Land (af)*	494.3737	446.5311	706.2481	736.0428	760.5776	736.0428	760.5776	760.5776	736.0428	508.2516	491.8564	508.2516	7,645.374
Sh	*Total Number of BIC Shares*	1,038.	1,038.	1,038.	1,038.	1,038.	1,038.	1,038.	1,038.	1,038.	1,038.	1,038.	1,038.	1,038.
G = D/Sh	*Acre-Feet per Share Per Month*	.5306	.4793	.7581	.7336	.7581	.7336	.7581	.7581	.7336	.5306	.5135	.5306	7.8179
ShC	*Shares Controlled by SNWA*	948.	948.	948.	948.	948.	948.	948.	948.	948.	948.	948.	948.	
I = G *ShC	*Acre-Feet Per Month Controlled by SNWA*	503.0555	454.3728	718.6508	695.4685	718.6508	695.4685	718.6508	718.6508	695.4685	503.0555	486.8279	503.0555	**7,411.3759**
H > I	*Is conservation > than SNWA rights*	No	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	
	Total ICS Created (af)	**494.3737**	**446.5311**	**706.2481**	**695.4685**	**718.6508**	**695.4685**	**718.6508**	**718.6508**	**695.4685**	**503.0555**	**486.8279**	**503.0555**	**7,382**

Notation for AF/Day		AF/Acre From Decree	Days in Season	AF/Day
S	Summer (March to September)	6.06	214	0.028336
W	Winter (October to February)	3.00	151	0.019835
		9.06	365	

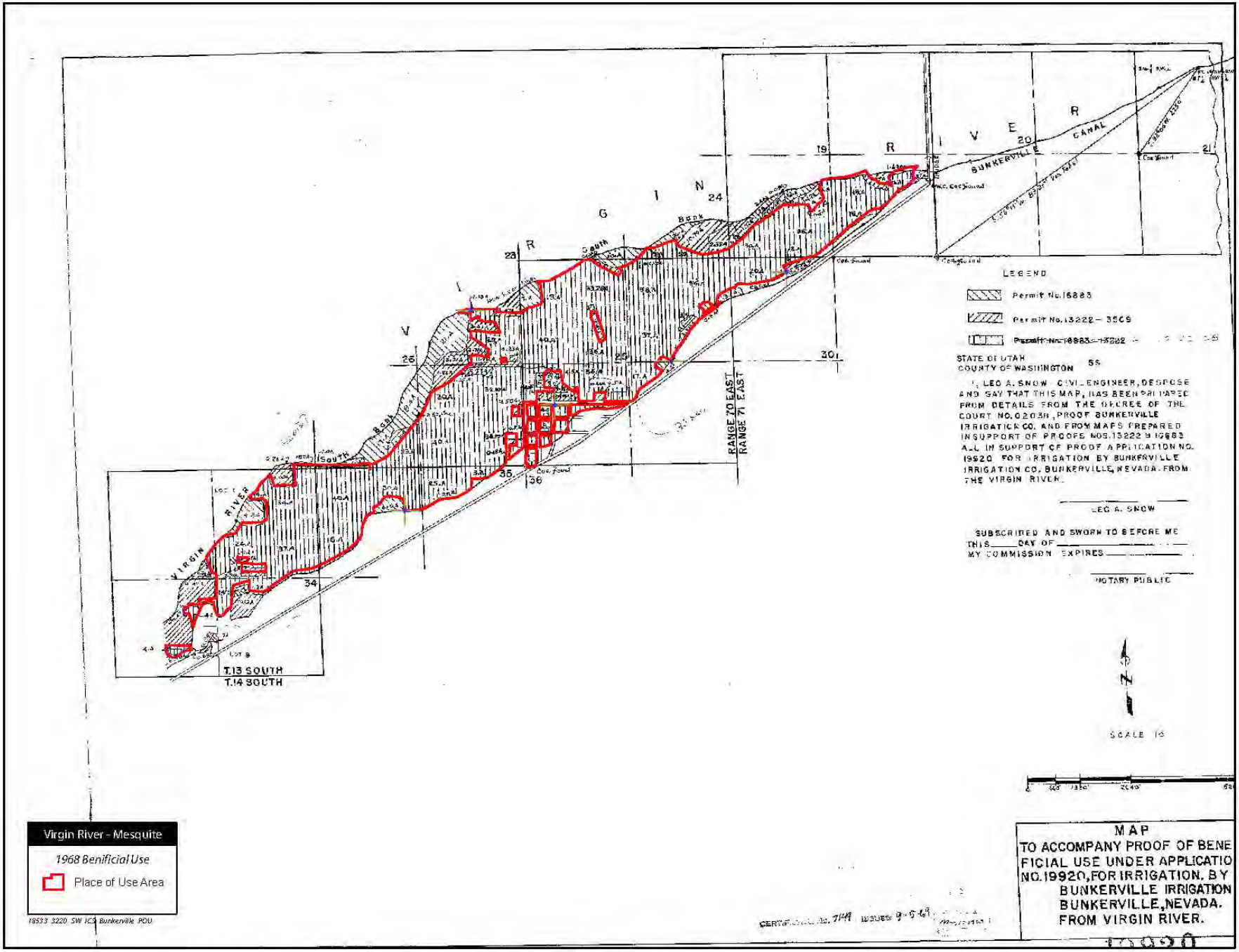

Figure 3 – BIC 1968 PBU Map; pre-BCPA Rights Highlighted in Red

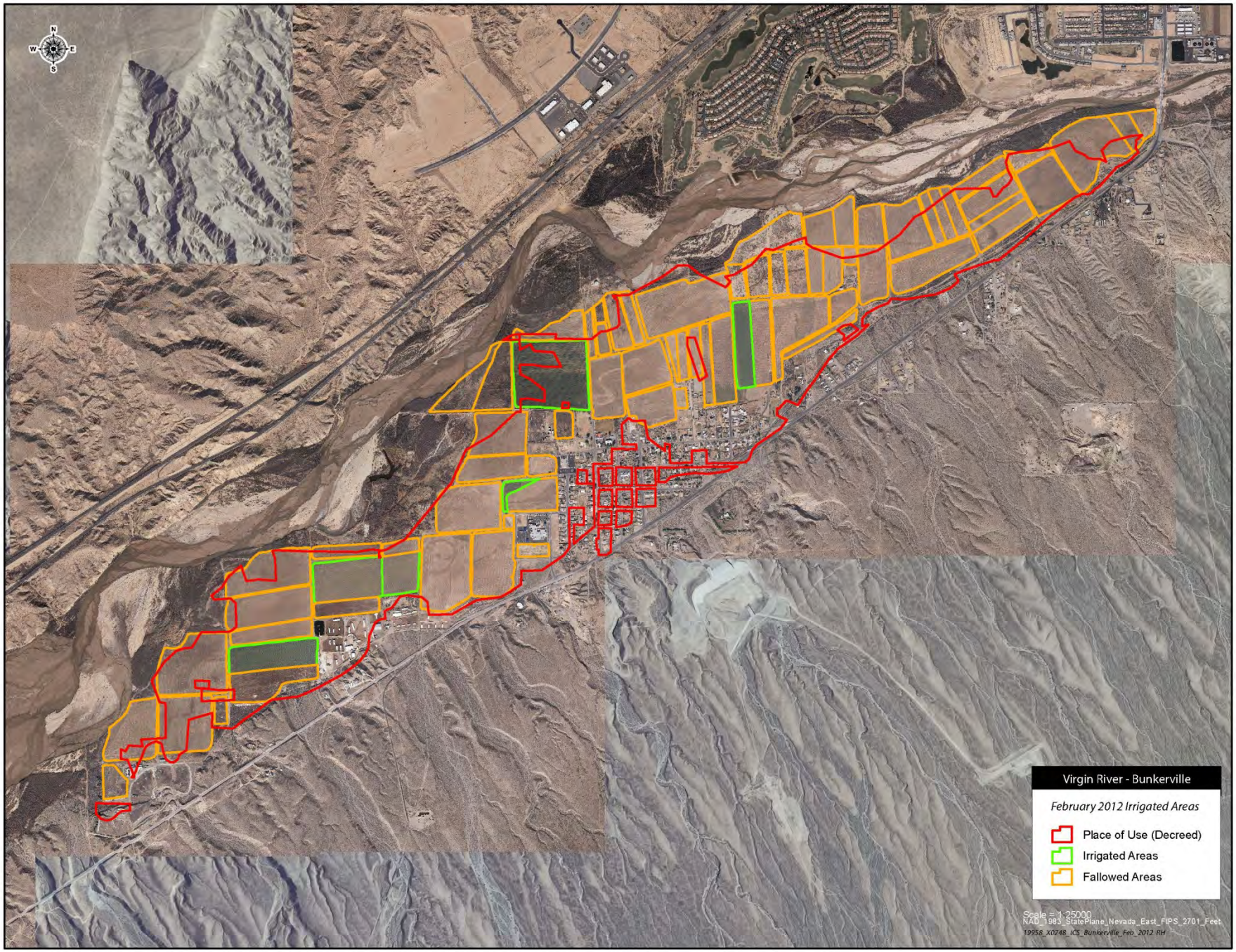

Figure 4– February 2012 Aerial Photography and Fallowed Acreage for BIC

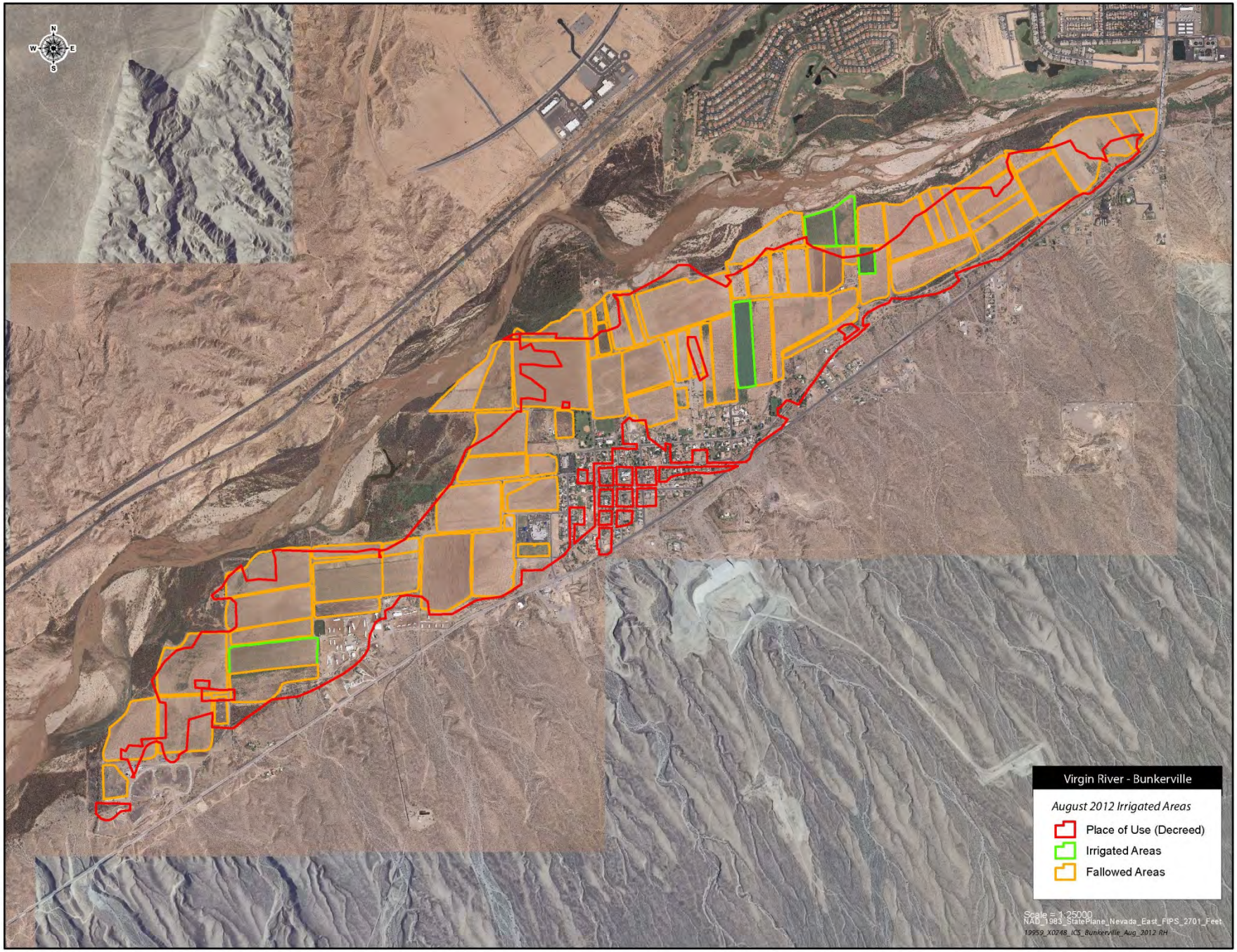

Figure 5 – August 2012 Aerial Photography and Fallowed Acreage for BIC

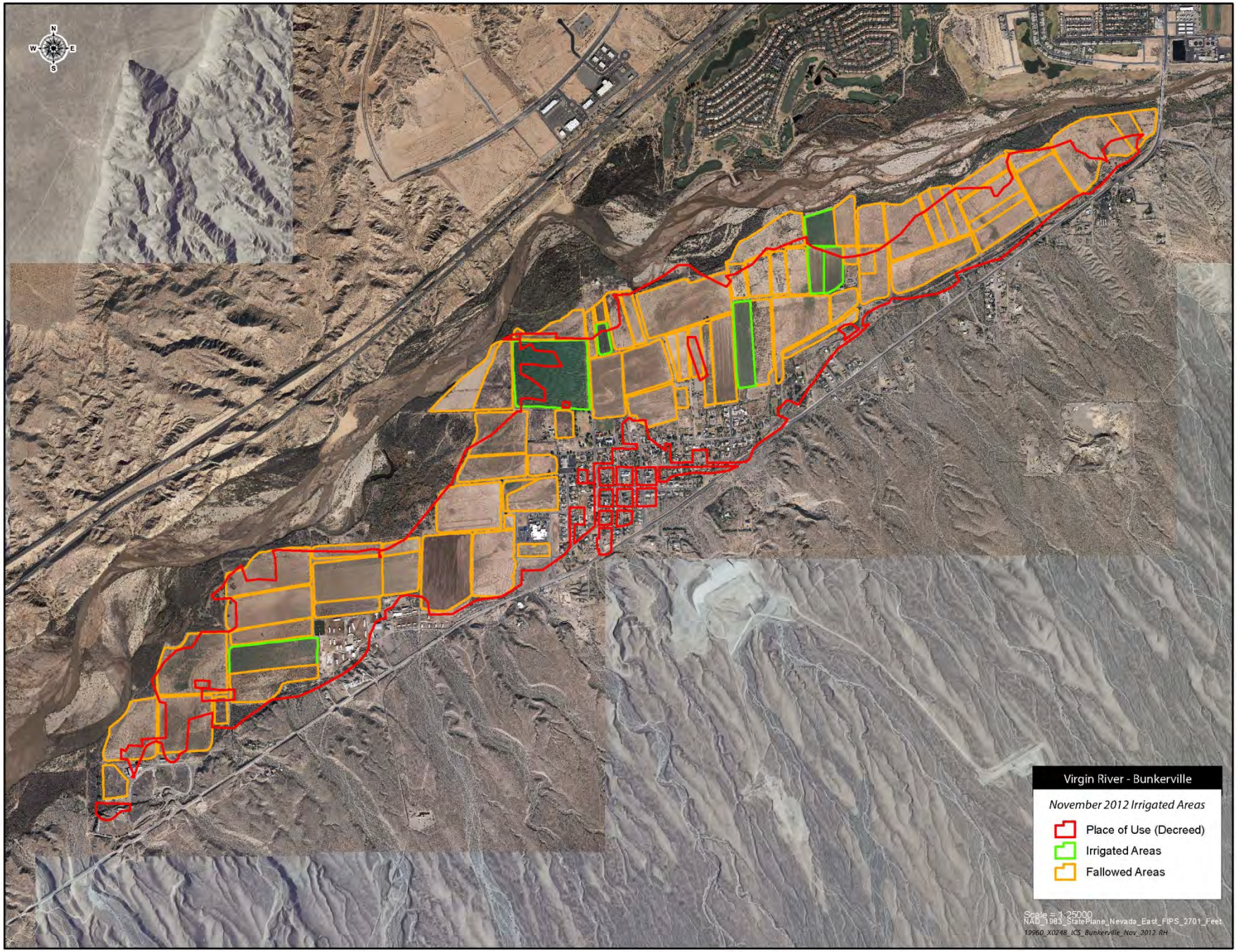

Figure 6 – November 2012 Aerial Photography and Fallowed Acreage for BIC

Mesquite Irrigation Company

The MIC service area is located along the right bank of the Virgin River, where much of the city of Mesquite is located today. MIC diverts water upstream of the MIC service area and delivers water within the MIC service area through a series of concrete lined irrigation ditches and pipes. Water rights held by MIC are owned by its shareholders represented by 1,673.25 shares.

Similar to BIC, agriculture has been occurring in the MIC service area since the late 1800s. Over time, the area has become urbanized with about two-thirds of the agricultural land being permanently fallowed due to urbanization.

In early 2008, SNWA issued an RFO for MIC shares (Appendix E). As a result of the RFO, SNWA has purchased 141.333 MIC shares and leased 731.833 shares effective through the end of CY 2012 and beyond. The vast majority of lands associated with these shares are represented by permanently fallowed land, resulting from urbanization.

Water Rights Summary and Documentation of Conserved Water

On May 14, 1927, MIC was decreed 9,669.56 afy of water rights under the Virgin River Decree to irrigate 1,067.28 acres. Subsequently, another 2,106.00 afy of water rights were granted to MIC under Permit No. 7624/Certificate No. 4509 with a priority date of 1926, to irrigate an additional 468 acres. This brought the total water available to MIC to 11,775.56 afy, to irrigate 1,535.28 acres of land, within the POU defined in the decree and Permit No. 7624. The duty per acre for the decreed rights is 9.06 af/acre, which is based on 1 cfs per 100 acres in the winter (October through February) and 1 cfs per 70 acres in the summer (March through September). The calculated duty under Permit No. 7624 is 4.5 af/acre. Table 3 distributes the decreed right (with an annual duty of 9.06 af/acre) on a monthly time-step based on the summer and winter duty designated above and distributes the 4.5 af/acre based on the number of days per month. The result is a weighted average duty of 7.67 af/acre for the pre-1929 water rights. Although MIC owns additional water rights which are post-June 25, 1929, these water rights were not used for the creation of Tributary Conservation ICS.

The acre-foot per share value for creating Tributary Conservation ICS is determined by dividing the total pre-1929 rights of 11,775.56 af by the total number of shares in MIC, 1,673.25, resulting in an annual acre-foot per share value of 7.0369 af/share. Table 3 lists the acre-foot per share value on a monthly time-step. During CY 2012, SNWA controlled a total of 873.166 shares in MIC, representing 6,144 af of water.

Agricultural acreage within MIC was verified using 1-ft and 6-in pixel resolution aerial photography, ground-truthing, and direct conservations with the MIC Manager. The fallowed lands were mapped using the February, August, and November 2012 aerial photography. Figure 8 through Figure 10 compare the 1968 PBU map for MIC on Figure 7 to observed fallowed and irrigated acreage in CY 2012 that has not been urbanized.

A portion of MIC water rights, not controlled by SNWA, are being used on golf courses in Mesquite, Nevada. The golf courses pump leased and owned MIC water rights directly from MIC's ditches to golf course ponds for use on fairways and roughs. For this report, the entire turf and pond surface area acreage associated with the golf courses was included as irrigated agriculture within MIC and this acreage is included in the total measured irrigated acreage in Table 3. Evaluating the golf course use in this manner drastically over estimates MIC's total irrigated acreage because two of the courses also have agreements with the City of Mesquite which requires them to take and utilize the City's treated wastewater, since the City of Mesquite

does not discharge its treated effluent to the Virgin River. More detailed accounting of the uses by the golf courses is being conducted and may be incorporated into future Tributary Conservation ICS Certification Reports.

This evaluation demonstrated that from January to March 2012 there were 493.72 acres of agriculture and 1,041.56 acres of fallowed land out of the total allowable acreage of 1,535.28 acres established in the decree and Permit No. 7624. The lands fallowed from March through September 2012, and October through December 2012, were 952.28 acres and 989.28 acres, respectively.

As illustrated by Table 3, SNWA controlled MIC shares represented 6,144 af in CY 2012. This value of total conserved pre-1929 rights within MIC must be greater than or equal to the acre-feet of water represented by SNWA's shares in MIC that were conserved in CY 2012. Table 3 illustrates that from January 1 to December 31, 2012, the total water conserved from fallowed lands was 7,520 af and exceeded the 6,144 af of water represented by SNWA's controlled shares. Appendix G includes a letter of concurrence signed by the MIC Manager documenting SNWA's control of MIC shares in CY 2012 and MIC's concurrence that the SNWA controlled shares were not used for irrigation. Therefore, all 6,144 afy of SNWA's controlled MIC rights can be accounted for as Tributary Conservation ICS created by SNWA in Lake Mead.

Table 3 - Calculated Volume of Conserved MIC Water Rights Controlled by SNWA in CY 2012

Notation	Description	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
A	*# Days*	31	28	31	30	31	30	31	31	30	31	30	31	365
B	*Decreed Acreage*	1,067.28	1,067.28	1,067.28	1,067.28	1,067.28	1,067.28	1,067.28	1,067.28	1,067.28	1,067.28	1,067.28	1,067.28	1,067.28
C	*Certificate 4509 (Pre-1928) (acres)*	468.	468.	468.	468.	468.	468.	468.	468.	468.	468.	468.	468.	468.
D=B+C	*Total Pre-1928 POU (acres)*	1,535.28	1,535.28	1,535.28	1,535.28	1,535.28	1,535.28	1,535.28	1,535.28	1,535.28	1,535.28	1,535.28	1,535.28	1,535.28
E=A*(S or W)	*Decree Acre-Feet Per Acre / Month*	.6149	.5554	.8784	.8501	.8784	.8501	.8784	.8784	.8501	.6149	.5951	.6149	9.0589
F= (4.5/365)*A	*Certificate 4509 Acre-Feet Per Acre / Month*	.3822	.3452	.3822	.3699	.3822	.3699	.3822	.3822	.3699	.3822	.3699	.3822	4.5
G= [(B*E)+(C*F)] / (B+C)	*Total Pre-1929 Rights Acre-Feet Per Acre / Month*	.544	.4913	.7271	.7037	.7271	.7037	.7271	.7271	.7037	.544	.5264	.544	7.6692
H = D * G		835.1202	754.3021	1,116.3721	1,080.3601	1,116.3721	1,080.3601	1,116.3721	1,116.3721	1,080.3601	835.1202	808.1809	835.1202	11,774.4125
I	*Measured Acres of AG each Month*	493.72	493.72	493.72	583.	583.	583.	583.	583.	583.	546.	546.	546.	
J = D - I	*Fallowed Acreage each Month*	1,041.56	1,041.56	1,041.56	952.28	952.28	952.28	952.28	952.28	952.28	989.28	989.28	989.28	
K = J * G	*Water Conserved by Fallowed Land (af)*	566.5597	511.7314	757.3658	670.1093	692.4462	670.1093	692.4462	692.4462	670.1093	538.1219	520.7631	538.1219	7,520.3302
L	*Total Number of MIC Shares*	1,673.25	1,673.25	1,673.25	1,673.25	1,673.25	1,673.25	1,673.25	1,673.25	1,673.25	1,673.25	1,673.25	1,673.25	1,673.25
M = H / L	*Acre-Feet per Share Per Month*	.4991	.4508	.66719	.64567	.66719	.64567	.66719	.66719	.64567	.4991	.483	.4991	7.0369
ShC	*Shares Controlled by SNWA*	873.166	873.166	873.166	873.166	873.166	873.166	873.166	873.166	873.166	873.166	873.166	873.166	
N = ShC * M	*Acre-Feet Per Month Controlled by SNWA*	435.7977	393.6238	582.5658	563.7733	582.5658	563.7733	582.5658	582.5658	563.7733	435.7977	421.7398	435.7977	**6,144.3399**
K > N	*Is conservation > than SNWA rights*	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	
	Total ICS Created (af)	**435.7977**	**393.6238**	**582.5658**	**563.7733**	**582.5658**	**563.7733**	**582.5658**	**582.5658**	**563.7733**	**435.7977**	**421.7398**	**435.7977**	**6,144**

Notation for AF/Day		AF/Acre From Decree	Days in Season	AF/Day
S	Summer (March to September)	6.06	214	0.028321
W	Winter (October to February)	3.00	151	0.019835
		9.06	365	

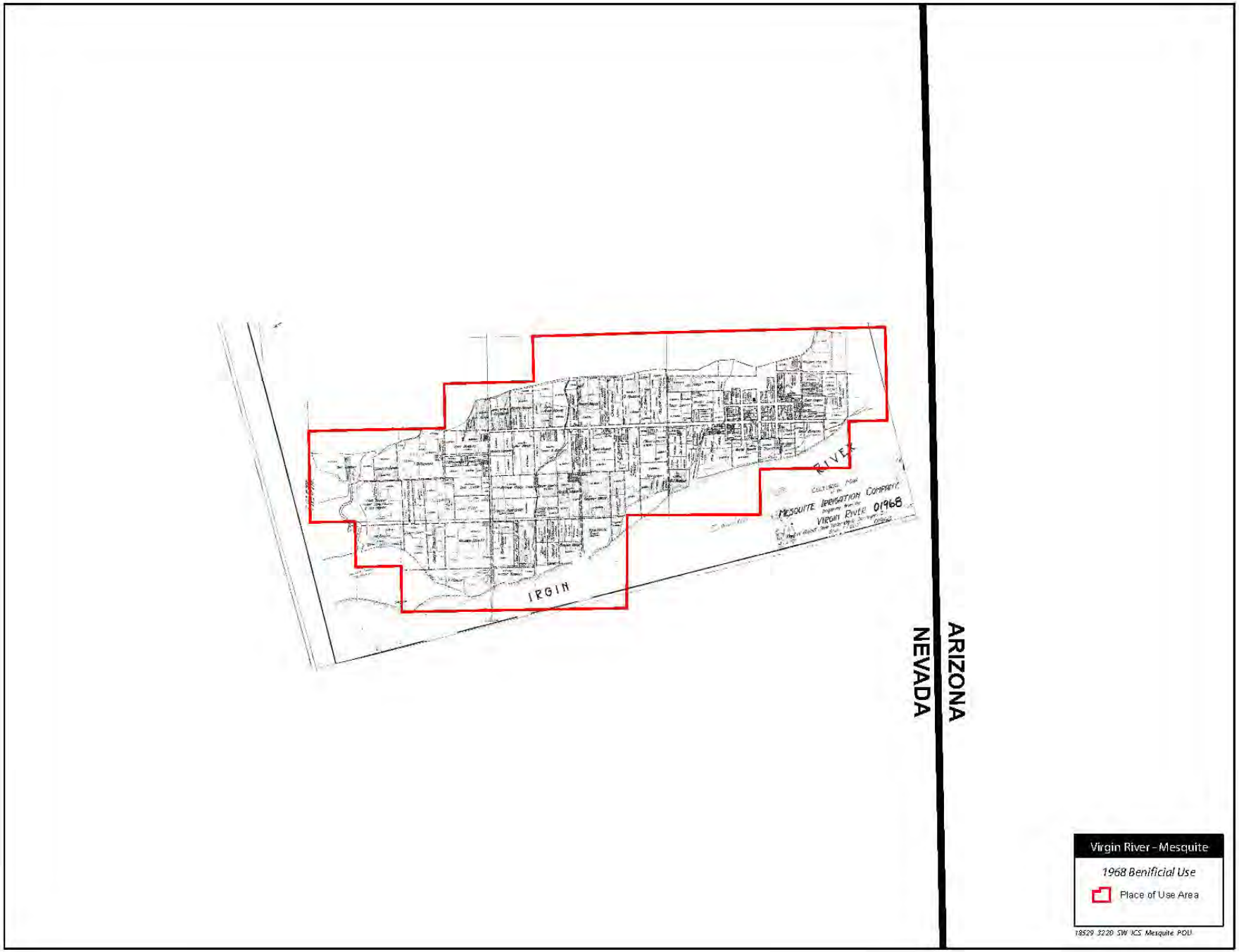

Figure 7 - MIC 1968 PBU Map; POU Quarter-Quarter Sections Highlighted in Red

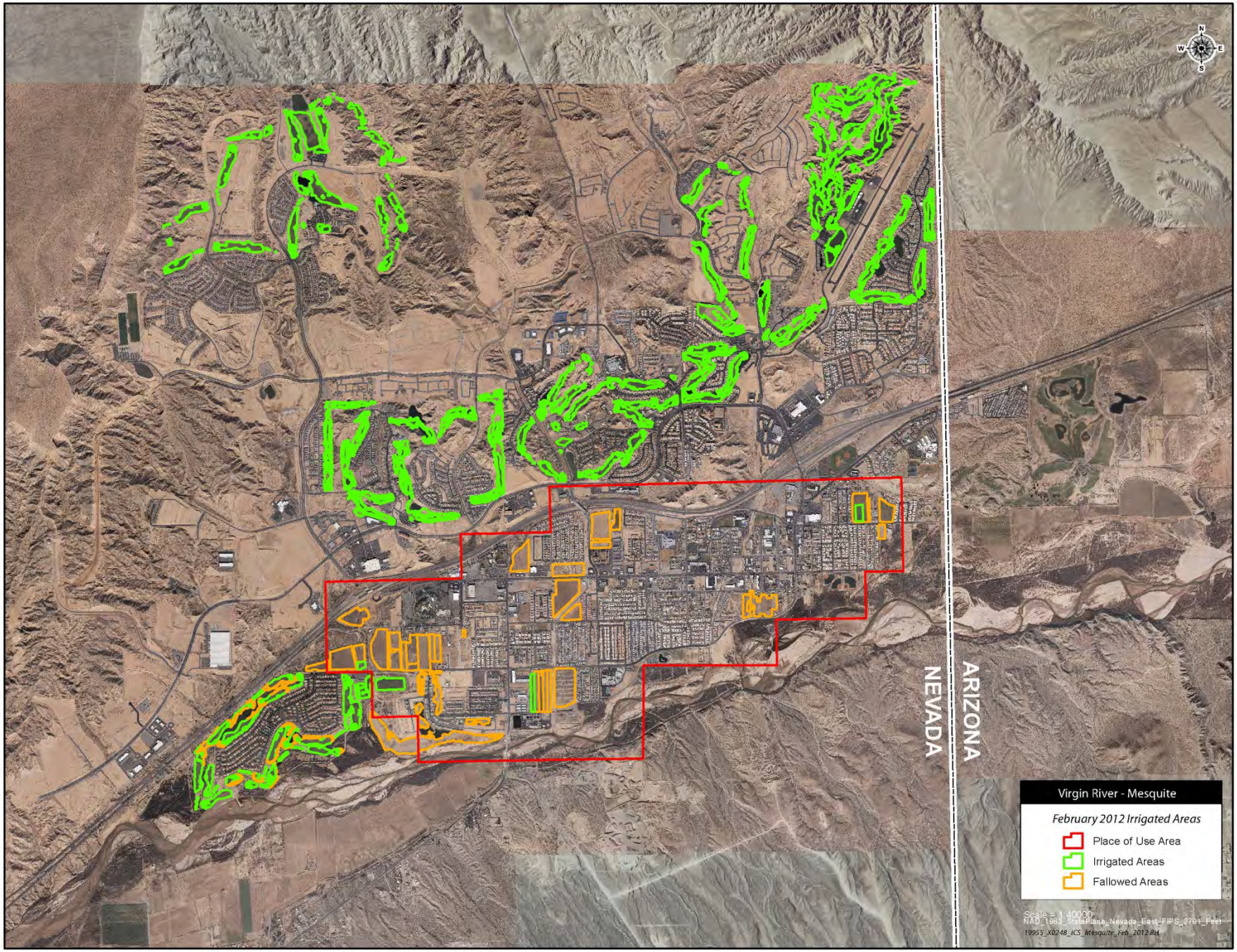

Figure 8 – February 2012 Aerial Photography and Fallowed Acreage for MIC

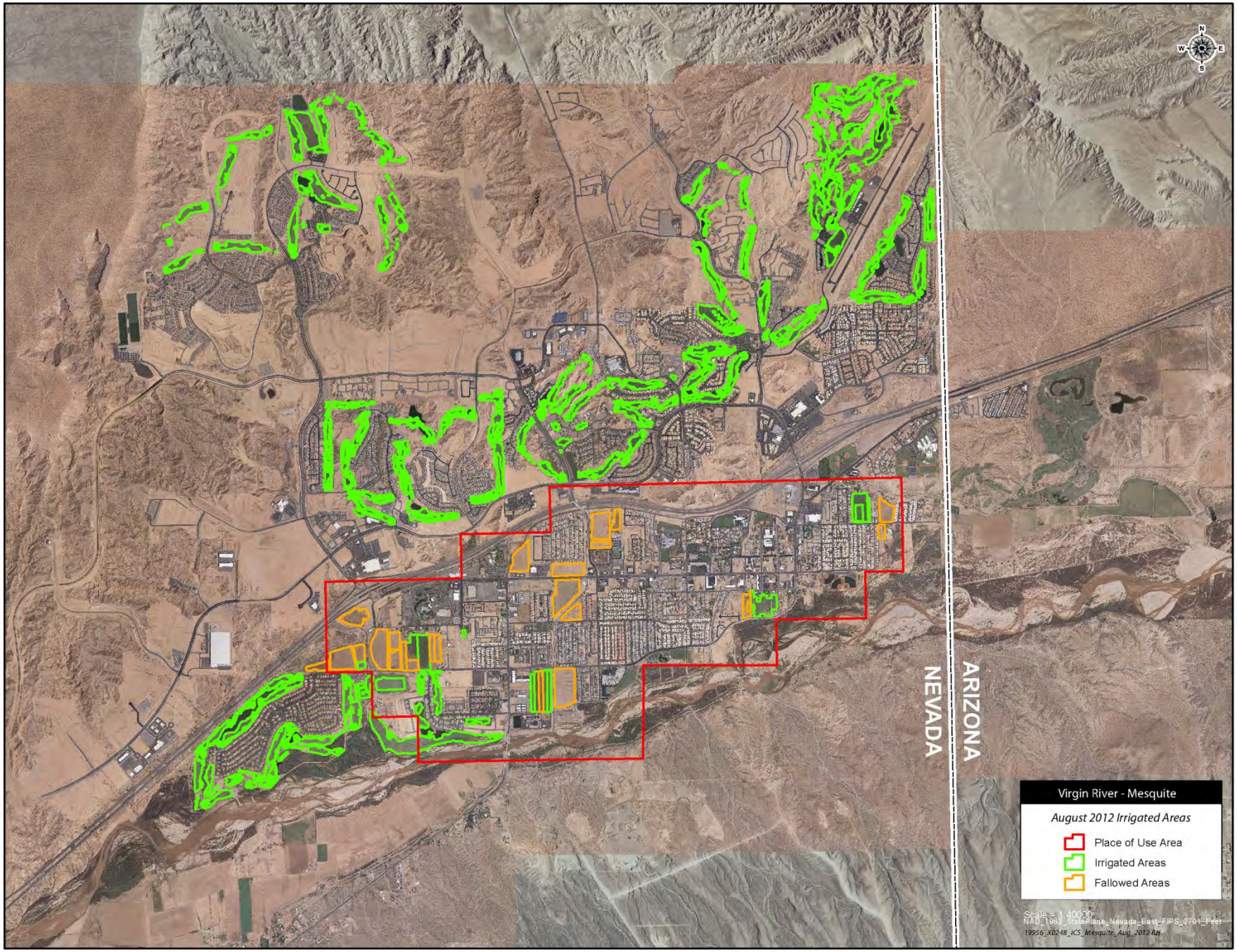

Figure 9 – August 2012 Aerial Photography and Fallowed Acreage for MIC

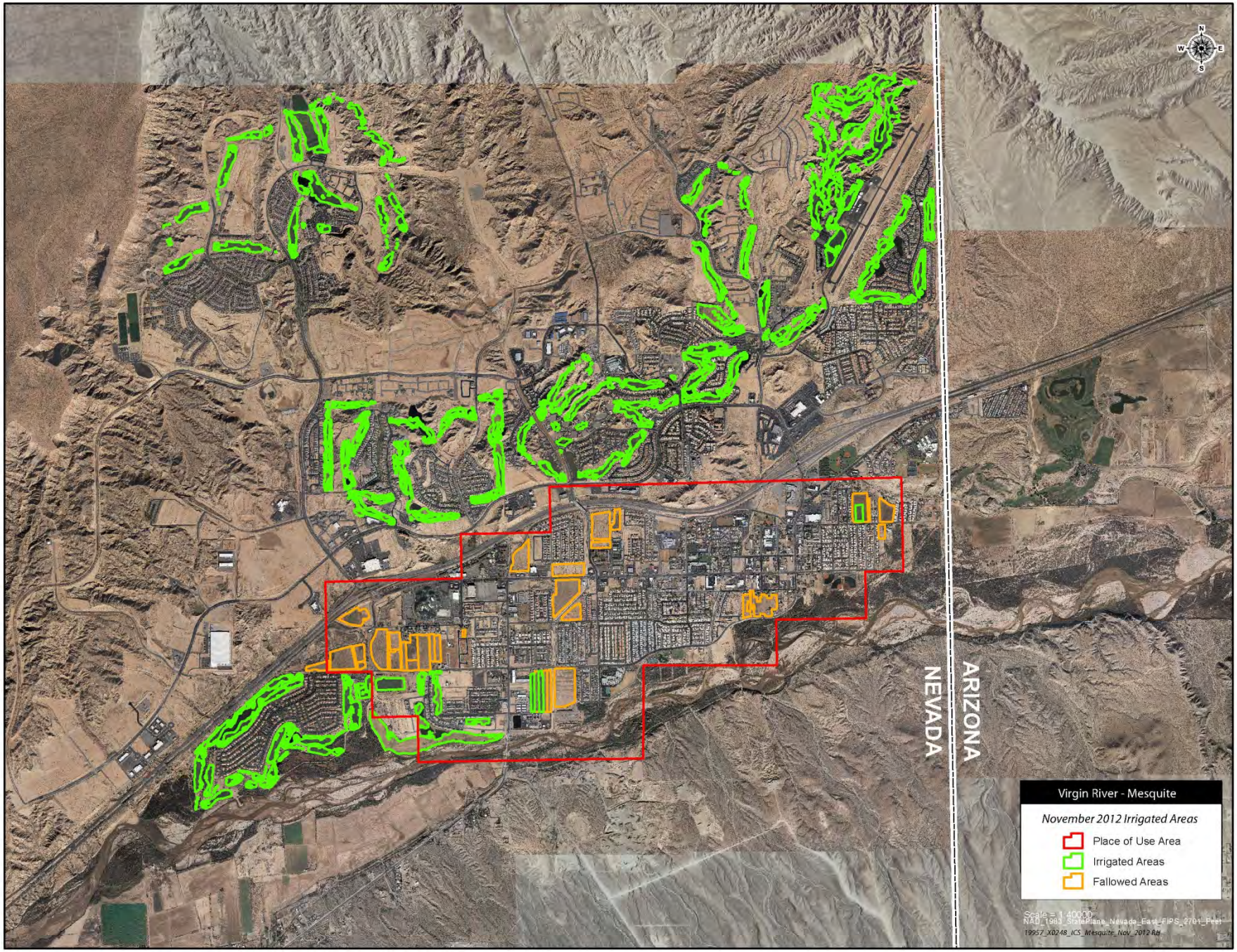

Figure 10 - November 2012 Aerial Photography and Fallowed Acreage for MIC

Riverside Area

The Riverside Area, located downstream of MIC, BIC, and the City of Mesquite, Nevada, is an agricultural area with specific permitted water rights with a designated POU.

In May, 2008, SNWA purchased a portion of water right Certificate No. 1153 which has a priority date of October 30, 1925. The certificate has a total water right of 1,062.26 af to irrigate 177.044 acres of land on the Lower Virgin River near Riverside, Nevada, at an annual duty of 6 af/acre. SNWA's controlled portion of Certificate No. 1153 is 601.97 afy, which represents approximately 100 acres based on an annual duty of 6 af/acre.

Water Rights Summary and Documentation of Conserved Water

Using the aerial photography obtained during CY 2012, fallowed lands within the Riverside Area were determined. Figure 11 through Figure 14 compares the POU for Certificate No. 1153 to the observed irrigated and fallowed lands in February, August, and November 2012, respectively.

Today, the configuration of agricultural fields is much different than in 1925 when the PBU map for Certificate 1153 was filed. This is probably due to land ownership changes and the migration of the Virgin River channel within its flood plain. Fallowed acreage within the 1925 POU, as seen in Figure 11 through Figure 14, was determined by subtracting the irrigated acreage from the total area of the 1925 POU during each season.

Table 4 details the calculations used to determine the monthly duty of water applied to irrigable lands in the Riverside area along with the volume of Virgin River water conserved through non-use. As indicated in Table 4, during the months of January through February 2012, 16.54 acres were irrigated resulting in 160.504 acres of fallowed lands; from March through September 49.02 acres were irrigated resulting in 128.024 acres of land fallowed; and from October through December 2012, none of the acreage was irrigated resulting in 177.044 acres of fallowed lands. Therefore, all 602 af of SNWA's controlled rights in the Riverside area can be accounted for as Tributary Conservation ICS created by SNWA in Lake Mead.

Table 4 - Calculated Volume of Conserved Water Rights within the Riverside Area Controlled by SNWA in CY 2012

Notation	Description	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
	# Days	31	28	31	30	31	30	31	31	30	31	30	31	365
A	*Total Certificate 1153 POU*	177.044	177.044	177.044	177.044	177.044	177.044	177.044	177.044	177.044	177.044	177.044	177.044	177.044
B	*Duty of Riverside Area Water Rights (af/acre)*	.5096	.4603	.5096	.4931	.5096	.4931	.5096	.5096	.4931	.5096	.4931	.5096	6.
C	*Acres Being Irrigated in Certificate 1153 POU*	16.54	16.54	16.54	49.02	49.02	49.02	49.02	49.02	49.02	.	.	.	
D = A - C	*Acres of Fallowed Land in Certificate 1153 POU*	160.504	160.504	160.504	128.024	128.024	128.024	128.024	128.024	128.024	177.044	177.044	177.044	
E = B * D	*Water Conserved from Fallowed Acreage (af)*	81.7928	73.88	81.7928	63.1286	65.241	63.1286	65.241	65.241	63.1286	90.2216	87.3004	90.2216	890.3183
F	*Acre-Feet per Month of SNWA's Owned Right*	51.1262	46.1785	51.1262	49.477	51.1262	49.477	51.1262	51.1262	49.477	51.1262	49.477	51.1262	601.97
E > F	*Is conservation > than SNWA rights*	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	
	Total ICS Created	**51.1262**	**46.1785**	**51.1262**	**49.477**	**51.1262**	**49.477**	**51.1262**	**51.1262**	**49.477**	**51.1262**	**49.477**	**51.1262**	**602.**

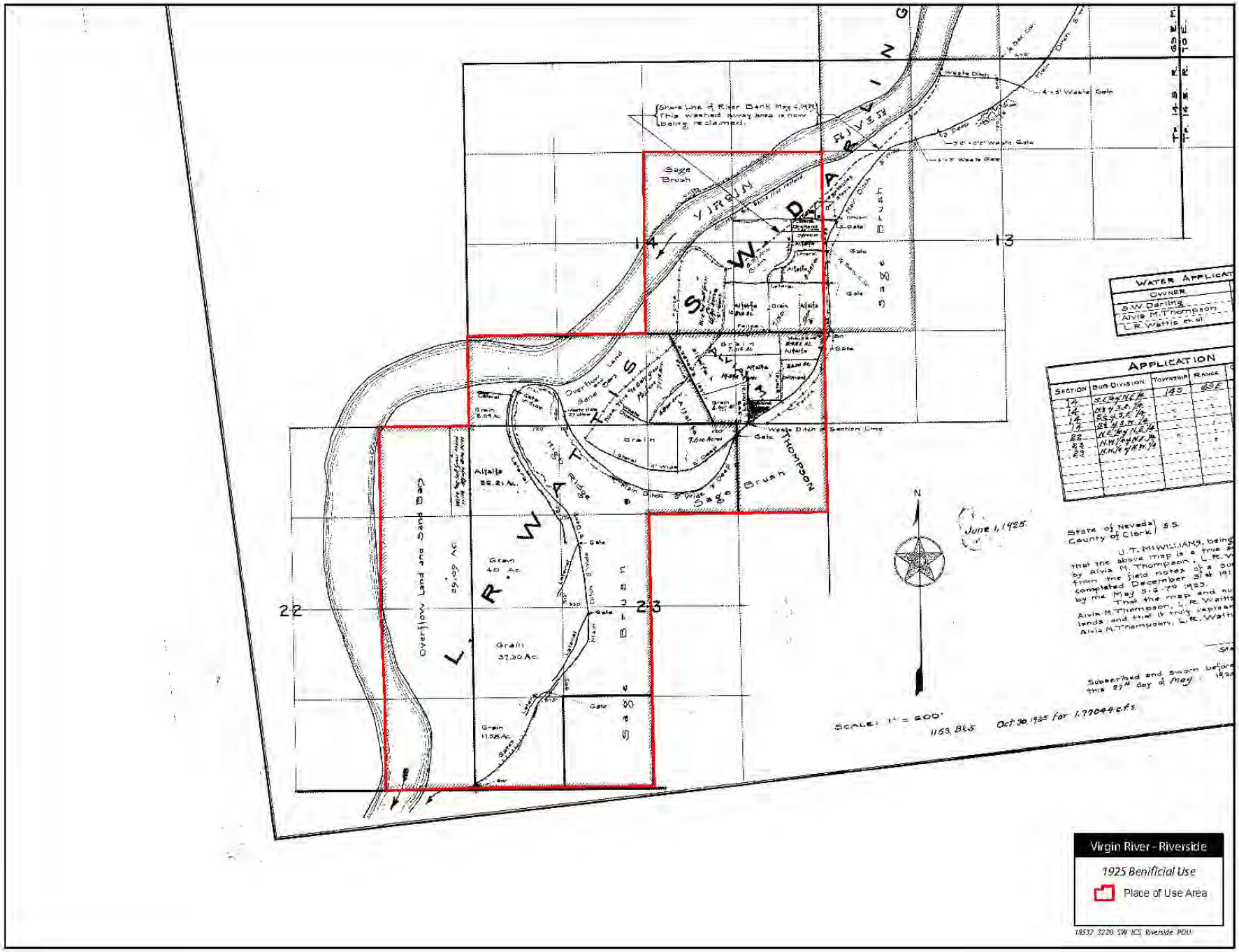

Figure 11 – Riverside Area 1925 PBU Map; POU Quarter-Quarter Sections Highlighted in Red

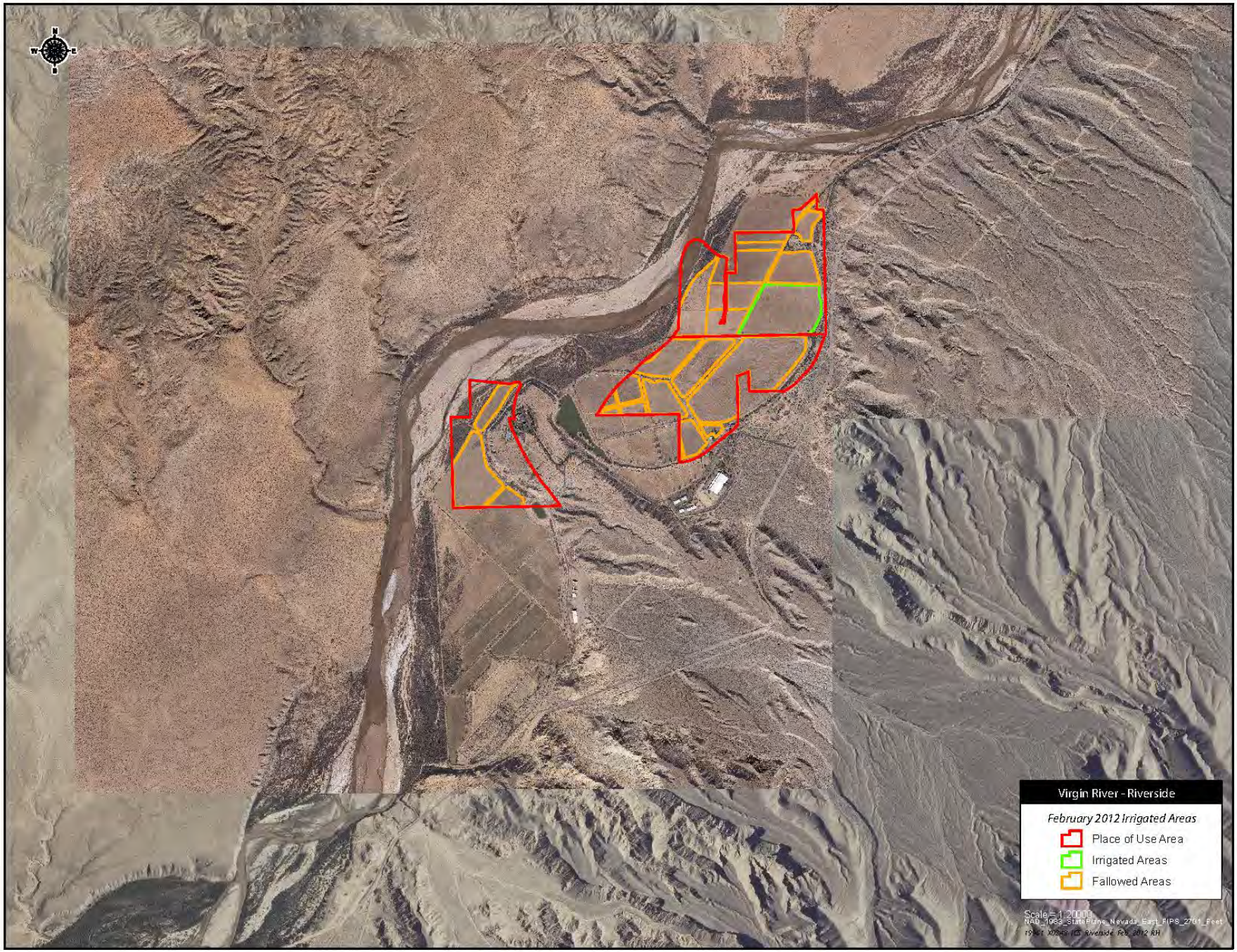

Figure 12 – February 2012 Aerial Photography and Fallowed Acreage for the Riverside Area

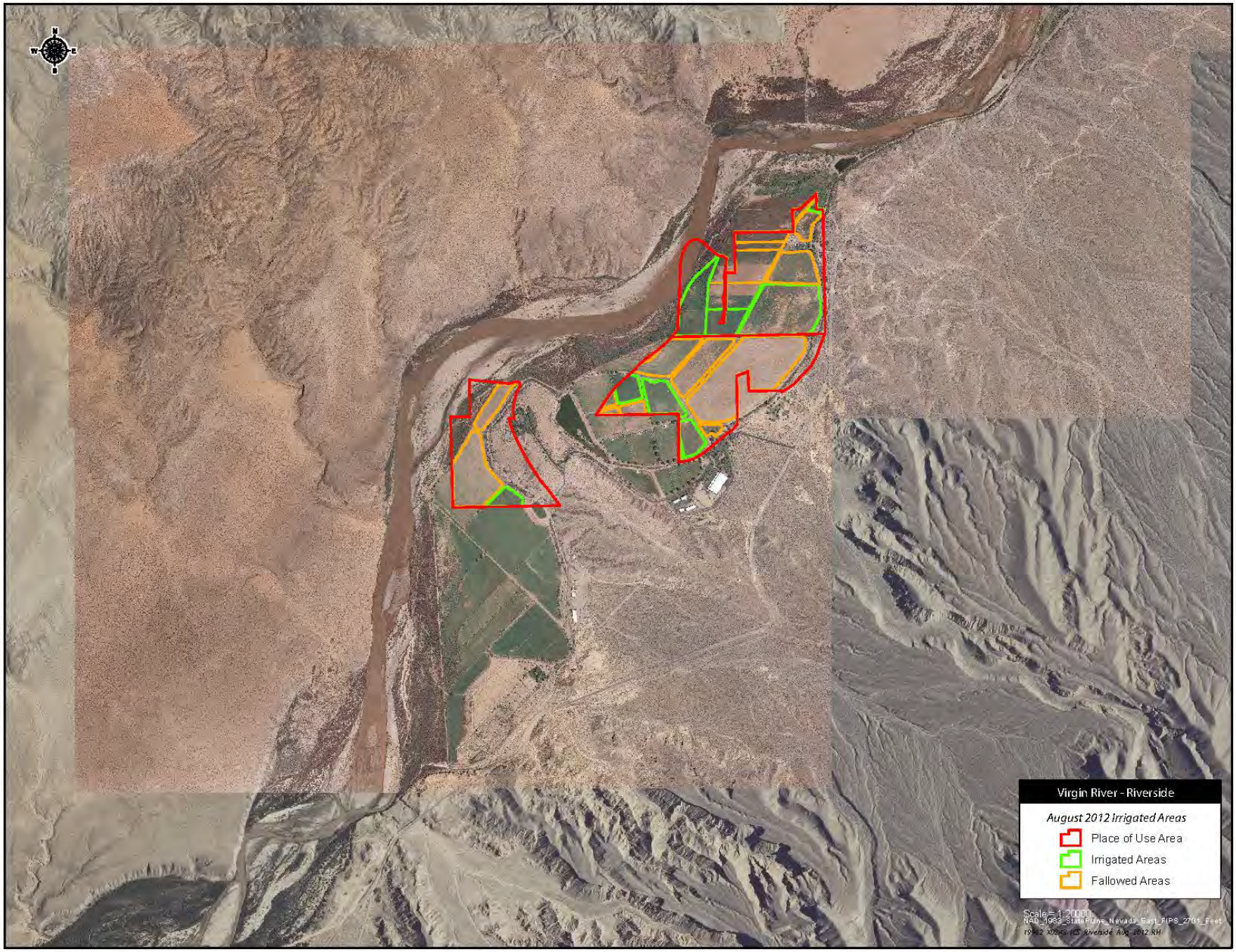

Figure 13 – August 2012 Aerial Photography and Fallowed Acreage for the Riverside Area

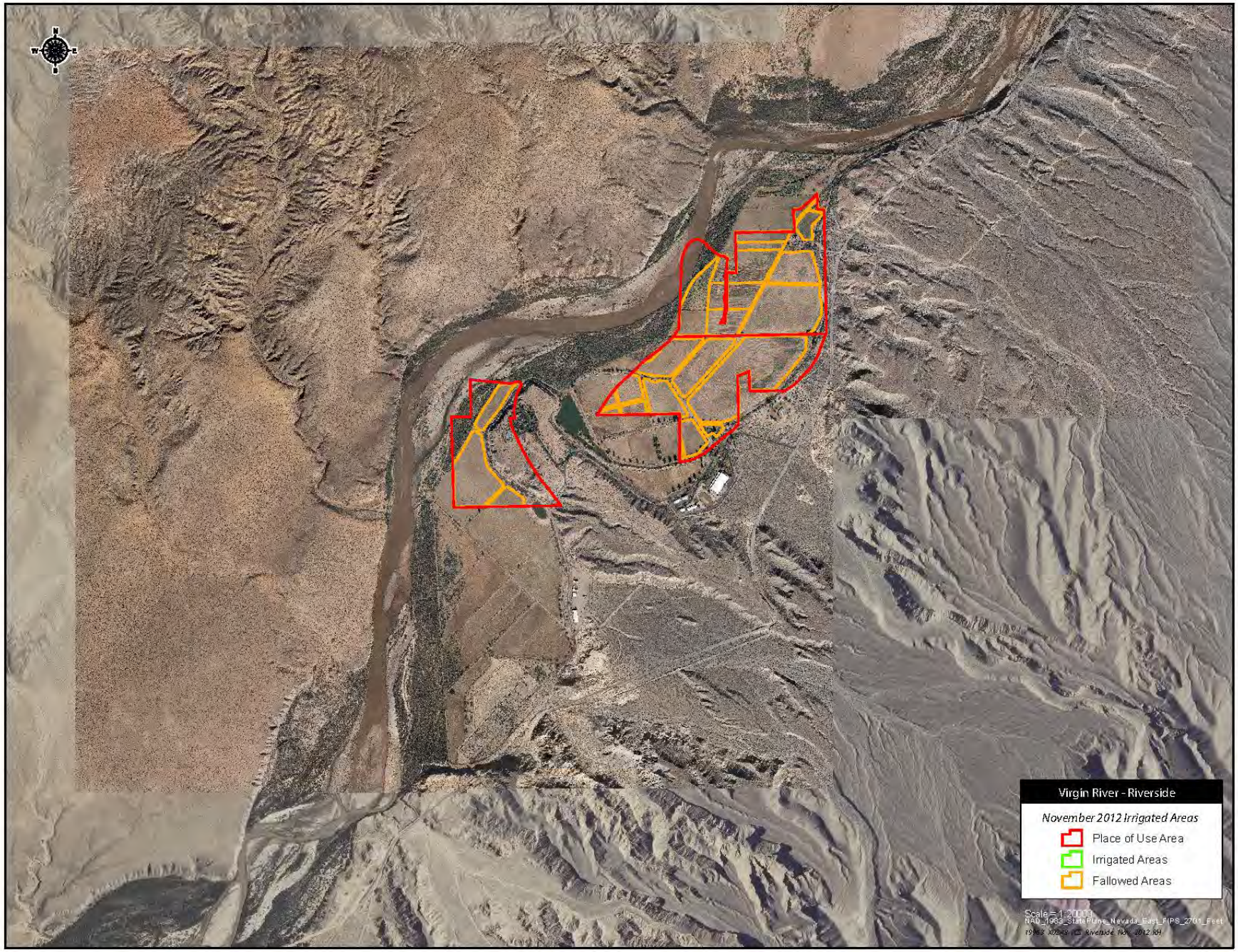

Figure 14 - November 2012 Aerial Photography and Fallowed Acreage for the Riverside Area

Conclusion

SNWA created 14,129 af of Virgin River Tributary Conservation ICS in Lake Mead, prior to any overrun payback and one-time deduction of 5% for the benefit of additional system storage in Lake Mead, during CY 2012 using SNWA owned and leased pre-BCPA Virgin River water rights. The method of creation was consistent with the approved CY 2012 ICS Plan, Forbearance Agreement, and Guidelines.

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Appendices on CD

Appendix A	Muddy River Exhibit A from Forbearance Agreement
Appendix B	2012 ICS Plan of Creation Submitted to the U.S. Bureau of Reclamation with Letter of Acceptance
Appendix C	Nevada State Engineer Order 1193
Appendix D	NDWR Report No. 1 Virgin River Water Rights
Appendix E	SNWA Requests for Offers to Purchase or Lease BIC and MIC Shares
Appendix F	BIC Letter of Concurrence
Appendix G	MIC Letter of Concurrence

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Exhibit A
Southern Nevada Water Authority
Virgin and Muddy Rivers Tributary Conservation,
Intentionally Created Surplus (ICS) Project

Summary: Nevada state water rights that predate the Boulder Canyon Project Act (BCPA) on the Virgin River have a priority date of pre-1905 and were decreed by the Nevada Supreme Court in 1927. The decree allocated 17,785 acre-feet per year (afy) to the Bunkerville and Mesquite Irrigation Companies, which represents approximately 10% of the annual average flow in the Virgin River above the Irrigation Companies.[1] The Southern Nevada Water Authority (SNWA) currently owns shares in the Bunkerville Irrigation Company representing approximately 3,700 afy of surface water rights.

On the Muddy River, water rights were decreed in 1920 and that decree allocated the entire flow of the Muddy River. On the Lower Muddy River, the entire flow of the river is diverted by the Muddy Valley Irrigation Company (MVIC) for agricultural use. SNWA currently owns shares in the Muddy Valley Irrigation Company representing approximately 7,000 afy of surface water rights and leases approximately 2,000 afy from the LDS Church, which are not represented by MVIC shares. The LDS Church lease is for a term of 20 years, with the option to renew the lease for an additional 20 years.

SNWA anticipates acquiring a total of approximately 30,000 afy of pre-BCPA water rights from entities with rights on the Virgin and Muddy Rivers. Approximately one-third of this amount is expected to come from the Virgin River and two-thirds from the Muddy River. This is consistent with the flow volumes that were analyzed in the Final Environmental Impact Statement, Colorado River Interim Guidelines for Lower Basin Shortages and Coordinated Operations for Lake Powell and Lake Mead and in the analysis for Lake Mead for the Lower Colorado River Multi-Species Conservation Program.

Retired agricultural water rights will be conveyed to Lake Mead's Overton Arm. The pre-BCPA water rights conveyed to Lake Mead represent the full right that is and has been historically used for agricultural purposes and could have otherwise been diverted from the Virgin or Muddy River and fully consumed by SNWA for municipal purposes.

Virgin and Muddy River rights conveyed to Lake Mead will either pass through their historic points of diversion, flow through the irrigation company ditches and return to the mainstream of the Virgin or Muddy River further downstream or will remain in the mainstream of the Virgin or Muddy River. The full right documented to flow to Lake Mead will be accounted for as Tributary Conservation ICS.

Virgin and Muddy River water rights that will be utilized to create Tributary Conservation pursuant to this Exhibit A of this Forbearance Agreement include both decreed Nevada state water rights that have been in continuous use since at least 1927 and decreed Nevada state water rights with an established history of use prior to 1927 but that have experienced periods of non-

[1] Annual average Virgin River flow for water years 1931 to 2006 at the U.S. Geological Survey (USGS) Virgin River at Littlefield, AZ gage, No. 09415000 was 176,000 afy.

use in the interim. Per this Exhibit A of this Forbearance Agreement, SNWA is specifically allowed to utilize any and all pre-BCPA Virgin and Muddy River water rights decreed by a Nevada State Court prior to 1928 to create Tributary Conservation ICS regardless of those water rights history of use after 1928.

Specific Water Rights: The sources of water that would create Tributary Conservation ICS credits covered by these two projects include:

i. Estimated 5,702 afy pursuant to 682 preferred shares in the Muddy Valley Irrigation Company[2]

ii. Estimated 1,460 afy pursuant to 1,921 common shares in the Muddy River Irrigation Company

iii. 2,001 afy pursuant to Certificate Nos. 6419, 25861, 26316, 26317 and 26318 (decreed Muddy River right not represented by MVIC shares).

iv. 3,710 afy pursuant to 350 shares of Bunkerville Irrigation Company stock[3]

v. Any other water rights represented by shares in the Bunkerville, Mesquite and Muddy Valley Irrigation Companies and other pre-1929 decreed rights to the Muddy and Virgin Rivers purchased or contractually acquired by SNWA.

Annual variations in the flow of the Muddy River from any cause will cause fluctuations in the quantity of water available per share in the Muddy Valley Irrigation Company and reduce or increase the quantity of Tributary Conservation ICS that is available.

Nevada State Approval: SNWA will acquire necessary approvals from the Nevada Division of Water Resources to allow the Nevada state water rights to be conveyed to Lake Mead to create Tributary Conservation ICS.

Plan for Creation and Verification of ICS: Pursuant to Sections 3.B. and 3.D. of the Interim Guidelines for the Operation of Lake Powell and Lake Mead, SNWA shall annually submit a plan to the Secretary of Interior. The annual plan will demonstrate the volume of water rights

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[2] Muddy River water rights were decreed in 1920 by the Tenth (now Eighth) Judicial District Court. Water rights on the lower Muddy River are divided into 2,432 preferred and 5,044 common shares of stock in the Muddy Valley Irrigation Company.

[3] Uses of surface water in Nevada prior to the water law of 1905 are considered vested rights, the quantification of which can only be judicially determined by a Nevada District Court in an adjudication proceeding. The Virgin River surface water uses prior to 1905 have been adjudicated by the Virgin River Decree pursuant to Proof No. 02038 filed by the Bunkerville Irrigation Company, and Proof No. 01968 filed by the Mesquite Irrigation Company. The Virgin River Decree was entered by the Tenth (now Eighth) Judicial District Court on May 14, 1927.

The Decree adjudicated water rights to Virgin River surface flow for irrigation of 1,963.08 acres for a total of 17,785.50 acre feet per year (AFY). The summer duty equals 1.0 cfs of flow for each 70 acres and the winter duty equals 1.0 cfs of flow for each 100 acres for a total duty of 9.06 afy per acre. The summer period is the months of March through September and the winter period is the months of October through February.

owned and/or contractually controlled by SNWA on the Virgin and Muddy Rivers, including any water rights in addition to those specified above that SNWA acquires subsequent to the execution of this Forbearance Agreement. The annual plan will also demonstrate how the Tributary Conservation ICS, as described in this Exhibit A will be created and accounted for to Lake Mead. Such verification plan will, at a minimum, include:

Muddy River

The 1920 Muddy River Decree allocated the entire flow of the Muddy River; therefore it is anticipated that accounting for Muddy River water at Lake Mead will require an annual accounting of the rights owned by SNWA based on actual USGS gage flows and a water budget of the flows on the Lower Muddy River as follows:

A. *Muddy River Rights Owned by SNWA:*

1. Upper Muddy River rights owned or contractually controlled by SNWA as quantified in the Muddy River Decree.

2. Shares of the Muddy Valley Irrigation Company owned or contractually controlled by SNWA. MVIC shares are quantified based on a percentage of the total flows (divided by total shares) in the Muddy River at the USGS Muddy River near Glendale, NV gage less the Upper Muddy River rights owned or controlled by SNWA that reach the gage.

3. Nos. 1 and 2 represent the water SNWA would release into the Lower Muddy River for the creation of ICS credits.

B. *Muddy River Flows reaching Lake Mead will be calculated as follows:*

Flows measured by USGS at Muddy River near Glendale, NV gage
- (minus) consumptive uses by agriculture below the Glendale gage
- (minus) direct uses by industry below the Glendale gage
- (minus) channel evapotranspiration below Glendale gage to Lake Mead
- (minus) evapotranspiration from the managed acreage on the Overton Wildlife Management Area (WMA)

= Total Flow to Lake Mead

C. If the total amount represented in A is equal to or greater than the amount calculated to reach Lake Mead in B, then SNWA shall be credited with the amount in B.

D. If the total amount in A is less than the amount in B, SNWA shall be credited with the amount in A.

E. Because the total volume of water SNWA currently owns and controls on the Muddy River represents a relatively small percentage of the total flow, conveyance losses of SNWA's current rights are negligible.

F. The total Muddy River flow reaching Lake Mead as calculated in B Above includes flows at the USGS Muddy River at Lewis Avenue at Overton, NV gage located just upstream of the Overton Wildlife Management Area and unmeasured underflow.

Virgin River

Because the Virgin River Decree allocated just 10% of the average annual flow in the Virgin River (17,785.50 afy) to irrigate 1,963.08 acres, Tributary Conservation ICS from the Virgin River can be calculated based on the reduction in agricultural acreage as follows:

Virgin River Calculation:

Decrease in total agricultural acreage decreed in the Bunkerville or Mesquite Irrigation Companies calculated using remote sensing and a Geographic Information System (as limited by the shares controlled by SNWA and the acreage it represents)
x the decreed duty per acre (9.06 acre-feet per acre)
= Flows to Lake Mead

Maximum ICS Created Under this Exhibit: Maximum amount of ICS that may be created by SNWA from these projects in one calendar year is limited to 50,000 acre-feet of Virgin and Muddy River water.

Use of SNWA 1989 Virgin River Rights: SNWA will not use Permit Nos. 54077 and 58591 (Nevada state permits for combined duty of 113,000 afy) in the future to support new development on the lands being fallowed near the Virgin River, excepting 5,000 acre-feet of such rights that SNWA is obligated to transfer to the Virgin Valley Water District and which SNWA cannot encumber.

In Witness of this Exhibit A to the Forbearance Agreement executed contemporaneously herewith, the Parties affix their official signatures below, acknowledging approval of this document on the 13th day of December, 2007.

Approved as to form:

By: W. Patrick Schiffer
Chief Counsel

THE STATE OF ARIZONA acting through the ARIZONA DEPARTMENT OF WATER RESOURCES

By: Herbert Guenther
Director

Attest:

By: _____
Edward W. Smith
General Manager

PALO VERDE IRRIGATION DISTRICT

By: _____
Charles VanDyke
Chair

Attest and Approved:

By: _____
John Penn Carter
Legal Counsel

IMPERIAL IRRIGATION DISTRICT

By: _____
Stella Altamirano-Mendoza
President

Approved as to form:

By: _____
Robert Hargreaves
City Attorney

THE CITY OF NEEDLES

By: _____
Jeff Williams
Mayor

Approved as to form:

By: _____
Steven B. Abbott
Legal Counsel

COACHELLA VALLEY WATER DISTRICT

By: _____
Steven B. Robbins
General Manager/Chief Engineer

Approved as to form:

By: _____
Karen L. Tachiki
General Counsel

THE METROPOLITAN WATER DISTRICT OF SOUTHERN CALIFORNIA

By: _____
Jeffrey Kightlinger
General Manager

Approved as to form:

By: _____
John J. Entsminger
Deputy General Counsel

SOUTHERN NEVADA WATER AUTHORITY

By: _____
Patricia Mulroy
General Manager

Approved as to form:

By: _____
Jennifer T. Crandell
Deputy Attorney General

COLORADO RIVER COMMISSION OF NEVADA

By: _____
George M. Caan
Executive Director

SOUTHERN NEVADA WATER AUTHORITY
100 City Parkway, Suite 700 • Las Vegas, NV 89106
MAILING ADDRESS: P.O. Box 99956 • Las Vegas, NV 89193-9956
(702) 862-3400 • snwa.com

June 30, 2011

Ms. Lorri Lee-Gray, Regional Director
Bureau of Reclamation
Lower Colorado Regional Office
P.O. Box 61470
Boulder City, Nevada 89006

Dear Ms. Lee-Gray:

SUBJECT: SOUTHERN NEVADA WATER AUTHORITY PLANS OF CREATION FOR MUDDY AND VIRGIN RIVER TRIBUTARY CONSERVATION AND COYOTE SPRING VALLEY IMPORTED INTENTIONALLY CREATED SURPLUS CALENDAR YEAR 2012

Enclosed are Southern Nevada Water Authority's (Authority) 2012 Plans of Creation (Plans) for Tributary Conservation Intentionally Created Surplus (ICS) for the Muddy and Virgin Rivers in Nevada, and Imported ICS from Coyote Spring Valley groundwater. Our Plans describe how we intend to meet all the requirements as outlined in Section 3 of the *Colorado River Interim Guidelines Lower Basin Shortages and the Coordinated Operations for Lake Powell and Lake Mead* (Guidelines). Calendar Year 2012 represents the 5th year in which the Authority will create ICS under the Guidelines.

As you know, the Guidelines require a Contractor to enter into a Delivery Agreement with the United States and a Forbearance Agreement with Lower Colorado River Basin Contract holders to create and take Tributary Conservation and Imported ICS. The Authority and Colorado River Commission (CRC) entered into a Delivery Agreement with the United States and a Forbearance Agreement with Lower Basin Contract holders on December 13, 2007. Exhibit A of the Forbearance Agreement describes the surface water rights on the Muddy and Virgin Rivers, pre-dating June 25, 1929, which the Authority plans to use to create Tributary Conservation ICS, and describes how the flows reaching Lake Mead will be calculated. Exhibit B of the Forbearance Agreement describes the groundwater rights from Coyote Spring Valley, which the Authority plans to use to create Imported ICS and how the imported water reaching Lake Mead will be calculated.

The enclosed Plans of Creation are consistent with the Guidelines, Forbearance Agreement, and Delivery Agreement. The Authority anticipates creating Tributary Conservation ICS and Imported ICS during Calendar Year 2012 as indicated below:

Calendar Year	**Potential Volume, in acre-feet/year** Cited in Plans of Creation		
	Virgin River	Muddy River	Coyote Spring Valley
2012	17,000	20,000	7,000

If you have any questions, please contact Jeff Johnson at 702-862-3748.

Sincerely,

for

William E. Rinne, Director
Surface Water Resources Department

WR:JJ:lmv

Enclosures (3)

c: Jayne Harkins, Director, Colorado River Commission of Nevada
Steve Hvinden, Office Director, Lower Colorado River Regional Office, Bureau of Reclamation w/enclosures
Paul Matuska, Manager, Water Conservation and Accounting Group, Lower Colorado River Regional Office, Bureau of Reclamation w/enclosures

Virgin River Intentionally Created Surplus (ICS) Tributary Conservation Plan of Creation Calendar Year 2012

Introduction

The Secretary of Interior (Secretary) issued a Record of Decision for *Colorado River Interim Guidelines for Lower Basin Shortages and the Coordinated Operations for Lake Powell and Lake Mead* (Guidelines) on December 13, 2007, which established criteria for the development and delivery of Intentionally Created Surplus (ICS). One type of ICS is Tributary Conservation, which allows a Contractor[1] to increase tributary flows into the mainstream of the Colorado River within its state for ICS credits. The conservation of tributary flows into the mainstream of the Colorado River is limited to water rights that have been used for a significant period of years and were perfected prior to June 25, 1929, the effective date of the Boulder Canyon Project Act (Pre-BCPA Water Rights).

To generate ICS, the Guidelines require a Contract holder to enter into a Delivery Agreement with the United States of America and a Forbearance Agreement with Lower Basin Contract holders. The Southern Nevada Water Authority (SNWA) and Colorado River Commission of Nevada (CRC) entered into a Forbearance Agreement with Lower Basin Contract holders on December 13, 2007. Exhibit A of the Forbearance Agreement describes the surface water rights on the Muddy and Virgin Rivers, pre-dating June 25, 1929, which SNWA plans to use to create Tributary Conservation ICS, and how the Virgin River flows reaching Lake Mead will be calculated.

The SNWA and CRC entered into a Delivery Agreement with the United States of America on December 13, 2007. Exhibit A from the Forbearance Agreement is attached to the Delivery Agreement.

The Guidelines, Forbearance Agreement, and Delivery Agreement require a plan for the creation of ICS (ICS Plan) be submitted to the Secretary of Interior demonstrating how all requirements of the Guidelines will be met. Section G.3.B.1 of the Guidelines outline that an ICS Plan will consist of, at a minimum, the following information:

a. Project Description including what extraordinary measures will be taken to conserve or import the water

b. Term of Activity

c. Estimate of the amount of water that will be conserved

[1] "Contractor" in the Guidelines "shall mean an entity holding an entitlement to Mainstream water under (a) the Consolidated Decree, (b) a water delivery contract with the United States through the Secretary, or (c) a reservation of water by the Secretary, whether the entitlement is obtained under (a), (b), or (c) before or after the adoption of the Guidelines.

d. Proposed methodology for verification of the amount of water conserved

e. Documentation regarding any state or federal permits or other regulatory approvals that have already been obtained by the Contractor or that need to be obtained prior to the creation of ICS

The following sections document each of these requirements. It is important to note that the majority of the information presented below is reiterated from Exhibit A of the Forbearance Agreement and Delivery Agreement.

Project Description

Virgin River water rights that will be utilized to create Tributary Conservation pursuant to this ICS Plan and Exhibit A of the Forbearance Agreement are decreed and permitted Nevada state water rights with an established history of use prior to 1927, but that have experienced periods of non-use in the interim. Per Exhibit A of the Forbearance Agreement, SNWA is specifically allowed to utilize any and all pre-June 25, 1929, Virgin River water rights to create Tributary Conservation ICS regardless of those water rights history of use after 1928.

The Virgin River begins in southwestern Utah, flows through Arizona and Nevada, and terminates in Lake Mead (Figure 1). The average annual flow of the Virgin River at U.S. Geological Survey gaging station *09415000 Virgin River at Littlefield, AZ* for water years 1931 to 2010 was 173,100 acre-feet per year (afy).

Nevada state water rights that pre-date the Boulder Canyon Project Act (BCPA) on the Virgin River are comprised of pre-1905 priority surface water rights decreed by the Nevada Supreme Court in 1927 for 17,785 afy to the Bunkerville and Mesquite Irrigation Companies, and additional permitted and certificated rights authorized by the Nevada Division of Water Resources (NDWR).

Retired agricultural water rights acquired by SNWA will be conveyed to Lake Mead along Lake Mead's Overton Arm. The pre-June 25, 1929, water rights conveyed to Lake Mead represent the full right that is and has been historically used for agricultural or could have otherwise been diverted from the Virgin River and fully consumed by the SNWA in Nevada.

Virgin River rights conveyed to Lake Mead will pass through their historic points of diversion and either flow through the irrigation company ditches and return to the mainstream of the Virgin River further downstream or will remain in the mainstream of the Virgin River. The full rights controlled by SNWA to flow to Lake Mead will be accounted for as Tributary Conservation ICS.

Term of Activity

The term of activity for this ICS Plan is Calendar Year 2012. SNWA anticipates receiving Tributary Conservation ICS credit for Virgin River water into the foreseeable

future. As more water rights are acquired and more land is fallowed, the amount of water claimed as Tributary Conservation ICS is anticipated to increase. Subsequent ICS Plans will be updated to reflect the acquired pre-June 25, 1929, water rights.

Leases of shares in the Bunkerville and Mesquite Irrigation Companies are on a water year basis; therefore, the number of shares leased after September 2012, may change. For planning purposes, the number of leased shares in January 2012, are estimated to be leased for the full calendar year.

Estimate of Water Conserved

SNWA currently owns or controls the following Virgin River rights:

- Bunkerville Irrigation Company: Approximately 948 shares representing approximately 7,500 afy of surface water rights. These shares are owned and leased by SNWA. The lease contracts are based on water years (October 1 to September 30).

- Mesquite Irrigation Company: Approximately 870 shares representing approximately 7,500 afy of surface water rights. These shares are owned and leased by SNWA. The lease contracts are based on water years (October 1 to September 30).

- A portion of Certificate 1153 with a priority date of 1914 for 601.97 afy designated to irrigate a portion of 177.044 acres of land (Figure 2).

.

For Calendar Year 2012, SNWA anticipates creating up to 17,000 acre-feet (af) of Tributary Conservation ICS with the above rights which pre-date June 25, 1929.

Methodology

Because the acreage represented by the water rights SNWA controls a small percentage (< 15%) of the total annual flow of the Virgin River, Tributary Conservation ICS on the Virgin River can be calculated based on the reduction in agricultural acreage as follows:

Virgin River Calculation:

Decrease in total agricultural acreage permitted by the Nevada Division of Water Resources calculated using remote sensing & GIS
x The duty per acre specified by the water right

= Flows to Lake Mead (Elevation 1,220 AMSL)

A. Proof of Fallowed Land

To demonstrate the fallowing of land and the conservation of water, aerial photography will be flown, ground-truthed, and analyzed periodically during the calendar year. A Geographic Information System (GIS) will be used to compare the current irrigated acreage with acreage defined by the water rights as approved by the Nevada Division of Water Resources. On the attached maps, the original Place of Use (POU) is shown as a red polygon. Subsequent Proof of Beneficial Use (PBU) maps were submitted in support of additional permits to NDWR and are included as yellow polygons on the maps for reference.

B. Certification Report

i. In compliance with Section G.3.D of the Guidelines, a Certification Report will be submitted for the Secretary's review and verification, demonstrating the amount of ICS created and that the method of creation was consistent with this ICS Plan, the Forbearance Agreement, and Delivery Agreement. The Certification Report will be submitted to the Secretary in the year following the creation of the ICS.

ii. The Certification Report, at a minimum, will include:

- Proof of acreage fallowed using aerial photography and GIS
- Documentation and calculations of the amount of the pre-June 25, 1929, water rights reaching Lake Mead owned or controlled by SNWA
- Letter from NDWR verifying the quantity of water conveyed through the Virgin River to the Colorado River mainstream for the purpose of creating ICS

Regulatory Approvals

Tributary Conservation ICS on the Virgin River was evaluated in the Environmental Impact Statement and Record of Decision (dated December 13, 2007) for the Guidelines. Similarly, compliance for Virgin River Tributary Conservation ICS was also obtained under section 7 of the Endangered Species Act through formal consultation with the U.S. Fish and Wildlife Service. The Final Biological Opinion for the Guidelines was issued December 12, 2007.

The NDWR issued State Engineer Order 1193 on July 15, 2008, regarding Tributary Conservation ICS on the Virgin River. The Order outlines the Nevada water rights on the Virgin River and the following process for verification of Virgin River rights being conveyed to the Colorado River mainstream:

> Nevada State Engineer Order 1193 states… "An entity with an ICS Delivery Contract, which uses water rights adjudicated under the Virgin River Decree or water rights on the Virgin River issued by the State Engineer with a priority date prior to June 25, 1929 for the creation of ICS, shall file an annual report with the State Engineer's Office. The annual report shall give a full accounting of water rights on the Virgin River owned or controlled by the entity with an ICS Delivery Contract, which have been conveyed through the Virgin River system to the Colorado River mainstream for the creation of ICS. After review of the annual report, the State Engineer shall issue a letter verifying the quantity of water conveyed through the Virgin River system to the Colorado River mainstream for the purpose of creating ICS."

Figure 1. Lower Virgin River showing Places of Use (red) for Pre-BCPA Water Rights

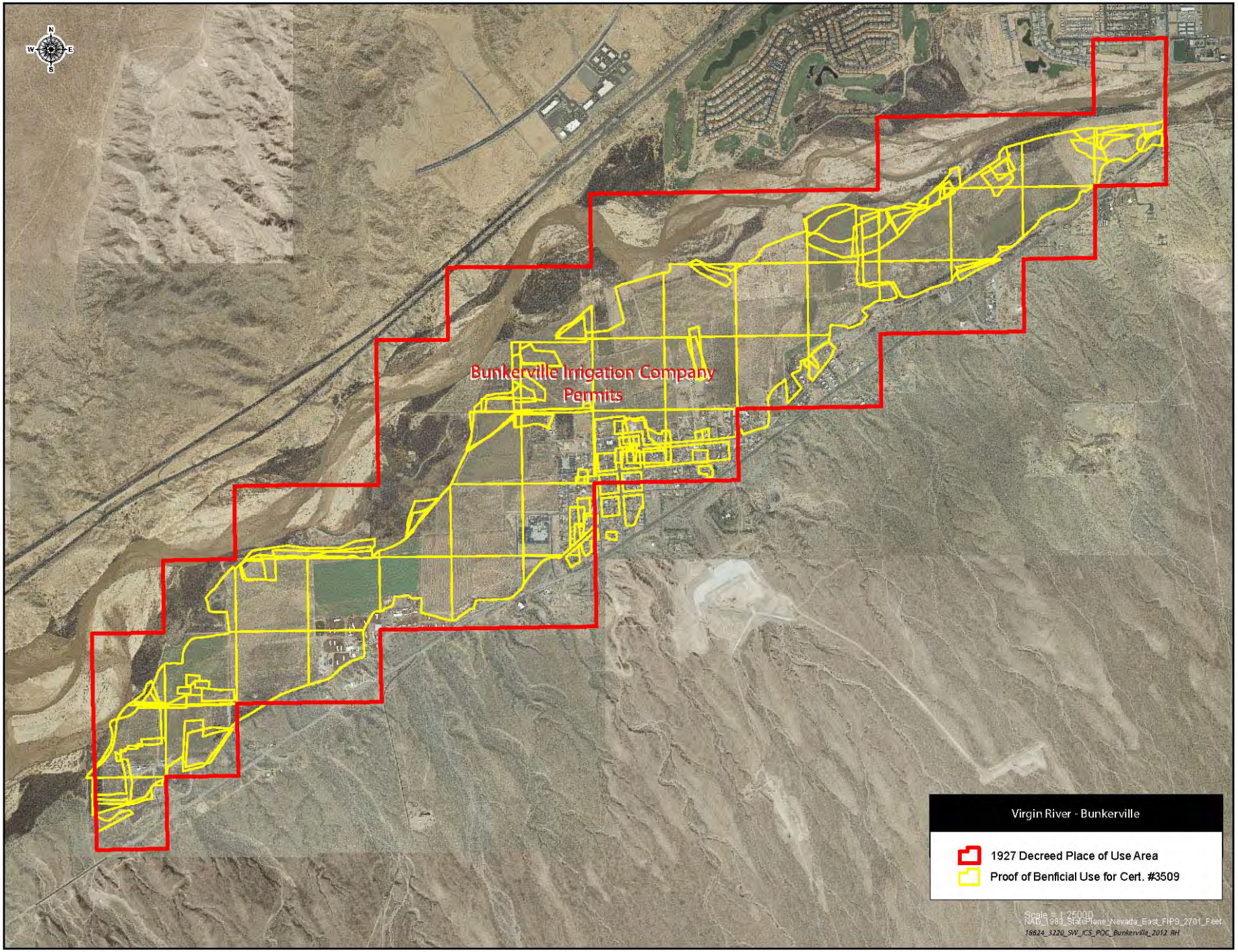

Figure 2 - Bunkerville Decreed Place of Use (red) and Proof of Beneficial Use (yellow). Aerial Photography February 2011

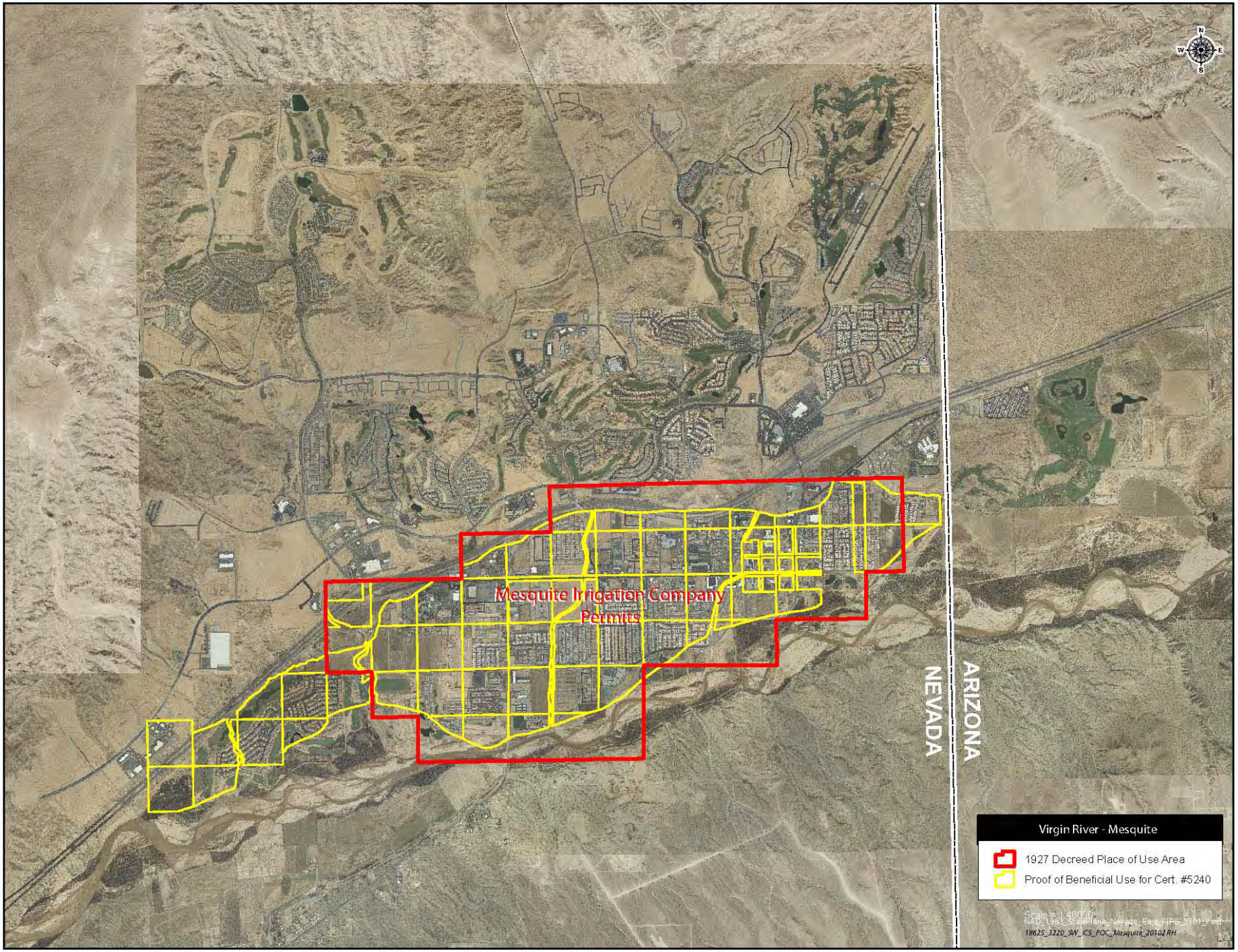

Figure 3 - Mesquite Decreed Place of Use (red) and Proof of Beneficial Use (yellow). Aerial Photography February 2011

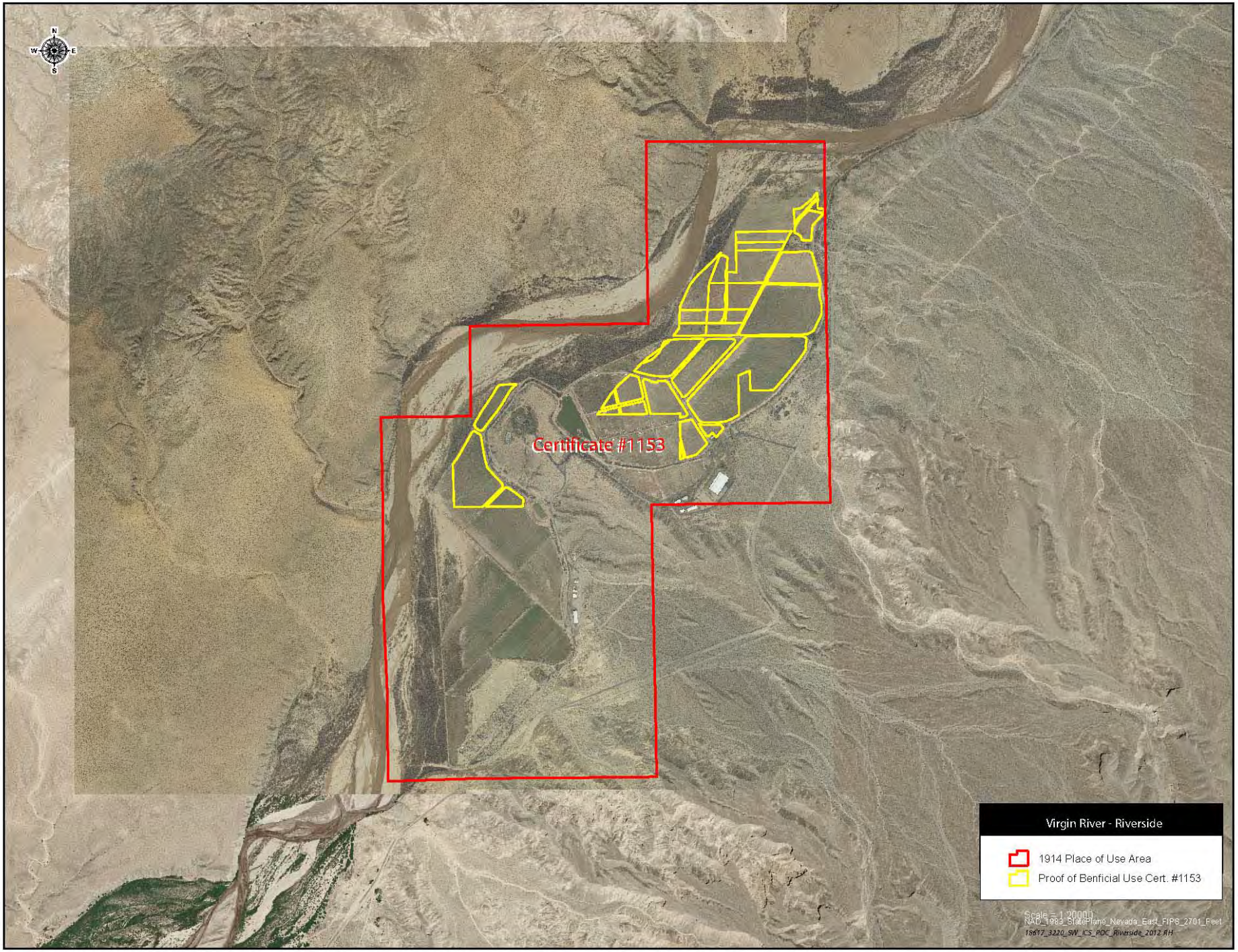

Figure 4 – Riverside Certificate 1153 Decreed Place of Use (red) and Proof of Beneficial Use (yellow). Aerial Photography February 2011

Muddy River Intentionally Created Surplus (ICS) Tributary Conservation Plan of Creation Calendar Year 2012

Introduction

The Secretary of Interior (Secretary) issued a Record of Decision for *Colorado River Interim Guidelines for Lower Basin Shortages and the Coordinated Operations for Lake Powell and Lake Mead* (Guidelines) on December 13, 2007, which established criteria for the development and delivery of Intentionally Created Surplus (ICS). One type of ICS is Tributary Conservation, which allows a Contractor[1] to increase tributary flows into the mainstream of the Colorado River within its state for ICS credits. The conservation of tributary flows into the mainstream of the Colorado River is limited to water rights that have been used for a significant period of years and were perfected prior to June 25, 1929, the effective date of the Boulder Canyon Project Act.

To generate ICS, the Guidelines require a Contract holder to enter into a Delivery Agreement with the United States of America and a Forbearance Agreement with Lower Basin Contract holders. The Southern Nevada Water Authority (SNWA) and Colorado River Commission of Nevada (CRC) entered into a Forbearance Agreement with Lower Basin Contract holders on December 13, 2007. Exhibit A of the Forbearance Agreement describes the surface water rights on the Muddy and Virgin Rivers, pre-dating June 25, 1929, which SNWA plans to use to create Tributary Conservation ICS, and how the Muddy River flows reaching Lake Mead will be calculated.

SNWA and CRC entered into a Delivery Agreement with the United States of America on December 13, 2007. Exhibit A from the Forbearance Agreement is attached to the Delivery Agreement.

The Guidelines, Forbearance Agreement, and Delivery Agreement require a plan for the creation of ICS (ICS Plan) be submitted to the Secretary of Interior demonstrating how all requirements of the Guidelines will be met. Section G.3.B.1 of the Guidelines outline that an ICS Plan will consist of, at a minimum, the following information:

a. Project Description including what extraordinary measures will be taken to conserve or import the water

b. Term of Activity

c. Estimate of the amount of water that will be conserved

[1] "Contractor" in the Guidelines "shall mean an entity holding an entitlement to Mainstream water under (a) the Consolidated Decree, (b) a water delivery contract with the United States through the Secretary, or (c) a reservation of water by the Secretary, whether the entitlement is obtained under (a), (b), or (c) before or after the adoption of the Guidelines.

d. Proposed methodology for verification of the amount of water conserved

e. Documentation regarding any state or federal permits or other regulatory approvals that have already been obtained by the Contractor or that need to be obtained prior to the creation of ICS

The following sections document each of these requirements. It is important to note that the majority of the information presented below is reiterated from Exhibit A of the Forbearance Agreement and Delivery Agreement.

Project Description

Muddy River water rights that will be utilized to create Tributary Conservation pursuant to this ICS Plan and Exhibit A of the Forbearance Agreement are decreed Nevada state water rights with an established history of use prior to 1927, but that have experienced periods of non-use in the interim. Per Exhibit A of the Forbearance Agreement, SNWA is specifically allowed to utilize any and all pre-June 25, 1929, Muddy River water rights to create Tributary Conservation ICS regardless of those water rights history of use after 1928.

The Muddy River originates from regional springs in the Muddy Springs Area in Nevada and flows into the Overton Arm of Lake Mead (Figure 1). Muddy River flows are relatively constant because the springs that form the river discharge water from the regional carbonate aquifer system of eastern Nevada. The average annual flow of the Muddy River at U.S. Geological Survey (USGS) gaging station 09419000 *Muddy River near Glendale, NV* for water years 1950 to 2010 was 30,450 acre-feet per year (afy).

On the Muddy River, water rights were decreed in 1920 and the decree allocated the entire flow of the Muddy River. On the Lower Muddy River, the entire flow of the river is diverted by the Muddy Valley Irrigation Company (MVIC) for agricultural use. SNWA owns and is leasing shares in MVIC. In addition, SNWA leases and owns decreed Muddy River water rights on the upper reach of the Muddy River, which are not represented by MVIC shares.

Retired agricultural water rights controlled by SNWA will be conveyed to Lake Mead along Lake Mead's Overton Arm. The pre-June 25, 1929, water rights conveyed to Lake Mead represent the full right that is and has been historically used for agricultural or could have otherwise been diverted from the Muddy River and fully consumed by SNWA within Nevada.

Muddy River rights conveyed to Lake Mead will pass through their historic points of diversion and either flow through the irrigation company ditches and return to the mainstream of the Muddy River further downstream or will remain in the mainstream of the Muddy River. The full rights controlled by SNWA to flow to Lake Mead will be accounted for as Tributary Conservation ICS.

Term of Activity

The term of activity for this ICS Plan is Calendar Year 2012. SNWA anticipates receiving Tributary Conservation ICS credit for Muddy River water into the foreseeable future. As more water rights are acquired and more land is fallowed, the amount of water claimed as Tributary Conservation ICS is anticipated to increase. Subsequent ICS Plans will be updated to reflect the acquired pre-June 25, 1929, water rights.

Estimate of Water Conserved

SNWA currently owns or controls the following Muddy River water rights:

1. *MVIC Shares*. The volume of water represented by MVIC shares is quantified based on a percentage of the total flows (divided by total shares) in the Muddy River at the USGS gage *Muddy River near Glendale, NV* (Glendale gage) less the Upper Muddy River rights owned or controlled by SNWA that reach the gage (Figure 2).

    a. Owned MVIC shares[2]

        i. 1,009 preferred shares in the MVIC estimated to represent approximately 6,500 afy in 2012.

        ii. 2,839 common shares in the MVIC estimated to represent approximately 2,000 afy in 2012.

        iii. If additional shares are acquired, the water rights represented by the shares will be included in the year-end Certification Report.

        iv. Some shares purchased by SNWA have a provision for the seller to lease the shares back from SNWA for agricultural use. The amount of water being leased-back by sellers varies by year and is not known until just before the beginning of the water year when sellers must notify SNWA of their intention to lease the water back for agricultural use. As an example, in 2010 approximately 1,600 acre-feet (af) of purchased shares were leased back to the seller.

[2] Muddy River water rights were decreed in 1920 by the Tenth (now Eighth) Judicial District Court. Water rights on the Lower Muddy River are divided into 2,432 preferred and 5,044 common shares of stock in the Muddy Valley Irrigation Company.

b. Leased MVIC shares[3]

The lease contracts for both preferred and common shares in MVIC are on a water year schedule, therefore the amount of leased shares may change at the beginning of water year 2012 (October 2011) depending on renewal of leases.

i. Approximately 238 preferred shares are expected to be leased in the MVIC from January to September 2012. For planning purposes the lease of 239 preferred shares for CY 2012 are estimated to represent about 1,700 af.

ii. Approximately 560 common shares are expected to be leased in the MVIC from January to September 2012. . For planning purposes the lease of 560 common shares for CY 2012 are estimated to represent about 500 af.

2. Up to 2,001 afy leased from the Church of Latter Day Saints (LDS Lease) pursuant to Certificate Nos. 6795, 10944, 10951, 10952, and 10953 (decreed Muddy River rights not represented by MVIC shares) in 2012 (Figure 3) being leased by SNWA.

3. Muddy River decree proofs V01619 and V01631 also referred to as the Cox and Mitchell Rights for a total of 111 afy that SNWA acquired with the purchase of the Warm Springs Natural Area (Figure 3).

4. Up to 1,040 afy pursuant to the Muddy River decree owned by SNWA (not represented by MVIC shares, commonly referred to as the Hidden Valley rights) (Figure 4).

5. Up to 3,700 afy pursuant to Permits 73482, 73483, and 73695 held by the Moapa Band of Paiutes. These rights are being leased by SNWA from the Moapa Band of Paiutes (Figure 5).

6. Up to 811 afy of decreed Muddy River water under Certificate 9609 which was acquired by SNWA (referred to as the Knox and Holmes right in this document) (Figure 6).

7. Up to 3,000 afy pursuant to Certificates 7316 and 13851 held by MVIC and being leased by SNWA.

For Calendar Year 2012, SNWA anticipates creating up to 20,000 af of Tributary Conservation ICS from these pre-June 25, 1929, water rights.

[3] SNWA has entered into lease agreements with individual share holders for terms ranging between 1 and 10 years.

Methodology

Muddy River Flows reaching Lake Mead will be calculated as follows:

Flows measured by USGS at the Glendale gage
- (minus) consumptive uses by agriculture below the Glendale gage
- (minus) direct uses by industry below the Glendale gage
- (minus) channel evapotranspiration below Glendale gage to Lake Mead
- (minus) evapotranspiration from the managed acreage on the Overton Wildlife Management Area (WMA)

= Total Flow to Lake Mead (Elevation 1,220 AMSL)

- To calculate the consumptive uses of crops and phreatophytes in the Lower Muddy River, a combination of data from the Lower Colorado River Accounting Study (LCRAS), Nevada Division of Water Resource's *Evapotranspiration and Net Irrigation Requirements for Nevada* report and locally measured reference ET data will be used.

- If the total amount of water represented by the rights controlled by SNWA described in this ICS Plan and documented in the Certification Report (described below) is found to be equal to or less than the amount of water calculated to reach Lake Mead, then SNWA shall be credited with the full amount of water rights described in the ICS Plan.

- If the total amount of water rights described in this ICS Plan and documented in the Certification Report is more than the amount calculated to reach Lake Mead, SNWA shall be credited with only the amount calculated to reach Lake Mead.

- The total Muddy River flow reaching Lake Mead as calculated above includes flows at the USGS gage *Muddy River at Lewis Avenue at Overton, NV* located just upstream of the WMA and unmeasured underflow.

A. Proof of Fallowed Land:

To demonstrate the fallowing of land and the conservation of water, aerial photography will be flown, ground-truthed, and analyzed during the calendar year. A Geographic Information System (GIS) will be used to compare the current irrigated acreage with acreage defined by the water rights as approved by the Nevada Division of Water Resources and the Muddy River decree. On the attached maps, the original Place of Use (POU) is shown as a red polygon. If a subsequent Proof of Beneficial Use (PBU) map was submitted to NDWR, the PBU boundaries are included as yellow polygons for reference. PBU maps were not filed for all decreed rights, since it is not required for vested rights; implying

beneficial use was initiated prior to the establishment of Nevada Water Law in 1905.

B. Certification Report

i. In compliance with Section G.3.D of the Guidelines, a Certification Report will be submitted for the Secretary's review and verification, demonstrating the amount of ICS created and that the method of creation was consistent with this ICS Plan, the Forbearance Agreement, and Delivery Agreement. The Certification Report will be submitted to the Secretary in the year following the creation of the ICS.

ii. The Certification Report, at a minimum, will include:

- Proof of acreage fallowed using aerial photography and GIS
- Calculations of the amount of pre-June 25, 1929, water rights reaching Lake Mead, including gage records of Muddy River flows as required
- Documentation and calculations of the amount of pre-June 25, 1929, water rights reaching Lake Mead owned or controlled by SNWA
- Letter from the Nevada Division of Water Resources verifying the quantity of water conveyed through the Muddy River system to the Colorado River mainstream for the purpose of creating ICS

Regulatory Approvals

Tributary Conservation ICS on the Muddy River was evaluated in the Environmental Impact Statement and Record of Decision (dated December 13, 2007) for the Guidelines. Similarly, compliance for Muddy River Tributary Conservation ICS was also obtained under section 7 of the Endangered Species Act through formal consultation with the U.S. Fish and Wildlife Service. The Final Biological Opinion for the Guidelines was issued December 12, 2007.

The NDWR issued State Engineer Order 1194 on July 15, 2008, regarding Tributary Conservation ICS on the Muddy River. The Order outlines the Nevada water rights on the Muddy River and the following process for verification of Muddy River rights being conveyed to the Colorado River mainstream:

> Nevada State Engineer Order 1194 states… "An entity with an ICS Delivery Contract, which uses water rights adjudicated under the Muddy River Decree for the creation of ICS, shall file an annual report with the State Engineer's Office. The annual report shall give a full accounting of adjudicated water rights on the Muddy River or its tributaries owned or controlled by the entity with an ICS Delivery Contract, which have been conveyed through the Muddy River system to the Colorado River mainstream for the creation of ICS. After review of the annual report, the State Engineer shall issue a letter verifying the quantity of water conveyed through the Muddy River system to the Colorado River mainstream for the purpose of creating ICS."

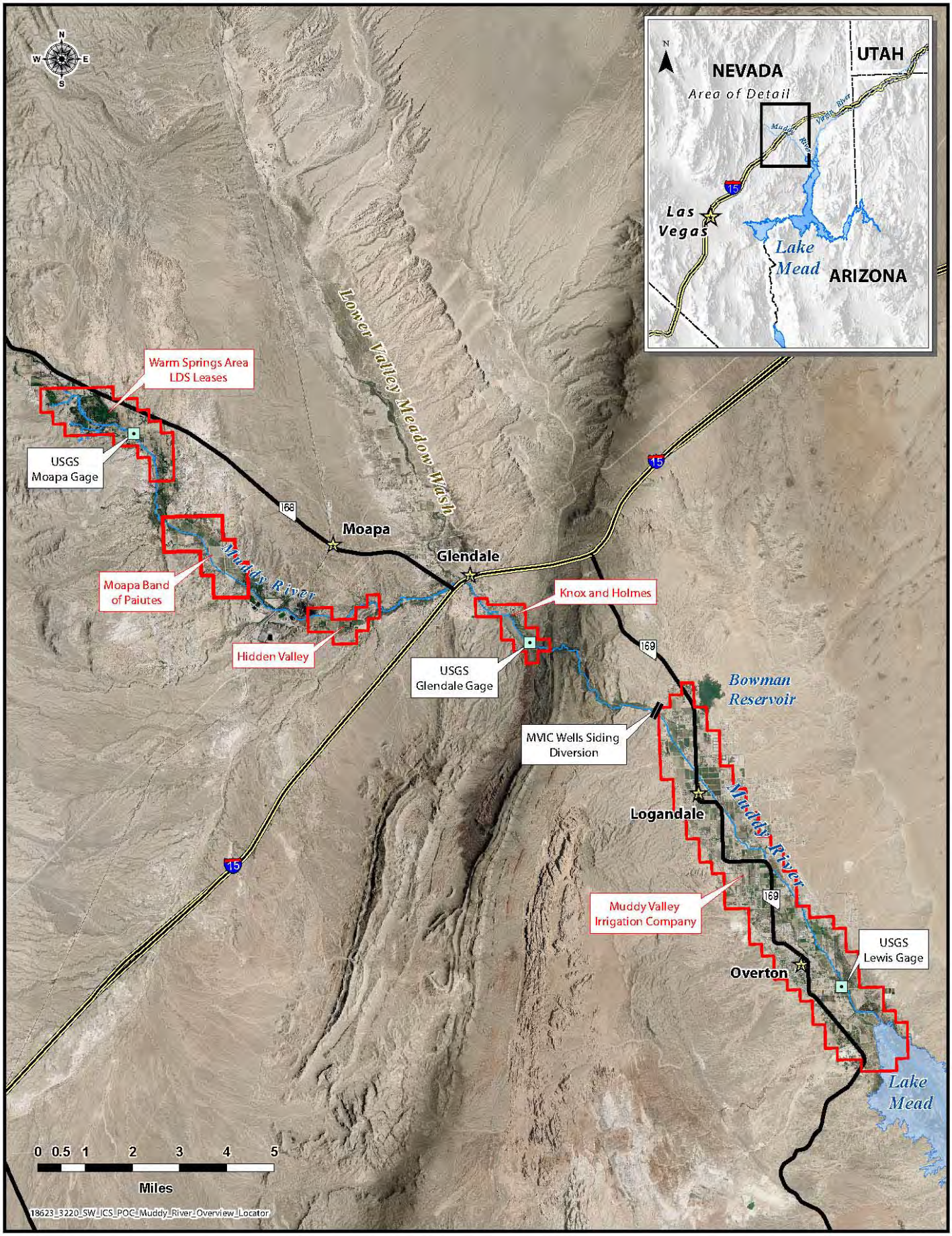

Figure 1- Muddy River

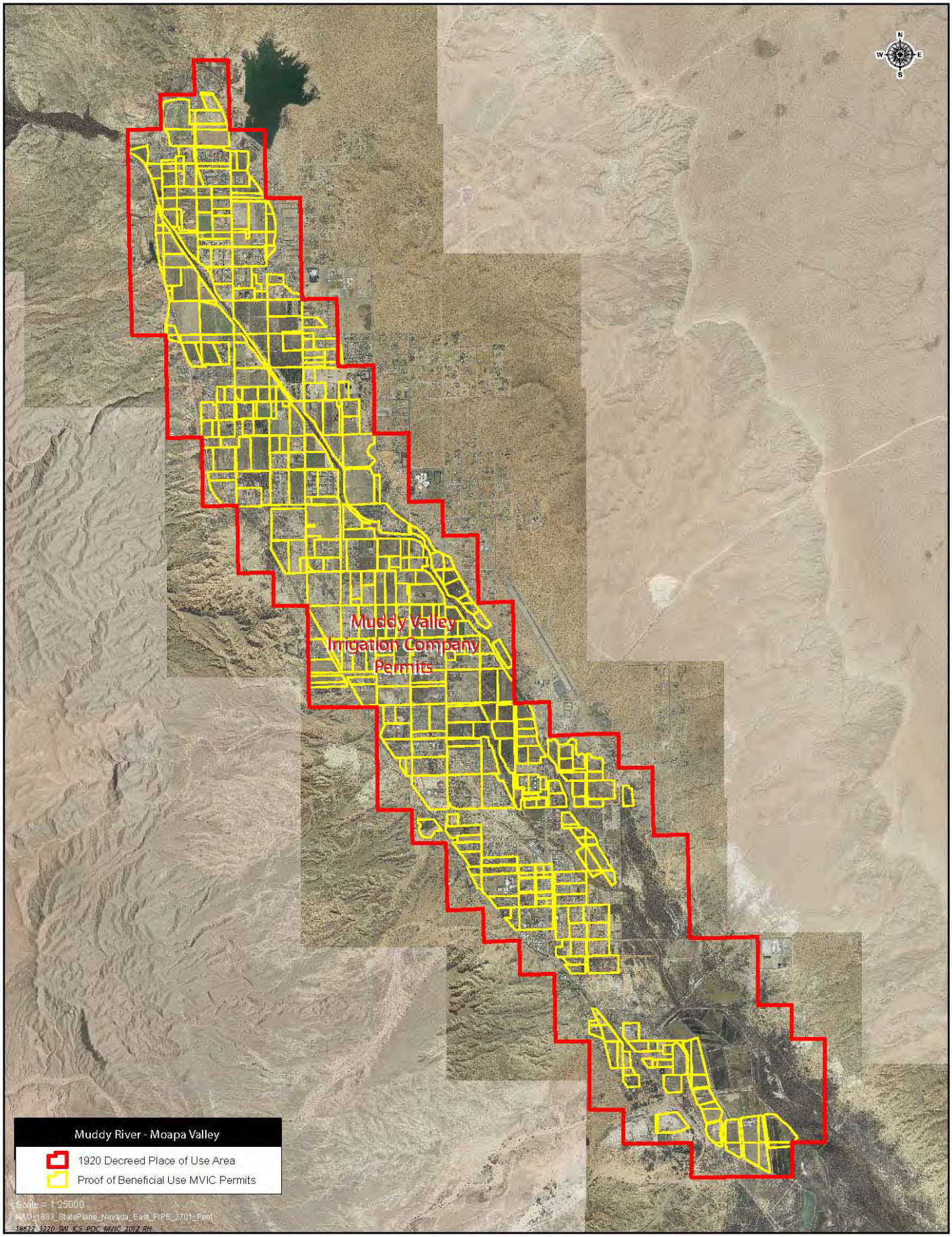

Figure 2- MVIC Decreed POU and PBU. Aerial Photography February 2011

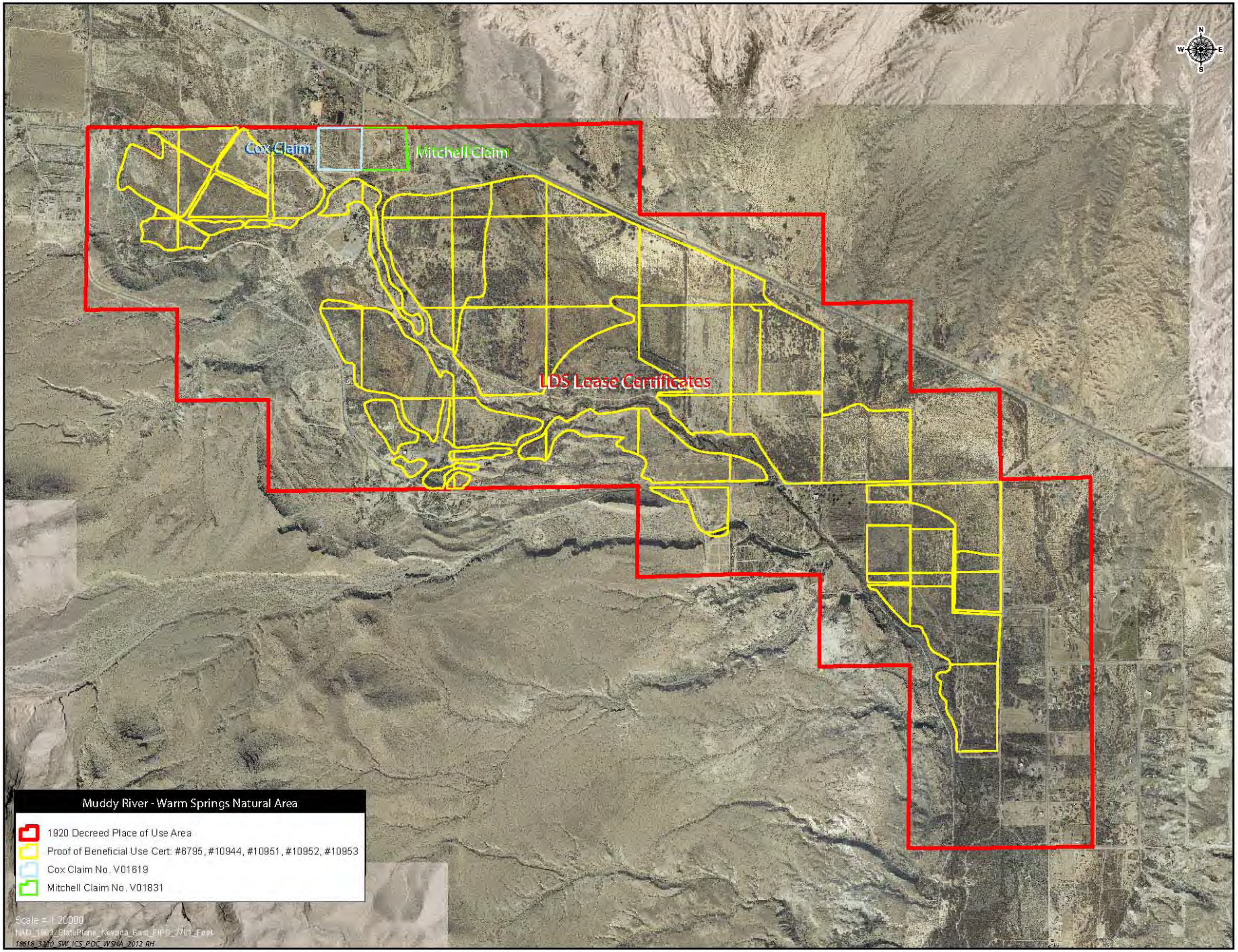

Figure 3- LDS Water Rights POU and PBU and Cox and Mitchell POU Aerial Photography February 2011

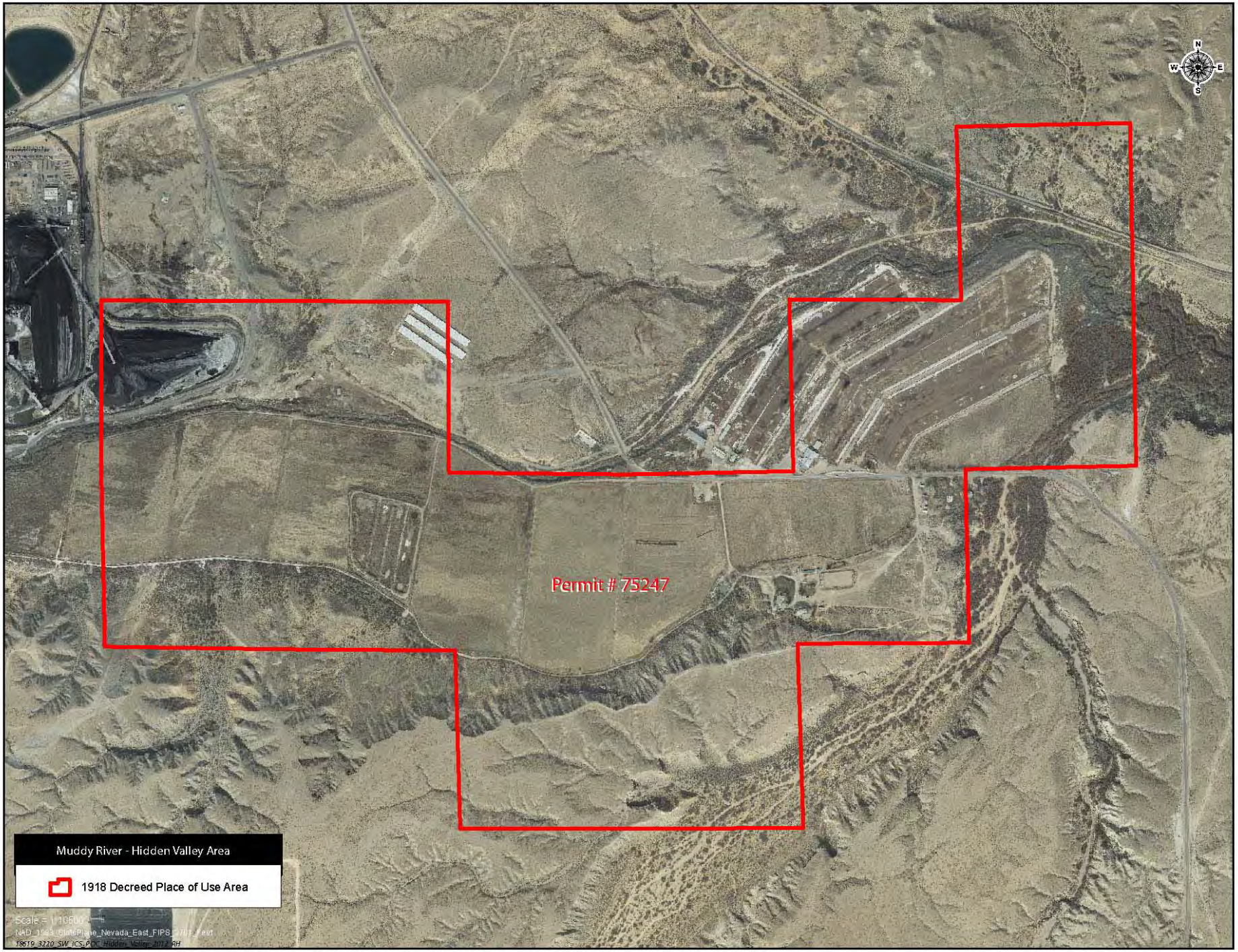

Figure 4- Hidden Valley Decreed Water Right POU. Aerial Photography February 2011

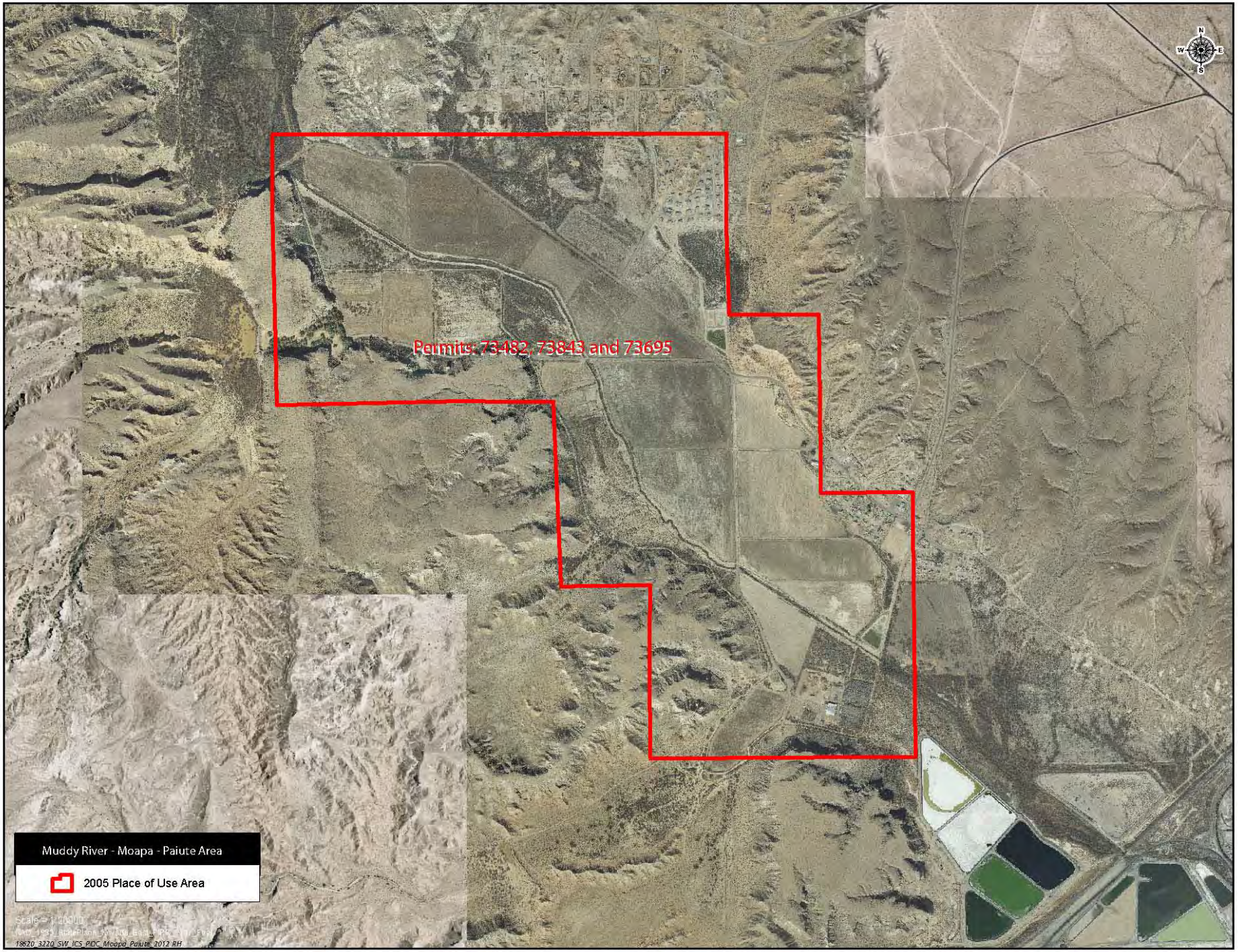

Figure 5- Moapa Band of Paiutes POU. Aerial Photography February 2011

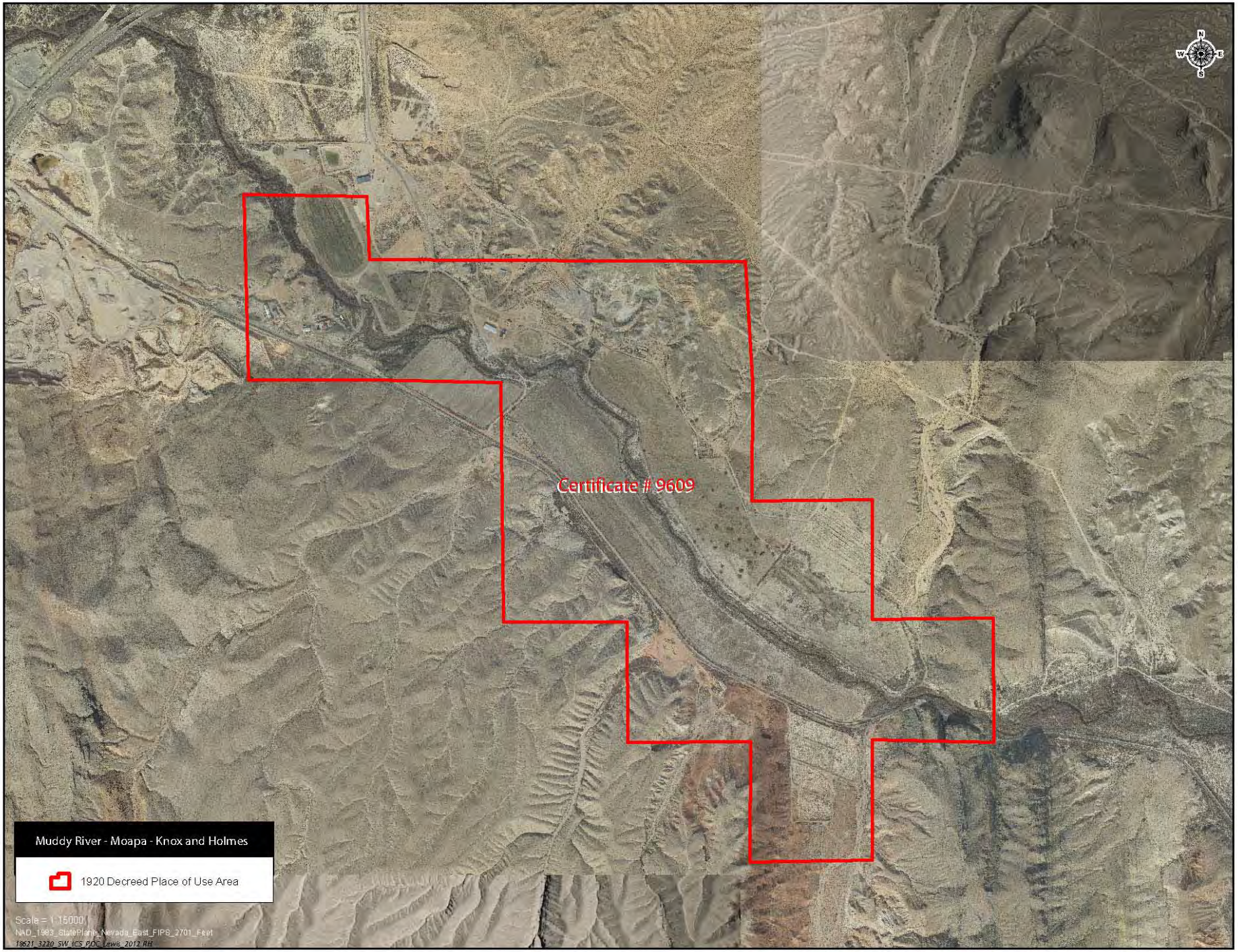

Figure 6– Knox and Holmes Decreed Water Right POU. Aerial Photography February 2011

Coyote Spring Valley Intentionally Created Surplus (ICS)
Imported ICS Plan of Creation
Calendar Year 2012

Introduction

The Secretary of Interior (Secretary) issued a Record of Decision for *Colorado River Interim Guidelines for Lower Basin Shortages and the Coordinated Operations for Lake Powell and Lake Mead* (Guidelines) on December 13, 2007, which established criteria for the development and delivery of Intentionally Created Surplus (ICS). One type of ICS is Imported ICS, which allows a Contractor[1] to introduce non-Colorado River System water from the Contractor's state into the mainstream of the Colorado River for ICS credits.

To generate ICS, the Guidelines require a Contract holder to enter into a Delivery Agreement with the United States of America and a Forbearance Agreement with Lower Basin Contract holders. The Southern Nevada Water Authority (SNWA) and Colorado River Commission of Nevada (CRC) entered into a Forbearance Agreement with Lower Basin Contract holders on December 13, 2007. Exhibit B of the Forbearance Agreement describes the State of Nevada groundwater rights in Coyote Spring Valley which SNWA plans to use to create Imported ICS, and how the Coyote Spring Valley groundwater conveyed to Lake Mead will be calculated.

The SNWA and CRC entered into a Delivery Agreement with the United States of America on December 13, 2007. Exhibit B from the Forbearance Agreement is attached to the Delivery Agreement.

The Guidelines, Forbearance Agreement, and Delivery Agreement require a plan for the creation of ICS (ICS Plan) be submitted to the Secretary of Interior demonstrating how all requirements of the Guidelines will be met. Section G.3.B.1 of the Guidelines outline that an ICS Plan will consist of, at a minimum, the following information:

a. Project Description including what extraordinary measures will be taken to conserve or import the water

b. Term of Activity

c. Estimate of the amount of water that will be imported

d. Proposed methodology for verification of the amount of water imported

[1] "Contractor" in the Guidelines "shall mean an entity holding an entitlement to mainstream water under (a) the Consolidated Decree, (b) a water delivery contract with the United States through the Secretary, or (c) a reservation of water by the Secretary, whether the entitlement is obtained under (a), (b), or (c) before or after the adoption of the Guidelines.

e. Documentation regarding any state or federal permits or other regulatory approvals that have already been obtained by the Contractor or that need to be obtained prior to the creation of ICS

The following sections document each of these requirements. It is important to note that the majority of the information presented below is reiterated from Exhibit B of the Forbearance Agreement and Delivery Agreement.

Project Description

Coyote Spring Valley groundwater rights that will be utilized to create Imported ICS pursuant to this ICS Plan and Exhibit B of the Forbearance Agreement are groundwater rights permitted by the Nevada Division of Water Resources.

Coyote Spring Valley is located approximately 50 miles north of the Las Vegas Valley and lies within Clark and Lincoln counties. SNWA will convey permitted groundwater rights and possibly additional groundwater rights granted by the Nevada Division of Water Resources through the recently constructed SNWA Coyote Spring transmission system. (Figure 1). The groundwater will then be conveyed through the Moapa Valley Water District's (MVWD) municipal supply system and discharged to the Muddy Valley Irrigation Company's irrigation system and the Muddy River. The water will then be allowed to flow down the Muddy River to Lake Mead. The metered groundwater rights that flow to Lake Mead will be accounted for as Imported ICS.

Term of Activity

The term of activity for this ICS Plan is Calendar Year 2012. SNWA anticipates receiving Imported ICS credit for Coyote Spring Valley groundwater conveyed to Lake Mead into the foreseeable future. As operational changes occur and if additional water rights are permitted, the amount of water claimed as Imported ICS may change. Subsequent ICS Plans will be updated to reflect any changes.

Estimate of Water Imported

Based on current operational limitations and water rights, SNWA is planning to convey up to 7,000 acre-feet (af) of Coyote Spring Valley groundwater rights to Lake Mead in Calendar Year 2012.

As outlined in Exhibit B of the Forbearance Agreement, the maximum amount of Imported ICS that may be created by SNWA from Nevada state water rights in one year is limited to 15,000 af from the following:

1. 9,000 acre-feet per year pursuant to Permit Nos. 49414, 49660 to 49662 and 49978 to 49987.

2. Water permitted for appropriation by the Nevada State Engineer pursuant to Application Nos. 54055 through 54059, inclusive.

3. Any effluent generated by the direct use of water rights specified in paragraphs 1 and 2 above by the MVWD or other municipal agency outside of the Las Vegas Valley and treated and discharged to Lake Mead in accordance with all applicable state and federal laws.

Methodology

Coyote Spring Valley groundwater introduced into the Muddy River channel (downstream of the U.S. Geological Survey (USGS) Glendale gage) in Lower Moapa Valley will be metered and will be in addition to SNWA Muddy River Tributary Conservation ICS water already in the channel, as determined from Muddy River flows at the USGS Glendale gage. Consumptive use by evapotranspiration in the Muddy River channel and Overton Wildlife Management Area will be accounted for in the Muddy River Certification Report for the Tributary Conservation ICS.

In compliance with Section G.3.D of the Guidelines, a Certification Report will be submitted for the Secretary's review and verification, demonstrating the amount of Imported ICS created and that the method of creation was consistent with this ICS Plan, the Forbearance Agreement, and Delivery Agreement. The Certification Report will be submitted to the Secretary in the year following the creation of the ICS. The Certification Report, at a minimum, will include:

- Documentation of metered discharge into the Muddy River
- Summary of Tributary Conservation ICS on the Muddy River accounting for evapotranspiration in the Muddy River channel and the Overton Wildlife Management Area
- Letter from the Nevada Division of Water Resources verifying the quantity of water conveyed from Coyote Spring Valley and discharged into the lower Muddy River system and to the Colorado River mainstream for the purpose of creating ICS

Regulatory Approvals

The SNWA will acquire necessary approvals from the Nevada Division of Water Resources to develop and convey Nevada state water rights to Lake Mead to create Imported ICS. The Coyote Spring Well and Moapa Transmission System Project were evaluated under the National Environmental Policy Act in the Environmental Assessment and Finding of No Significant Impact/Decision Record dated June 22, 2007. In addition, compliance under Section 7 of the Endangered Species Act was obtained through formal consultation with the U.S. Fish and Wildlife Service. The Final Biological Opinion for the Coyote Spring Well and Moapa Transmission System Project was issued May 9, 2007. SNWA has obtained a National Pollutant Discharge Elimination System (NPDES) permit for discharge of Coyote Spring Valley groundwater into the Muddy River from the Nevada Division of Environmental Protection.

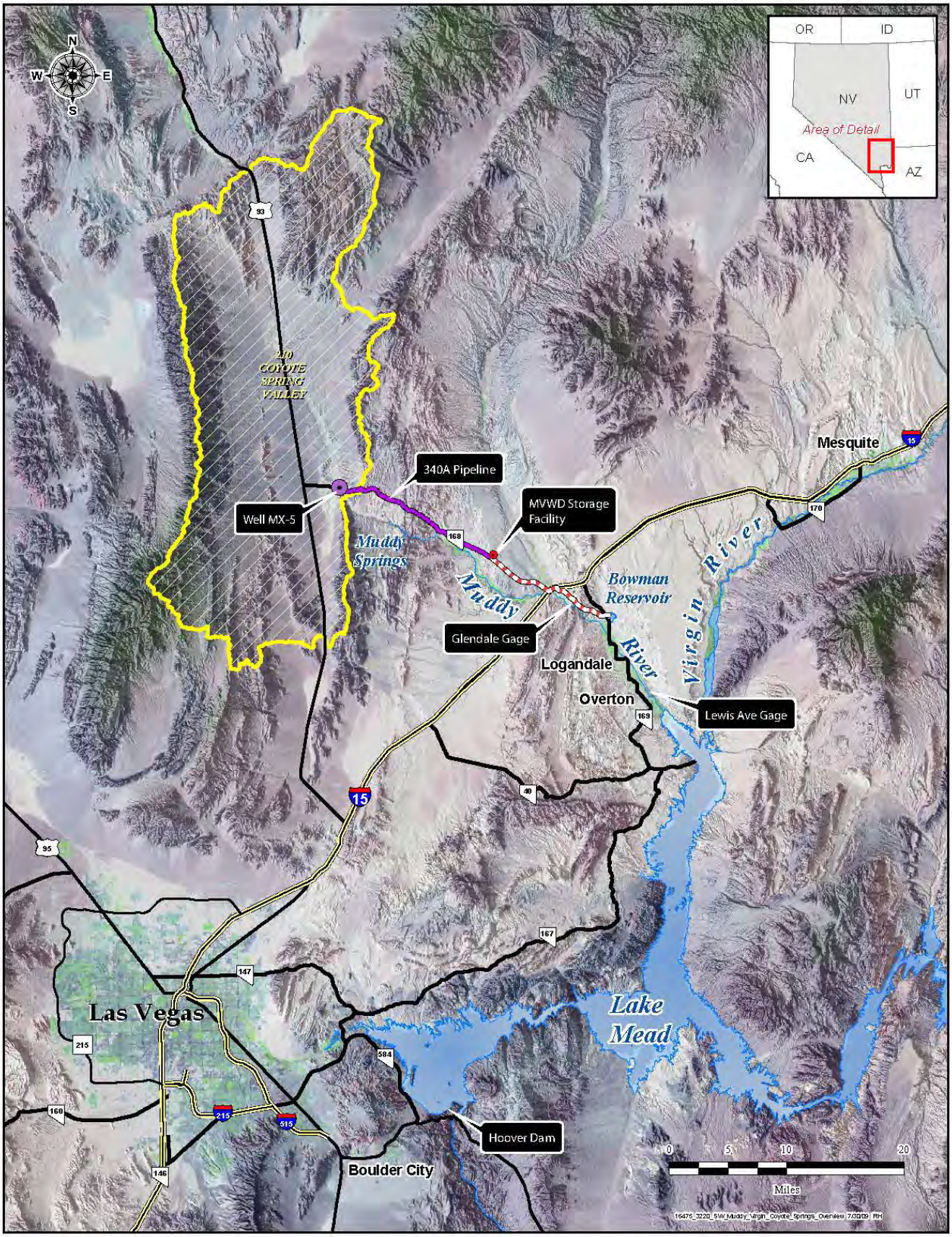

Figure 1. Location Map of Coyote Spring Valley

IN THE OFFICE OF THE STATE ENGINEER

OF THE STATE OF NEVADA

1193

ORDER

REGARDING TRIBUTARY CONSERVATION INTENTIONALLY CREATED SURPLUS FOR THE VIRGIN RIVER

WHEREAS, the Nevada State Engineer is designated by the Nevada Legislature to perform duties related to the management and appropriation of the water resources belonging to the people of the State of Nevada;[1]

WHEREAS, pursuant to Nevada Revised Statute (NRS) chapter 533, the Nevada State Engineer acts as an officer of the court for administration and distribution of water from a stream system that has been adjudicated by a district court decree;

WHEREAS, the Virgin River Decree was entered on May 14, 1927, by the Tenth (now Eighth) Judicial District Court, Clark County, Nevada;

WHEREAS, under the Virgin River Decree, the Bunkerville Irrigation Company (BIC) and Mesquite Irrigation Company (MIC) own water rights on the Virgin River and said water is distributed by BIC and MIC to the individual shareholders of said irrigation companies;

WHEREAS, in addition to the Virgin River Decree, other water rights for the diversion of the waters of the Virgin River have been granted through the permitting and certification process administered by the Nevada State Engineer;

WHEREAS, pursuant to NRS 533.060 rights to the use of surface water cannot be lost through forfeiture;

WHEREAS, pursuant to NRS 533.060 a surface water right that is appurtenant to land formerly used primarily for agricultural purposes is not subject to abandonment if the land has been converted to urban use or the water right has been acquired by a water purveyor for municipal use;

WHEREAS, pursuant to NRS 538.171 any appropriation or use of the waters of the Colorado River by the Colorado River Commission of Nevada or an entity with whom the Colorado River Commission of Nevada has contracted is not subject to regulation by the State Engineer;

WHEREAS, the Attorney General of the State of Nevada determined in Attorney General Opinion Number 88-16 that a permit from the State Engineer is not required for appropriation and use of Colorado River water for entities that have water delivery contracts with the Secretary of the Interior (Secretary), nor is a permit from the State Engineer necessary for use of such water merely to provide the State Engineer with information regarding such use if information is timely supplied upon request;

WHEREAS, pursuant to Section 2 of Chapter 393 of the Statutes of Nevada 1995, the powers, duties, rights and obligations of the State of Nevada and the Colorado River Commission of Nevada relating to contracts for delivery of Colorado River water were assumed by the Southern Nevada Water Authority;

WHEREAS, the Boulder Canyon Project Act (BCPA), 43 U.S.C. § 617, became effective on June 25, 1929;

WHEREAS, the Secretary of the Interior (Secretary) has a broad and unique legal role in managing the lower Colorado River system in accordance with federal law, including the Boulder Canyon Project Act of 1928, the 1963 decision of the U.S. Supreme court in *Arizona v. California*, the 2006 Consolidated Decree of the U.S. Supreme Court in *Arizona v. California*, the Colorado River Basin Project Act of 1968, and other applicable provisions of federal law. Within this legal framework, the Secretary makes annual determinations regarding the availability of water to be delivered to Colorado River contract holders from Lake Mead;

WHEREAS, on December 13, 2007, the Secretary adopted the Colorado River Interim Guidelines for Lower Basin Shortages and the Coordinated Operations for Lake Powell and Lake Mead (Guidelines). The Guidelines provide for the creation and delivery of Tributary Conservation Intentionally Created Surplus and Developed Shortage Supply (for convenience, both referred to hereinafter as ICS) to entities with a contract or entitlement to Colorado River water with the Bureau of Reclamation provided said entities have also entered into a delivery agreement with the Bureau of Reclamation for delivery of ICS (ICS Delivery Contract);

WHEREAS, pursuant to Sections 3 and 4 of the Guidelines, the holder of a valid ICS Delivery Contract who purchases documented water rights on a tributary of the Colorado River, perfected prior to June 25, 1929, (the effective date of the BCPA) may convey said water to the Colorado River mainstream so that said water may be diverted from the Colorado River mainstream by the ICS Delivery Contract holder as Tributary Conservation ICS;

WHEREAS, the Guidelines and the consolidated decree in *Arizona v. California*, 547 U.S. 150 (2006), define the Colorado River mainstream to include the reservoirs located on the Colorado River downstream from Lee Ferry within the United States; and

WHEREAS, Lake Mead is located on the Colorado River mainstream downstream from Lee Ferry and full pool elevation of Lake Mead is 1,220 feet above mean sea level.

NOW THEREFORE, the State Engineer finds that:

1. The Judgment and Decree in the Matter of the Determination of the Relative Rights in and to the Waters of the Virgin River (Virgin River Decree) was entered on May 14, 1927 by the Tenth (now Eighth) Judicial District Court, Clark County, Nevada.
2. All water rights adjudicated in the Virgin River Decree were acquired by valid appropriation prior to March 1, 1905, and were determined to be in good standing and in use prior to March 1, 1905 as affirmed by the Virgin River Decree.
3. That Permit No. 3085 (Certificate No. 1153) is for the diversion of the waters of the Virgin River with a priority date of August 17, 1914 and was acquired by valid appropriation prior to June 25, 1929.
4. Permit No. 6061 (Certificate No. 1408) is for the diversion of the waters of the Virgin River with a priority date of April 21, 1920 and was acquired by valid appropriation prior to June 25, 1929.
5. Permit No. 7624 (Certificate No. 4509) is for the diversion of the waters of the Virgin River with a priority date of January 21, 1926 and was acquired by valid appropriation prior to June 25, 1929.
6. The Virgin River Decree and issuance of subsequent permits and certificates by the State Engineer have appropriated the entire flow of the Virgin River, and that there is insufficient flow in the Virgin River to grant any new appropriations.
7. As of the date of this Order there has been no declaration or finding of forfeiture or abandonment regarding any water rights adjudicated under the Virgin River Decree or certificated by the State Engineer for the diversion of the waters of the Virgin River.

8. As of the date of this Order, no proceedings for forfeiture or abandonment have been initiated regarding any water rights adjudicated under the Virgin River Decree or certificated by the State Engineer for the diversion of the waters of the Virgin River.
9. In accordance with NRS 538.171 and Attorney General Opinion 88-16 a permit is not required for the creation or use of Tributary Conservation ICS when an ICS Delivery Contract exists with the Secretary.
10. The creation of ICS as defined in the current Guidelines promulgated by the Secretary and as those Guidelines may hereinafter be amended, is beneficial to the state of Nevada.

NOW THEREFORE, the State Engineer orders:

1. The Virgin River is closed to new appropriations.
2. An entity with an ICS Delivery Contract, which uses water rights adjudicated under the Virgin River Decree or water rights on the Virgin River issued by the State Engineer with a priority date prior to June 25, 1929 for the creation of ICS, shall file an annual report with the State Engineer's Office. The annual report shall give a full accounting of water rights on the Virgin River owned or controlled by the entity with an ICS Delivery Contract, which have been conveyed through the Virgin River system to the Colorado River mainstream for the creation of ICS. After review of the annual report, the State Engineer shall issue a letter verifying the quantity of water conveyed through the Virgin River system to the Colorado River mainstream for the purpose of creating ICS.

TRACY TAYLOR, P.E.
State Engineer

Dated at Carson City, Nevada
this 15 day of July, 2008.

Report No. 1

Analysis of Existing
Surface and Underground Water Rights and Applications
for Permits within the
Virgin River Drainage Area of Nevada

1992

Prepared by:

State of Nevada
Department of Conservation and Natural Resources
Division of Water Resources

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RECEIVED
JAN 25 1993
Div. of Water Resources
Branch Office - Las Vegas, NV

January 20, 1993

Bill Quinn
State Engineer's Office
1515 E. Tropicana, Suite 375
Las Vegas NV 89119

RE: Virgin River

Dear Bill:

As we discussed last week, distribution of Nevada's Report No. 1 on the Virgin River probably should include the following:

(By L. Linser)
Elizabeth Ann Rieke, Director
Arizona Department of Water Resources
15 South 15th Avenue
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C. Laurence Linser, Deputy Director
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Phoenix AZ 85007

(By L. Anderson)
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1636 West North Temple
Salt Lake City Utah 84116-3156

D. Larry Anderson, Division Director
State of Utah Department of Natural Resources
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Rosalyn Mike, Chairperson
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P.O. Box 340
Moapa NV 89025

~~Rick Hafen~~ Mike Winters
Mesquite Farmstead Association
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Mesquite NV 89024

Paul Henderson, City Manager
City of Mesquite
P.O. Box 69
Mesquite NV 89024

Patricia Mulroy
Southern Nevada Water Authority
1850 E. Flamingo Road, Ste 234
Las Vegas NV 89119

Director, Utah Wilderness Alliance

Roger M. Bunker, President
Bunkerville Irrigation Co.
P.O. Box 7337
Bunkerville NV 89007

Courtney Jensen, President
Mesquite Irrigation Co.
P.O. Box 303
Mesquite NV 89024

Sincerely,

Bob Marshall

Bob Marshall

RWM/jd

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Figure 3	Irrigated Lands of the Mesquite Irrigation Company

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Table 1(a)	Virgin River Decree - Bunkerville Irrigation Company Tabulation.
Table 1(b)	Virgin River Decree - Mesquite Irrigation Company Tabulation.
Table 2	Summary of Applications, Permits and Certificates in Nevada for Virgin River Surface Water.
Table 3	Abstract of Applications, Permits and Certificates for Ground Water in the Virgin River Basin of Nevada.
Table 4	Summary of Applications, Permits, Certificates and Proofs in Nevada for Beaver Dam Wash Surface Water.
Table 5	Virgin River Irrigation Use in Arizona, Adjacent to Mesquite, Nevada.

FOREWORD

The purpose of Report No. 1 is to satisfy a commitment on behalf of the State of Nevada to the States of Arizona and Utah in accordance with a Memorandum of Understanding, dated May of 1992.

This report is the first in a series of three and outlines the total appropriated water rights in the Virgin River Basin in Nevada. This information is based on records of the Nevada State Engineer as of November, 1992.

NEVADA REPORT NO. 1 ON VIRGIN RIVER USES, INCLUDING BEAVER DAM WASH IN NEVADA

The State of Nevada presents this Report No. 1 on Virgin River and Beaver Dam Wash water uses in Nevada pursuant to the terms of the Virgin River Memorandum of Understanding (M.O.U.) between the States of Arizona, Nevada and Utah. Report No. 1 covers past and present uses and pending applications for use of Virgin River surface water, Beaver Dam Wash surface flows and Virgin River underground basin water as revealed from the records of the Water Resources Division of the Nevada Department of Conservation and Natural Resources and the records of the Eighth Judicial District Court of the State of Nevada in and for Clark County, Nevada.

Figure No. 1 is a map showing the Virgin River in Nevada and adjacent Arizona, including the communities of Mesquite, Bunkerville and Riverside.

Uses of surface water in Nevada prior to the water law of 1905 are considered vested rights, the quantification of which can only be judicially determined by a Nevada District Court in an adjudication proceeding. The Virgin River surface uses prior to 1905 have been adjudicated by the Virgin River Decree pursuant to Proof No. 02038 filed by the Bunkerville Irrigation Company, and Proof No. 01968 filed by the Mesquite Irrigation Company. The Virgin River Decree was entered by the Tenth (now Eighth) Judicial District Court on May 14, 1927.

The Decree adjudicated water rights to Virgin River surface flow for irrigation of 1963.08 acres for a total of 17,785.50 acre feet per year (AFY). The summer duty equals 1.0 cubic feet per second (c.f.s.) of flow for each 70 acres and the winter duty equals 1.0 c.f.s. of flow for each 100 acres for a total duty of 9.06 AFY per acre. The summer period is the months of March through September and the winter period is the months of October through February. 9.06 ac.ft/yr * 1967.08 AC = 17785.5048 AF/

A tabulation of the water rights and uses set forth in the Virgin River Decree is attached as Table 1.

After the water law was enacted in 1905 a water right to surface waters could only be perfected under Nevada law by obtaining a permit from the State Engineer and then by putting the water to beneficial use at which time a certificate is issued. The permitting process is initiated by filing an application with the State Engineer, which is pending until a permit is issued.

Certificates for Virgin River surface water placed to beneficial use for irrigation subsequent to 1905 aggregate 5518.39 AFY. In addition, there are three applications to appropriate surface water pending action by the State Engineer: one for M & I use with a diversion rate of 500 c.f.s., limited to the yield of the Virgin River, one for industrial use (power production) for 30,000 AFY and one for irrigation for 1114.8 AFY.

Table 2 details the surface flow certificates and applications.

Subsequent to the water law of 1913 (1939 as to percolating waters) a right to ground water could be only obtained by following the permitting process with the obtaining of a certificate on placing the water to beneficial use.

Table 3 lists the ground water permits and certificates and pending applications for ground water in the Virgin River basin within Nevada.

There are three existing certificates for use in Nevada of surface water from the Beaver Dam Wash. One is for irrigation for 186 AFY, one is for stockwater for 4.36 AFY and one is for recreational use in connection with Schroeder Lake for 272 AFY. These total 462.36 AFY. In addition, there are claims of vested rights for irrigation of 42 acres. The amount of water has not been adjudicated. There are three pending applications by the Mesquite Farmstead Association for M & I use, totaling 1000 c.f.s. of flow on a year round basis. The point of diversion for two of these applications is the State of Utah. The Beaver Dam Wash uses and applications are set forth on Table 4.

For informational purposes, Virgin River surface uses for irrigation in Arizona adjacent to Mesquite, are set forth in Table 5. These uses are revealed from maps filed in connection with Permit Nos. 7624 and 15619 and aggregate 1465 AFY. These uses are not included in the Virgin River Decree nor in any of the certificates which have been issued by the Nevada State Engineer.

Copies of maps showing the Bunkerville Irrigation Company and Mesquite Irrigation Company irrigated lands are included as Figures 2 and 3 respectively. These maps are historic maps and may not show all irrigated areas under all filings.

A future study, Report No. 2 will detail Nevada's projected needs of water from the Virgin River source, both in the Mesquite area as well as in the Las Vegas Valley and the possible methods proposed to utilize such water.

Several studies have been conducted, or are ongoing, which bear upon the interaction between Virgin River surface flows and the ground water system of the Virgin River Basin of Nevada. Nevada recognizes that there may be interaction between the river and the ground water system. This likelihood will be the subject of Report No. 3.

Documentation furnishing the basis of the information contained in this report will be available to representatives of Arizona and Utah on request at a time and place mutually agreed on.

Submitted this 17th day of November, 1992.

Nevada Department of Conservation and Natural Resources, Division of Water Resources, Office of the State Engineer.

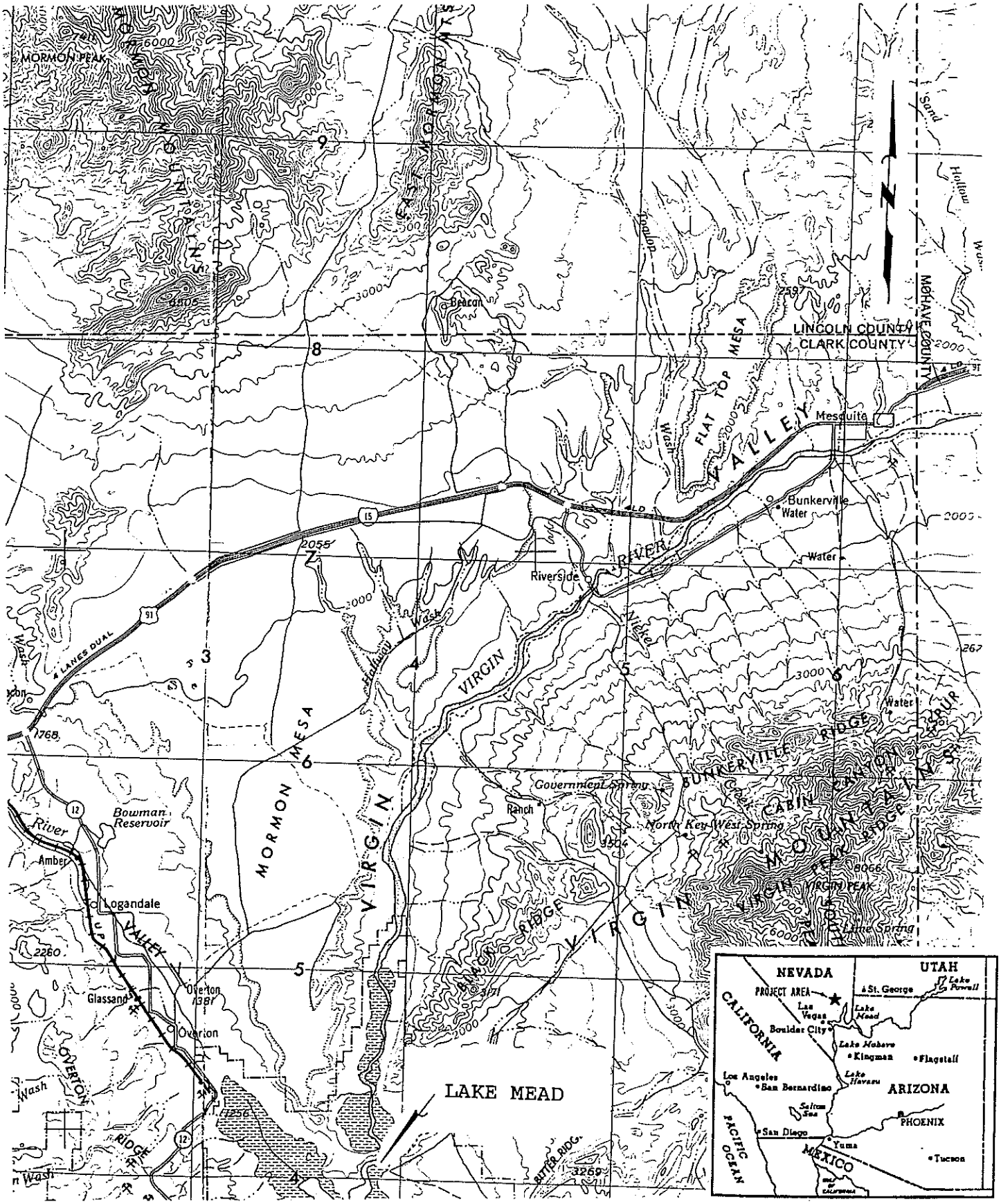

Figure 1
Virgin River Location Map
Scale: 1" = Approximately 4 Miles

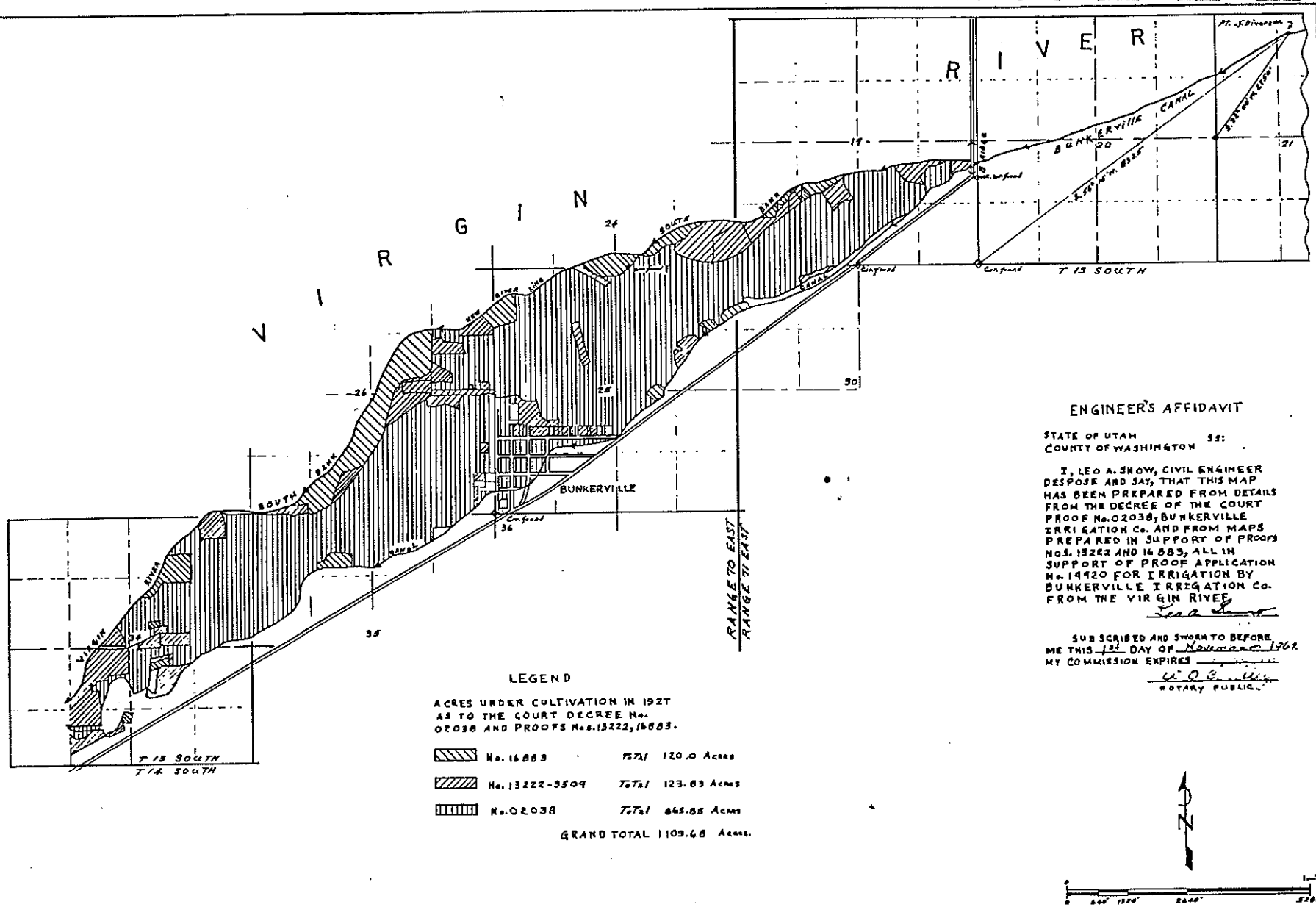
VIRGIN RIVER
BUNKERVILLE CANAL
SOUTH BANK
NEW BANK
BUNKERVILLE
T 13 SOUTH
T 14 SOUTH
RANGE 70 EAST
RANGE 71 EAST
LEGEND
ACRES UNDER CULTIVATION IN 1927 AS TO THE COURT DECREE No. 02038 AND PROOFS No.s. 13222, 16883.
No. 16883 TOTAL 120.0 Acres
No. 13222-3509 TOTAL 123.83 Acres
No. 02038 TOTAL 865.85 Acres
GRAND TOTAL 1109.68 Acres.
ENGINEER'S AFFIDAVIT
STATE OF UTAH
COUNTY OF WASHINGTON ss:
I, LEO A. SNOW, CIVIL ENGINEER DESPOSE AND SAY, THAT THIS MAP HAS BEEN PREPARED FROM DETAILS FROM THE DECREE OF THE COURT PROOF No. 02038, BUNKERVILLE IRRIGATION Co. AND FROM MAPS PREPARED IN SUPPORT OF PROOFS NOS. 13222 AND 16883, ALL IN SUPPORT OF PROOF APPLICATION No. 19920 FOR IRRIGATION BY BUNKERVILLE IRRIGATION Co. FROM THE VIRGIN RIVER
SUBSCRIBED AND SWORN TO BEFORE ME THIS 1st DAY OF November 1962
MY COMMISSION EXPIRES
NOTARY PUBLIC
N
MAP
TO ACCOMPANY PROOF
OF
BENEFICIAL USE UNDER
APPLICATION No. 19920 FOR
IRRIGATION
BY BUNKERVILLE IRRIGATION
Co. FROM VIRGIN RIVER.

Figure 2

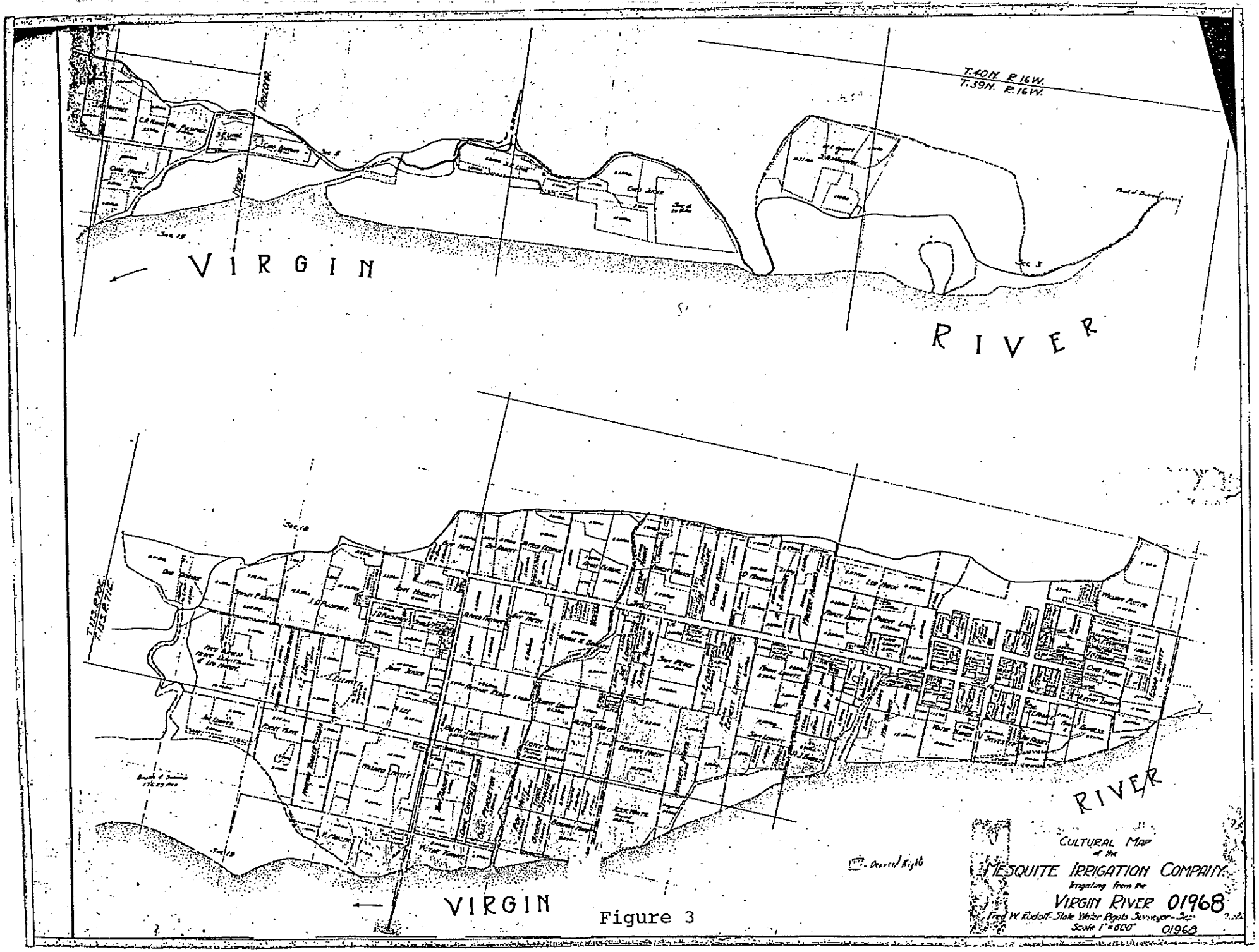
T.40N. R.16W.
T.39N. R.16W.
VIRGIN
RIVER
VIRGIN
RIVER
CULTURAL MAP
of the
MESQUITE IRRIGATION COMPANY
Irrigating from the
VIRGIN RIVER 01968
Fred W. Rudolf - State Water Rights Surveyor - Sec.
Scale 1" = 600'
01968

Figure 3

VIRGIN RIVER DECREE
Tenth (now Eighth) Judicial District Court of Nevada
in and for Clark County
May 14, 1927

Summary

Bunkerville Irrigation Co.	(Proof No. 02038)	8,115.94 AFY
Mesquite Irrigation Co.	(Proof No. 01968)	9,669.56 AFY
TOTAL		17,785.50 AFY

Table 1

VIRGIN RIVER DECREE
Bunkerville Irrigation Co.
Proof No. 02038

Name	Acres	Twnsp, Rge (S.,E.)	Seasonal Duty Acre Feet Totals: Winter Duty	Seasonal Duty Acre Feet Totals: Summer Duty
1. James S. Abbott	2.69	13, 70	8.07	16.30
	6.47	13, 70	19.41	39.21
	7.19	13, 70	21.57	43.57
	0.24 (T.L.)*	13, 70	0.72	1.45
	16.59		49.77	100.53
2. Conrad Adams	0.31 (T.L.)	13, 70	0.93	1.88
	0.31		0.93	1.88
3. Harley Adams	9.90	13, 70	29.70	59.99
	5.80	13, 70	17.40	35.15
	7.66	13, 70	22.98	46.42
	5.14	13, 70	15.42	31.15
	1.08	13, 70	3.42 VRD (3.24 Actual)	6.54
	0.61 (T.L.)	13, 70	1.83	3.70
	30.19		90.57	182.95
4. Milo Adams	5.50	13, 70	16.50	33.33
	2.13	13, 70	6.39	12.91
	19.06	13, 70	57.18	115.50
	5.64	13, 70	16.92	34.18
	0.51 (T.L.)	13, 70	1.53	3.09
	32.84		98.52	199.01

*T.L. Stands for Town Lot

Table 1(a)

Name	Acres	Townsp, Rge (S.,E)	Seasonal Duty Acre Feet Totals: Winter Duty	Seasonal Duty Acre Feet Totals: Summer Duty
5. Thomas Adams	12.19	13, 70	36.57	73.87
	2.30	13, 70	6.90	13.94
	12.73	13, 70	38.19	77.14
	0.41	13, 70	1.23	2.48
	11.21	13, 70	33.63	67.93
	0.77(T.L.)	13, 70	2.31	4.67
	39.61		118.83	240.03
6. M.E. Bowman	5.07	13, 70	15.21	30.72
	0.11	13, 70	0.33	0.67
	0.27(T.L.)	13, 70	0.81	1.64
	0.20(T.L.)	13, 70	0.60	1.21
	5.65		16.95	34.24
7. W.C. Bowman	6.41	13, 70 &71	19.23	38.84
	6.03	13, 70	18.09	36.54
	0.61	13, 70	1.83	3.70
	0.53	13, 70	1.59	3.21
	1.04	13, 70	3.12	6.30
	14.62		43.86	88.59
8. Hector Bunker	0.62(T.L.)	13, 70	1.86	3.75
	0.62		1.86	3.75
9. Hugh Bunker	0.86	13, 70	2.58	5.21
	3.36	13, 70	10.08	20.36
	5.86	13, 70	17.58	35.51
	8.08	13, 70	24.24	48.96
	9.06	13, 70	27.18	54.90
	0.24(T.L.)	13, 70	0.72	1.45
	27.46		82.38	166.39

Name	Acres	Twnsp, Rge (S.,E.)	Seasonal Duty Acre Feet Totals: Winter Duty	Summer Duty
10. Anne E. Cox	0.92(T.L.)	13, 70	2.76	5.58
	0.92		2.76	5.58
11. Ed I. Cox	10.72	13, 70	32.16	64.96
	0.88(T.L.)	13, 70	2.64	5.33
	4.41	13, 70	13.23	26.72
	0.91	13, 70	2.73	5.51
	10.91	13, 70	32.73	66.11
	15.84	13, 70	47.52	95.99
	14.05	13, 71	42.15	85.14
	0.43(T.L.)	13, 70	1.29	2.61
	58.15		174.45	352.37
12. Mary E. Hafen	12.05	13, 71	36.15	73.02
	0.86(T.L.)	13, 70	2.58	5.21
	0.33	13, 70	0.99	2.00
	0.31	13, 70	0.93	1.88
	13.55		40.65	82.11
13. Heber Hardy	1.06	13, 70	3.18	6.42
	5.07	13, 70	15.21	30.72
	8.00	13, 70	24.00	48.48
	17.21	13, 70	51.63	104.29
	1.23	13, 71	3.69	7.45
	15.25	13, 71	45.75	92.42
	2.59	13, 71	7.77	15.70
	1.90(T.L.)	13, 70	5.70	11.51
	52.31		156.93	316.99

Name	Acres	Twnsp, Rge (S.,E.)	Seasonal Duty Acre Feet Totals: Winter Duty	Summer Duty
14. Joe Hardy	4.71	13, 70	14.13	28.54
	7.52	13, 70 & 71	22.56	45.57
	0.88(T.L.)	13, 70	2.64	5.33
	13.11		39.33	79.44
15. Warren Hardy	15.28	13, 70	45.84	92.60
	15.28		45.84	92.60
16. George Hunt	5.42	13, 70	16.26	32.85
	7.88	13, 70	23.64	47.75
	0.88(T.L.)	13, 70	2.64	5.33
	0.57(T.L.)	13, 70	1.71	3.45
	14.75		44.25	89.38
17. Nephi Hunt	0.69	13, 70	2.07	4.18
	1.14	13, 70	3.42	6.91
	1.83		5.49	11.09
18. Parley Hunt	0.22	13, 70	0.66	1.33
	3.12	13, 70	9.36	18.91
	10.35	13, 70	31.05	62.72
	3.84	13, 70	11.52	23.27
	17.53		52.59	106.23
19. Albert Leavitt	23.98	13, 71	71.94	145.32
	13.85	13, 70	41.55	83.93
	0.41	13, 70	1.23	2.48
	0.15(T.L.)	13, 70	0.45	0.91
	0.68(T.L.)	13, 70	2.04	4.12
	0.81(T.L.)	13, 70	2.43	4.91
	39.88		119.64	241.67

Name	Acres	Twnsp, Rge (S.,E.)	Seasonal Duty Acre Feet Totals: Winter Duty	Summer Duty
20. Alma Leavitt	1.05(T.L.)	13, 70	3.15	6.36
	1.05		3.15	6.36
21. Lena Leavitt	2.19	13, 70	6.57	13.27
	5.37	13, 70	16.11	32.54
	14.59		43.77	88.42
	22.15		66.45	134.23
22. Dudley Leavitt	7.58	13, 70	22.74	45.93
	7.58		22.74	45.93
23. D.H. Leavitt	0.37	13, 70	1.11	2.24
	9.43	13, 70	28.29	57.15
	0.59	13, 70	1.77	3.58
	2.64	13, 70	7.92	16.00
	11.07	13, 71	33.21	67.08
	4.45	13, 71	13.35	26.97
	1.07(T.L.)		3.21	6.48
	29.62		88.86	179.50
24. Elmer Leavitt	8.21	13, 70	24.36 VAD (24.63)	49.75
	7.37	13, 70	22.11	44.66
	0.41(T.L.)	13, 70	1.23	2.48
	15.99		47.97	96.89

Name	Acres	Twnsp, Rge (S., E.)	Seasonal Duty Acre Feet Totals: Winter Duty	Seasonal Duty Acre Feet Totals: Summer Duty
25. John Leavitt	2.66	13, 70	7.98	16.12
	3.99	13, 70	11.97	24.18
	6.75	13, 71	20.25	40.91
	0.42(T.L.)	13, 70	1.26	2.55
	0.16(T.L.)	13, 70	0.48	0.97
	0.11(T.L.)	13, 70	0.33	0.67
	0.48(T.L.)	13, 70	1.44	2.91
	14.57		43.71	88.31
26. Lawrence Leavitt	0.52(T.L.)	13, 70	1.56	3.15
	0.52		1.56	3.15
27. Lemuel Leavitt	20.48	13, 71	61.44	124.11
	0.43	13, 70	1.29	2.61
	0.20	13, 70	0.60	1.21
	6.21	13, 70	18.63	37.63
	7.15	13, 70	21.45	43.33
	0.61	13, 70	1.83	3.70
	35.08		105.24	212.59
28. Mary E. Leavitt	0.69(T.L.)	13, 70	2.07	4.18
	0.69		2.07	4.18
29. Myron Leavitt	0.55(T.L.)	13, 70	1.65	3.33
	0.55		1.65	3.33
30. Thirza Leavitt	0.71(T.L.)	13, 70	2.13	4.30
	0.71		2.13	4.30

Name	Acres	Twnsp, Rge (S.,E.)	Seasonal Duty Acre Feet Totals: Winter Duty	Summer Duty
31. Thomas Leavitt, Jr.	7.45	13, 70	22.35	45.15
	23.98	13, 70	71.94	145.32
	23.98	13, 70	71.94	145.32
	6.89	13, 70	20.67	41.75
	0.63(T.L.)	13, 70	1.89	3.82
	62.93		188.79	381.36
32. Thomas Leavitt, Sr.	5.93	13, 71	17.79	35.94
	8.52	13, 70	25.56	51.63
	26.06	13, 70	78.18	157.92
	3.90	13, 70	11.70	23.63
	0.87(T.L.)	13, 70	2.61	5.27
	45.28		135.84	274.39
33. Will Leavitt	10.38	13, 70	31.14	62.90
	0.99(T.L.)	13, 70	2.97	6.00
	11.37		34.11	68.90
34. Randall Lunt	0.57	13, 70	1.71	3.45
	2.48	13, 70	7.44	15.03
	1.08	13, 70	3.24	6.54
	4.13		12.39	25.02
35. Roy Neagle	0.77(T.L.)	13, 70	2.31	4.67
	0.34(T.L.)	13, 70	1.02	2.06
	1.11		3.33	6.73
36. Ruth Nealge	4.92	13, 70	14.76	29.82
	8.95	13, 70	26.85	54.24
	0.14(T.L.)	13, 70	0.42	0.85
	0.16(T.L.)	13, 70	0.48	0.97
	14.17		42.51	85.88

Name	Acres	Twnsp, Rge (S.,E.)	Seasonal Duty Acre Feet Totals: Winter Duty	Summer Duty
37. Andrew Pulsipher	9.39	13, 70	28.17	56.90
	0.31(T.L.)	13, 70	0.93	1.88
	0.82(T.L.)	13, 70	2.46	4.97
	10.52		31.56	63.75
38. Harmon Tobbler	0.30	13, 70	0.90	1.82
	5.35	13, 70	16.05	32.42
	2.41	13, 70	7.23	14.60
	2.10	13, 70	6.30	12.73
	0.97(T.L.)	13, 70	2.91	5.88
	0.20(T.L.)	13, 70	0.60	1.21
	11.33		33.99	68.66
39. Valley Supply Co.	0.10(T.L.)	13, 70	0.30	0.61
	0.10		0.30	0.61
40. Herbert Waite	19.70	13, 71	59.10	119.38
	1.26	13, 70	3.78	7.64
	20.96		62.88	127.02
41. Jesse Waite	4.46	13, 70	13.38	27.03
	5.43	13, 70	16.29	32.91
	0.83	13, 70	2.49	5.03
	10.72		32.16	64.97
42. Roy Waite	5.73	13, 70	17.19	34.72
	2.62	13, 70	7.86	15.88
	0.38(T.L.)	13, 70	1.14	2.30
	0.56(T.L.)	13, 70	1.68	3.39
	9.29		27.87	56.29

Name	Acres	Twnsp, Rge (S., E.)	Seasonal Duty Acre Feet Totals: Winter Duty	Summer Duty
43. Albert Wittwer	9.51	13, 70	28.53	57.63
	3.71	13, 70	11.13	22.48
	0.68	13, 70	2.04	4.12
	0.24	13, 70	0.72	1.45
	1.55	13, 70	4.65	9.39
	68.87	13, 70	206.61	417.35
	84.56		253.68	512.42
44. Harmon Wittwer	18.23	13, 70	54.69	110.47
	8.20	13, 70	24.60	49.69
	0.82	13, 70	2.46	4.97
	2.32	13, 70	6.96	14.06
	8.58	13, 70	25.74	51.99
	13.01	13, 70	39.03	78.84
	3.47	13, 70	10.41	21.03
	54.63		163.89	331.05
45. Samuel Wittwer	0.23(T.L.)	13, 70	0.69	1.39
	0.28(T.L.)	13, 70	0.84	1.70
	0.51		1.53	3.09
46. Will Wittwer	17.62	13, 70	52.86	106.78
	12.57	13, 70	37.71	76.17
	0.29(T.L.)	13, 70	0.87	1.76
	30.48		91.44	184.71
TOTALS:	895.80		2,687.40	5,428.54 5428.45
COMBINED AFY TOTAL			8,115.94 (8115.85)	

VIRGIN RIVER DECREE
Mesquite Irrigation Co.
Proof No. 01968

Name	Acres	Twnsp, Rge (S.E.)	Seasonal Duty Acre Feet Totals Winter Duty	Summer Duty
1. Dave Abbott	0.90	13,71	2.70	5.45
	0.84	13,71	2.52	5.09
	1.74		5.22	10.54
2. Ray Abbott	8.27	13,71	24.81	50.12
	4.82	13,71	14.46	29.21
	0.12	13,71	0.36	0.73
	0.35	13,71	1.05	2.12
	0.43	13,71	1.29	2.61
	2.80	13,71	8.40	16.97
	0.44	13,71	1.32	2.67
	17.23		51.69	104.43
3. Tom Abbott	6.00	13,71	18.00	36.36
	1.10	13,71	3.30	6.67
	11.22	13,71	33.66	67.99
	18.32		54.96	111.02
4. W.E. Abbott	3.80	13,71	11.40	23.03
	0.33	13,71	10.99 (0.99 VAD)	2.00
	4.13		12.39	25.03

Table 1(b)

(Mesquite Irrigation Co.)
Page 2

Name	Acres	Twnsp, Rge (S.E.)	Winter Duty	Summer Duty
5. Joe Anderson	0.27	13,71	0.81	1.64
	1.74	13,71	5.22	10.54
	2.01 ✓		6.03 ✓	12.18 ✓
6. A.J. Barnum	3.85	13,71	11.55	23.33
	2.67	13,71	8.01	16.18
	1.73	13,71	5.19	10.48
	1.57	13,71	4.71	9.51
	6.91	13,71	20.73	41.87
	16.73 ✓		50.19 ✓	101.37 ✓
7. J.A. Barnum	0.39	13,71	1.17	2.36
	0.39 ✓		1.17 ✓	2.36 ✓
8. John H. Barnum	0.89	13,71	2.67	5.39
	0.89 ✓		2.67 ✓	5.39 ✓
9. Robert Barnum	0.60	13,71	1.80	3.64
	0.60 ✓		1.80 ✓	3.64 ✓
10. Amos Berghe	7.52	13,71	22.56	45.57
	1.47	13,71	4.41	8.91
	8.03	13,71	24.09	48.66
	17.02 ✓		51.06 ✓	103.14 ✓

(Mesquite Irrigation Co.)

Name	Acres	Twnsp, Rge (S.E.)	Winter Duty	Summer Duty
11. Geo. H. Bouller	10.56	13,71	31.68	63.99
	8.82	13,71	26.46	53.45
	2.19	13,71	6.57	13.27
	1.03	13,71	3.09	6.24
	22.60		67.80	136.95
12. Frank Burgess	2.80	13,71	8.40	16.97
	1.38	13,71	4.14	8.36
	0.35	13,71	1.05	2.12
	1.37	13,71	4.11	8.30
	5.90		17.70	35.75
13. Fred Burgess	7.49	13,71	22.47	45.39
Heber Leavitt	8.13	13,71	24.39	49.27
Leo Hardy	2.33	13,71	6.99	14.12
	17.95		53.85	108.78
14. Dave Canfield	4.00	13,71	12.00	24.24
	4.00		12.00	24.24
15. Alfred Frehner	9.19	13,71	27.57	55.69
	2.18	13,71	6.54	13.21
	0.76	13,71	2.28	4.61
	3.06	13,71	9.18	18.54
	6.65	13,71	19.95	40.30
	12.51		37.53	75.81
	34.35		103.05	208.16

(Mesquite Irrigation Co.)

Name	Acres	Twnsp, Rge (S.E.)	Winter Duty	Summer Duty
16. George Granger	4.51	13,71	13.53	27.33
	4.51		13.53	27.33
17. Guy Hafen	3.86	13,71	11.58	23.39
	8.28	13,71	24.48	50.18
	8.23	13,71	24.69	49.87
	9.92	13,71	29.76	60.12
	30.29		90.51	183.56
18. Brigham Hardy	12.90	13,71	38.70	78.17
	12.93	13,71	38.79	78.36
	0.55	13,71	1.65	3.33
	1.11	13,71	3.33	6.73
	1.61	13,71	4.83	9.76
	11.98	13,71	35.94	72.60
	4.17	13,71	12.51	25.27
	3.00	13,71	9.00	18.18
	48.25		144.75	292.40
19. Charles Hardy	6.04	13,71	18.12	36.60
	0.72	13,71	2.16	4.36
	8.70	13,71	26.10	52.72
	2.13	13,71	6.39	12.91
	4.12	13,71	12.36	24.97
	0.28	13,71	0.84	1.70
	0.98	13,71	2.94	5.94
	22.97		68.91	139.20
20. Leo Hardy	0.90	13,71	2.70	5.45
	7.97	13,71	23.91	48.30
	8.72	13,71	26.16	52.84
	0.84	13,71	2.52	5.09
	18.43		55.29	111.68

Name	Acres	Twnsp, Rge (S.E.)	Winter Duty	Summer Duty
21. John Horsley	0.62	13,71	1.86	3.76
	7.14	13,71	21.42	43.27
	0.15	13,71	0.45	0.91
	5.20	13,71	15.60	31.51
	13.11		39.33	79.45
22. Dewey Hort	0.36	13,71	1.08	2.18
	1.15	13,71	3.45	6.97
	1.51		4.53	9.15
23. D. Houston	4.70	13,71	14.10	28.48
	9.51	13,71	28.53	57.63
	0.12	13,71	0.36	0.73
	14.33		42.99	86.84
24. C.A. Hughes	0.70	13,71	2.10	4.24
	0.35	13,71	1.05	2.12
	0.37	13,71	1.11	2.24
	2.36	13,71	7.08	14.30
	4.62	13,71	13.86	28.00 (25.82)
	5.39	13,71	16.17	32.66 (35.69)
	2.39	13,71	7.13 (7.17 VRD)	14.18 (14.48)
	16.18		48.54	98.04 (98.89)
25. Elmer Hughes	0.81	13,71	2.43	4.91
	0.81		2.43	4.91
26. Jas. E. Hughes	1.65	13,71	4.95	10.00
	0.64	13,71	1.92	3.88
	1.31	13,71	3.93	7.94
	1.56	13,71	4.68	9.45
	5.16		15.48	31.27

Name	Acres	Twnsp, Rge (S.E.)	Winter Duty	Summer Duty
27. Walter Hughes	9.00	13,71	27.00	54.54
	1.96	13,71	5.88	11.88
	2.64	13,71	7.92	16.00
	1.60	13,71	4.80	9.70
	1.92	13,71	5.76	11.64
	8.89	13,71	26.67	53.87
	1.48	13,71	4.44	8.97
	27.49		82.47	166.60
28. Will Hughes	13.45	13,71	40.35	81.51
	2.81	13,71	8.43	17.03
	1.62	13,71	4.86	9.82
	17.88		53.64	108.36
29. Parley Hunt	5.75	13,71	17.25	34.85
	0.97	13,71	2.91	5.88
	6.72		20.16	40.73
30. Ralph Huntsman	3.23	13,71	9.69	19.57
	5.84	13,71	17.52	35.39
	1.69	13,71	5.07	10.24
	10.76		32.28	65.20
31. S.E. Huntsman	1.81	13,71	5.43	10.97
	1.08	13,71	3.24	6.54
	5.40	13,71	16.20	32.72
	0.80	13,71	2.40	4.85
	9.09		27.27	55.08

Name	Acres	Twnsp, Rge (S.E.)	Decree Winter	Summer Duty
32. John Jensen	15.20	13,71	45.60	92.11
	5.15	13,71	15.45	31.21
	1.73	13,71	5.19	10.48
	0.51	13,71	1.53	3.09
	22.59 ✓		67.77 ✓	136.89 ✓
33. Carlos Knight	9.50	13,71	28.50	57.57
	3.66	13,71	10.98 (10.99)	22.18
	0.53	13,71	1.59	3.21
	0.08	13,71	0.24	0.48
	13.77 ✓		41.31 (111.32)	83.44 ✓
34. Victor Knight	8.44	13,71	25.32	51.15
	3.03	13,71	9.09	18.36
	11.47 ✓		34.41 ✓	69.51 ✓
35. Edgar Leavitt	10.10	13,71	30.30	61.21
	1.57	13,71	4.71	9.51
	5.47	13,71	16.41	33.15
	3.95	13,71	11.85	23.94
	1.57	13,71	4.71	9.51
	1.46	13,71	4.38	8.85
	24.12 ✓		72.36 ✓	146.17 ✓
36. Ernest Leavitt	4.36	13,71	13.08	26.42
	8.46	13,71	25.38	51.27
	6.41	13,71	19.23	38.84 (37.21 VRD)
	19.23 ✓		57.69 ✓	116.53 (114.96)

(Mesquite Irrigation Co.)

Name	Acres	Twnsp, Rge (S.E.)	Decree Winter	Summer Duty
37. Frank Leavitt	8.96	13,71	26.88	54.30
	5.10	13,71	15.30	30.91
	2.82	13,71	8.46	17.09
	0.73	13,71	2.19	4.42
	0.69	13,71	2.07	4.18
	18.30 ✓		54.90 ✓	110.90 ✓
38. H.E. Leavitt	4.16	13,71	12.48	25.21
	3.51	13,71	10.53	21.27
	7.67 ✓		23.01 ✓	46.48 ✓
39. Hubert Leavitt	0.82	13,71	2.46	4.97
	0.82 ✓		2.46 ✓	4.97 ✓
40. Ira Leavitt	1.28	13,71	3.84	7.76
	2.43	13,71	7.29	14.73
	4.43	13,71	13.29	26.85
	2.01	13,71	6.03	12.18
	8.22	13,71	24.66	49.81
	0.43	13,71	1.29	2.61
	18.80 ✓		56.40 ✓	113.94 ✓
41. Jeremy Leavitt	8.63	13,71	25.89	52.30
	3.01	13,71	9.03	18.24
	0.30	13,71	0.90	1.82
	0.30	13,71	0.90	1.82
	12.24 ✓		36.72 ✓	74.18 ✓
42. J.J. Leavitt	4.42	13,71	13.26	26.79
	0.92	13,71	2.76 (2.26 YRD)	5.58
	6.89	13,71	20.67	41.75
	8.13	13,71	24.39	49.27
	20.36 ✓		61.08 (60.58 YRD)	123.39 ✓

Name	Acres	Twnsp, Rge (S.E.)	Decree Winter	Summer Duty
43. Joe Leavitt	6.24	13,71	18.72	37.81
	7.71	13,71	23.13	46.72
	2.30	13,71	6.90	13.94
	2.45	13,71	7.35	14.85
	0.57	13,71	1.71	3.45
	0.33	13,71	0.99	2.00
	19.60		58.80	118.77
44. Lister Leavitt	2.87	13,71	8.61	17.39
	4.28	13,71	12.84	25.94
	5.40	13,71	16.20	32.72
	12.55		37.65	76.05
45. Parley Leavitt	4.54	13,71	13.62	27.51
	4.53	13,71	13.59	27.45
	0.55	13,71	1.65	3.33
	9.62		28.86	58.29
46. Sam Leavitt	3.84	13,71	11.52	23.27
	1.77	13,71	5.31	10.73
	3.21	13,71	9.63	19.45
	9.09	13,71	27.27	55.09
	0.96	13,71	2.88	5.82
	1.09	13,71	3.27	6.61
	0.65	13,71	1.95	3.94
	20.61		61.83	124.91
47. Willard Levitt	8.41	13,71	25.83	50.96
	0.76	13,71	2.28	4.61
	14.46	13,71	43.38	87.63
	23.63		70.89	143.20

Name	Acres	Twnsp, Rge (S.E.)	Decree Winter	Summer Duty
48. A. Lee	6.67	13,71	20.01	40.42
	1.77	13,71	5.31	10.73
	0.65	13,71	1.95	3.94
	9.09		27.27	55.09
49. Robert Linge	5.50	13,71	16.50	33.33
	1.38	13,71	4.14	8.36
	6.88		20.64	41.69
50. S.R. Linge	5.65	13,71	16.95	34.24
	5.65		16.95	34.24
51. V. Mokler	13.79	13,71	41.37	83.57
	2.10	13,71	6.30	12.73
	7.19	13,71	21.57	43.57
	1.03	13,71	3.09	6.24
	24.11		72.33	146.11
52. Gus Pendleton	13.50	13,71	40.50	81.81
	13.50		40.50	81.81
53. William Potter	1.13	13,71	3.39	6.85
	3.12	13,71	9.36	18.91
	0.60	13,71	1.80	3.64
	0.45	13,71	1.35	2.73
	7.18	13,71	21.54	43.51
	11.82	13,71	35.46	71.63
	24.30		72.90	147.27

Name	Acres	Twnsp, Rge (S.E.)	Decree Winter	Summer Duty
54. J.D. Pulsipher	17.11	13,71	51.33	103.69
	15.46	13,71	46.38	93.69
	0.44	13,71	1.32	2.67
	1.20	13,71	3.60	7.27
	1.02	13,71	3.06	6.18
	4.08	13,71	12.24	24.72
	0.39	13,71	1.17	2.36
	39.70		119.10	240.58
55. J.L. Pulsipher	35.35	13,70	106.05	214.22
	1.67	13,70	5.01	10.12
	0.92	13,70	2.76	5.58
	12.98	13, 70 & 71	38.94	78.66
	0.49	13,70	1.47	2.97
	1.17	13,71	3.51	7.09
	52.58		157.74	318.64
56. Stanley Pulsipher	1.97	13,71	5.91	11.94
	0.39	13,71	1.17	2.36
	0.21	13,71	0.63	1.27
	0.53	13,71	1.59	3.21
	7.72	13,71	23.16	46.78
	4.09	13,71	12.27	24.79
	5.14	13,71	15.42	31.15
	6.25	13,71	18.75	37.88
	26.30		78.90	159.38

Name	Acres	Twnsp, Rge (S.E.)	Decree Winter	Summer Duty
57. William Pulsipher	3.04	13,71	9.12	18.42
	1.39	13,71	4.17	8.42
	1.68	13,71	5.04	10.18
	0.38	13,71	1.14	2.30
	1.67	13,71	5.01	10.12
	9.40	13,71	28.20	56.96
	17.56		52.68	106.40
58. Arthur Reber	5.31	13,71	15.93	32.18
	7.76	13,71	23.28	47.03
	13.07		39.21	79.21
59. Sam Reber	10.11	13,71	30.33	61.27
	1.46	13,71	4.38	8.85
	5.82	13,71	17.46	35.27
	0.91	13,71	2.73	5.51
	1.60	13,71	4.80	9.70
	19.90		59.70	120.60
60. Geo. Strausser	4.64	13,71	13.92	28.12
	3.52	13,71	10.56	21.33
	1.47	13,71	4.41	8.91
	1.57	13,71	4.71	9.51
	11.20		33.60	67.87
61. J. Sylvester	5.00	13,71	15.00	30.30
	1.42	13,71	4.26	8.61
	0.26	13,71	0.78	1.58
	6.68		20.04	40.49

Name	Acres	Twnsp, Rge (S.E.)	Decree Winter	Summer Duty
62. Alfred Tobler	9.90	13,71	29.70	59.99
	7.87	13,71	23.61	47.69
	1.45	13,71	4.35	8.79
	3.80	13,71	11.40	23.03
	3.89	13,71	11.67	23.57
	26.91		80.73	163.07
63. Harmon Tobbler	4.55	13,71	13.65	27.57
	1.71	13,71	5.13	10.36
	2.17	13,71	6.51	13.15
	0.38	13,71	1.14	2.30
	8.81		26.43	53.38
64. Herbert Waite	6.03	13,71	18.09	36.54
	2.82	13,71	8.46	17.09
	6.80	13,71	20.40	41.21
	15.65		46.95	94.84
65. Jesse Waite	0.98	13,71	2.94	5.94
	18.20	13,71	54.60	110.29
	19.18		57.54	116.23
66. Roy Waite	4.88	13,71	14.64	29.57
	4.90	13,71	14.70	29.69
	9.78		29.34	59.26
67. Ernest Walker	11.30	13,71	33.90	68.48
	0.65	13,71	1.95	3.94
	6.25	13,71	18.75	37.88
	0.92	13,71	2.76	5.58
	19.12		57.36	115.88
68. S.A. Waymire	5.90	13,71	17.70	35.75
	12.13	13,71	36.39	73.51
	18.03		54.09	109.26

Name	Acres	Twnsp, Rge (S.E.)	Decree Winter	Summer Duty
69. Harmon Wittwer	3.87	13,71	11.61	23.45
Harmon Tobbler	3.87		11.61	23.45
70. Abe Woodbury	3.98	13,71	11.94	24.12
	1.26	13,71	3.78	7.64
	2.06	13,71	6.18	12.48
	0.86	13,71	2.58	5.21
	0.52	13,71	1.56	3.15
	8.68		26.04	52.60
TOTAL	1,067.28		3,201.84	6,467.72

VIRGIN RIVER SURFACE WATER
SUMMARY OF APPLICATIONS, PERMITS & CERTIFICATES IN NEVADA

Permit No.	Certificate	Priority Date	Use	AFY
3085	1153	August 17, 1914	Irrigation	1,062.26
6061	1408	April 21, 1920	Irrigation	228.00
7624	4509	January 21, 1926	Irrigation	2,106.00
10544	4485	August 2, 1940	Irrigation	246.13
11504	3611	February 28, 1946	Irrigation	380.00
13222	3509	January 3, 1950	Irrigation	896.00
16883	5343	March 21, 1956	Irrigation	600.00
Total AFY				5,518.39

Applications (Pending)	Priority Date	Use	AFY
28142	February 25, 1974	Ind.	30,000
57643	October 17, 1989	M & I	500 c.f.s. (361,900.00)*
54383	January 21, 1990	Irrigation	1,114.80
Total AFY			393,014.80

*limited to amount of available flow in the river

Table 2

NEVADA DIVISION OF WATER RESOURCES
WATER RIGHTS DATABASE

HYDROGRAPHIC BASIN ABSTRACT
GROUND WATER

RUN DATE: 11/17/1992

HYDROGRAPHIC BASIN: 222 VIRGIN RIVER VALLEY

HYDROGRAPHIC REGION: 13 COLORADO RIVER BASIN

APP#	CHANGE OF APP#	CERT#	FILING DATE	STAT	SRC	POINT OF DIVERSION QQ	QTR	SEC	TWP	RNG	DIV RATE (CFS)	TYPE OF USE	SUP	ACRES IRRIGATED	ANNUAL DUTY	CO	OWNER OF RECORD
12934		4018	05/27/1949	ABR	UG	SW	SW	20	13S	71E	0.000	MUN		0.00	0.00	MGA CL	MESQUITE FARMSTEAD WATER ASSOC.
CHANGE BY:	52015			-PER													
14347		7270	06/23/1952	CER	UG	SW	SW	20	13S	71E	0.200	MUN	Y	0.00	47.17	MGA CL	MESQUITE FARMSTEAD WATER ASSOC.
14471		4358	08/04/1952	CER	UG	SE	SW	35	13S	70E	0.100	DOM		0.00	23.59	MGA CL	BUNKERVILLE WATER USERS ASSOC.
17833		5495	02/18/1959	CER	UG	NW	SE	21	13S	71E	0.300	MUN	Y	0.00	70.75	MGA CL	MESQUITE FARMSTEAD WATER ASSOC.
19451		5556	01/16/1961	CER	UG	NE	NW	02	14S	70E	0.500	MUN		0.00	117.95	MGA CL	BUNKERVILLE WATER USERS ASSOCIATIO
20361		5922	03/12/1962	CER	UG	SW	SW	20	13S	71E	0.300	MUN	Y	0.00	54.75	MGA CL	MESQUITE FARMSTEAD WATER ASSOC.
21884		6936	03/20/1964	CER	UG	NE	SW	21	05S	71E	0.010	REC		0.00	2.35	MGA LI	PARKS DIVISION-NEVADA
21885		6937	03/20/1964	CER	UG	NW	NE	17	05S	71E	0.010	REC		0.00	2.35	MGA LI	DIVISION OF PARKS-NEVADA
22406		7917	02/01/1965	CER	UG	NW	NE	23	14S	69E	2.810	IRR		118.22	591.11	AFA CL	ARRIBA VERDE RANCH
25304		9038	10/01/1969	CER	UG	NW	SE	25	13S	70E	0.750	MUN		0.00	176.93	MGA CL	BUNKERVILLE WATER USERS ASSOCIATIO

Table 3

HYDROGRAPHIC BASIN: 222 VIRGIN RIVER VALLEY

HYDROGRAPHIC REGION: 13 COLORADO RIVER BASIN

APP#	CHANGE OF APP#	CERT#	FILING DATE	STAT	SRC	POINT OF DIVERSION QQ	QTR	SEC	TWP	RNG	DIV RATE (CFS)	TYPE OF USE	SUP	ACRES IRRIGATED	ANNUAL DUTY	CO	OWNER OF RECORD
26370		8182	10/20/1971	CER	UG	NW	NE	23	14S	69E	0.100	STK		0.00	1.64 MGA	CL	ARRIBA VERDE RANCH
27808		10680	10/03/1973	CER	UG	SW	SW	25	13S	70E	0.110	MUN		0.00	25.94 MGA	CL	BUNKERVILLE WATER USERS ASSOCIATON
27816		10681	10/09/1973	CER	UG	SW	SW	25	13S	70E	0.110	MUN		0.00	25.94 MGA	CL	BUNKERVILLE WATER USERS ASSOCIATIO
41120			04/17/1980	PER	UG	NW	NW	29	13S	71E	1.500	MUN	Y	0.00	353.80 MGA	CL	MESQUITE FARMSTEAD WATER ASSOCIATI
41121			04/17/1980	PER	UG	SE	SE	09	13S	71E	1.500	MUN	Y	0.00	353.80 MGA	CL	MESQUITE FARMSTEAD WATER ASSOCIATI
41122			04/17/1980	PER	UG	SE	NW	29	13S	71E	1.500	MUN	Y	0.00	353.80 MGA	CL	MESQUITE FARMSTEAD WATER ASSOCIATI
44704		12440	10/29/1981	CER	UG	SE	SW	04	13S	70E	0.003	STK		0.00	0.73 MGA	CL	LYTLE, FRANCIS
44706		12017	10/29/1981	CER	UG	SE	SW	32	08S	71E	0.016	STK		0.00	3.72 MGA	LI	GUBLER TRUST 507
44739		12018	10/29/1981	CER	UG	NE	NE	14	08S	70E	0.016	STK		0.00	3.72 MGA	LI	GUBLER TRUST 507
46645		12575	02/17/1983	CER	UG	SE	NE	16	13S	71E	0.050	STK		0.00	11.28 MGA	CL	SEPEDA FARIA DAIRY
49680			02/03/1986	PER	UG	SW	NE	25	13S	70E	1.443	MUN		0.00	340.41 MGA	CL	BUNKERVILLE WATER USERS ASSOCIATIO
CHANGE BY:	58036T			-PER													
49707			02/11/1986	RFA	UG	NW	NE	17	13S	71E	1.000	QM		0.00	2.19 MGA	CL	REBER, DE MURREN

HYDROGRAPHIC BASIN: 222 VIRGIN RIVER VALLEY

HYDROGRAPHIC REGION: 13 COLORADO RIVER BASIN

APP#	CHANGE OF APP#	CERT#	FILING DATE	STAT	SRC	POINT OF DIVERSION QQ	QTR	SEC	TWP	RNG	DIV RATE (CFS)	TYPE OF USE	SUP	ACRES IRRIGATED	ANNUAL DUTY	CO	OWNER OF RECORD
50172			09/22/1986	PER	UG	SW	SW	28	13S	71E	2.000	MUN	Y	0.00	471.80 MGA	CL	MESQUITE FARMSTEAD WATER ASSOCIATI
50864			04/29/1987	ABR	UG	SW	NW	21	13S	70E	0.000	MUN		0.00	0.00 MGA	CL	MESQUITE FARMSTEAD WATER ASSN.
CHANGE BY:	56244			-PER													
50865			04/29/1987	PER	UG	NW	SW	21	13S	70E	1.000	MUN	Y	0.00	146.00 MGA	CL	MESQUITE FARMSTEAD WATER ASSN.
51023			06/15/1987	RFA	UG	SE	NE	14	14S	69E	2.228	OTH		0.00	0.00 *	CL	BUREAU OF RECLAMATION - U.S.
51024			06/15/1987	RFA	UG	SW	NW	05	15S	69E	2.228	OTH		0.00	0.00 *	CL	BUREAU OF RECLAIMATION - U.S.
51025			06/15/1987	RFA	UG	SW	NW	31	15S	69E	2.228	OTH		0.00	0.00 *	CL	BUREAU OF RECLAMATION-U.S.
51270			09/03/1987	PER	UG	SE	SW	28	13S	71E	1.000	MUN	Y	0.00	325.85 MGA	CL	MESQUITE FARMSTEAD WATER ASSOCIATI
51271			09/03/1987	PER	UG	SE	SW	28	13S	71E	1.000	MUN	Y	0.00	325.85 MGA	CL	MESQUITE FARMSTEAD WATER ASSOCIATI
51272			09/03/1987	PER	UG	SW	SE	28	13S	71E	1.000	MUN	Y	0.00	325.85 MGA	CL	MESQUITE FARMSTEAD WATER

HYDROGRAPHIC BASIN: 222 VIRGIN RIVER VALLEY

HYDROGRAPHIC REGION: 13 COLORADO RIVER BASIN

APP#	CHANGE OF APP#	CERT#	FILING DATE	STAT	SRC	POINT OF DIVERSION QQ	QTR	SEC	TWP	RNG	DIV RATE (CFS)	TYPE OF USE	SUP	ACRES IRRIGATED	ANNUAL DUTY	CO	OWNER OF RECORD
																	ASSOCIATI
51306			09/16/1987	PER	UG	SE	SW	10	13S	71E	1.000	MUN	Y	0.00	325.85 MGA	CL	MESQUITE FARMSTEAD WATER ASSOCIATI
52015	12934		04/15/1988	PER	UG	SW	SW	20	13S	71E	0.080	MUN	Y	0.00	18.90 MGA	CL	MESQUITE FARMSTEAD WATER ASSOCIATI
52016			04/15/1988	PER	UG	SE	SW	09	13S	71E	2.000	MUN	Y	0.00	471.81 MGA	CL	MESQUITE FARMSTEAD WATER ASSOCIATI
CHANGE BY:	56981			-RFA													
52017			04/15/1988	PER	UG	NE	SE	30	13S	71E	2.000	MUN	Y	0.00	471.81 MGA	CL	MESQUITE FARMSTEAD WATER ASSOCIATI
52333			07/18/1988	PER	UG	NE	SE	21	13S	71E	1.000	MUN	Y	0.00	235.91 MGA	CL	MESQUITE FARMSTEAD WATER ASSOC.
52356			08/01/1988	PER	UG	NE	SW	21	12S	68E	0.010	STK		0.00	2.16 MGA	LI	BLM
52952			02/22/1989	PER	UG	NE	NE	30	13S	71E	1.000	MUN	Y	0.00	235.91 MGA	CL	MESQUITE FARMSTEAD WATER ASSOC.
52995			03/09/1989	PER	UG	SE	SW	34	13S	70E	0.060	COM	Y	0.00	14.15 MGA	CL	BIASI, BRUNO
52996			03/09/1989	PER	UG	SE	SW	34	13S	70E	0.450	COM	Y	0.00	43.80 MGA	CL	BIASI, BRUNO
52997			03/09/1989	PER	UG	NE	SW	34	13S	70E	0.110	COM	Y	0.00	25.95 MGA	CL	BIASI, BRUNO

HYDROGRAPHIC BASIN: 222 VIRGIN RIVER VALLEY

HYDROGRAPHIC REGION: 13 COLORADO RIVER BASIN

APP#	CHANGE OF APP#	CERT#	FILING DATE	STAT	SRC	POINT OF DIVERSION QQ	QTR	SEC	TWP	RNG	DIV RATE (CFS)	TYPE OF USE	SUP	ACRES IRRIGATED	ANNUAL DUTY	CO	OWNER OF RECORD
52998			03/09/1989	PER	UG	NE	SW	34	13S	70E	0.110	COM	Y	0.00	25.95 MGA	CL	BIASI, BRUNO
53026			03/16/1989	PER	UG		LT1003		13S	71E	4.000	MUN	Y	0.00	943.60 MGA	CL	MESQUITE-CITY
53027			03/16/1989	PER	UG	SE	NE	09	13S	71E	4.000	MUN	Y	0.00	943.60 MGA	CL	MESQUITE-CITY
54078			10/17/1989	RFP	UG	NE	SE	11	14S	69E	6.000	MUN		0.00	1,415.46 MGA	CL	LAS VEGAS VALLEY WATER DISTRICT
54079			10/17/1989	RFP	UG	NE	NE	14	14S	69E	6.000	MUN		0.00	1,415.46 MGA	CL	LAS VEGAS VALLEY WATER DISTRICT
54080			10/17/1989	RFP	UG	NW	NW	14	14S	69E	6.000	MUN		0.00	1,415.46 MGA	CL	LAS VEGAS VALLEY WATER DISTRICT
54081			10/17/1989	RFP	UG	NE	SE	15	14S	69E	6.000	MUN		0.00	1,415.46 MGA	CL	LAS VEGAS VALLEY WATER DISTRICT
54082			10/17/1989	RFP	UG	SE	SW	15	14S	69E	6.000	MUN		0.00	1,415.46 MGA	CL	LAS VEGAS VALLEY WATER DISTRICT
54083			10/17/1989	RFP	UG	SW	SE	16	14S	69E	6.000	MUN		0.00	1,415.46 MGA	CL	LAS VEGAS VALLEY WATER DISTRICT
54084			10/17/1989	RFP	UG	SE	NE	21	14S	69E	6.000	MUN		0.00	1,415.46 MGA	CL	LAS VEGAS VALLEY WATER DISTRICT
54085			10/17/1989	RFP	UG	SE	NW	21	14S	69E	6.000	MUN		0.00	1,415.46 MGA	CL	LAS VEGAS VALLEY WATER DISTRICT
54086			10/17/1989	RFP	UG	SW	SE	21	14S	69E	6.000	MUN		0.00	1,415.46 MGA	CL	LAS VEGAS VALLEY WATER DISTRICT
54087			10/17/1989	RFP	UG	SW	NW	28	14S	69E	6.000	MUN		0.00	1,415.46 MGA	CL	LAS VEGAS VALLEY WATER DISTRICT

HYDROGRAPHIC BASIN: 222 VIRGIN RIVER VALLEY

HYDROGRAPHIC REGION: 13 COLORADO RIVER BASIN

APP#	CHANGE OF APP#	CERT#	FILING DATE	STAT	SRC	POINT OF DIVERSION QQ	QTR	SEC	TWP	RNG	DIV RATE (CFS)	TYPE OF USE	SUP	ACRES IRRIGATED	ANNUAL DUTY	CO	OWNER OF RECORD
54088			10/17/1989	RFP	UG	NE	NE	29	14S	69E	6.000	MUN		0.00	1,415.46 MGA	CL	LAS VEGAS VALLEY WATER DISTRICT
54089			10/17/1989	RFP	UG	SE	SE	29	14S	69E	6.000	MUN		0.00	1,415.46 MGA	CL	LAS VEGAS VALLEY WATER DISTRICT
54090			10/17/1989	RFP	UG	NW	NW	32	14S	69E	6.000	MUN		0.00	1,415.46 MGA	CL	LAS VEGAS VALLEY WATER DISTRICT
54091			10/17/1989	RFP	UG	NW	SW	31	14S	69E	6.000	MUN		0.00	1,415.46 MGA	CL	LAS VEGAS VALLEY WATER DISTRICT
54092			10/17/1989	RFP	UG	SE	SE	31	14S	69E	6.000	MUN		0.00	1,415.46 MGA	CL	LAS VEGAS VALLEY WATER DISTRICT
54154			11/09/1989	PER	UG	SE	SE	30	13S	71E	1.000	MUN	Y	0.00	235.91 MGA	CL	MESQUITE FARMSTEAD WATER ASSOCIATI
54175			11/16/1989	RFA	UG	SE	NE	32	13S	70E	1.000	MUN		0.00	235.91 MGA	CL	MESQUITE FARMSTEAD WATER ASSOCIATI
54681			04/23/1990	RFA	UG	NE	SE	26	13S	70E	1.000	MUN		0.00	235.91 MGA	CL	BUNKERVILLE WATER USERS ASSOCIATIO
55282			09/18/1990	RFP	UG	SE	SW	21	05S	71E	20.000	MUN		0.00	4,718.20 MGA	LI	MESQUITE - CITY OF
55283			09/18/1990	RFP	UG	NW	NE	33	05S	71E	10.000	MUN		0.00	2,359.10 MGA	LI	MESQUITE - CITY OF
55284			09/18/1990	RFP	UG	SE	NE	33	05S	71E	20.000	MUN		0.00	4,718.20 MGA	LI	MESQUITE - CITY OF

HYDROGRAPHIC BASIN: 222 VIRGIN RIVER VALLEY

HYDROGRAPHIC REGION: 13 COLORADO RIVER BASIN

APP#	CHANGE OF APP#	CERT#	FILING DATE	STAT	SRC	POINT OF DIVERSION QQ	QTR	SEC	TWP	RNG	DIV RATE (CFS)	TYPE OF USE	SUP	ACRES IRRIGATED	ANNUAL DUTY	CO	OWNER OF RECORD
55289			09/18/1990	RFP	UG	NE	NE	04	07S	71E	5.000	MUN		0.00	1,179.55 MGA	LI	MESQUITE - CITY OF
55290			09/18/1990	RFP	UG	SW	NW	13	08S	70E	10.000	MUN		0.00	2,359.10 MGA	LI	MESQUITE - CITY OF
55291			09/18/1990	RFP	UG	SE	SW	32	08S	71E	10.000	MUN		0.00	2,359.10 MGA	LI	MESQUITE - CITY OF
55292			09/18/1990	RFP	UG	NW	NE	04	09S	71E	10.000	MUN		0.00	2,359.10 MGA	LI	MESQUITE - CITY OF
55293			09/18/1990	RFP	UG	NE	SW	08	09S	71E	10.000	MUN		0.00	2,359.10 MGA	LI	MESQUITE - CITY OF
55294			09/18/1990	RFP	UG	SE	SE	28	09S	71E	10.000	MUN		0.00	2,359.10 MGA	LI	MESQUITE - CITY OF
55295			09/18/1990	RFP	UG	SW	SW	31	10S	71E	10.000	MUN		0.00	2,359.10 MGA	LI	MESQUITE - CITY OF
55296			09/18/1990	RFP	UG	SW	NW	21	05S	71E	10.000	MUN		0.00	2,359.10 MGA	LI	MESQUITE - CITY OF
55297			09/18/1990	RFP	UG	SE	SW	21	11S	71E	5.000	MUN		0.00	1,179.55 MGA	LI	MESQUITE - CITY OF
55298			09/18/1990	RFP	UG	NW	NW	34	11S	71E	5.000	MUN		0.00	1,179.55 MGA	LI	MESQUITE - CITY OF
55943			03/06/1991	RFA	UG	SW	NW	22	15S	70E	2.000	DOM		0.00	471.82 MGA	CL	BUNKERVILLE CULINARY WATER ASSOC.

HYDROGRAPHIC BASIN: 222 VIRGIN RIVER VALLEY

HYDROGRAPHIC REGION: 13 COLORADO RIVER BASIN

APP#	CHANGE OF APP#	CERT#	FILING DATE	STAT	SRC	POINT OF DIVERSION QQ	QTR	SEC	TWP	RNG	DIV RATE (CFS)	TYPE OF USE	SUP	ACRES IRRIGATED	ANNUAL DUTY	CO	OWNER OF RECORD
55944			03/06/1991	RFA	UG	SW	SW	14	15S	70E	2.000	DOM		0.00	471.82 MGA	CL	BUNKERVILLE CULINARY WATER ASSOC.
56244	50864		04/29/1991	PER	UG	NW	NE	30	13S	71E	1.000	QM	Y	0.00	146.00 MGA	CL	MESQUITE FARMSTEAD WATER ASSN.
56793			10/02/1991	RFP	UG		LT0108		13S	71E	5.000	MUN		0.00	1,179.55 MGA	CL	MESQUITE - CITY OF
56828			10/14/1991	RFP	UG	NW	NW	16	13S	71E	5.000	MUN		0.00	1,179.55 MGA	CL	MESQUITE - CITY
56829			10/14/1991	RFP	UG	NE	NW	09	13S	71E	5.000	MUN		0.00	1,179.55 MGA	CL	MESQUITE - CITY
56959			11/25/1991	RFP	UG	NE	SE	12	13S	70E	10.000	MUN		0.00	2,359.10 MGA	CL	MESQUITE, CITY OF
56981	52016		12/06/1991	RFA	UG			16	13S	71E	2.000	MUN		0.00	471.82 MGA	CL	MESQUITE FARMSTEAD WATER ASSOCIATI
58036T	49680		09/03/1992	PER	UG	NE	SE	26	13S	70E	0.557	MUN			131.40 MGA	CL	BUNKERVILLE WATER USER'S ASSOCIATI
V04219			10/11/1984	VST	OGW	SW	SE	14	15S	71E	0.022	STK		0.00	0.29 MGA	CL	TOM, NORMAN

NEVADA DIVISION OF WATER RESOURCES
WATER RIGHTS DATABASE

HYDROGRAPHIC BASIN SUMMARY
BY STATUS FOR ACTIVE GROUNDWATER SOURCES

RUN DATE: 11/17/1992

HYDROGRAPHIC BASIN: 222 VIRGIN RIVER VALLEY

HYDROGRAPHIC REGION: 13 COLORADO RIVER BASIN

STATUS	ANNUAL DUTY UNDERGROUND AF	ANNUAL DUTY UNDERGROUND MG	ANNUAL DUTY GEOTHERMAL AF	ANNUAL DUTY GEOTHERMAL MG	ANNUAL DUTY OTHER GROUNDWATER AF	ANNUAL DUTY OTHER GROUNDWATER MG	ANNUAL DUTY TOTAL AF	ANNUAL DUTY TOTAL MG
VESTED RIGHT	.00	.00	.00	.00	.89	.29	.89	.29
RESERVED RIGHT	.00	.00	.00	.00	.00	.00	.00	.00
APPLICATION	.00	.00	.00	.00	.00	.00	.00	.00
READY FOR ACTION	186,793.87	60,866.97	.00	.00	.00	.00	186,793.87	60,866.97
PERMIT	10,020.22	3,265.10	.00	.00	.00	.00	10,020.22	3,265.10
REVOCABLE PERMIT	.00	.00	.00	.00	.00	.00	.00	.00
CERTIFICATE	2,336.72	761.42	.00	.00	.00	.00	2,336.72	761.42
DECREED	.00	.00	.00	.00	.00	.00	.00	.00

NEVADA DIVISION OF WATER RESOURCES
WATER RIGHTS DATABASE

HYDROGRAPHIC BASIN SUMMARY
BY MANNER OF USE FOR GROUNDWATER SOURCES

RUN DATE: 11/17/92

HYDROGRAPHIC BASIN: 222 VIRGIN RIVER VALLEY

HYDROGRAPHIC REGION: 13 COLORADO RIVER BASIN

MANNER OF USE	ACTIVE ANNUAL DUTY ACRE FEET	ACTIVE ANNUAL DUTY MILL GALLONS	PENDING ANNUAL DUTY * ACRE FEET	PENDING ANNUAL DUTY * MILL GALLONS
COMMERCIAL	134.42	43.80	.00	.00
CONSTRUCTION	.00	.00	.00	.00
DOMESTIC	72.40	23.59	2,895.92	943.64
ENVIRONMENTAL	.00	.00	.00	.00
INDUSTRIAL	.00	.00	.00	.00
IRRIGATION (CAREY ACT)	.00	.00	.00	.00
IRRIGATION (DLE)	.00	.00	.00	.00
IRRIGATION	591.11	192.61	.00	.00
MINING & MILLING	.00	.00	.00	.00
MUNICIPAL	11,473.25	3,738.57	183,891.23	59,921.14
POWER GENERATION	.00	.00	.00	.00
QUASI-MUNICIPAL	.00	.00	6.72	2.19
RECREATION	14.42	4.70	.00	.00
STOCK WATER	72.24	23.54	.00	.00
STORAGE	.00	.00	.00	.00
WILD LIFE	.00	.00	.00	.00
OTHER/DECREED	.00	.00	.00	.00

TOTAL NUMBER OF RECORDS WITH UNDEFINED ANNUAL DUTY: 3
* May include supplemental duties as well as duties associated with applications to change.

BEAVER DAM WASH SURFACE WATER
SUMMARY OF APPLICATIONS, PERMITS, CERTIFICATES AND PROOFS IN NEVADA

PERMITTED RIGHTS

Permit No.	Certificate	Priority Date	Use	AFY
7508	1857	September 19, 1925	Irrigation	186.00
9009	2046	August 12, 1929	Stockwater	4.36
18516	5283	January 11, 1960	Recreation (Schroeder Lake)	272.00
Total				462.36

VESTED RIGHTS
(Unadjudicated)

Proof No.	Priority Date	Use	AFY
00782	September 12, 1910	Irrigation	27 acres
00113	July 6, 1912	Irrigation	15 acres

APPLICATIONS
(Pending)

Application 55987*	Mesquite Farmstead Association	M & I	500 c.f.s.**
Application 55988	Mesquite Farmstead Association	M & I	500 c.f.s.**
Application 56206*	Mesquite Farmstead Association	M & I	(included in Nos. 55987 and 55988)

* diversion point in Utah
** limited by available flow

Table 4

VRIGIN RIVER IRRIGATION USE IN ARIZONA
ADJACENT TO MESQUITE, NEVADA
(As revealed from maps on file with the
Nevada Division of Water Resources)

Permit No.	Certificate	Priority Date	AFY
Mesquite Irrigation Co.			
7624	4509	January 21, 1926	260.7 acres within Sections 3, 4 & 5, T16W, R39N, Mohave County, at 4.5 acre feet per year per acre = 1173.15 afy
Mesquite Irrigation Co.			
15619	5240	April 30, 1954	293 acres within the same land area with a duty of 5 acre feet per year per acre = 1465 afy*

* This total includes the total described above under Application No. 7624. This usage is not included in the Nevada Permits or Certificates.

Table 5

REQUEST FOR OFFERS TO SELL SHARES OF STOCK IN THE MESQUITE IRRIGATION COMPANY

The Southern Nevada Water Authority ("SNWA") requests that owners of shares of stock in the Mesquite Irrigation Company who desire to sell some or all of their shares, submit a completed and signed copy of the attached Offer to Sell Shares of Stock ("OFFER" or "Offer(s) to Sell") to the Southern Nevada Water Authority, 100 City Parkway, Suite 700, Las Vegas, Nevada, ATTENTION: Jeffrey Johnson, SNWA Division Manager, Water Management and Accounting Division, on or before 5:00 p.m. on July 21, 2009. OFFERS may be mailed to P.O. Box 99956, Las Vegas, NV 89193-9956. The signed OFFER must be RECEIVED by SNWA at the above offices on or before 5:00 p.m. on July 21, 2009. Please call Jeff Johnson or Lisa Von Heeder at 702-862-3752 with any questions. SNWA intends to purchase shares in the Mesquite Irrigation Company on a first come, first served basis, subject to appropriation of funds by its Board of Directors for such purposes.

The terms of this Request for Offers to Sell are as follows:

1. SNWA is requesting OFFERS from all Mesquite Irrigation Company shareholders. SNWA will also consider Offers to Sell fractional shares.

2. SNWA will only consider accepting an OFFER if it is made on the attached form with no alterations to the terms contained in it.

3. Each signed OFFER returned to SNWA must also be signed by the Mesquite Irrigation Company certifying that the stock certificates for the number of shares of stock offered for sale are on deposit with the Mesquite Irrigation Company, and are endorsed for transfer by the signature of all owners whose names appear on the stock certificates, and that the certificates do not reflect any liens or encumbrances that would prevent the shareholder from executing the sale and/or prevent SNWA from utilizing the water represented by the shares to its full extent.

4. SNWA requests OFFERS at $71,422.72 per share. Sellers have three payment options to choose from:

   A. Lump sum payment. SNWA will pay all money to the Seller within sixty (60) days of SNWA's acceptance.

B. 5-year payment option. SNWA will pay annual payments no later than September 1 of every year for five (5) years, based on the payment table below. The initial payment amount will be escalated by 3% each year. The Seller will have no right to use the water during the payment period.

Payment Table	
	Five-Year Term
Payment	Payment per Share *
1	$14,284.54
2	$14,713.08
3	$15,154.47
4	$15,609.11
5	$16,077.38
Total	$75,838.58

* Amounts increase at 3% per year.

C. 10-year payment option. SNWA will pay annual payments no later than September 1 of every year for ten (10) years based on the payment table below. The initial payment amount will be escalated by 3% each year. The Seller will have no right to use the water during the payment period.

Payment Table	
	Ten-Year Term
Payment	Payment per Share *
1	$7,142.27
2	$7,356.54
3	$7,577.24
4	$7,804.55
5	$8,038.69
6	$8,279.85
7	$8,528.25
8	$8,784.09
9	$9,047.62
10	$9,319.04
Total	$81,878.14

* Amounts increase at 3% per year.

5. On receipt of notification of SNWA's acceptance of a shareholder's OFFER, the Mesquite Irrigation Company will record the name of Muddy River Water Holdings, Inc. as the record owner of the shares in the Irrigation Company's records and shall deliver stock certificates evidencing the transfer to SNWA.

6. All OFFERS made to SNWA must be signed by all persons whose name(s) appear as owners on the stock certificates for the shares offered for sale.

7. The name of the ditch through which the water represented by the shares offered for sale is conveyed shall be listed in the OFFER.

8. Conveyance to Lake Mead of the water represented by the shares sold may require authorization from the Nevada State Engineer. The Seller expressly agrees not to take any actions to protest or otherwise prevent the conveyance of this water to Lake Mead.

9. The Seller agrees to identify all real property, if any, within the Virgin River Valley that is either currently, or has been historically, irrigated with water represented by the shares sold, together with any documentation, including leases, regarding the use of the Seller's shares during the last five (5) years. Such obligation will be satisfied by completing the "Description of Land and Share Usage" form attached to this Request for Offers to Sell.

10. The Mesquite Irrigation Company will not deliver the water covered by the sold shares for irrigation, but may either leave the water in the Virgin River or divert such water into its diversion ditches and allow such water to pass through its ditches into the Virgin River for discharge into Lake Mead.

11. By returning a signed OFFER to SNWA, each Seller warrants and represents that the shares of stock in the Mesquite Irrigation Company offered for sale are free and clear of all encumbrances and obligations, except for balances owing for prior purchase of shares, and that the Seller(s) have the absolute right to transfer such shares pursuant to the terms of the OFFER and this Request for Offers to Sell. In the event of an encumbrance due to the unpaid purchase price of shares arising from a prior purchase and sale, the person to whom money is owed ("Encumbrancer") shall countersign the OFFER and agree to be bound by the terms of the sale. Both the Seller and the Encumbrancer shall give instructions to SNWA in the space provided on the OFFER regarding payment of funds. In lieu of the Encumbrancer countersigning the OFFER, the Seller(s) may present documentation acceptable to the SNWA showing that the Seller(s) have the absolute right to transfer such shares pursuant to the terms of this Request for Offers to Sell.

12. Each completed OFFER *MUST BE SIGNED BY THE MESQUITE IRRIGATION COMPANY.*

13. For any OFFER received by July 21, 2008, SNWA will notify all persons who submitted an OFFER whether or not their OFFER has been accepted by September 1, 2008. For any OFFER received after July 21, 2008, SNWA will notify all persons who submitted an OFFER whether or not their OFFER has been accepted no later than 60 days after the OFFER was received. No OFFER will be accepted if it is received after July 21,

2009. SNWA will also promptly notify the Mesquite Irrigation Company of the name(s) of the Seller(s) and of the shares for which the OFFER has been accepted. The endorsed stock certificates will be returned by the Mesquite Irrigation Company to the persons whose OFFERS are not accepted.

14. SNWA will pay all stock transfer fees and other Mesquite Irrigation Company costs resulting from an accepted OFFER.

15. SNWA reserves the right to reject an OFFER if in SNWA's sole judgment the aggregate amount of water represented by shares from a particular ditch is not sufficient to enable convenient monitoring of the conveyance of such water through the ditches of the Mesquite Irrigation Company to Lake Mead.

16. For all purposes of this OFFER, endorsed stock certificates will be held by the Mesquite Irrigation Company in accordance with the provisions hereof.

17. No OFFER is a binding sale unless and until accepted by SNWA.

DATED this 8th day of May, 2008.

SOUTHERN NEVADA WATER AUTHORITY
100 City Parkway, Suite 700
Las Vegas, Nevada 89106

By: _____
Authorized Representative

Revised 4.18.08

REQUEST FOR OFFERS TO LEASE SHARES OF STOCK IN THE MESQUITE IRRIGATION COMPANY

The Southern Nevada Water Authority ("SNWA") requests that owners of shares of stock in the Mesquite Irrigation Company ("MESQUITE") who desire to lease some or all of their shares, submit a completed and signed copy of the attached Offer to Lease Shares of Stock ("OFFER") to the Southern Nevada Water Authority, 100 City Parkway, Suite 700, Las Vegas, Nevada 89106, ATTENTION: Jeffrey Johnson, SNWA Division Manager, Water Management and Accounting Division on or before 5:00 p.m. on July 21, 2008. OFFERS may be mailed to P.O. Box 99956, Las Vegas, NV 89193-9956. The signed OFFER must be RECEIVED by SNWA at the above offices on or before 5:00 p.m. on July 21, 2008. Please call Jeff Johnson or Lisa Von Heeder at 702-862-3752 with any questions. SNWA intends to lease shares in MESQUITE on a first come, first served basis, subject to appropriation of funds by its Board of Directors for such purposes.

The terms of this Request for Offers to Lease are as follows:

1. SNWA is requesting OFFERS from all MESQUITE shareholders. No OFFER will be accepted for lease of less than one (1) share.

2. SNWA will only consider accepting an OFFER if it is made on the attached form with no alterations to the terms contained in it.

3. The Lessor may choose to begin the lease either on October 1, 2008 or on October 1, 2009. The term of each Lease will begin on October 1 and end on September 30 of the year specified by the Lessor. The minimum lease term is one year, and all leases must end on or before September 30, 2018.

4. By mutual agreement of the Lessor and SNWA, any lease may be extended on a year-to-year basis, so long as the lease term does not extend after September 30, 2018. The party wishing to extend the lease shall give written notice of that party's desire to extend the lease to the other party no later than July 1 of the year the initial lease term expires. The non-requesting party will notify the party that requested to extend the lease no later than September 1 whether or not that party agrees to extend the lease.

5. The annual rent for the lease and the latest date by which the lease payment will be mailed by SNWA to the Lessor is described in the table below. The initial lease payment amount will be escalated by 3% each year, as shown in the table below.

Year	Date of Annual Lease Payment	Annual Lease Payment per Share
2009 October 1, 2008 – September 30, 2009	9/1/2008	$2,491.41
2010 October 1, 2009 – September 30, 2010	9/1/2009	$2,566.15
2011 October 1, 2010 – September 30, 2011	9/1/2010	$2,643.13
2012 October 1, 2011– September 30, 2012	9/1/2011	$2,722.43
2013 October 1, 2012 – September 30, 2013	9/1/2012	$2,804.10
2014 October 1, 2013 – September 30, 2014	9/1/2013	$2,888.22
2015 October 1, 2014 – September 30, 2015	9/1/2014	$2,974.87
2016 October 1, 2015 – September 30, 2016	9/1/2015	$3,064.12
2017 October 1, 2016 – September 30, 2017	9/1/2016	$3,156.04
2018 October 1, 2017 – September 30, 2018	9/1/2017	$3,250.72

6. The Lessor agrees not to use, order or divert any portion of the water leased to SNWA during the lease term.

7. Each signed OFFER returned to SNWA must also be signed by MESQUITE certifying that all record owners of the stock certificate have signed the OFFER, and that the stock certificates do not reflect any liens or encumbrances that would prevent the shareholder from executing the lease and/or prevent SNWA from utilizing the water represented by the shares to its full extent.

8. All OFFERS made to SNWA must be signed by all persons whose name(s) appear as owners on the stock certificates for the shares offered for lease.

9. The name of the ditch through which the water represented by the shares offered for lease is conveyed shall be listed in the OFFER.

10. Conveyance to Lake Mead of the water represented by the leased shares may require authorization from the Nevada State Engineer. The Lessor expressly agrees not to take any actions to protest or otherwise prevent the conveyance of this water to Lake Mead.

11. The Lessor agrees to identify all real property, if any, within the Virgin River Valley that is either currently, or has been historically, irrigated with water represented by the leased shares, together with any documentation, including leases, regarding the use of the Lessor's shares during the last five (5) years. Such obligation will be satisfied by completing the "Description of Land and Share Usage" form attached to this Request for Offers to Lease.

12. MESQUITE will not deliver the water covered by the leased shares for irrigation, but may either leave the water in the Virgin River or divert such water into its diversion ditches and allow such water to pass through its ditches into the Virgin River for discharge into Lake Mead.

13. By returning a signed OFFER to SNWA, each Lessor warrants and represents that the shares of stock in MESQUITE offered for lease are free and clear of all encumbrances and obligations that would prevent the shareholder from executing the lease and/or prevent SNWA from utilizing the water represented by the shares to its full extent during the lease term.

14. Each completed OFFER *MUST BE SIGNED BY THE MESQUITE IRRIGATION COMPANY.*

15. By September 1, 2008, SNWA will notify all persons who submitted OFFERS whether or not their OFFER has been accepted. SNWA will also promptly notify MESQUITE of the name(s) of the Lessor(s) and of the shares for which the OFFER has been accepted.

16. SNWA will pay any MESQUITE fees and assessments due for each leased share during the lease term.

17. On receipt of notification of SNWA's acceptance of a shareholder's OFFER, MESQUITE will record the name of Muddy River Water Holdings, Inc. as the record lessee of the shares in the Irrigation Company's records and shall deliver stock certificates or other documentation evidencing the lease to SNWA.

18. SNWA reserves the right to reject an OFFER if in SNWA's sole judgment the aggregate amount of water represented by shares from a particular ditch is not sufficient to enable convenient monitoring of the conveyance of such water through the ditches of the MESQUITE to Lake Mead.

19. No OFFER is a binding lease unless and until accepted by SNWA.

DATED this 8th day of May, 2008.

SOUTHERN NEVADA WATER AUTHORITY
100 City Parkway, Suite 700
Las Vegas, Nevada 89106

By: _____
Authorized Representative

Revised 4.24.08

REQUEST FOR OFFERS TO SELL SHARES OF STOCK IN THE BUNKERVILLE IRRIGATION COMPANY

The Southern Nevada Water Authority ("SNWA") requests that owners of shares of stock in the Bunkerville Irrigation Company who desire to sell some or all of their shares, submit a completed and signed copy of the attached Offer to Sell Shares of Stock ("OFFER" or "Offer(s) to Sell") to the Southern Nevada Water Authority, 100 City Parkway, Suite 700, Las Vegas, Nevada, ATTENTION: Jeffrey Johnson, SNWA Division Manager, Water Management and Accounting Division, on or before 5:00 p.m. on July 21, 2009. OFFERS may be mailed to P.O. Box 99956, Las Vegas, NV 89193-9956. The signed OFFER must be RECEIVED by SNWA at the above offices on or before 5:00 p.m. on July 21, 2009. Please call Jeff Johnson or Lisa Von Heeder at 702-862-3752 with any questions. SNWA intends to purchase shares in the Bunkerville Irrigation Company on a first come, first served basis, subject to appropriation of funds by its Board of Directors for such purposes.

The terms of this Request for Offers to Sell are as follows:

1. SNWA is requesting OFFERS from all Bunkerville Irrigation Company shareholders. SNWA will also consider Offers to Sell fractional shares.

2. SNWA will only consider accepting an OFFER if it is made on the attached form with no alterations to the terms contained in it.

3. Each signed OFFER returned to SNWA must also be signed by the Bunkerville Irrigation Company certifying that the stock certificates for the number of shares of stock offered for sale are on deposit with the Bunkerville Irrigation Company, and are endorsed for transfer by the signature of all owners whose names appear on the stock certificates and that the certificates do not reflect any liens or encumbrances that would prevent the shareholder from executing the sale and/or prevent SNWA from utilizing the water represented by the shares to its full extent.

4. SNWA requests OFFERS at $80,056.23 per share. Sellers have three payment options to choose from:

   A. Lump sum payment. SNWA will pay all money to the Seller within sixty (60) days of SNWA's acceptance.

B. 5-year payment option. SNWA will pay annual payments no later than September 1 of every year for five (5) years, based on the payment table below. The initial payment amount will be escalated by 3% each year. The Seller will have no right to use the water during the payment period.

Payment Table	
	Five-Year Term
Payment	Payment per Share *
1	$16,011.25
2	$16,491.58
3	$16,986.33
4	$17,495.92
5	$18,020.80
Total	$85,005.88

* Amounts increase at 3% per year.

C. 10-year payment option. SNWA will pay annual payments no later than September 1 of every year for ten (10) years based on the payment table below. The initial payment amount will be escalated by 3% each year. The Seller will have no right to use the water during the payment period.

Payment Table	
	Ten-Year Term
Payment	Payment per Share *
1	$8,005.62
2	$8,245.79
3	$8,493.17
4	$8,747.96
5	$9,010.40
6	$9,280.71
7	$9,559.13
8	$9,845.91
9	$10,141.28
10	$10,445.52
Total	$91,775.49

* Amounts increase at 3% per year.

5. On receipt of notification of SNWA's acceptance of a shareholder's OFFER, the Bunkerville Irrigation Company will record the name of Muddy River Water Holdings, Inc. as the record owner of the shares in the Irrigation Company's records and shall deliver stock certificates evidencing the transfer to SNWA.

6. All OFFERS made to SNWA must be signed by all persons whose name(s) appear as owners on the stock certificates for the shares offered for sale.

7. The name of the ditch through which the water represented by the shares offered for sale is conveyed shall be listed in the OFFER.

8. Conveyance to Lake Mead of the water represented by the shares sold may require authorization from the Nevada State Engineer. The Seller expressly agrees not to take any actions to protest or otherwise prevent the conveyance of this water to Lake Mead.

9. The Seller agrees to identify all real property, if any, within the Virgin River Valley that is either currently, or has been historically, irrigated with water represented by the shares sold, together with any documentation, including leases, regarding the use of the Seller's shares during the last five (5) years. Such obligation will be satisfied by completing the "Description of Land and Share Usage" form attached to this Request for Offers to Sell.

10. The Bunkerville Irrigation Company will not deliver the water covered by the sold shares for irrigation, but may either leave the water in the Virgin River or divert such water into its diversion ditches and allow such water to pass through its ditches into the Virgin River for discharge into Lake Mead.

11. By returning a signed OFFER to SNWA, each Seller warrants and represents that the shares of stock in the Bunkerville Irrigation Company offered for sale are free and clear of all encumbrances and obligations, except for balances owing for prior purchase of shares, and that the Seller(s) have the absolute right to transfer such shares pursuant to the terms of the OFFER and this Request for Offers to Sell. In the event of an encumbrance due to the unpaid purchase price of shares arising from a prior purchase and sale, the person to whom money is owed ("Encumbrancer") shall countersign the OFFER and agree to be bound by the terms of the sale. Both the Seller and the Encumbrancer shall give instructions to SNWA in the space provided on the OFFER regarding payment of funds. In lieu of the Encumbrancer countersigning the OFFER, the Seller(s) may present documentation acceptable to SNWA showing that the Seller(s) have the absolute right to transfer such shares pursuant to the terms of this Request for Offers to Sell.

12. Each completed OFFER *MUST BE SIGNED BY THE BUNKERVILLE IRRIGATION COMPANY.*

13. For any OFFER received by July 21, 2008, SNWA will notify all persons who submitted an OFFER whether or not their OFFER has been accepted by September 1, 2008. For any OFFER received after July 21, 2008, SNWA will notify all persons who submitted an OFFER whether or not their OFFER has been accepted no later than 60 days after the OFFER was received. No OFFER will be accepted if it is received after July 21,

2009. SNWA will also promptly notify the Bunkerville Irrigation Company of the name(s) of the Seller(s) and of the shares for which the OFFER has been accepted. The endorsed stock certificates will be returned by the Bunkerville Irrigation Company to the persons whose OFFERS are not accepted.

14. SNWA will pay all stock transfer fees and other Bunkerville Irrigation Company costs resulting from an accepted OFFER.

15. SNWA reserves the right to reject an OFFER if in SNWA's sole judgment the aggregate amount of water represented by shares from a particular ditch is not sufficient to enable convenient monitoring of the conveyance of such water through the ditches of the Bunkerville Irrigation Company to Lake Mead.

16. For all purposes of this OFFER, endorsed stock certificates will be held by the Bunkerville Irrigation Company in accordance with the provisions hereof.

17. No OFFER is a binding sale unless and until accepted by SNWA.

DATED this 8th day of May, 2008.

SOUTHERN NEVADA WATER AUTHORITY
100 City Parkway, Suite 700
Las Vegas, Nevada 89106

By: _____
Authorized Representative

Revised 4.18.08

REQUEST FOR OFFERS TO LEASE SHARES OF STOCK IN THE BUNKERVILLE IRRIGATION COMPANY

The Southern Nevada Water Authority ("SNWA") requests that owners of shares of stock in the Bunkerville Irrigation Company ("BUNKERVILLE") who desire to lease some or all of their shares, submit a completed and signed copy of the attached Offer to Lease Shares of Stock ("OFFER") to the Southern Nevada Water Authority, 100 City Parkway, Suite 700, Las Vegas, Nevada 89106, ATTENTION: Jeffrey Johnson, SNWA Division Manager, Water Management and Accounting Division on or before 5:00 p.m. on July 21, 2008. OFFERS may be mailed to P.O. Box 99956, Las Vegas, NV 89193-9956. The signed OFFER must be RECEIVED by SNWA at the above offices on or before 5:00 p.m. on July 21, 2008. Please call Jeff Johnson or Lisa Von Heeder at 702-862-3752 with any questions. SNWA intends to lease shares in BUNKERVILLE on a first come, first served basis, subject to appropriation of funds by its Board of Directors for such purposes.

The terms of this Request for Offers to Lease are as follows:

1. SNWA is requesting OFFERS from all BUNKERVILLE shareholders. No OFFER will be accepted for lease of less than one (1) share.

2. SNWA will only consider accepting an OFFER if it is made on the attached form with no alterations to the terms contained in it.

3. The Lessor may choose to begin the lease either on October 1, 2008 or on October 1, 2009. The term of each Lease will begin on October 1 and end on September 30 of the year specified by the Lessor. The minimum lease term is one year, and all leases must end on or before September 30, 2018.

4. By mutual agreement of the Lessor and SNWA, any lease may be extended on a year-to-year basis, so long as the lease term does not extend after September 30, 2018. The party wishing to extend the lease shall give written notice of that party's desire to extend the lease to the other party no later than July 1 of the year the initial lease term expires. The non-requesting party will notify the party that requested to extend the lease no later than September 1 whether or not that party agrees to extend the lease.

5. The annual rent for the lease and the latest date by which the lease payment will be mailed by SNWA to the Lessor is described in the table below. The initial lease payment amount will be escalated by 3% each year, as shown in the table below.

Year	Date of Annual Lease Payment	Annual Lease Payment per Share
2009 October 1, 2008 – September 30, 2009	9/1/2008	$2,792.56
2010 October 1, 2009 – September 30, 2010	9/1/2009	$2,876.34
2011 October 1, 2010 – September 30, 2011	9/1/2010	$2,962.63
2012 October 1, 2011– September 30, 2012	9/1/2011	$3,051.51
2013 October 1, 2012 – September 30, 2013	9/1/2012	$3,143.05
2014 October 1, 2013 – September 30, 2014	9/1/2013	$3,237.35
2015 October 1, 2014 – September 30, 2015	9/1/2014	$3,334.47
2016 October 1, 2015 – September 30, 2016	9/1/2015	$3,434.50
2017 October 1, 2016 – September 30, 2017	9/1/2016	$3,537.53
2018 October 1, 2017 – September 30, 2018	9/1/2017	$3,643.66

6. The Lessor agrees not to use, order or divert any portion of the water leased to SNWA during the lease term.

7. Each signed OFFER returned to SNWA must also be signed by BUNKERVILLE certifying that all record owners of the stock certificate have signed the OFFER, and that the stock certificates do not reflect any liens or encumbrances that would prevent the shareholder from executing the lease and/or prevent SNWA from utilizing the water represented by the shares to its full extent.

8. All OFFERS made to SNWA must be signed by all persons whose name(s) appear as owners on the stock certificates for the shares offered for lease.

9. The name of the ditch through which the water represented by the shares offered for lease is conveyed shall be listed in the OFFER.

10. Conveyance to Lake Mead of the water represented by the leased shares may require authorization from the Nevada State Engineer. The Lessor expressly agrees not to take any actions to protest or otherwise prevent the conveyance of this water to Lake Mead.

11. The Lessor agrees to identify all real property, if any, within the Virgin River Valley that is either currently, or has been historically, irrigated with water represented by the leased shares, together with any documentation, including leases, regarding the use of the Lessor's shares during the last five (5) years. Such obligation will be satisfied by completing the "Description of Land and Share Usage" form attached to this Request for Offers to Lease.

12. BUNKERVILLE will not deliver the water covered by the leased shares for irrigation, but may either leave the water in the Virgin River or divert such water into its diversion ditches and allow such water to pass through its ditches into the Virgin River for discharge into Lake Mead.

13. By returning a signed OFFER to SNWA, each Lessor warrants and represents that the shares of stock in BUNKERVILLE offered for lease are free and clear of all encumbrances and obligations that would prevent the shareholder from executing the lease and/or prevent SNWA from utilizing the water represented by the shares to its full extent during the lease term.

14. Each completed OFFER *MUST BE SIGNED BY THE BUNKERVILLE IRRIGATION COMPANY.*

15. By September 1, 2008, SNWA will notify all persons who submitted OFFERS whether or not their OFFER has been accepted. SNWA will also promptly notify

BUNKERVILLE of the name(s) of the Lessor(s) and of the shares for which the OFFER has been accepted.

16. SNWA will pay any BUNKERVILLE fees and assessments due for each leased share during the lease term.

17. On receipt of notification of SNWA's acceptance of a shareholder's OFFER, BUNKERVILLE will record the name of Muddy River Water Holdings, Inc. as the record lessee of the shares in the Irrigation Company's records and shall deliver stock certificates or other documentation evidencing the lease to SNWA.

18. SNWA reserves the right to reject an OFFER if in SNWA's sole judgment the aggregate amount of water represented by shares from a particular ditch is not sufficient to enable convenient monitoring of the conveyance of such water through the ditches of BUNKERVILLE to Lake Mead.

19. No OFFER is a binding lease unless and until accepted by SNWA.

DATED this 8th day of May, 2008.

SOUTHERN NEVADA WATER AUTHORITY
100 City Parkway, Suite 700
Las Vegas, Nevada 89106

By: _____
Authorized Representative

Revised 4.24.08

SOUTHERN NEVADA WATER AUTHORITY
100 City Parkway, Suite 700 • Las Vegas, NV 89106
MAILING ADDRESS: P.O. Box 99956 • Las Vegas, NV 89193-9956
(702) 862-3400 • snwa.com

February 25, 2013

Robert Bunker, General Manager
Bunkerville Irrigation Company
P.O. Box 7150
Bunkerville, Nevada 89007

Dear Mr. Bunker:

The Southern Nevada Water Authority (SNWA) would like to confirm the number of Bunkerville Irrigation Company (BIC) shares it owned and leased during Calendar Year (CY) 2012. This letter of concurrence verifying the number of shares controlled will be provided to the Bureau of Reclamation and the Nevada State Engineer's Office in support of SNWA's accounting of its BIC water rights, in lieu of providing them copies of owned share certificates and numerous lease agreements. Please review the number of shares below that SNWA has described it controlled during CY 2012 and sign this letter if BIC concurs with the numbers and time periods of non-use.

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Owned	445 -	445 -	445 -	445 -	445 -	445 -	445 -	445 -	445 -	445 -	445 -	445 -
Leased	503	503	503	503	503	503	503	503	503	503	503	503
Total	948	948	948	948	948	948	948	948	948	948	948	948

Thank you for your assistance. If you have any questions, please contact me at (702) 862-3748 or Sean Collier at (702) 691-5375.

Sincerely,

Jeffrey Johnson, SNWA Division Manager
Water Management and Accounting Division

JJ:lmv

Concurrence by:

4-1-2013

Robert Bunker, General Manager — Date
Bunkerville Irrigation Company

SOUTHERN NEVADA WATER AUTHORITY
100 City Parkway, Suite 700 • Las Vegas, NV 89106
MAILING ADDRESS: P.O. Box 99956 • Las Vegas, NV 89193-9956
(702) 862-3400 • snwa.com

February 25, 2013

Kraig Hafen, Manager
Mesquite Irrigation Company
P.O. Box 142
Mesquite, Nevada 89024

Dear Mr. Hafen:

The Southern Nevada Water Authority (SNWA) would like to confirm the number of Mesquite Irrigation Company (MIC) shares it owned and leased during Calendar Year (CY) 2012. This letter of concurrence verifying the number of shares controlled will be provided to the Bureau of Reclamation and the Nevada State Engineer's Office in support of SNWA's accounting of its MIC water rights, in lieu of providing them copies of owned share certificates and numerous lease agreements. Please review the number of shares below that SNWA has described it controlled during CY 2012 and sign this letter if MIC concurs with the numbers and time periods of non-use.

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Owned	141.333	141.333	141.333	141.333	141.333	141.333	141.333	141.333	141.333	141.333	141.333	141.333
	-	-	-	-	-	-	-	-	-	-	-	-
Leased	731.833	731.833	731.833	731.833	731.833	731.833	731.833	731.833	731.833	731.833	731.833	731.833
Total	873.166	873.166	873.166	873.166	873.166	873.166	873.166	873.166	873.166	873.166	873.166	873.166

Thank you for your assistance. If you have any questions, please contact me at (702) 862-3748 or Sean Collier at (702) 691-5375.

Sincerely,

Jeffrey Johnson, SNWA Division Manager
Water Management and Accounting Division

JJ:lmv

Concurrence by:

3-1-13

Kraig Hafen, Manager — Date
Mesquite Irrigation Company

Coyote Spring Valley Imported Intentionally Created Surplus Certification Report Calendar Year 2012

SOUTHERN NEVADA WATER AUTHORITY

Cover: Background image is the Lower Muddy River near Logandale, Nevada. The individual photos from left to right are: MX-5 well, Bowman Reservoir canal, Bowman Reservoir discharge, Bowman Reservoir, and Gubler Street Muddy River discharge.

Coyote Spring Valley
Imported
Intentionally Created Surplus
Certification Report

Calendar Year 2012

Southern Nevada Water Authority
100 City Parkway, Suite 700
Las Vegas, Nevada 89106

Water and Environmental Resources Department
Water Management and Planning Division

November 2013

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Acronyms

AZMET	Arizona Meteorological Network
BCPA	Boulder Canyon Project Act
CY	Calendar Year
ET	Evapotranspiration
ICS	Intentionally Created Surplus
LCRAS	Lower Colorado River Accounting System
MVIC	Muddy Valley Irrigation Company
MVWD	Moapa Valley Water District
OWMA	Overton Wildlife Management Area
SNWA	Southern Nevada Water Authority
USGS	United States Geological Survey

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Abbreviations

af	acre-feet
afy	acre-feet per year
cfs	cubic-feet per second
ft	foot

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Introduction

The Secretary of Interior (Secretary) issued a Record of Decision for *Colorado River Interim Guidelines for Lower Basin Shortages and the Coordinated Operations for Lake Powell and Lake Mead* (Guidelines) on December 13, 2007, which established criteria for the development and delivery of Intentionally Created Surplus (ICS). One type of ICS is Imported ICS, which allows a Contractor, as defined in the Guidelines, to introduce non-Colorado River System water from the Contractor's state into the mainstream of the Colorado River for ICS credits.

To generate ICS, the Guidelines require a Contract holder to enter into a Delivery Agreement with the United States of America and a Forbearance Agreement with Lower Basin Contract holders. On December 13, 2007, the Southern Nevada Water Authority (SNWA) and Colorado River Commission of Nevada (CRC) entered into a Delivery Agreement with the United States of America and a Forbearance Agreement with Lower Basin Contract holders. Exhibit B of the Forbearance Agreement is attached to the Delivery Agreement and describes the State of Nevada groundwater rights in Coyote Spring Valley which SNWA plans to use to create Imported ICS, and how the Coyote Spring Valley groundwater conveyed to Lake Mead will be determined. (Appendix A).

The Guidelines, Delivery Agreement, and Forbearance Agreement require a plan for the creation of ICS (ICS Plan). An ICS Plan for Imported ICS was submitted to the Bureau of Reclamation (Reclamation) for Calendar Year (CY) 2012 in July 2011. SNWA received a letter from Reclamation in December 2011 approving the ICS Plans for CY 2012 (Appendix B).

This report satisfies the requirements of Nevada State Engineer and the Guidelines as follows:

- Nevada State Approval
    - Intentionally Created Surplus is declared a beneficial use of a Nevada water right under NRS 533.030
    - State of Nevada Water Right Permits 77291 through 77306, which changed the Point of Diversion, Manner of Use, and Place of Use of Permit Nos. 46777, 49414, 49660 – 49662, and 49978 – 49987, to facilitate the transmission of up to 9,000 acre-feet per year (afy) of Coyote Spring groundwater to the mainstream of the Colorado River, and beneficial use of the water within Clark County, Nevada. Copies of the water right permits can be found in Appendix C
    - Continued monitoring of SNWA's groundwater development as required by permit conditions issued by the Nevada State Engineer
- Based on the Guidelines, an annual certification report will be submitted for the Secretary of Interior's review and verification to demonstrate the amount of Imported ICS created in the preceding year, and that the method of creation was consistent with SNWA's approved ICS Plan.

Project Description

Between 1998 and 2002, the SNWA purchased 9,000 afy of groundwater rights in Coyote Spring Valley (State of Nevada hydrographic area #219), along with real property including the MX-5 well. Since this purchase, SNWA constructed treatment and pipeline facilities to convey its groundwater rights from Coyote Spring Valley into Lower Moapa Valley, where the water enters Moapa Valley Water District's (MVWD) potable distribution system and is conveyed to Bowman Reservoir. From Bowman Reservoir the water is discharged to the Lower Muddy River and allowed to flow into Lake Mead to create Imported ICS credits. This transmission system is presented in Figure 1 and Figure 2.

Summary of Results

In CY 2012, 3,918 acre-feet (af) of Coyote Spring Valley Groundwater, Imported ICS (Coyote Spring Imported ICS) was delivered to Lake Mead, prior to accounting for the one-time deduction of 5% for the benefit of additional system storage in Lake Mead as described in the Guidelines. This volume was less than outlined in the approved CY 2012 ICS Plan due to some operational issues with the well-head treatment facility.

Accounting Methodology

Quantification of Imported ICS

There are two key water flow meters used to verify the amount of water being pumped out of Coyote Spring Valley and conveyed to Bowman Reservoir/Lower Muddy River and Lake Mead for Imported ICS credit:

- MX-5 well pumpage meter
- MVWD's dechlorination facility meter

The MX-5 well pumpage meter documents the volume of groundwater developed at the wellhead. The groundwater is then treated to remove arsenic, chlorinated, and conveyed out of Coyote Spring Valley via the newly constructed 16-mile pipeline to MVWD's distribution system, where it enters MVWD's 3-million gallon storage tank and is comingled with MVWD's existing sources of drinking water. The Coyote Spring groundwater remains in MVWD's system as it is conveyed to Lower Moapa Valley.

In Lower Moapa Valley, the Coyote Spring groundwater is discharged from MVWD's distribution system into Bowman Reservoir after passing through MVWD's Dechlorination Facility, which removes any residual chlorine from the treated, potable water prior to entering Bowman Reservoir. The volume of water discharged from MVWD's system to Bowman Reservoir is metered at MVWD's Dechlorination Facility. Once in Bowman Reservoir, the Coyote Spring Imported ICS water enters the Muddy Valley Irrigation Company (MVIC) distribution system, where the water comingles with Muddy River Water and ultimately enters the mainstream of the Lower Muddy River and flows to Lake Mead.

The monthly, meter readings at MVWD's Dechlorination Facility meter represents the volume of Imported ICS delivered to the Lower Muddy River system. The well MX-5 meter is used to

verify the metered volume delivered to the Lower Muddy River system does not exceed the volume developed from Coyote Spring Valley. If the annual volume developed from well MX-5 is less than the volume measured at the dechlorination facility for the year, the volume of ICS created for that year will be limited to the amount pumped from well MX-5. This insures there are no operational issues where MVWD's water (i.e., non-Coyote Spring Valley groundwater) is delivered to Bowman Reservoir instead of Coyote Spring Valley well MX-5 water.

Table 1 presents the monthly detail of the volumes of water developed from Coyote Spring Valley, and imported into the Lower Muddy River. As stated previously, the volume imported into the Lower Muddy River never exceeded the amount developed from Coyote Spring Valley. Therefore, the entire volume of water that is metered through MVWD's Dechlorination Facility is considered SNWA Coyote Spring Valley Groundwater reaching the Lower Muddy River. The volume of water delivered to Bowman reservoir is verified by MVWD in a letter of concurrence that can be found in Appendix D.

Once the Coyote Spring Valley groundwater becomes comingled with Lower Muddy River water after leaving Bowman Reservoir, the most effective way to account for and demonstrate the Coyote Spring Valley groundwater water reaches Lake Mead is to perform a water balance on the entire Lower Muddy River. This balance factors in all methods of consumptive use and quantifies the total amount of surface and subsurface water flowing to Lake Mead.

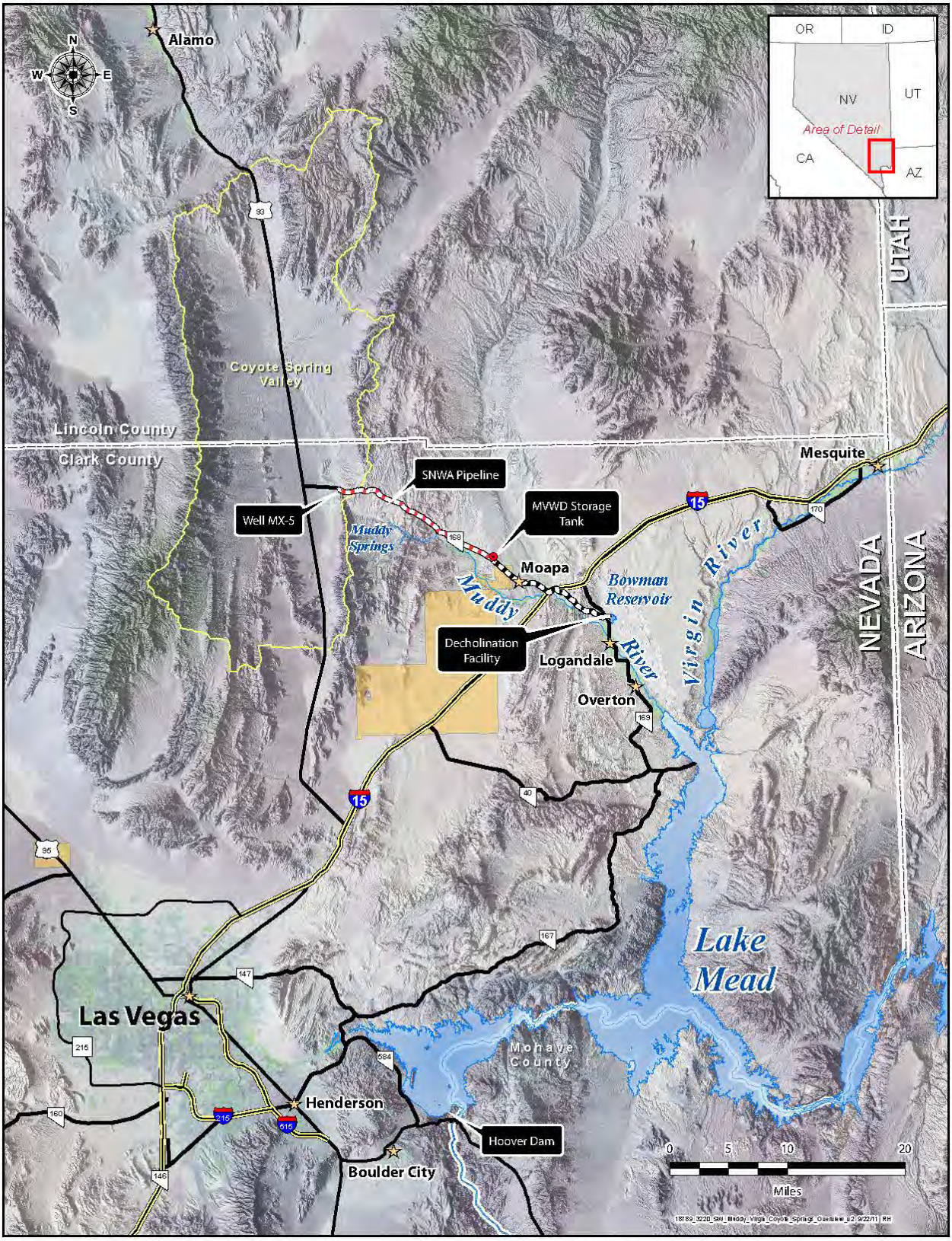

Figure 1 - Overview of Coyote Spring Valley Groundwater, Imported ICS Project Area

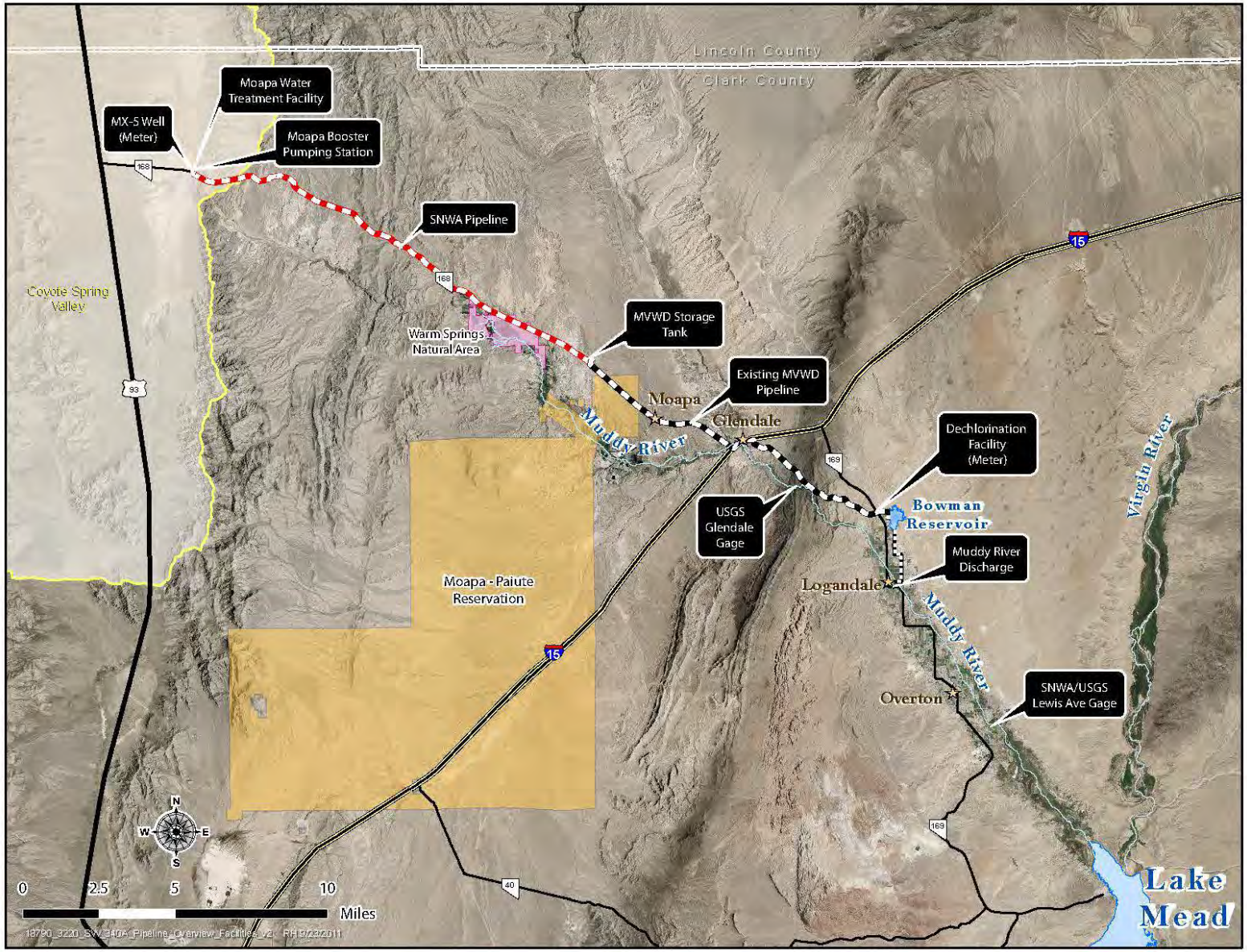

Figure 2 –Coyote Spring Valley to Lake Mead Groundwater Transmission System

Table 1 - Metered Amounts of Coyote Spring Valley Groundwater, Imported ICS developed and Conveyed to the Lower Muddy River (in Acre Feet)

Meter	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
MX-5 Pumpage (af)	227	0	5	127	467	462	397	460	456	446	451	462	3,961
Into Bowman Reservoir (af)	223	3	2	123	470	465	389	473	457	417	449	449	**3,918**
Bowman ≤ Coyote Spring													Yes

Lower Muddy River ICS Report Water Balance

Since 2008, SNWA has performed an annual water balance on the Lower Muddy River for SNWA's annual Muddy River Tributary Conservation ICS Certification Report (Muddy River ICS Report). This water balance accounts for inflows, consumptive uses, and outflows resulting in the total surface and subsurface flows from the Lower Muddy River to Lake Mead.

The Coyote Spring Imported ICS is added as an inflow component to the Lower Muddy River water balance used in the Muddy River ICS Report. This water balance will be used to demonstrate that Coyote Spring Imported ICS reaches Lake Mead, while accounting for all system losses due to open water evaporation and channel evapotranspiration (ET). The itemized water balance on a seasonal time step can be found in Table 2.

Similar to the Muddy River ICS Report, each component of the water balance computation is labeled with an alphabetical row reference that can be found in Table 2. An outline of the water budget is presented below with additional information on each line item. A more detailed description of the water balance components, including GIS maps, and data tables can be found in SNWA's CY 2012 Muddy River ICS Report. The detailed verification section of the Muddy River ICS report can be found in Appendix E.

Water Balance Components

Inflows

Water flowing into the Lower Muddy River is measured at the Glendale gage (Row A in Table 2). The gage is located in a narrow cut of carbonate rocks that are tilted almost vertically due to a thrust fault. Any shallow, alluvial underflow is thought to ramp up and be measured by the gage. Downstream of the narrows, the Muddy River enters the lower reach of the Muddy River and the floodplain begins to widen, until reaching Wells Siding. The Muddy River, downstream of Wells Siding, is an incised narrow channel that has artificially been constrained to facilitate farming on the river's historic floodplain.

For the purposes of this water balance, flood flows measured at the Glendale gage are limited to a maximum of 70 cfs mean daily discharge. For example, if a flood with a mean daily average of 100 cfs is measured by the Glendale gage, the 100 cfs is replaced with a value of 70 cfs. The purpose of limiting these flows was mainly for the quantification of Lower Muddy River water rights. Since the maximum amount of water that can be diverted and used by the MVIC is approximately 70 cfs, only flows of 70 cfs or lower can be theoretically utilized by MVIC, with the remaining flow staying in the Muddy River Channel. These excess flows do not increase riparian vegetation or ET due to the incised state of the river channel in the Lower Muddy River. Therefore these flood flows are not factored into the overall water balance.

The inflow of Coyote Spring Imported ICS into Bowman Reservoir which is metered at the MVWD Dechlorination Facility is in Row J, and is part of the Bowman Reservoir Operations section of the balance. The only other inflow besides the Muddy River and Coyote Spring Imported ICS is precipitation which is factored into the ET equations for crops.

Consumptive Uses

Industrial Uses

A portion of MVIC's shares have been purchased and leased by Simplot, a sand and minerals operation in Overton, Nevada, which is using the water represented by shares they control for slurrying and washing sand for glass production. The water is 100% consumptively used, so the water represented by the shares controlled by Simplot is subtracted in its entirety from the water balance (Row E).

Crop and Phreatophyte ET

To calculate ET demands by crops (Row F) and phreatophytes (Rows B and H) on the Muddy River, a literature search for ET data with a long period-of-record and monthly time-step data was performed. The Lower Colorado River Accounting System (LCRAS) was chosen because it contained monthly data in a similar climate for a relatively long period, 1995-2007.

The LCRAS is conducted annually by Reclamation to assist with determining consumptive water use along the Lower Colorado River. The LCRAS ET rates are determined by collecting data from meteorological towers, determining potential ET, and applying various crop coefficients to determine crop-specific ET values.

The LCRAS data chosen for use in this analysis utilize data collected from two Arizona Meteorological Network (AZMET) stations located in the Mohave Valley in Arizona, which are used to calculate local phreatophyte and crop ET. This is the most northern area examined in LCRAS and most closely represents climatic conditions of the Lower Muddy River. The Mohave Valley is, however, at a lower elevation and experiences higher temperatures than the Lower Muddy River, resulting in higher ET values. This makes the use of Mohave Valley ET values in the water balance a conservative approach, overestimating the actual ET demand in the Lower Muddy River.

Open Water Evaporation

Open water bodies on the Lower Muddy River include Bowman Reservoir, the Lower Muddy River channel, and a few small ponds on the Overton Wildlife Management Area (OWMA). The surface area of Bowman Reservoir varies depending on how full it is. For Bowman Reservoir, SNWA has developed a stage/capacity/surface area curve using remote sensing and GIS. Every month MVIC measures the elevation of the reservoir using a staff gage. Using the elevation and the stage/capacity/surface curve, SNWA is able to determine the surface area of the reservoir for that month which can then be multiplied by an open water evaporation rate to estimate the amount of open water evaporation that occurred for that month. The Bowman Reservoir evaporation volume is in Row G.

The open water evaporation rate used for Bowman Reservoir, the Muddy River channel, and the ponds on the OWMA was 7.50 feet per year. This value is the open water evaporation rate determined and published by the USGS for Lake Mead. The monthly average evaporation data was published in the USGS SIR 2006-5252 titled *Evaporation from Lake Mead, Arizona, and Nevada, 1997-99*. The volume of open water evaporation occurring in the Lower Muddy River channel is incorporated into the phreatophyte consumptive uses in Rows B and H. The open water evaporation for OWMA is incorporated into the total consumptive use of OWMA (Row P).

Outflows

Lewis Avenue in Overton is generally considered to be the lower most extent of agricultural uses within MVIC's irrigable area. The OWMA is located downstream of the USGS Lewis Avenue gage and abuts Lake Mead. Provisional discharge data for CY 2012 at the Lewis Avenue gage measured approximately 20,971 af (Row N). The calculations from the water balance determined that there was a total surface and subsurface flow of 24,504 afy (Row M) reaching Lake Mead. This means there was 3,572 afy of subsurface flow leaving the Lower Muddy River (Row O).

Overton Wildlife Management Area (OWMA)

The OWMA is located just above the Lower Muddy River's confluence with Lake Mead, downstream of the Lewis Avenue gage. The OWMA is managed for migrating birds, hunting, and most recently, a refugia for Razorback suckers in a small impoundment called Honey Bee Pond. The managed part of the facility, located above Lake Mead, is about 280 acres in size and consists of a series of seasonal wetlands that are flooded in the winter for migrating waterfowl, along with several fields of Alfalfa, Sudan grass, and Bermuda grass for bird habitat and minor farming, along with Honey Bee Pond and a couple other small impoundments.

The OWMA receives most of its water directly from the Muddy River and is permitted to do so under tail-water permits. In addition to the tail-water rights, the OWMA owns shares in MVIC. In 2012, the OWMA controlled 347 af of MVIC water that was delivered to the OWMA via ditches from MVIC's Wells Siding diversion. The OWMA controlled shares of water are therefore bypassing the USGS Lewis Avenue gage.

The managed area of the OWMA above Lake Mead uses approximately 852 afy (Row P), in addition to the 347 afy from MVIC shares, based on the type of vegetation/management practices for the OWMA lands above Lake Mead. Aerial photography and discussions with OWMA management were used to determine the appropriate LCRAS Vegetation ET rates to apply to the managed areas.

Total Flows to Lake Mead and SNWA Rights Verification

By taking the total flows to Lake Mead (Row M) and subtracting the consumptive uses by the OWMA, a total flow of water reaching Lake Mead is calculated, which is the final output of the water balance. Row V is a total of all of the Muddy River and Coyote Spring water rights that were left in or added to the river by SNWA. For SNWA to receive credit for these rights, the volume of water represented by SNWA rights (Row V) cannot exceed the total calculated volume of water reaching Lake Mead (Row Q). Row W is the difference between the water reaching Lake Mead and the SNWA controlled rights. These values fluctuate on a seasonal basis due to irrigation company operational strategies that include the filling and emptying of Bowman Reservoir. The water balance factors these variables in on an annual time-step.

Conclusion

The Lower Muddy River water balance accounts for all system losses, and these losses are incorporated into SNWA's Muddy River Tributary Conservation ICS certification reports. As a result, the calculations leave the metered Coyote Spring Imported ICS discharged to Bowman Reservoir and the Lower Muddy River intact without additional losses applied. Again, this is because all system losses were applied to the Muddy River Tributary Conservation ICS. Therefore, in CY 2012 SNWA delivered 3,918 af of Coyote Spring Imported ICS to Lake Mead.

Table 2 - Lower Muddy River Water Balance

2012 Muddy River Intentionally Created Surplus Water Balance Sheet (all units in Acre-Feet)						
		Winter (Jan - Apr)	Summer (May-Sep)	Winter (Oct-Dec)	Total	Row Reference
Total Inflows To Lower Muddy River	Muddy River at Glendale Gage	9,910.00	11,300.00	6,960.00	28,170.00	A
	Phreatophyte Consumptive Use to Wells Siding	151.83	866.46	130.89	1,149.17	B
	Leased Upper Muddy River Water Rights	3,517.91	3,522.59	2,888.65	9,929.15	C
	Acre-feet per Share Basis	**6,240.26**	**6,910.95**	**3,940.47**	**17,092**	D = A - B - C
Consumptive Uses Above Lewis Avenue	Simplot	512.93	537.48	384.70	1,435.12	E
	MVIC Crop Use	518.70	2,166.77	277.18	2,962.65	F
	Bowman Reservoir Evaporation	258.97	532.04	163.09	954.10	G
	Phreatophyte Consumptive Use (Wells Siding to Lake Mead)	124.37	584.23	86.52	795.12	H
	MVIC Consumptive Uses above Lewis Ave	1,414.97	3,820.52	911.49	6,147	I = E + F + G + H
Bowman Reservoir Operations						
	Coyote Springs Imported ICS	351.48	2,253.06	1,313.77	3,918	J
	Net Muddy River Water In (+) or Out (-) of Bowman	1,725.57	(3,240.51)	(2,114.42)	(3,629)	K
	Total Change in Bowman Reservoir Storage	2,077.05	(987.44)	(800.66)	289	L=J+K
Outflows from MVIC Service Area	Total Calculated Flows Passing Lewis Avenue	6,617.64	9,853.53	8,032.05	24,503	M=A-B-I+J-L
	Flows Measured at USGS Lewis Avenue Gage	5,196.00	9,321.00	6,454.00	20,971	N
	Calculated Unmeasured Sub-Surface Flows	1,421.64	532.53	1,578.05	3,532	O=M-N
	Total Calculated Flows Passing Lewis Avenue	6,618.00	9,854.00	8,032.00	24,504	M
Overton Wildlife Management Area Water Use	OWMA Consumptive Use	319.07	293.23	239.83	852	P
	Total Flows to Lake Mead	6,298.93	9,560.77	7,792.17	23,652	Q=M-P
SNWA Water Rights	Upper Muddy River Water Rights	3,517.91	3,522.59	2,888.65	9,929	R
	MVIC Rights	2,801.66	2,812.76	1,769.13	7,384	S
	Muddy River Water Rights Controlled by SNWA	**6,319.57**	**6,335.35**	**4,657.78**	**17,313**	T
	Coyote Spring Imported ICS	351.48	2,253.06	1,313.77	3,918	U
	Total Muddy River and Coyote Spring Water Rights Controlled by SNWA	**6,671.05**	**8,588.42**	**5,971.55**	**21,231**	V=T+U
Flow Check	Difference Between total Flows to Lake Mead and SNWA Water Rights	(372.12)	972.35	1,820.63	2,421	W=Q-V
	Is conservation > than SNWA rights	Yes	Yes	Yes	Yes	Q > V

Appendices on CD

Appendix A	Coyote Spring Exhibit B from Forbearance Agreement
Appendix B	2012 ICS Plan of Creation Submitted to US Bureau of Reclamation and Letter of Acceptance
Appendix C	SNWA Coyote Spring Valley Water Right Permits
Appendix D	2012 Muddy River ICS Report – Verification Section

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Exhibit B
Southern Nevada Water Authority
Coyote Spring Valley Groundwater, Imported Intentionally Created Surplus (ICS) Project

Summary: The Southern Nevada Water Authority (SNWA) plans to construct and operate a water transmission system from new and existing wells in Coyote Spring Valley into the existing Moapa Valley Water District (MVWD) storage reservoir in upper Moapa Valley. Major components of the Coyote Spring Project, which would be located on both federal and non-federal lands, include several wells, approximately 16 miles of pipeline, a regulating tank, less than 1 mile of power line, and system improvements by MVWD.

SNWA will convey its 9,000 afy of permitted water rights (see below) and possibly additional water rights granted by the Nevada Division of Water Resources, through the Coyote Spring Project. The water will then be conveyed through the MVWD's municipal supply system and discharged at a point to be determined either on the Muddy River or within the Muddy Valley Irrigation Company's irrigation system. The water would then be allowed to flow down the Muddy River to Lake Mead at which point the water becomes Imported ICS credited to SNWA's ICS Account.

Specific Nevada State Water Rights:

1. 9,000 afy pursuant to Permit Nos. 49414, 49660 to 49662 and 49978 to 49987.

2. Water permitted for appropriation by the Nevada State Engineer pursuant to Application Nos. 54055 through 54059, inclusive.

3. Any effluent generated by the direct use of water rights specified in paragraphs 1 and 2 above by the Moapa Valley Water District or other municipal agency outside of the Las Vegas Valley and treated and discharged to Lake Mead in accordance with all applicable state and federal laws.

Nevada State Approval: SNWA will acquire necessary approvals from the Nevada Division of Water Resources to permit the Nevada state water rights to be conveyed to Lake Mead to create Imported ICS and Developed Shortage Supply. SNWA's state groundwater rights are subject to a monitoring plan mandated by the Nevada State Engineer that will determine effects, if any, of SNWA's groundwater development in the Coyote Spring Valley on the Muddy River.

Verification Plan: Pursuant to Sections 3.B. and 3.D. of the Interim Guidelines for the Operation of Lake Powell and Lake Mead, SNWA shall annually submit a plan to the Secretary of the Interior demonstrating how the Imported ICS described in this Exhibit B will be accounted for at Lake Mead. Coyote Spring water introduced into the Muddy River Channel in the Lower Moapa Valley will be metered and will be in addition to SNWA Muddy River Tributary Conservation ICS that will be in the channel as derived from the flows in the Muddy River at the U.S. Geological Survey Glendale gage.

Consumptive use by evapotranspiration in the Muddy River Channel and Overton Wildlife Management Area will be accounted for in the Muddy River Verification Plan for the Tributary Conservation ICS.

Maximum ICS Created Under this Exhibit: Maximum amount of water that may be created by SNWA from these projects in one calendar year is limited to 15,000 acre-feet.

In Witness of this Exhibit B to the Forbearance Agreement executed contemporaneously herewith, the Parties affix their official signatures below, acknowledging approval of this document on the 13th day of December, 2007.

Approved as to form:

By: _____
W. Patrick Schiffer
Chief Counsel

THE STATE OF ARIZONA acting through the ARIZONA DEPARTMENT OF WATER RESOURCES

By: _____
Herbert Guenther
Director

Attest:

By: _____
Edward W. Smith
General Manager

PALO VERDE IRRIGATION DISTRICT

By: _____
Charles VanDyke
Chair

Attest and Approved:

By: _____
John Penn Carter
Legal Counsel

IMPERIAL IRRIGATION DISTRICT

By: _____
Stella Altamirano-Mendoza
President

Approved as to form:

By: _____
Robert Hargreaves
City Attorney

THE CITY OF NEEDLES

By: _____
Jeff Williams
Mayor

Approved as to form:

By: _____
Steven B. Abbott
Legal Counsel

COACHELLA VALLEY WATER DISTRICT

By: _____
Steven B. Robbins
General Manager/Chief Engineer

Approved as to form:

By: _____
Karen L. Tachiki
General Counsel

THE METROPOLITAN WATER DISTRICT OF SOUTHERN CALIFORNIA

By: _____
Jeffrey Kightlinger
General Manager

Approved as to form:

By: _____
John J. Entsminger
Deputy General Counsel

SOUTHERN NEVADA WATER AUTHORITY

By: _____
Patricia Mulroy
General Manager

Approved as to form:

By: _____
Jennifer T. Crandell
Deputy Attorney General

COLORADO RIVER COMMISSION OF NEVADA

By: _____
George M. Caan
Executive Director

SOUTHERN NEVADA WATER AUTHORITY
100 City Parkway, Suite 700 • Las Vegas, NV 89106
MAILING ADDRESS: P.O. Box 99956 • Las Vegas, NV 89193-9956
(702) 862-3400 • snwa.com

June 30, 2011

Ms. Lorri Lee-Gray, Regional Director
Bureau of Reclamation
Lower Colorado Regional Office
P.O. Box 61470
Boulder City, Nevada 89006

Dear Ms. Lee-Gray:

SUBJECT: SOUTHERN NEVADA WATER AUTHORITY PLANS OF CREATION FOR MUDDY AND VIRGIN RIVER TRIBUTARY CONSERVATION AND COYOTE SPRING VALLEY IMPORTED INTENTIONALLY CREATED SURPLUS CALENDAR YEAR 2012

Enclosed are Southern Nevada Water Authority's (Authority) 2012 Plans of Creation (Plans) for Tributary Conservation Intentionally Created Surplus (ICS) for the Muddy and Virgin Rivers in Nevada, and Imported ICS from Coyote Spring Valley groundwater. Our Plans describe how we intend to meet all the requirements as outlined in Section 3 of the *Colorado River Interim Guidelines Lower Basin Shortages and the Coordinated Operations for Lake Powell and Lake Mead* (Guidelines). Calendar Year 2012 represents the 5th year in which the Authority will create ICS under the Guidelines.

As you know, the Guidelines require a Contractor to enter into a Delivery Agreement with the United States and a Forbearance Agreement with Lower Colorado River Basin Contract holders to create and take Tributary Conservation and Imported ICS. The Authority and Colorado River Commission (CRC) entered into a Delivery Agreement with the United States and a Forbearance Agreement with Lower Basin Contract holders on December 13, 2007. Exhibit A of the Forbearance Agreement describes the surface water rights on the Muddy and Virgin Rivers, pre-dating June 25, 1929, which the Authority plans to use to create Tributary Conservation ICS, and describes how the flows reaching Lake Mead will be calculated. Exhibit B of the Forbearance Agreement describes the groundwater rights from Coyote Spring Valley, which the Authority plans to use to create Imported ICS and how the imported water reaching Lake Mead will be calculated.

The enclosed Plans of Creation are consistent with the Guidelines, Forbearance Agreement, and Delivery Agreement. The Authority anticipates creating Tributary Conservation ICS and Imported ICS during Calendar Year 2012 as indicated below:

Calendar Year	**Potential Volume, in acre-feet/year** Cited in Plans of Creation		
	Virgin River	Muddy River	Coyote Spring Valley
2012	17,000	20,000	7,000

If you have any questions, please contact Jeff Johnson at 702-862-3748.

Sincerely,

for

William E. Rinne, Director
Surface Water Resources Department

WR:JJ:lmv

Enclosures (3)

c: Jayne Harkins, Director, Colorado River Commission of Nevada
Steve Hvinden, Office Director, Lower Colorado River Regional Office, Bureau of Reclamation w/enclosures
Paul Matuska, Manager, Water Conservation and Accounting Group, Lower Colorado River Regional Office, Bureau of Reclamation w/enclosures

Virgin River Intentionally Created Surplus (ICS) Tributary Conservation Plan of Creation Calendar Year 2012

Introduction

The Secretary of Interior (Secretary) issued a Record of Decision for *Colorado River Interim Guidelines for Lower Basin Shortages and the Coordinated Operations for Lake Powell and Lake Mead* (Guidelines) on December 13, 2007, which established criteria for the development and delivery of Intentionally Created Surplus (ICS). One type of ICS is Tributary Conservation, which allows a Contractor[1] to increase tributary flows into the mainstream of the Colorado River within its state for ICS credits. The conservation of tributary flows into the mainstream of the Colorado River is limited to water rights that have been used for a significant period of years and were perfected prior to June 25, 1929, the effective date of the Boulder Canyon Project Act (Pre-BCPA Water Rights).

To generate ICS, the Guidelines require a Contract holder to enter into a Delivery Agreement with the United States of America and a Forbearance Agreement with Lower Basin Contract holders. The Southern Nevada Water Authority (SNWA) and Colorado River Commission of Nevada (CRC) entered into a Forbearance Agreement with Lower Basin Contract holders on December 13, 2007. Exhibit A of the Forbearance Agreement describes the surface water rights on the Muddy and Virgin Rivers, pre-dating June 25, 1929, which SNWA plans to use to create Tributary Conservation ICS, and how the Virgin River flows reaching Lake Mead will be calculated.

The SNWA and CRC entered into a Delivery Agreement with the United States of America on December 13, 2007. Exhibit A from the Forbearance Agreement is attached to the Delivery Agreement.

The Guidelines, Forbearance Agreement, and Delivery Agreement require a plan for the creation of ICS (ICS Plan) be submitted to the Secretary of Interior demonstrating how all requirements of the Guidelines will be met. Section G.3.B.1 of the Guidelines outline that an ICS Plan will consist of, at a minimum, the following information:

a. Project Description including what extraordinary measures will be taken to conserve or import the water

b. Term of Activity

c. Estimate of the amount of water that will be conserved

[1] "Contractor" in the Guidelines "shall mean an entity holding an entitlement to Mainstream water under (a) the Consolidated Decree, (b) a water delivery contract with the United States through the Secretary, or (c) a reservation of water by the Secretary, whether the entitlement is obtained under (a), (b), or (c) before or after the adoption of the Guidelines.

d. Proposed methodology for verification of the amount of water conserved

e. Documentation regarding any state or federal permits or other regulatory approvals that have already been obtained by the Contractor or that need to be obtained prior to the creation of ICS

The following sections document each of these requirements. It is important to note that the majority of the information presented below is reiterated from Exhibit A of the Forbearance Agreement and Delivery Agreement.

Project Description

Virgin River water rights that will be utilized to create Tributary Conservation pursuant to this ICS Plan and Exhibit A of the Forbearance Agreement are decreed and permitted Nevada state water rights with an established history of use prior to 1927, but that have experienced periods of non-use in the interim. Per Exhibit A of the Forbearance Agreement, SNWA is specifically allowed to utilize any and all pre-June 25, 1929, Virgin River water rights to create Tributary Conservation ICS regardless of those water rights history of use after 1928.

The Virgin River begins in southwestern Utah, flows through Arizona and Nevada, and terminates in Lake Mead (Figure 1). The average annual flow of the Virgin River at U.S. Geological Survey gaging station *09415000 Virgin River at Littlefield, AZ* for water years 1931 to 2010 was 173,100 acre-feet per year (afy).

Nevada state water rights that pre-date the Boulder Canyon Project Act (BCPA) on the Virgin River are comprised of pre-1905 priority surface water rights decreed by the Nevada Supreme Court in 1927 for 17,785 afy to the Bunkerville and Mesquite Irrigation Companies, and additional permitted and certificated rights authorized by the Nevada Division of Water Resources (NDWR).

Retired agricultural water rights acquired by SNWA will be conveyed to Lake Mead along Lake Mead's Overton Arm. The pre-June 25, 1929, water rights conveyed to Lake Mead represent the full right that is and has been historically used for agricultural or could have otherwise been diverted from the Virgin River and fully consumed by the SNWA in Nevada.

Virgin River rights conveyed to Lake Mead will pass through their historic points of diversion and either flow through the irrigation company ditches and return to the mainstream of the Virgin River further downstream or will remain in the mainstream of the Virgin River. The full rights controlled by SNWA to flow to Lake Mead will be accounted for as Tributary Conservation ICS.

Term of Activity

The term of activity for this ICS Plan is Calendar Year 2012. SNWA anticipates receiving Tributary Conservation ICS credit for Virgin River water into the foreseeable

future. As more water rights are acquired and more land is fallowed, the amount of water claimed as Tributary Conservation ICS is anticipated to increase. Subsequent ICS Plans will be updated to reflect the acquired pre-June 25, 1929, water rights.

Leases of shares in the Bunkerville and Mesquite Irrigation Companies are on a water year basis; therefore, the number of shares leased after September 2012, may change. For planning purposes, the number of leased shares in January 2012, are estimated to be leased for the full calendar year.

Estimate of Water Conserved

SNWA currently owns or controls the following Virgin River rights:

- Bunkerville Irrigation Company: Approximately 948 shares representing approximately 7,500 afy of surface water rights. These shares are owned and leased by SNWA. The lease contracts are based on water years (October 1 to September 30).

- Mesquite Irrigation Company: Approximately 870 shares representing approximately 7,500 afy of surface water rights. These shares are owned and leased by SNWA. The lease contracts are based on water years (October 1 to September 30).

- A portion of Certificate 1153 with a priority date of 1914 for 601.97 afy designated to irrigate a portion of 177.044 acres of land (Figure 2).

.

For Calendar Year 2012, SNWA anticipates creating up to 17,000 acre-feet (af) of Tributary Conservation ICS with the above rights which pre-date June 25, 1929.

Methodology

Because the acreage represented by the water rights SNWA controls a small percentage (< 15%) of the total annual flow of the Virgin River, Tributary Conservation ICS on the Virgin River can be calculated based on the reduction in agricultural acreage as follows:

Virgin River Calculation:

Decrease in total agricultural acreage permitted by the Nevada Division of Water Resources calculated using remote sensing & GIS
x The duty per acre specified by the water right

= Flows to Lake Mead (Elevation 1,220 AMSL)

A. Proof of Fallowed Land

To demonstrate the fallowing of land and the conservation of water, aerial photography will be flown, ground-truthed, and analyzed periodically during the calendar year. A Geographic Information System (GIS) will be used to compare the current irrigated acreage with acreage defined by the water rights as approved by the Nevada Division of Water Resources. On the attached maps, the original Place of Use (POU) is shown as a red polygon. Subsequent Proof of Beneficial Use (PBU) maps were submitted in support of additional permits to NDWR and are included as yellow polygons on the maps for reference.

B. Certification Report

i. In compliance with Section G.3.D of the Guidelines, a Certification Report will be submitted for the Secretary's review and verification, demonstrating the amount of ICS created and that the method of creation was consistent with this ICS Plan, the Forbearance Agreement, and Delivery Agreement. The Certification Report will be submitted to the Secretary in the year following the creation of the ICS.

ii. The Certification Report, at a minimum, will include:

- Proof of acreage fallowed using aerial photography and GIS
- Documentation and calculations of the amount of the pre-June 25, 1929, water rights reaching Lake Mead owned or controlled by SNWA
- Letter from NDWR verifying the quantity of water conveyed through the Virgin River to the Colorado River mainstream for the purpose of creating ICS

Regulatory Approvals

Tributary Conservation ICS on the Virgin River was evaluated in the Environmental Impact Statement and Record of Decision (dated December 13, 2007) for the Guidelines. Similarly, compliance for Virgin River Tributary Conservation ICS was also obtained under section 7 of the Endangered Species Act through formal consultation with the U.S. Fish and Wildlife Service. The Final Biological Opinion for the Guidelines was issued December 12, 2007.

The NDWR issued State Engineer Order 1193 on July 15, 2008, regarding Tributary Conservation ICS on the Virgin River. The Order outlines the Nevada water rights on the Virgin River and the following process for verification of Virgin River rights being conveyed to the Colorado River mainstream:

> Nevada State Engineer Order 1193 states… "An entity with an ICS Delivery Contract, which uses water rights adjudicated under the Virgin River Decree or water rights on the Virgin River issued by the State Engineer with a priority date prior to June 25, 1929 for the creation of ICS, shall file an annual report with the State Engineer's Office. The annual report shall give a full accounting of water rights on the Virgin River owned or controlled by the entity with an ICS Delivery Contract, which have been conveyed through the Virgin River system to the Colorado River mainstream for the creation of ICS. After review of the annual report, the State Engineer shall issue a letter verifying the quantity of water conveyed through the Virgin River system to the Colorado River mainstream for the purpose of creating ICS."

Figure 1. Lower Virgin River showing Places of Use (red) for Pre-BCPA Water Rights

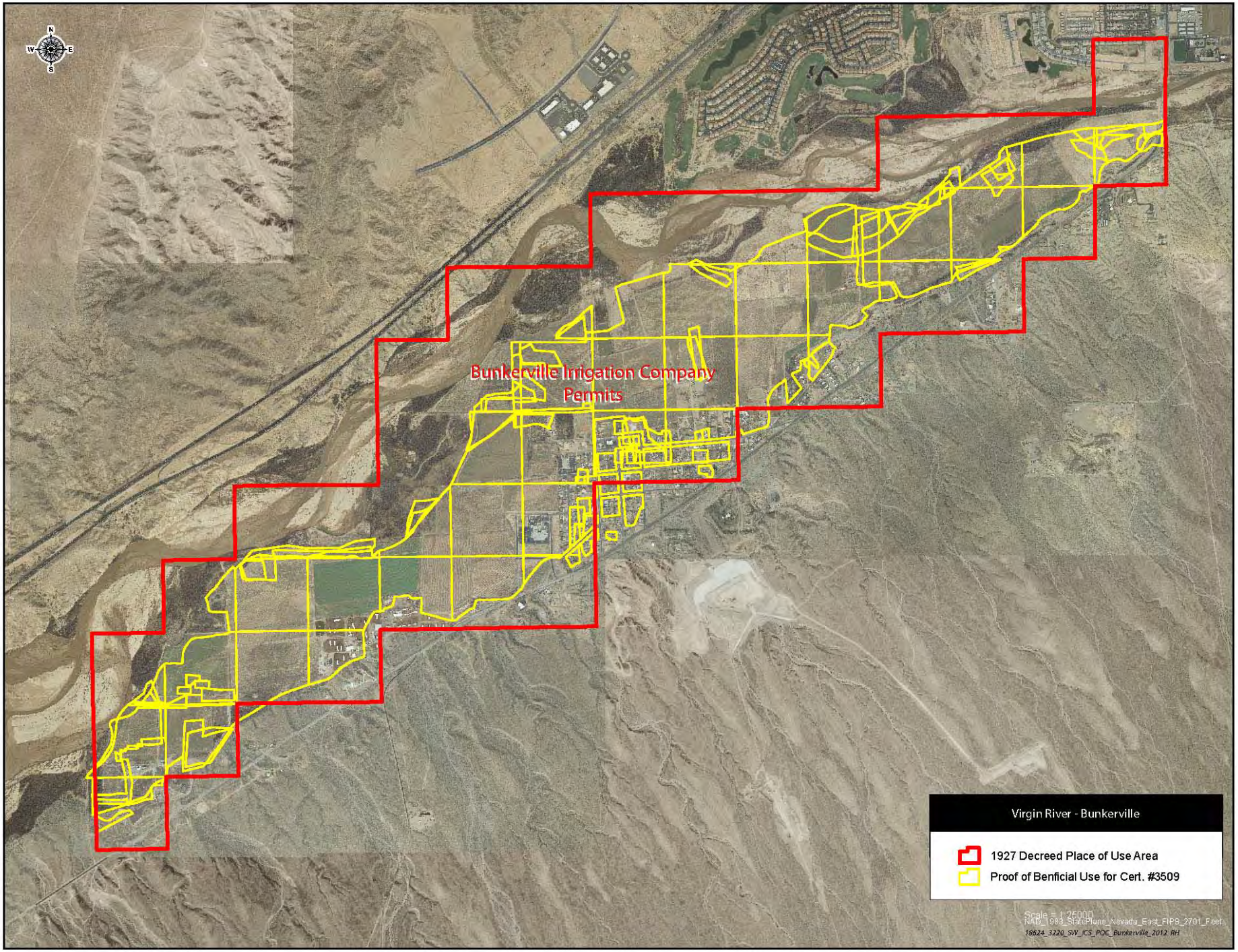

Figure 2 - Bunkerville Decreed Place of Use (red) and Proof of Beneficial Use (yellow). Aerial Photography February 2011

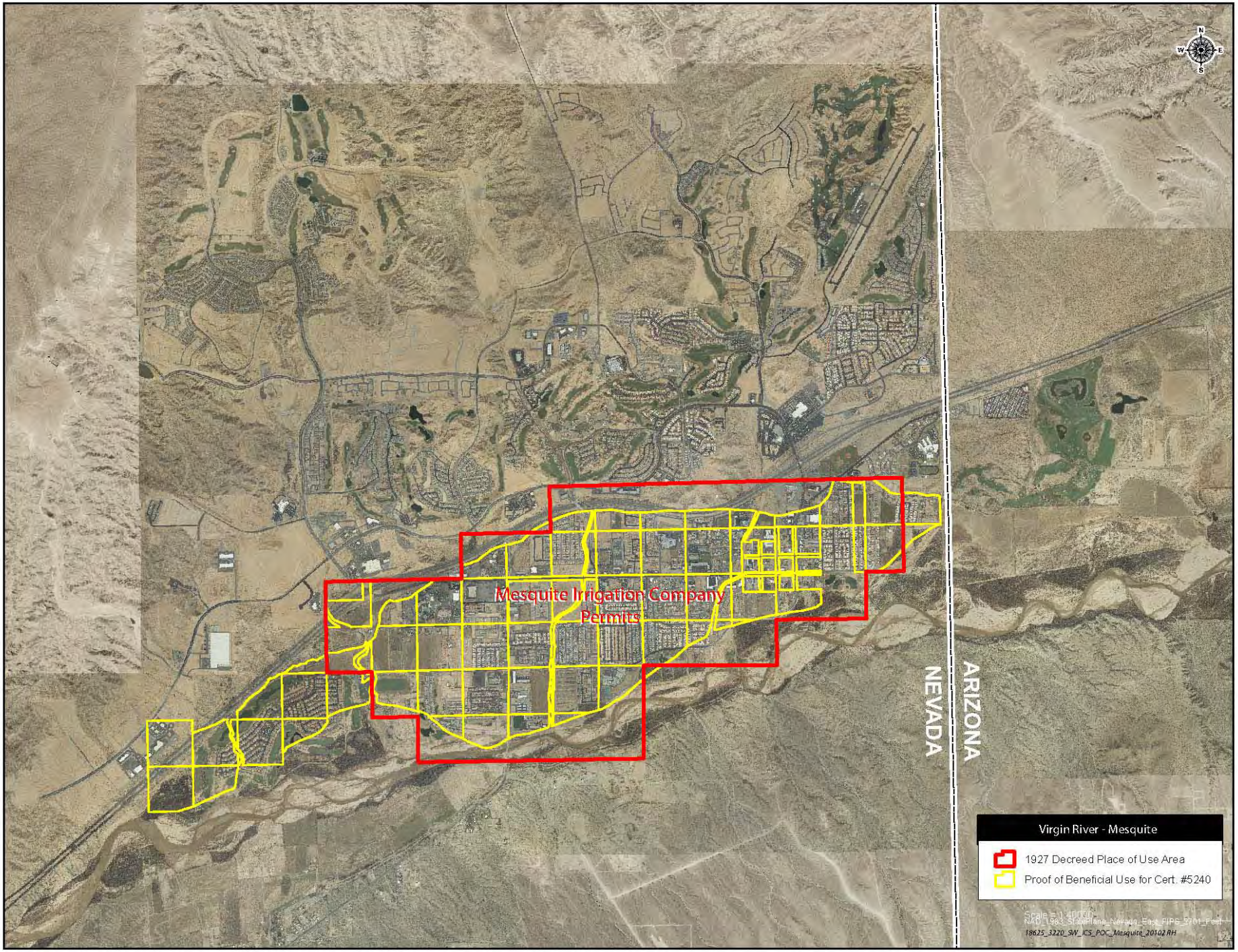

Figure 3 - Mesquite Decreed Place of Use (red) and Proof of Beneficial Use (yellow). Aerial Photography February 2011

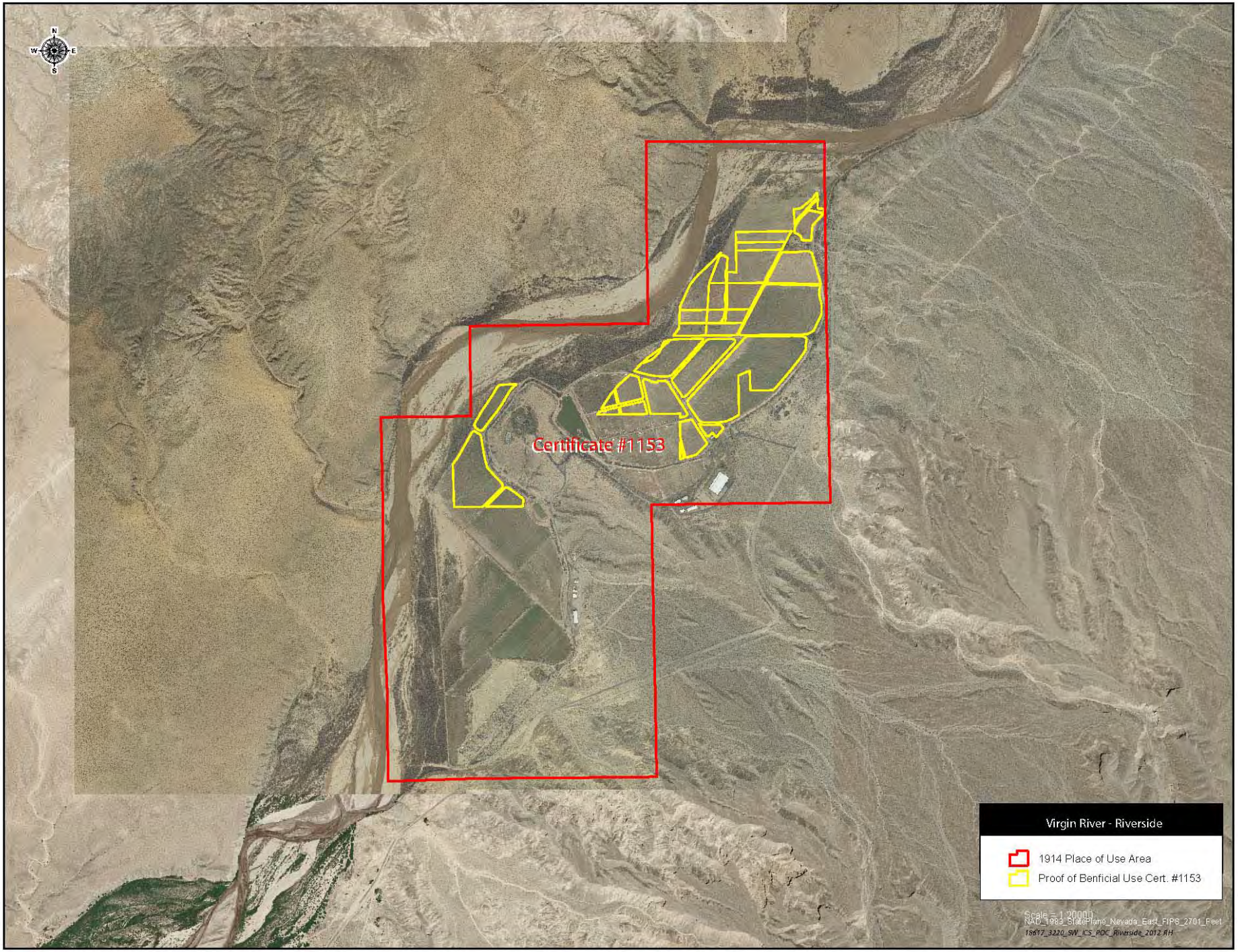

Figure 4 – Riverside Certificate 1153 Decreed Place of Use (red) and Proof of Beneficial Use (yellow). Aerial Photography February 2011

Muddy River Intentionally Created Surplus (ICS) Tributary Conservation Plan of Creation Calendar Year 2012

Introduction

The Secretary of Interior (Secretary) issued a Record of Decision for *Colorado River Interim Guidelines for Lower Basin Shortages and the Coordinated Operations for Lake Powell and Lake Mead* (Guidelines) on December 13, 2007, which established criteria for the development and delivery of Intentionally Created Surplus (ICS). One type of ICS is Tributary Conservation, which allows a Contractor[1] to increase tributary flows into the mainstream of the Colorado River within its state for ICS credits. The conservation of tributary flows into the mainstream of the Colorado River is limited to water rights that have been used for a significant period of years and were perfected prior to June 25, 1929, the effective date of the Boulder Canyon Project Act.

To generate ICS, the Guidelines require a Contract holder to enter into a Delivery Agreement with the United States of America and a Forbearance Agreement with Lower Basin Contract holders. The Southern Nevada Water Authority (SNWA) and Colorado River Commission of Nevada (CRC) entered into a Forbearance Agreement with Lower Basin Contract holders on December 13, 2007. Exhibit A of the Forbearance Agreement describes the surface water rights on the Muddy and Virgin Rivers, pre-dating June 25, 1929, which SNWA plans to use to create Tributary Conservation ICS, and how the Muddy River flows reaching Lake Mead will be calculated.

SNWA and CRC entered into a Delivery Agreement with the United States of America on December 13, 2007. Exhibit A from the Forbearance Agreement is attached to the Delivery Agreement.

The Guidelines, Forbearance Agreement, and Delivery Agreement require a plan for the creation of ICS (ICS Plan) be submitted to the Secretary of Interior demonstrating how all requirements of the Guidelines will be met. Section G.3.B.1 of the Guidelines outline that an ICS Plan will consist of, at a minimum, the following information:

a. Project Description including what extraordinary measures will be taken to conserve or import the water

b. Term of Activity

c. Estimate of the amount of water that will be conserved

[1] "Contractor" in the Guidelines "shall mean an entity holding an entitlement to Mainstream water under (a) the Consolidated Decree, (b) a water delivery contract with the United States through the Secretary, or (c) a reservation of water by the Secretary, whether the entitlement is obtained under (a), (b), or (c) before or after the adoption of the Guidelines.

d. Proposed methodology for verification of the amount of water conserved

e. Documentation regarding any state or federal permits or other regulatory approvals that have already been obtained by the Contractor or that need to be obtained prior to the creation of ICS

The following sections document each of these requirements. It is important to note that the majority of the information presented below is reiterated from Exhibit A of the Forbearance Agreement and Delivery Agreement.

Project Description

Muddy River water rights that will be utilized to create Tributary Conservation pursuant to this ICS Plan and Exhibit A of the Forbearance Agreement are decreed Nevada state water rights with an established history of use prior to 1927, but that have experienced periods of non-use in the interim. Per Exhibit A of the Forbearance Agreement, SNWA is specifically allowed to utilize any and all pre-June 25, 1929, Muddy River water rights to create Tributary Conservation ICS regardless of those water rights history of use after 1928.

The Muddy River originates from regional springs in the Muddy Springs Area in Nevada and flows into the Overton Arm of Lake Mead (Figure 1). Muddy River flows are relatively constant because the springs that form the river discharge water from the regional carbonate aquifer system of eastern Nevada. The average annual flow of the Muddy River at U.S. Geological Survey (USGS) gaging station 09419000 *Muddy River near Glendale, NV* for water years 1950 to 2010 was 30,450 acre-feet per year (afy).

On the Muddy River, water rights were decreed in 1920 and the decree allocated the entire flow of the Muddy River. On the Lower Muddy River, the entire flow of the river is diverted by the Muddy Valley Irrigation Company (MVIC) for agricultural use. SNWA owns and is leasing shares in MVIC. In addition, SNWA leases and owns decreed Muddy River water rights on the upper reach of the Muddy River, which are not represented by MVIC shares.

Retired agricultural water rights controlled by SNWA will be conveyed to Lake Mead along Lake Mead's Overton Arm. The pre-June 25, 1929, water rights conveyed to Lake Mead represent the full right that is and has been historically used for agricultural or could have otherwise been diverted from the Muddy River and fully consumed by SNWA within Nevada.

Muddy River rights conveyed to Lake Mead will pass through their historic points of diversion and either flow through the irrigation company ditches and return to the mainstream of the Muddy River further downstream or will remain in the mainstream of the Muddy River. The full rights controlled by SNWA to flow to Lake Mead will be accounted for as Tributary Conservation ICS.

Term of Activity

The term of activity for this ICS Plan is Calendar Year 2012. SNWA anticipates receiving Tributary Conservation ICS credit for Muddy River water into the foreseeable future. As more water rights are acquired and more land is fallowed, the amount of water claimed as Tributary Conservation ICS is anticipated to increase. Subsequent ICS Plans will be updated to reflect the acquired pre-June 25, 1929, water rights.

Estimate of Water Conserved

SNWA currently owns or controls the following Muddy River water rights:

1. *MVIC Shares*. The volume of water represented by MVIC shares is quantified based on a percentage of the total flows (divided by total shares) in the Muddy River at the USGS gage *Muddy River near Glendale, NV* (Glendale gage) less the Upper Muddy River rights owned or controlled by SNWA that reach the gage (Figure 2).

    a. Owned MVIC shares[2]

        i. 1,009 preferred shares in the MVIC estimated to represent approximately 6,500 afy in 2012.

        ii. 2,839 common shares in the MVIC estimated to represent approximately 2,000 afy in 2012.

        iii. If additional shares are acquired, the water rights represented by the shares will be included in the year-end Certification Report.

        iv. Some shares purchased by SNWA have a provision for the seller to lease the shares back from SNWA for agricultural use. The amount of water being leased-back by sellers varies by year and is not known until just before the beginning of the water year when sellers must notify SNWA of their intention to lease the water back for agricultural use. As an example, in 2010 approximately 1,600 acre-feet (af) of purchased shares were leased back to the seller.

[2] Muddy River water rights were decreed in 1920 by the Tenth (now Eighth) Judicial District Court. Water rights on the Lower Muddy River are divided into 2,432 preferred and 5,044 common shares of stock in the Muddy Valley Irrigation Company.

b. Leased MVIC shares[3]

The lease contracts for both preferred and common shares in MVIC are on a water year schedule, therefore the amount of leased shares may change at the beginning of water year 2012 (October 2011) depending on renewal of leases.

i. Approximately 238 preferred shares are expected to be leased in the MVIC from January to September 2012. For planning purposes the lease of 239 preferred shares for CY 2012 are estimated to represent about 1,700 af.

ii. Approximately 560 common shares are expected to be leased in the MVIC from January to September 2012. . For planning purposes the lease of 560 common shares for CY 2012 are estimated to represent about 500 af.

2. Up to 2,001 afy leased from the Church of Latter Day Saints (LDS Lease) pursuant to Certificate Nos. 6795, 10944, 10951, 10952, and 10953 (decreed Muddy River rights not represented by MVIC shares) in 2012 (Figure 3) being leased by SNWA.

3. Muddy River decree proofs V01619 and V01631 also referred to as the Cox and Mitchell Rights for a total of 111 afy that SNWA acquired with the purchase of the Warm Springs Natural Area (Figure 3).

4. Up to 1,040 afy pursuant to the Muddy River decree owned by SNWA (not represented by MVIC shares, commonly referred to as the Hidden Valley rights) (Figure 4).

5. Up to 3,700 afy pursuant to Permits 73482, 73483, and 73695 held by the Moapa Band of Paiutes. These rights are being leased by SNWA from the Moapa Band of Paiutes (Figure 5).

6. Up to 811 afy of decreed Muddy River water under Certificate 9609 which was acquired by SNWA (referred to as the Knox and Holmes right in this document) (Figure 6).

7. Up to 3,000 afy pursuant to Certificates 7316 and 13851 held by MVIC and being leased by SNWA.

For Calendar Year 2012, SNWA anticipates creating up to 20,000 af of Tributary Conservation ICS from these pre-June 25, 1929, water rights.

[3] SNWA has entered into lease agreements with individual share holders for terms ranging between 1 and 10 years.

Methodology

Muddy River Flows reaching Lake Mead will be calculated as follows:

Flows measured by USGS at the Glendale gage
- (minus) consumptive uses by agriculture below the Glendale gage
- (minus) direct uses by industry below the Glendale gage
- (minus) channel evapotranspiration below Glendale gage to Lake Mead
- (minus) evapotranspiration from the managed acreage on the Overton Wildlife Management Area (WMA)

= Total Flow to Lake Mead (Elevation 1,220 AMSL)

- To calculate the consumptive uses of crops and phreatophytes in the Lower Muddy River, a combination of data from the Lower Colorado River Accounting Study (LCRAS), Nevada Division of Water Resource's *Evapotranspiration and Net Irrigation Requirements for Nevada* report and locally measured reference ET data will be used.

- If the total amount of water represented by the rights controlled by SNWA described in this ICS Plan and documented in the Certification Report (described below) is found to be equal to or less than the amount of water calculated to reach Lake Mead, then SNWA shall be credited with the full amount of water rights described in the ICS Plan.

- If the total amount of water rights described in this ICS Plan and documented in the Certification Report is more than the amount calculated to reach Lake Mead, SNWA shall be credited with only the amount calculated to reach Lake Mead.

- The total Muddy River flow reaching Lake Mead as calculated above includes flows at the USGS gage *Muddy River at Lewis Avenue at Overton, NV* located just upstream of the WMA and unmeasured underflow.

A. Proof of Fallowed Land:

To demonstrate the fallowing of land and the conservation of water, aerial photography will be flown, ground-truthed, and analyzed during the calendar year. A Geographic Information System (GIS) will be used to compare the current irrigated acreage with acreage defined by the water rights as approved by the Nevada Division of Water Resources and the Muddy River decree. On the attached maps, the original Place of Use (POU) is shown as a red polygon. If a subsequent Proof of Beneficial Use (PBU) map was submitted to NDWR, the PBU boundaries are included as yellow polygons for reference. PBU maps were not filed for all decreed rights, since it is not required for vested rights; implying

beneficial use was initiated prior to the establishment of Nevada Water Law in 1905.

B. Certification Report

i. In compliance with Section G.3.D of the Guidelines, a Certification Report will be submitted for the Secretary's review and verification, demonstrating the amount of ICS created and that the method of creation was consistent with this ICS Plan, the Forbearance Agreement, and Delivery Agreement. The Certification Report will be submitted to the Secretary in the year following the creation of the ICS.

ii. The Certification Report, at a minimum, will include:

- Proof of acreage fallowed using aerial photography and GIS
- Calculations of the amount of pre-June 25, 1929, water rights reaching Lake Mead, including gage records of Muddy River flows as required
- Documentation and calculations of the amount of pre-June 25, 1929, water rights reaching Lake Mead owned or controlled by SNWA
- Letter from the Nevada Division of Water Resources verifying the quantity of water conveyed through the Muddy River system to the Colorado River mainstream for the purpose of creating ICS

Regulatory Approvals

Tributary Conservation ICS on the Muddy River was evaluated in the Environmental Impact Statement and Record of Decision (dated December 13, 2007) for the Guidelines. Similarly, compliance for Muddy River Tributary Conservation ICS was also obtained under section 7 of the Endangered Species Act through formal consultation with the U.S. Fish and Wildlife Service. The Final Biological Opinion for the Guidelines was issued December 12, 2007.

The NDWR issued State Engineer Order 1194 on July 15, 2008, regarding Tributary Conservation ICS on the Muddy River. The Order outlines the Nevada water rights on the Muddy River and the following process for verification of Muddy River rights being conveyed to the Colorado River mainstream:

> Nevada State Engineer Order 1194 states… "An entity with an ICS Delivery Contract, which uses water rights adjudicated under the Muddy River Decree for the creation of ICS, shall file an annual report with the State Engineer's Office. The annual report shall give a full accounting of adjudicated water rights on the Muddy River or its tributaries owned or controlled by the entity with an ICS Delivery Contract, which have been conveyed through the Muddy River system to the Colorado River mainstream for the creation of ICS. After review of the annual report, the State Engineer shall issue a letter verifying the quantity of water conveyed through the Muddy River system to the Colorado River mainstream for the purpose of creating ICS."

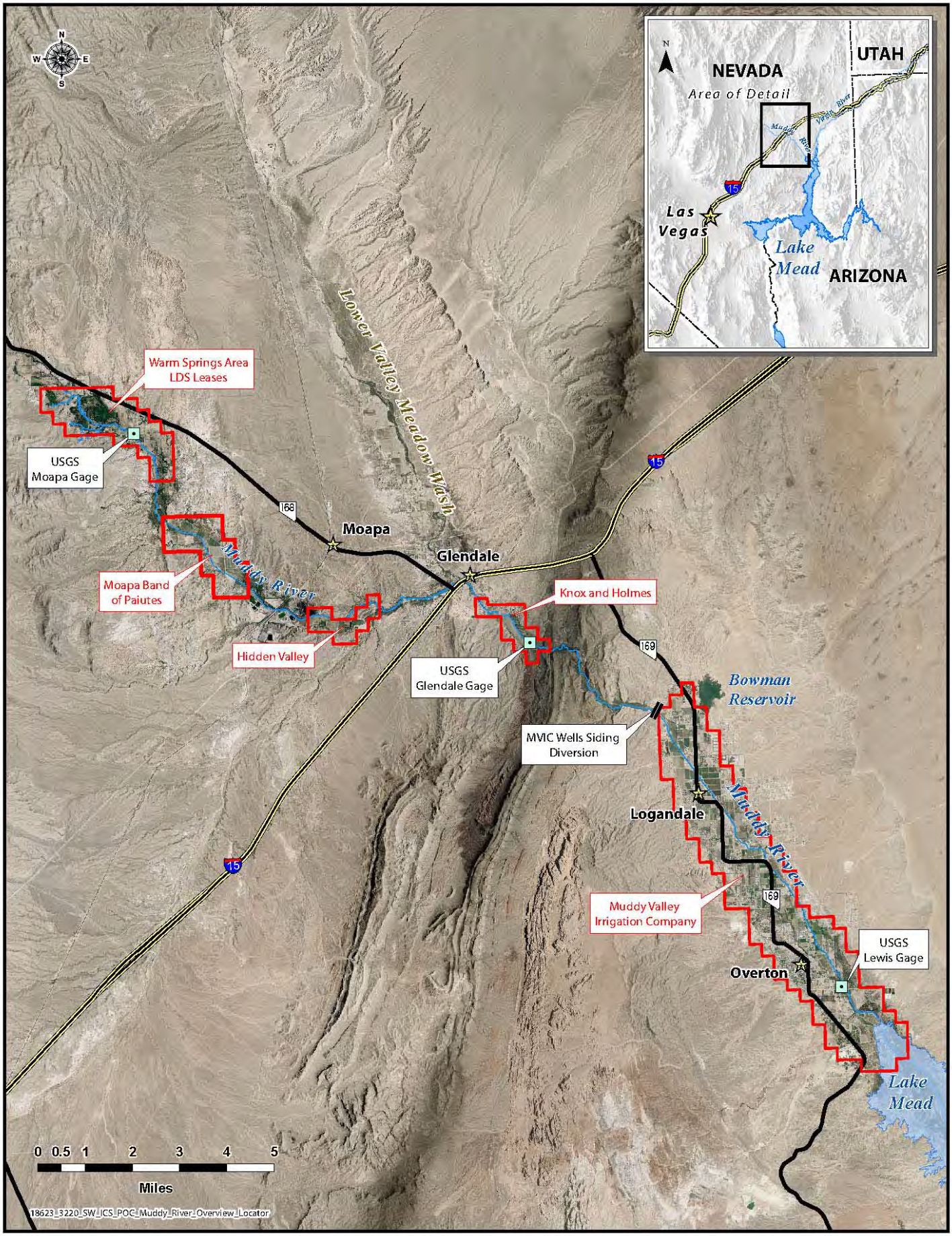

Figure 1- Muddy River

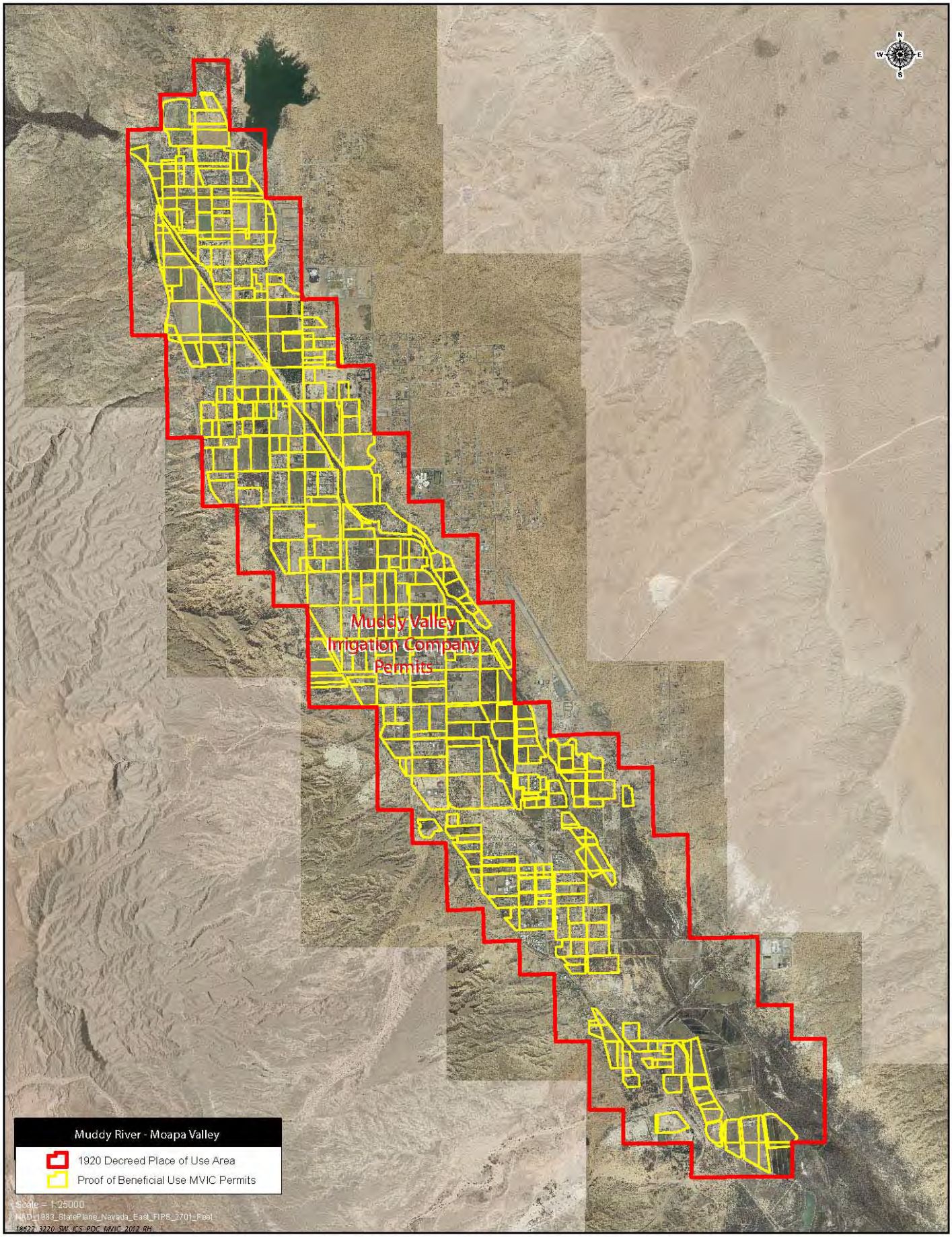

Figure 2- MVIC Decreed POU and PBU. Aerial Photography February 2011

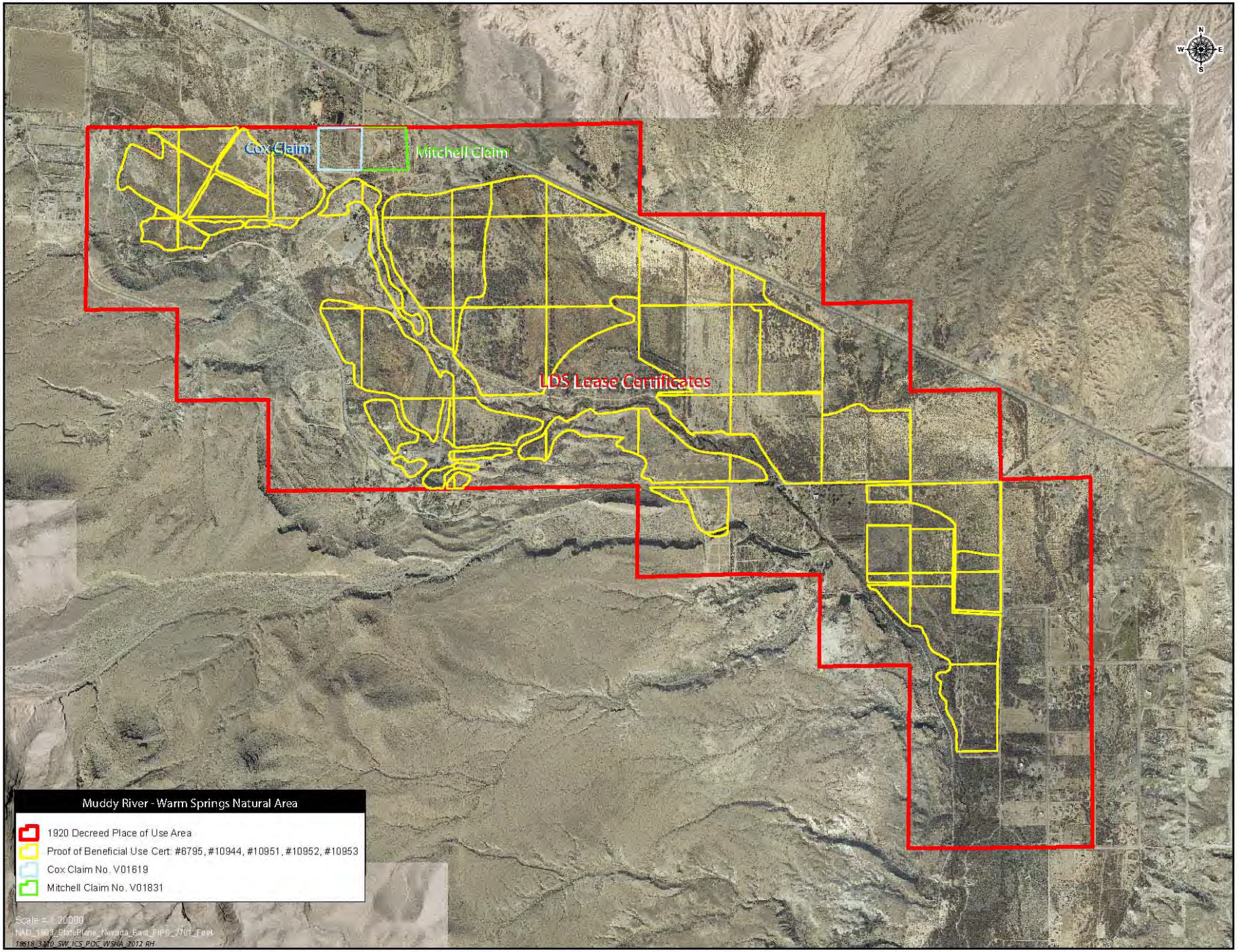

Figure 3- LDS Water Rights POU and PBU and Cox and Mitchell POU Aerial Photography February 2011

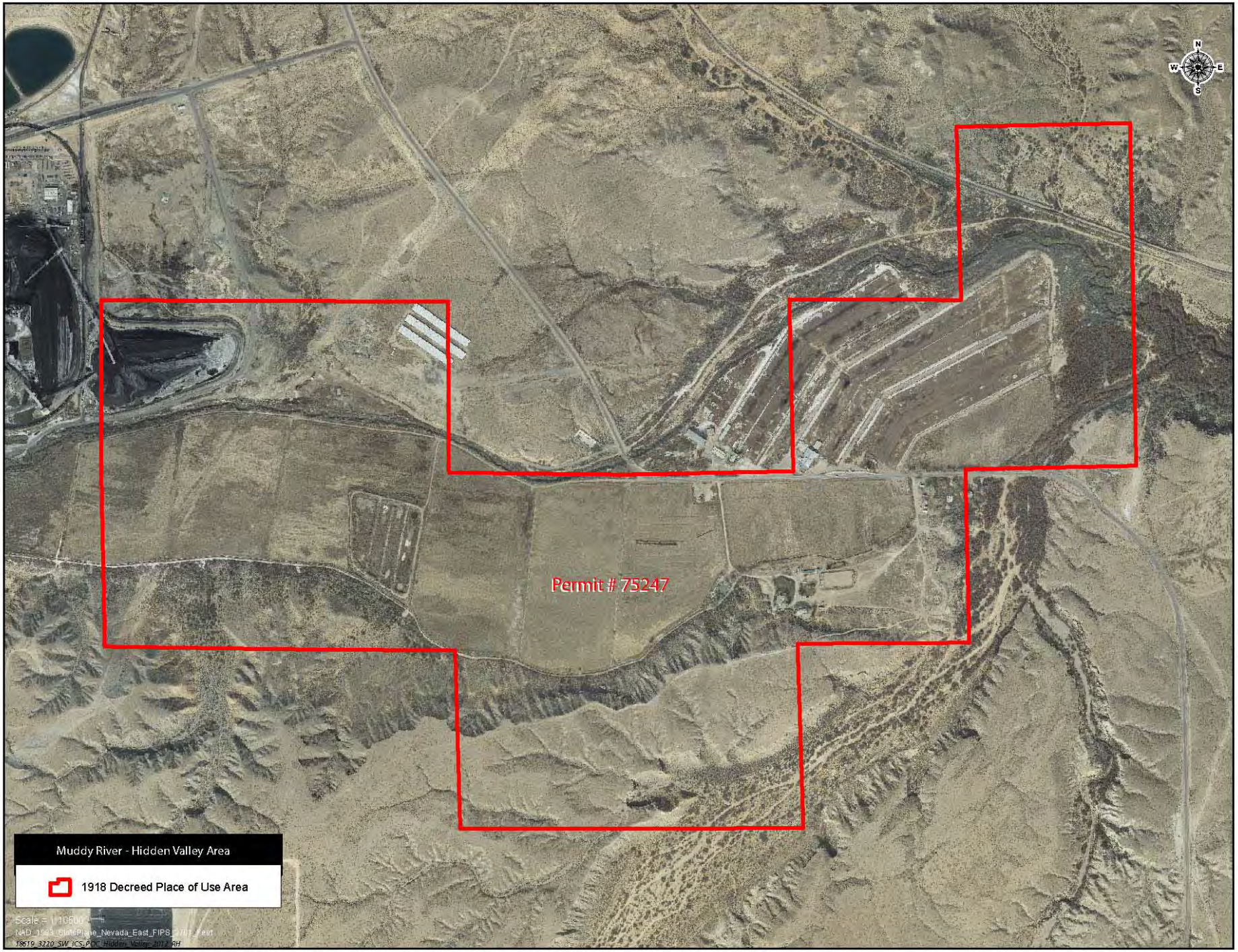

Figure 4- Hidden Valley Decreed Water Right POU. Aerial Photography February 2011

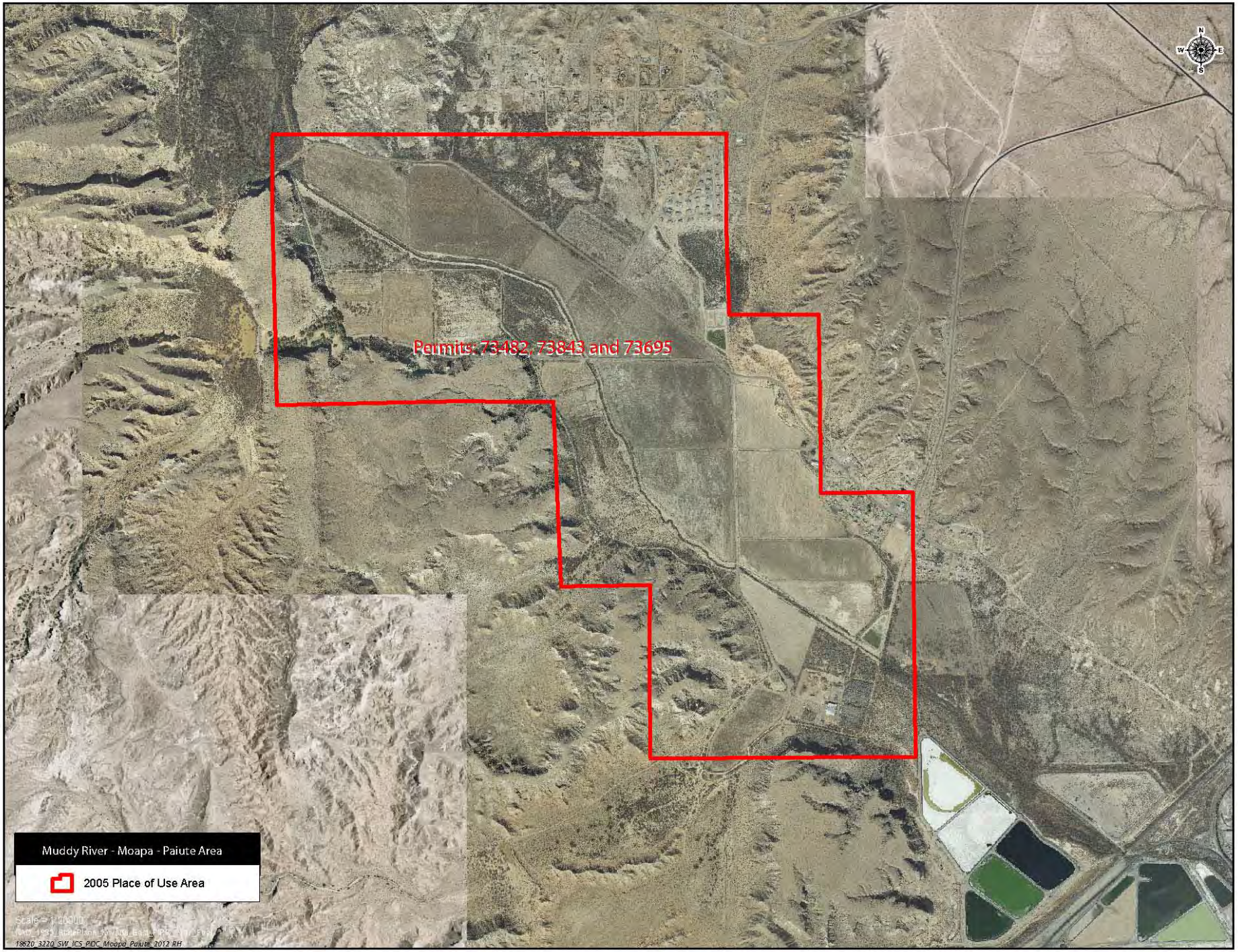

Figure 5- Moapa Band of Paiutes POU. Aerial Photography February 2011

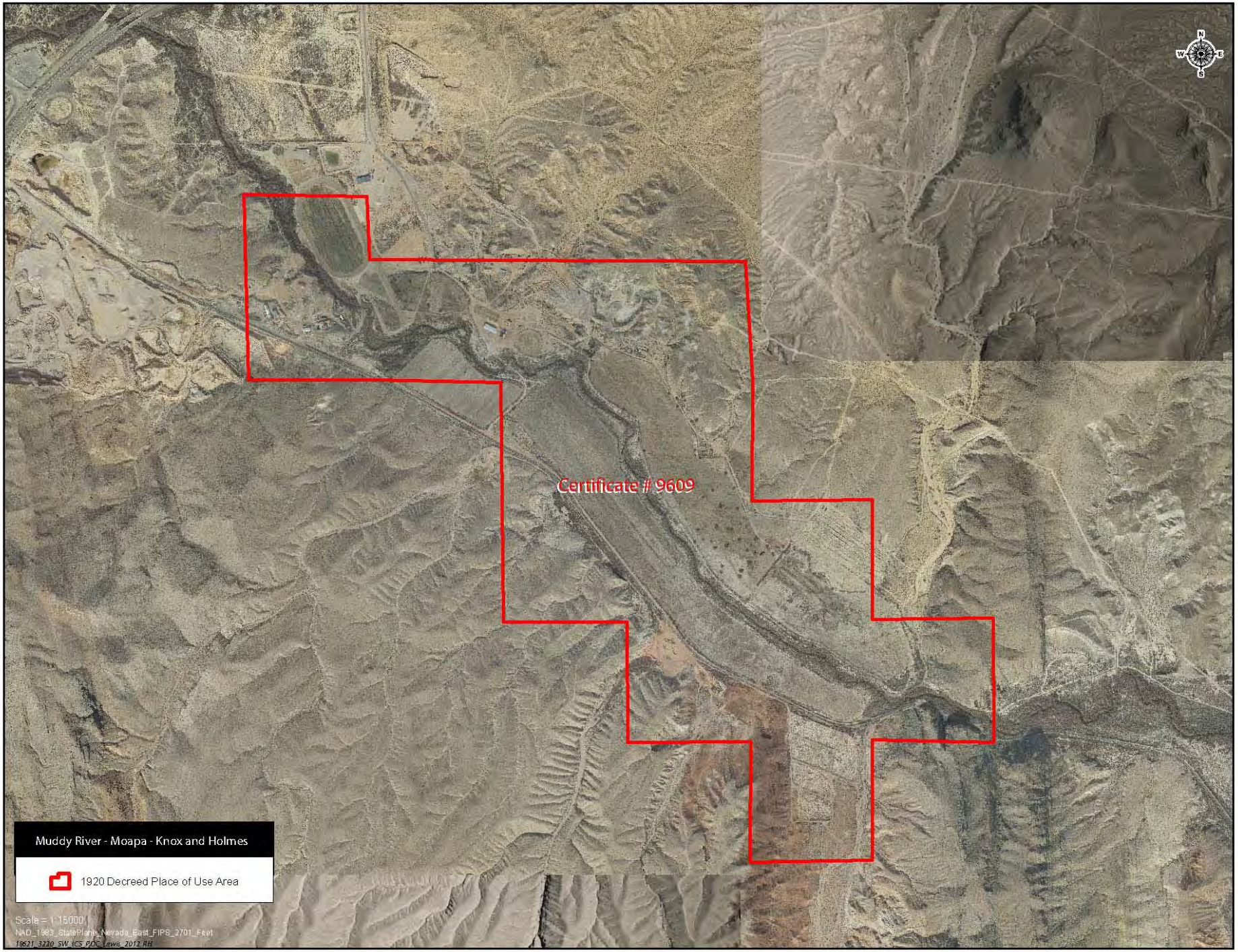

Figure 6– Knox and Holmes Decreed Water Right POU. Aerial Photography February 2011

Coyote Spring Valley Intentionally Created Surplus (ICS)
Imported ICS Plan of Creation
Calendar Year 2012

Introduction

The Secretary of Interior (Secretary) issued a Record of Decision for *Colorado River Interim Guidelines for Lower Basin Shortages and the Coordinated Operations for Lake Powell and Lake Mead* (Guidelines) on December 13, 2007, which established criteria for the development and delivery of Intentionally Created Surplus (ICS). One type of ICS is Imported ICS, which allows a Contractor[1] to introduce non-Colorado River System water from the Contractor's state into the mainstream of the Colorado River for ICS credits.

To generate ICS, the Guidelines require a Contract holder to enter into a Delivery Agreement with the United States of America and a Forbearance Agreement with Lower Basin Contract holders. The Southern Nevada Water Authority (SNWA) and Colorado River Commission of Nevada (CRC) entered into a Forbearance Agreement with Lower Basin Contract holders on December 13, 2007. Exhibit B of the Forbearance Agreement describes the State of Nevada groundwater rights in Coyote Spring Valley which SNWA plans to use to create Imported ICS, and how the Coyote Spring Valley groundwater conveyed to Lake Mead will be calculated.

The SNWA and CRC entered into a Delivery Agreement with the United States of America on December 13, 2007. Exhibit B from the Forbearance Agreement is attached to the Delivery Agreement.

The Guidelines, Forbearance Agreement, and Delivery Agreement require a plan for the creation of ICS (ICS Plan) be submitted to the Secretary of Interior demonstrating how all requirements of the Guidelines will be met. Section G.3.B.1 of the Guidelines outline that an ICS Plan will consist of, at a minimum, the following information:

a. Project Description including what extraordinary measures will be taken to conserve or import the water

b. Term of Activity

c. Estimate of the amount of water that will be imported

d. Proposed methodology for verification of the amount of water imported

[1] "Contractor" in the Guidelines "shall mean an entity holding an entitlement to mainstream water under (a) the Consolidated Decree, (b) a water delivery contract with the United States through the Secretary, or (c) a reservation of water by the Secretary, whether the entitlement is obtained under (a), (b), or (c) before or after the adoption of the Guidelines.

e. Documentation regarding any state or federal permits or other regulatory approvals that have already been obtained by the Contractor or that need to be obtained prior to the creation of ICS

The following sections document each of these requirements. It is important to note that the majority of the information presented below is reiterated from Exhibit B of the Forbearance Agreement and Delivery Agreement.

Project Description

Coyote Spring Valley groundwater rights that will be utilized to create Imported ICS pursuant to this ICS Plan and Exhibit B of the Forbearance Agreement are groundwater rights permitted by the Nevada Division of Water Resources.

Coyote Spring Valley is located approximately 50 miles north of the Las Vegas Valley and lies within Clark and Lincoln counties. SNWA will convey permitted groundwater rights and possibly additional groundwater rights granted by the Nevada Division of Water Resources through the recently constructed SNWA Coyote Spring transmission system. (Figure 1). The groundwater will then be conveyed through the Moapa Valley Water District's (MVWD) municipal supply system and discharged to the Muddy Valley Irrigation Company's irrigation system and the Muddy River. The water will then be allowed to flow down the Muddy River to Lake Mead. The metered groundwater rights that flow to Lake Mead will be accounted for as Imported ICS.

Term of Activity

The term of activity for this ICS Plan is Calendar Year 2012. SNWA anticipates receiving Imported ICS credit for Coyote Spring Valley groundwater conveyed to Lake Mead into the foreseeable future. As operational changes occur and if additional water rights are permitted, the amount of water claimed as Imported ICS may change. Subsequent ICS Plans will be updated to reflect any changes.

Estimate of Water Imported

Based on current operational limitations and water rights, SNWA is planning to convey up to 7,000 acre-feet (af) of Coyote Spring Valley groundwater rights to Lake Mead in Calendar Year 2012.

As outlined in Exhibit B of the Forbearance Agreement, the maximum amount of Imported ICS that may be created by SNWA from Nevada state water rights in one year is limited to 15,000 af from the following:

1. 9,000 acre-feet per year pursuant to Permit Nos. 49414, 49660 to 49662 and 49978 to 49987.

2. Water permitted for appropriation by the Nevada State Engineer pursuant to Application Nos. 54055 through 54059, inclusive.

3. Any effluent generated by the direct use of water rights specified in paragraphs 1 and 2 above by the MVWD or other municipal agency outside of the Las Vegas Valley and treated and discharged to Lake Mead in accordance with all applicable state and federal laws.

Methodology

Coyote Spring Valley groundwater introduced into the Muddy River channel (downstream of the U.S. Geological Survey (USGS) Glendale gage) in Lower Moapa Valley will be metered and will be in addition to SNWA Muddy River Tributary Conservation ICS water already in the channel, as determined from Muddy River flows at the USGS Glendale gage. Consumptive use by evapotranspiration in the Muddy River channel and Overton Wildlife Management Area will be accounted for in the Muddy River Certification Report for the Tributary Conservation ICS.

In compliance with Section G.3.D of the Guidelines, a Certification Report will be submitted for the Secretary's review and verification, demonstrating the amount of Imported ICS created and that the method of creation was consistent with this ICS Plan, the Forbearance Agreement, and Delivery Agreement. The Certification Report will be submitted to the Secretary in the year following the creation of the ICS. The Certification Report, at a minimum, will include:

- Documentation of metered discharge into the Muddy River
- Summary of Tributary Conservation ICS on the Muddy River accounting for evapotranspiration in the Muddy River channel and the Overton Wildlife Management Area
- Letter from the Nevada Division of Water Resources verifying the quantity of water conveyed from Coyote Spring Valley and discharged into the lower Muddy River system and to the Colorado River mainstream for the purpose of creating ICS

Regulatory Approvals

The SNWA will acquire necessary approvals from the Nevada Division of Water Resources to develop and convey Nevada state water rights to Lake Mead to create Imported ICS. The Coyote Spring Well and Moapa Transmission System Project were evaluated under the National Environmental Policy Act in the Environmental Assessment and Finding of No Significant Impact/Decision Record dated June 22, 2007. In addition, compliance under Section 7 of the Endangered Species Act was obtained through formal consultation with the U.S. Fish and Wildlife Service. The Final Biological Opinion for the Coyote Spring Well and Moapa Transmission System Project was issued May 9, 2007. SNWA has obtained a National Pollutant Discharge Elimination System (NPDES) permit for discharge of Coyote Spring Valley groundwater into the Muddy River from the Nevada Division of Environmental Protection.

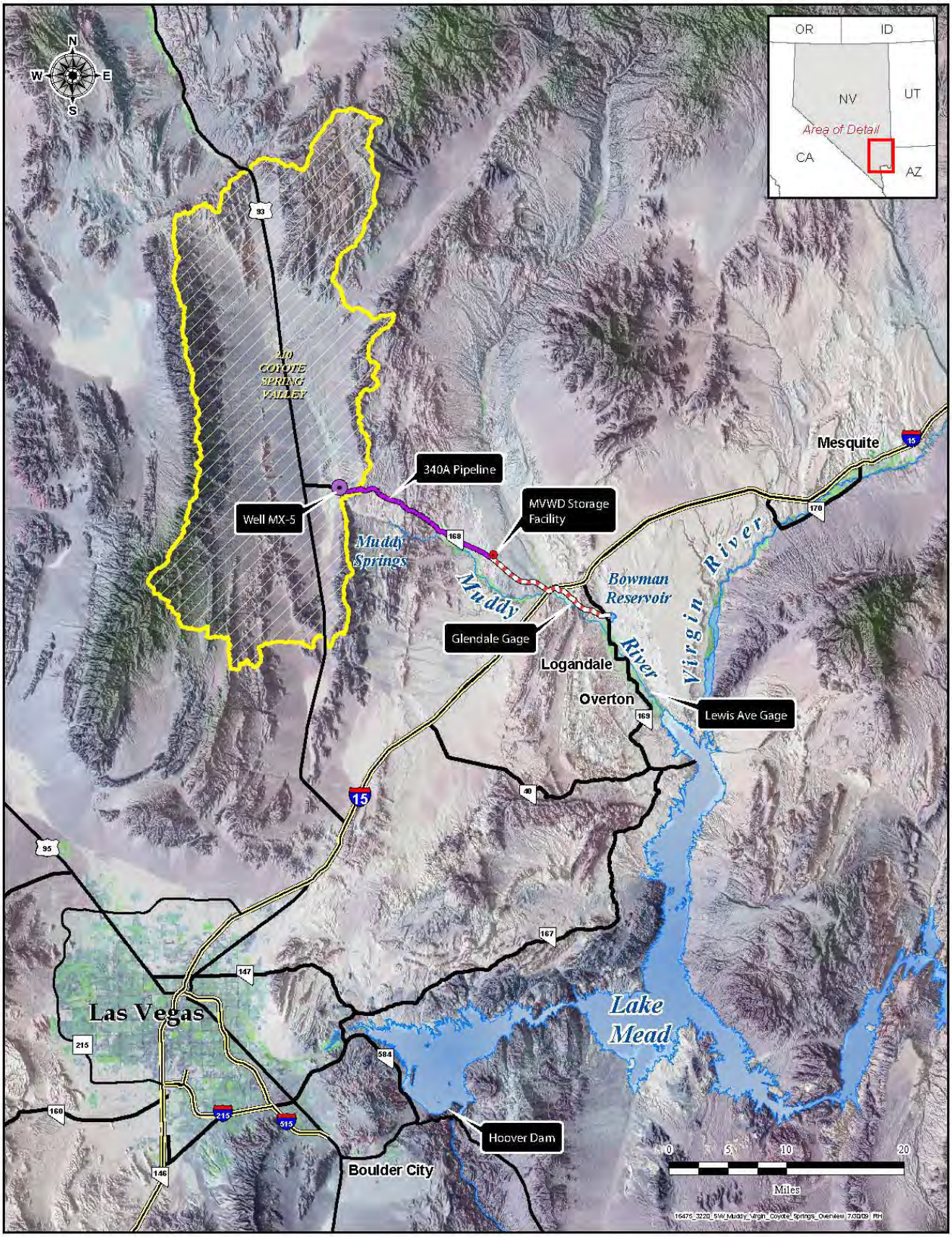

Figure 1. Location Map of Coyote Spring Valley

Permit No. 77291

THE STATE OF NEVADA

PERMIT TO APPROPRIATE WATER

Name of applicant:	**SOUTHERN NEVADA WATER AUTHORITY**
Source:	**UNDERGROUND**
Basin:	**COYOTE SPRING VALLEY**
Manner of Use:	**MUNICIPAL**
Period of Use:	**January 1st to December 31st**
Priority Date:	**08/13/2008**

****

APPROVAL OF STATE ENGINEER

This is to certify that I have examined the foregoing application, and do hereby grant the same, subject to the following limitations and conditions:

This permit is issued subject to existing rights. It is understood that the amount of water herein granted is only a temporary allowance and that the final water right obtained under this permit will be dependent upon the amount of water actually placed to beneficial use. It is also understood that this right must allow for a reasonable lowering of the static water level. A totalizing meter must be installed and maintained in the discharge pipeline near the point of diversion and accurate measurements must be kept of water placed to beneficial use. The totalizing meter must be installed before any use of water begins, or before the Proof of Completion of Work is filed. This permit is issued subject to existing rights. This well shall be equipped with a two (2) inch opening for measuring depth to water. If the well is flowing, a valve must be installed and maintained to prevent waste. This source is located within an area designated by the State Engineer, pursuant to NRS 534.030. The State retains the right to regulate the use of the water herein granted at any and all times.

Monthly records shall be kept of the amount of water pumped from this well and the records submitted to the State Engineer on a quarterly basis within 15 days after the end of each calendar quarter.

This permit does not extend the permittee the right of ingress and egress on public, private or corporate lands.

The total combined duty of water under Permits 77291 though 77306 shall not exceed 9000 acre-feet annually.

The issuance of this permit does not waive the requirements that the permit holder obtain other permits from State, Federal and local agencies.

This permit is issued under the provisions of NRS 534.120(2) as a preferred use.

This permit must comply with the monitoring requirements of Order 1169.

This permit is issued for diversion rate only, and as such is not an additional appropriation of water from the basin.

The point of diversion and place of use are as described on the submitted application to support this permit.

(Continued on Page 2)

The amount of water to be appropriated shall be limited to the amount which can be applied to beneficial use, **and not to exceed 15.0 cubic feet per second.**

Work must be prosecuted with reasonable diligence and proof of completion of work shall be filed on or before: **December 19, 2010**

Water must be placed to beneficial use and proof of the application of water to beneficial use shall be filed on or before: **December 19, 2018**

Map in support of proof of beneficial use shall be filed on or before: **N/A**

IN TESTIMONY WHEREOF, I, TRACY TAYLOR, P.E.,

State Engineer of Nevada, have hereunto set my hand and the seal of my office, this 19th day of **December,** A.D. **2008**

for State Engineer

Completion of work filed _____

Proof of beneficial use filed _____

Cultural map filed _____

Certificate No. _____ Issued _____

llb

Application No. 77291

APPLICATION FOR PERMIT TO APPROPRIATE THE PUBLIC WATERS OF THE STATE OF NEVADA

THIS SPACE FOR OFFICE USE ONLY

Date of filing in State Engineer's Office AUG 1 3 2008

Returned to applicant for correction _____

Corrected application filed _____ Map filed NOV 0 6 2003 under 70429 sheet 1

The applicant Southern Nevada Water Authority

1001 S. Valley View Blvd. (Street Address or P.O. Box) of Las Vegas (City or Town)

Nevada, 89153 (State and Zip Code) hereby make(s) application for permission to appropriate the public waters of the State of Nevada, as hereinafter stated. (If applicant is a corporation, give date and place of incorporation; if a copartnership or association give names of members.)

1. The source of water is Underground (Name of stream, lake, underground, spring or other sources.)
2. The amount of water applied for is 15.0 c.f.s. [NTE 9000 AFA] (One second foot equals 448.83 gallons per minute) second feet.
   (a) If stored in reservoir give number of acre-feet _____
3. The water to be used for Municipal (Irrigation, power, mining, commercial, domestic or other use. Must limit to one major use.)
4. If use is for:
   (a) Irrigation, state number of acres to be irrigated _____
   (b) Stockwater, state number and kind of animals _____
   (c) Other use (describe fully in No. 12) _____
   (d) Power:
      (1) Horsepower developed _____
      (2) Point of return of water to stream _____

210-cl

77291

5. The water is to be diverted from its source at the following point: (Describe as being within a 40-acre subdivision of public survey, and by course and distance to a found section corner. If on unsurveyed land, it should be so stated.)

Within the SE 1/4 SW 1/4, Section 14, T. 13 S., R. 63 E., M.D.B.&M., or at a point from which the NW corner of Section 21, T. 13 S., R. 63 E., M.D.B.&M. bears S. 89 deg. 13' 53" W., a distance of 12,470 feet. Please refer to map filed with Application No. 70429.

6. Place of use: (Describe by legal subdivision. If on unsurveyed land, it should be so stated.)

Clark County Nevada as described in NRS 242.035 - 243.040

7. Use will begin about 1/1 (Month and Day) and end about 12/31 (Month and Day) of each year.

8. Description of proposed works. (Under the provisions of NRS 535.010 you may be required to submit plans and specifications of your diversion or storage works.) (State manner in which water is to be diverted, i.e. diversion structure, ditches and flumes, drilled well with pump and motor, etc.)

Well, turbine pump, motor, and pipelines

9. Estimated cost of works: $5,000,000.00

10. Estimated time required to construct works: 2 years (If well completed, describe works.)

11. Estimated time required to complete the application of water to beneficial use: 10 years

12. Provide a detailed description of the proposed project and its water usage (use attachments if necessary): (Failure to provide a detailed description may cause a delay in processing.)

1019' depth well currently installed [well log no. 99823]. Water will be diverted by a turbine pump, motor & pipeline. Water will be metered and delivered to the headwaters of the Muddy River at Warm Springs or delivered directly to Lake Mead. Water delivered to Lake Mead will be re-diverted at an existing pumping plant at Saddle Island or alternative plant at Lake Mead.

13. Miscellaneous remarks:

This application is for diversion rate only. Permit Nos. 49414, 49660 through 49662 [inclusive] and 49978 through 49987 [inclusive] have a combined duty of 8600 AFA. Permit No. 46777 has a duty of 400 AFA. The applicant is concurrently submitting change applications for these permits with a single Point of Diversion. The applicant requests a combined duty of 9000 AFA from the point of diversion identified in this application and the single point of diversion in the change applications identified above.

kay.brothers@snwa.com
E-mail Address

(702) 862-3708
Phone No.

Kay Brothers
Type or print name clearly

By Kay Brothers
Signature, applicant or agent

SNWA - Deputy General Manager
Company Name

1001 S. Valley View Blvd.
Street Address or P.O. Box

Las Vegas, NV 89153
City, State, Zip Code

2008 AUG 13 PM 2:52

APPLICATION MUST BE SIGNED BY THE APPLICANT OR AGENT

$250 FILING FEE AND SUPPORTING MAP MUST ACCOMPANY APPLICATION

Revised 11-07

Permit No. 77292

THE STATE OF NEVADA

PERMIT TO CHANGE POINT OF DIVERSION, MANNER OF USE AND PLACE OF USE OF THE PUBLIC WATERS OF THE STATE OF NEVADA HERETOFORE APPROPRIATED

Name of applicant:	**SOUTHERN NEVADA WATER AUTHORITY**
Source:	**UNDERGROUND**
Basin:	**COYOTE SPRING VALLEY**
Manner of Use:	**MUNICIPAL**
Period of Use:	**January 1st to December 31st**
Priority Date:	**03/31/1983**

****

APPROVAL OF STATE ENGINEER

This is to certify that I have examined the foregoing application, and do hereby grant the same, subject to the following limitations and conditions:

This permit to change the point of diversion, place and manner of use of a portion of the waters of an underground source as heretofore granted under Permit 46777 is issued subject to the terms and conditions imposed in said Permit 46777 and with the understanding that no other rights on the source will be affected by the change proposed herein. The well shall be equipped with a 2-inch opening and a totalizing meter must be installed and maintained in the discharge pipeline near the point of diversion and accurate measurements must be kept of water placed to beneficial use. The totalizing meter must be installed before any use of the water begins or before the proof of completion of work is filed. If the well is flowing, a valve must be installed and maintained to prevent waste. This source is located within an area designated by the State Engineer pursuant to NRS 534.030. The State retains the right to regulate the use of the water herein granted at any and all times.

Monthly records shall be kept of the amount of water pumped from this well and the records submitted to the State Engineer on a quarterly basis within 15 days after the end of each calendar quarter.

This permit does not extend the permittee the right of ingress and egress on public, private or corporate lands.

The total combined duty of water under Permits 77291 though 77306 shall not exceed 9000 acre-feet annually.

The issuance of this permit does not waive the requirements that the permit holder obtain other permits from State, Federal and local agencies.

This permit must comply with the monitoring requirements of Order 1169.

(Continued on Page 2)

The point of diversion and place of use are as described on the submitted application to support this permit.

The amount of water to be appropriated shall be limited to the amount which can be applied to beneficial use, **and not to exceed 0.8 cubic feet per second or 400.0 acre-feet annually.**

Work must be prosecuted with reasonable diligence and proof of completion of work shall be filed on or before:	**December 19, 2010**
Water must be placed to beneficial use and proof of the application of water to beneficial use shall be filed on or before:	**December 19, 2018**
Map in support of proof of beneficial use shall be filed on or before:	**N/A**

IN TESTIMONY WHEREOF, I, TRACY TAYLOR, P.E.,

State Engineer of Nevada, have hereunto set my hand and the seal of my office, this 19th day of **December,** A.D. **2008**

P.E.

for State Engineer

Completion of work filed _____

Proof of beneficial use filed _____

Cultural map filed _____

Certificate No. _____ Issued _____

llb

Serial No 77292

APPLICATION FOR PERMISSION TO CHANGE POINT OF DIVERSION, MANNER OF USE AND PLACE OF USE OF THE PUBLIC WATERS OF THE STATE OF NEVADA HERETOFORE APPROPRIATED

THIS SPACE FOR OFFICE USE ONLY

Date of filing in State Engineer's Office AUG 1 3 2008

Returned to applicant for correction _____

Corrected application filed _____ Map filed AUG 1 3 2008

The applicant Southern Nevada Water Authority

1001 S. Valley View Blvd (Street and No. Or P.O. Box No) of Las Vegas (City or Town) Nevada 89153 (State and Zip Code)

hereby makes application for permission to change the

☒ Point of diversion ☒ Place of use ☒ Manner of use ☐ Of a portion

of water heretofore appropriated under Permit 46777
Identify existing right by Permit, Certificate, Proof or Claim Nos. If Decreed, give title of Decree identify right in Decree.

1. The source of water is Underground
Name of stream, lake, underground, spring or other sources.

2. The amount of water to be changed 0.80 c.f.s [400 AFA]
Second feet, acre-feet. One second foot equals 448.83 gallons per minute.

3. The water to be used for Municipal
Irrigation, power, mining, commercial, etc. If for stock state number and kind of animals. Must limit to one major use.

4. The water heretofore used for Industrial
If for stock state number and kind of animals.

5. The water is to be diverted at the following Point within the NE ¼ NE ¼, Section 26, T. 13 S., R. 63 E., M.D.B.&M., or at a point from which the NW corner of said Section 26 bears S. 87° 52' 54" W., a distance of 5084.64 feet. This is the same well as listed as the existing point of diversion, distance and bearing based on more current Cadastral Survey.

Describe as being within a 40-acre subdivision of public survey and by course and distance to a section corner. If on unsurveyed land, it should be stated.

6. The existing point of diversion is located within SE ¼ SE ¼, Sec. 23, T. 13 S., R. 63 E., M.D.B.&M. The SW corner of Section 23 bears S. 88° 12' 27" W., 5103 feet from the point of diversion.
If point of diversion is not changed, do not answer.

7. Proposed place of use Clark Co. Nevada as described in NRS 243.035 - 243.040
Describe by legal subdivisions. If for irrigation state number of acres to be irrigated.

210-cl

77292

8. Existing place of use T. 17 S., R. 63 E., Sections 12 (portion), 13 (portion), 24, 25, 35 (portion), and 36; T. 17 S., R. 64 E., Sections 7 (portion), 18, 19, 30 and 31; T. 18 S., R. 63 E., Sections 1 (portion) and 2 (portion).
Describe by legal subdivisions. If permit is for irrigation, state number of acres irrigated. If changing place of use and/or manner of use of irrigation permit, describe acreage to be removed from irrigation.

9. Proposed use will be from 1/1 (Month and Day) to 12/31 (Month and Day) of each year.

10. Existing use permitted from 1/1 (Month and Day) to 12/31 (Month and Day) of each year.

11. Description of proposed works. (Under the provision of NRS 535.010 you may be required to submit plans and specifications of your diversion or storage works.) 628' depth – well currently installed [well log no. 22861]; Pumps, motor and pipelines
State manner in which water is to be diverted, i.e. diversion structure, ditches, pipes and flumes or drilled well, pump and motor, etc.

12. Estimated cost of works $5,000,000.00

13. Estimated time required to construct works 2 YEARS
If well completed, describe well.

14. Estimated time required to complete the application of water to beneficial use 10 YEARS

15. Provide a detailed description of the proposed project and its water usage (use attachments if necessary): (Failure to provide a detailed description may cause a delay in processing) Water will be diverted by a turbine pump, motor & pipeline. Water will be metered and delivered to the headwaters of the Muddy River at Warm Springs or delivered directly to Lake Mead. Water delivered to Lake Mead will be re-diverted at an existing pumping plant at Saddle Island or alternative plant on Lake Mead.

16. Miscellaneous Remarks: Existing POU and POD map filed under Permit 46777. It is the intent of the applicant to use this water from either of two points of diversions with a combined duty. An application to appropriate water [diversion rate only] will be submitted along with this change application.

(702) 862-3708
Phone No.

By: Kay Brothers
Print or type name clearly

Kay Brothers
Signature, applicant or agent

kay.brothers@snwa.com
E-mail

SNWA – Deputy General Manager
Company Name

1001 S. Valley Blvd.
Street and No., or P.O. Box No.

Las Vegas, Nevada 89153
City, State, Zip Code

2008 AUG 13 PM 2:52
STATE ENGINEER'S OFFICE

APPLICATION MUST BE SIGNED BY THE APPLICANT OR AGENT

$150 FILING FEE AND SUPPORTING MAP MUST ACCOMPANY APPLICATION

THE STATE OF NEVADA

PERMIT TO CHANGE POINT OF DIVERSION, MANNER OF USE AND PLACE OF USE OF THE PUBLIC WATERS OF THE STATE OF NEVADA HERETOFORE APPROPRIATED

Name of applicant:	**SOUTHERN NEVADA WATER AUTHORITY**
Source:	**UNDERGROUND**
Basin:	**COYOTE SPRING VALLEY**
Manner of Use:	**MUNICIPAL**
Period of Use:	**January 1st to December 31st**
Priority Date:	**09/27/1985**

****

APPROVAL OF STATE ENGINEER

This is to certify that I have examined the foregoing application, and do hereby grant the same, subject to the following limitations and conditions:

This permit to change the point of diversion, place and manner of use of the waters of an underground source as heretofore granted under Permit 49414 is issued subject to the terms and conditions imposed in said Permit 49414 and with the understanding that no other rights on the source will be affected by the change proposed herein. The well shall be equipped with a 2-inch opening and a totalizing meter must be installed and maintained in the discharge pipeline near the point of diversion and accurate measurements must be kept of water placed to beneficial use. The totalizing meter must be installed before any use of the water begins or before the proof of completion of work is filed. If the well is flowing, a valve must be installed and maintained to prevent waste. This source is located within an area designated by the State Engineer pursuant to NRS 534.030. The State retains the right to regulate the use of the water herein granted at any and all times.

Monthly records shall be kept of the amount of water pumped from this well and the records submitted to the State Engineer on a quarterly basis within 15 days after the end of each calendar quarter.

This permit does not extend the permittee the right of ingress and egress on public, private or corporate lands.

The total combined duty of water under Permits 77291 though 77306 shall not exceed 9000 acre-feet annually.

The issuance of this permit does not waive the requirements that the permit holder obtain other permits from State, Federal and local agencies.

This permit must comply with the monitoring requirements of Order 1169.

The point of diversion and place of use are as described on the submitted application to support this permit.

(Continued on Page 2)

The amount of water to be appropriated shall be limited to the amount which can be applied to beneficial use, **and not to exceed 6.0 cubic feet per second or 4000.0 acre-feet annually.**

Work must be prosecuted with reasonable diligence and proof of completion of work shall be filed on or before: **December 19, 2010**

Water must be placed to beneficial use and proof of the application of water to beneficial use shall be filed on or before: **December 19, 2018**

Map in support of proof of beneficial use shall be filed on or before: **N/A**

IN TESTIMONY WHEREOF, I, TRACY TAYLOR, P.E.,

State Engineer of Nevada, have hereunto set my hand and the seal of my office, this 19th day of **December,** A.D. **2008**

for State Engineer

Completion of work filed _____

Proof of beneficial use filed _____

Cultural map filed _____

Certificate No. _____ Issued _____

llb

Serial No 77293

APPLICATION FOR PERMISSION TO CHANGE POINT OF DIVERSION, MANNER OF USE AND PLACE OF USE OF THE PUBLIC WATERS OF THE STATE OF NEVADA HERETOFORE APPROPRIATED

THIS SPACE FOR OFFICE USE ONLY

Date of filing in State Engineer's Office AUG 1 3 2008

Returned to applicant for correction _____

Corrected application filed _____ Map filed AUG 1 3 2008 under 77292

The applicant Southern Nevada Water Authority

1001 S. Valley View Blvd (Street and No. Or P.O. Box No) of Las Vegas (City or Town) Nevada 89153 (State and Zip Code)

hereby makes application for permission to change the

☒ Point of diversion ☒ Place of use ☒ Manner of use ☐ Of a portion

of water heretofore appropriated under Permit 49414
Identify existing right by Permit, Certificate, Proof or Claim Nos. If Decreed, give title of Decree identify right in Decree.

1. The source of water is Underground
   Name of stream, lake, underground, spring or other sources.
2. The amount of water to be changed 6.0 c.f.s [4,000 AFA]
   Second feet, acre-feet. One second foot equals 448.83 gallons per minute.
3. The water to be used for Municipal
   Irrigation, power, mining, commercial, etc. If for stock state number and kind of animals. Must limit to one major use.
4. The water heretofore used for Industrial
   If for stock state number and kind of animals.
5. The water is to be diverted at the following Point within the NE ¼ NE ¼ , Section 26, T. 13 S., R. 63 E., M.D.B.&M., or at a point from which the NW corner of said Section 26 bears S. 87° 52' 54 " W., a distance of 5084.64 feet. This is the same well as listed as the existing point of diversion, distance and bearing based on more current Cadastral Survey.
   Describe as being within a 40-acre subdivision of public survey and by course and distance to a section corner. If on unsurveyed land, it should be stated.
6. The existing point of diversion is located within SE ¼ SE ¼ , Sec. 23, T. 13 S., R. 63 E., M.D.B.&M., from which the Southwest corner of the SE ¼ quarter of said Section 23 bears S. 87° 42' 27" W., 2446.5 feet.
   If point of diversion is not changed, do not answer.
7. Proposed place of use Clark Co. Nevada as described in NRS 243.035 - 243.040
   Describe by legal subdivisions. If for irrigation state number of acres to be irrigated.

210-cc

8. Existing place of use Coyote Springs Valley (See exhibit "A" attached for legal subdivision)

Describe by legal subdivisions. If permit is for irrigation, state number of acres irrigated. If changing place of use and/or manner of use of irrigation permit, describe acreage to be removed from irrigation.

9. Proposed use will be from 1/1 (Month and Day) to 12/31 (Month and Day) of each year.

10. Existing use permitted from 1/1 (Month and Day) to 12/31 (Month and Day) of each year.

11. Description of proposed works. (Under the provision of NRS 535.010 you may be required to submit plans and specifications of your diversion or storage works.) 628' depth – well currently installed [well log no. 22861]; Pumps, motor and pipelines
State manner in which water is to be diverted, i.e. diversion structure, ditches, pipes and flumes or drilled well, pump and motor, etc.

12. Estimated cost of works $5,000,000.00

13. Estimated time required to construct works 2 YEARS
If well completed, describe well.

14. Estimated time required to complete the application of water to beneficial use 10 YEARS

15. Provide a detailed description of the proposed project and its water usage (use attachments if necessary): (Failure to provide a detailed description may cause a delay in processing) Water will be diverted by a turbine pump, motor & pipeline. Water will be metered and delivered to the headwaters of the Muddy River at Warm Springs or delivered directly to Lake Mead. Water delivered to Lake Mead will be re-diverted at an existing pumping plant at Saddle Island or alternative plant on Lake Mead.

16. Miscellaneous Remarks: Existing POU and POD map filed under Permit 49414. It is the intent of the applicant to use this water from either of two points of diversions with a combined duty. An application to appropriate water [diversion rate only] will be submitted along with this change application.

(702) 862-3708
Phone No.

By: Kay Brothers
Print or type name clearly

Kay Brothers
Signature, applicant or agent

kay.brothers@snwa.com
E-mail

SNWA – Deputy General Manager
Company Name

1001 S. Valley Blvd.
Street and No., or P.O. Box No.

Las Vegas, Nevada 89153
City, State, Zip Code

2008 AUG 13 PM 2:52
STATE ENGINEER'S OFFICE

APPLICATION MUST BE SIGNED
BY THE APPLICANT OR AGENT

$150 FILING FEE AND SUPPORTING MAP MUST ACCOMPANY APPLICATION

EXHIBIT "A"

Description to accompany Michael W. Palmer's Coyote Springs Valley application.

PLACE OF USE

All of Sections 1, 2, 3, 4, 5, 9, 10, 11, 12, 13, 14, 15, 16, 21, 22, 23 and 24; and the E1/2, and the E1/2 of the W1/2 of Section 8; the E1/2 of Sections 17 and 20; and the N1/2 of Sections 25 and 26, in Township 13 South, Range 63 East, M.D.M., Clark County, Nevada.

All of Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 20, 21, 22, 23, 25, 26, 27, 28, 29, 32, 33, 34, 35 and 36; and the W1/2 of Sections 13 and 24; the E1/2 of Sections 18, 19, 30 and 31; and the W1/2 of the W1/2 of Section 12, in Township 12 South, Range 63 East M.D.M., Lincoln County, Nevada.

All of Sections 19, 20, 21, 22, 23, 26, 27, 28, 29, 30, 31, 32, 33, 34 and 35; and the W1/2 of Sections 24 and 25, in Township 11 South, Range 63 East, M.D.M., Lincoln County, Nevada.

All of Sections 18 and 19; and the N1/2 of Section 30; and the W1/2 and the W1/2 of the SE1/4 of Section 7; and the W1/2 of Section 6 in the unsurveyed Township 13 South, Range 64 East, M.D.M., Clark County, Nevada.

The W1/2 of the SW1/4 of Section 31 in the unsurveyed Township 12 South, Range 64 East, M.D.M., Lincoln County, Nevada.

2000 AUG 13 PM 2:52
STATE ENGINEER'S OFFICE

Permit No. 77294

THE STATE OF NEVADA

PERMIT TO CHANGE POINT OF DIVERSION, MANNER OF USE AND PLACE OF USE OF THE PUBLIC WATERS OF THE STATE OF NEVADA HERETOFORE APPROPRIATED

Name of applicant:	**SOUTHERN NEVADA WATER AUTHORITY**
Source:	**UNDERGROUND**
Basin:	**COYOTE SPRING VALLEY**
Manner of Use:	**MUNICIPAL**
Period of Use:	**January 1st to December 31st**
Priority Date:	**01/27/1986**

****

APPROVAL OF STATE ENGINEER

This is to certify that I have examined the foregoing application, and do hereby grant the same, subject to the following limitations and conditions:

This permit to change the point of diversion, place and manner of use of the waters of an underground source as heretofore granted under Permit 49660 is issued subject to the terms and conditions imposed in said Permit 49660 and with the understanding that no other rights on the source will be affected by the change proposed herein. The well shall be equipped with a 2-inch opening and a totalizing meter must be installed and maintained in the discharge pipeline near the point of diversion and accurate measurements must be kept of water placed to beneficial use. The totalizing meter must be installed before any use of the water begins or before the proof of completion of work is filed. If the well is flowing, a valve must be installed and maintained to prevent waste. This source is located within an area designated by the State Engineer pursuant to NRS 534.030. The State retains the right to regulate the use of the water herein granted at any and all times.

Monthly records shall be kept of the amount of water pumped from this well and the records submitted to the State Engineer on a quarterly basis within 15 days after the end of each calendar quarter.

This permit does not extend the permittee the right of ingress and egress on public, private or corporate lands.

The total combined duty of water under Permits 77291 though 77306 shall not exceed 9000 acre-feet annually.

The issuance of this permit does not waive the requirements that the permit holder obtain other permits from State, Federal and local agencies.

This permit must comply with the monitoring requirements of Order 1169.

(Continued on Page 2)

The point of diversion and place of use are as described on the submitted application to support this permit.

The amount of water to be appropriated shall be limited to the amount which can be applied to beneficial use, **and not to exceed 0.138 cubic feet per second or 100.0 acre-feet annually**.

Work must be prosecuted with reasonable diligence and proof of completion of work shall be filed on or before:	**December 19, 2010**
Water must be placed to beneficial use and proof of the application of water to beneficial use shall be filed on or before:	**December 19, 2018**
Map in support of proof of beneficial use shall be filed on or before:	**N/A**

IN TESTIMONY WHEREOF, I, TRACY TAYLOR, P.E.,

State Engineer of Nevada, have hereunto set my hand and the seal of my office, this 19th day of **December**, A.D. **2008**

P.E.

For State Engineer

Completion of work filed _____

Proof of beneficial use filed _____

Cultural map filed _____

Certificate No. _____ Issued _____

llb

Serial No 77294

APPLICATION FOR PERMISSION TO CHANGE POINT OF DIVERSION, MANNER OF USE AND PLACE OF USE OF THE PUBLIC WATERS OF THE STATE OF NEVADA HERETOFORE APPROPRIATED

THIS SPACE FOR OFFICE USE ONLY

Date of filing in State Engineer's Office AUG 1 3 2008

Returned to applicant for correction _____

Corrected application filed _____ Map filed AUG 1 3 2008 under 77292

The applicant Southern Nevada Water Authority

1001 S. Valley View Blvd (Street and No. Or P.O. Box No) of Las Vegas (City or Town) Nevada 89153 (State and Zip Code)

hereby makes application for permission to change the

☒ Point of diversion ☒ Place of use ☒ Manner of use ☐ Of a portion

of water heretofore appropriated under Permit 49660
Identify existing right by Permit, Certificate, Proof or Claim Nos. If Decreed, give title of Decree identify right in Decree.

1. The source of water is Underground
   Name of stream, lake, underground, spring or other sources.
2. The amount of water to be changed 0.138 c.f.s [NTE 100 AFA]
   Second feet, acre-feet. One second foot equals 448.83 gallons per minute.
3. The water to be used for Municipal
   Irrigation, power, mining, commercial, etc. If for stock state number and kind of animals. Must limit to one major use.
4. The water heretofore used for Industrial
   If for stock state number and kind of animals.
5. The water is to be diverted at the following Point within the NE ¼ NE ¼ , Section 26, T. 13 S., R. 63 E., M.D.B.&M., or at a point from which the NW corner of said Section 26 bears S. 87° 52' 54 " W., a distance of 5084.64 feet.
   Describe as being within a 40-acre subdivision of public survey and by course and distance to a section corner. If on unsurveyed land, it should be stated.
6. The existing point of diversion is located within SW ¼ NW ¼ , Sec. 13, T. 11 S., R. 63 E., M.D.B.&M., from which the Southwest corner said Section 13 bears S. 08° 37' 22" W., 3493 feet.
   If point of diversion is not changed, do not answer.
7. Proposed place of use Clark Co. Nevada as described in NRS 243.035 - 243.040
   Describe by legal subdivisions. If for irrigation state number of acres to be irrigated.

210-cl

77294

8. Existing place of use Coyote Springs Valley (See exhibit "A" attached for legal subdivision)

Describe by legal subdivisions. If permit is for irrigation, state number of acres irrigated. If changing place of use and/or manner of use of irrigation permit, describe acreage to be removed from irrigation.

9. Proposed use will be from 1/1 (Month and Day) to 12/31 (Month and Day) of each year.

10. Existing use permitted from 1/1 (Month and Day) to 12/31 (Month and Day) of each year.

11. Description of proposed works. (Under the provision of NRS 535.010 you may be required to submit plans and specifications of your diversion or storage works.) 628' depth – well currently installed [well log no. 22861]; Pumps, motor and pipelines
State manner in which water is to be diverted, i.e. diversion structure, ditches, pipes and flumes or drilled well, pump and motor, etc.

12. Estimated cost of works $5,000,000.00

13. Estimated time required to construct works 2 YEARS
If well completed, describe well.

14. Estimated time required to complete the application of water to beneficial use 10 YEARS

15. Provide a detailed description of the proposed project and its water usage (use attachments if necessary): (Failure to provide a detailed description may cause a delay in processing) Water will be diverted by a turbine pump, motor & pipeline. Water will be metered and delivered to the headwaters of the Muddy River at Warm Springs or delivered directly to Lake Mead. Water delivered to Lake Mead will be re-diverted at an existing pumping plant at Saddle Island or alternative plant on Lake Mead.

16. Miscellaneous Remarks: Existing POU and POD map filed under Permit 49660. It is the intent of the applicant to use this water from either of two points of diversions with a combined duty. An application to appropriate water [diversion rate only] will be submitted along with this change application.

(702) 862-3708
Phone No.

By: Kay Brothers
Print or type name clearly

Kay Brothers
Signature, applicant or agent

kay.brothers@snwa.com
E-mail

SNWA – Deputy General Manager
Company Name

1001 S. Valley Blvd.
Street and No., or P.O. Box No.

Las Vegas, Nevada 89153
City, State, Zip Code

2008 AUG 13 PM 2:52
STATE ENGINEER'S OFFICE

APPLICATION MUST BE SIGNED BY THE APPLICANT OR AGENT

$150 FILING FEE AND SUPPORTING MAP MUST ACCOMPANY APPLICATION

~~49660~~

77294

397.387
Revised Dec. 16, 1985
By: B.L.S.
Ckd. By: K.L.A.

EXHIBIT "A"

Description to accompany Michael W. Palmer's Coyote Springs Valley application.

PLACE OF USE

All of Sections 1, 2, 3, 4, 5, 9, 10, 11, 12, 13, 14, 15, 16, 21, 22, 23 and 24; and the E1/2, and the E1/2 of the W1/2 of Section 8; the E1/2 of Sections 17 and 20; and the N1/2 of Sections 25 and 26, in Township 13 South, Range 63 East, M.D.M., Clark County, Nevada.

All of Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 20, 21, 22, 23, 25, 26, 27, 28, 29, 32, 33, 34, 35 and 36; and the W1/2 of Sections 13 and 24; the E1/2 of Sections 18, 19, 30 and 31; and the W1/2 of the W1/2 of Section 12, in Township 12 South, Range 63 East M.D.M., Lincoln County, Nevada.

All of Sections 1, 2, 3, 10, 11, 12, 13, 14, 15, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34 and 35 in Township 11 South, Range 63 East, M.D.M., Lincoln County, Nevada.

All of Sections 18 and 19; and the N1/2 of Section 30; and the W1/2 and the W1/2 of the SE1/4 of Section 7; and the W1/2 of Section 6 in the unsurveyed Township 13 South, Range 64 East, M.D.M., Clark County, Nevada.

The W1/2 of the SW1/4 of Section 31 in the unsurveyed Township 12 South, Range 64 East, M.D.M., Lincoln County, Nevada.

2008 AUG 13 PM 2:52
STATE ENGINEER'S OFFICE

Permit No. 77295

THE STATE OF NEVADA

PERMIT TO CHANGE POINT OF DIVERSION, MANNER OF USE AND PLACE OF USE OF THE PUBLIC WATERS OF THE STATE OF NEVADA HERETOFORE APPROPRIATED

Name of applicant:	**SOUTHERN NEVADA WATER AUTHORITY**
Source:	**UNDERGROUND**
Basin:	**COYOTE SPRING VALLEY**
Manner of Use:	**MUNICIPAL**
Period of Use:	**January 1st to December 31st**
Priority Date:	**01/27/1986**

****

APPROVAL OF STATE ENGINEER

This is to certify that I have examined the foregoing application, and do hereby grant the same, subject to the following limitations and conditions:

This permit to change the point of diversion, place and manner of use of the waters of an underground source as heretofore granted under Permit 49661 is issued subject to the terms and conditions imposed in said Permit 49661 and with the understanding that no other rights on the source will be affected by the change proposed herein. The well shall be equipped with a 2-inch opening and a totalizing meter must be installed and maintained in the discharge pipeline near the point of diversion and accurate measurements must be kept of water placed to beneficial use. The totalizing meter must be installed before any use of the water begins or before the proof of completion of work is filed. If the well is flowing, a valve must be installed and maintained to prevent waste. This source is located within an area designated by the State Engineer pursuant to NRS 534.030. The State retains the right to regulate the use of the water herein granted at any and all times.

Monthly records shall be kept of the amount of water pumped from this well and the records submitted to the State Engineer on a quarterly basis within 15 days after the end of each calendar quarter.

This permit does not extend the permittee the right of ingress and egress on public, private or corporate lands.

The total combined duty of water under Permits 77291 though 77306 shall not exceed 9000 acre-feet annually.

The issuance of this permit does not waive the requirements that the permit holder obtain other permits from State, Federal and local agencies.

This permit must comply with the monitoring requirements of Order 1169.

(Continued on Page 2)

The point of diversion and place of use are as described on the submitted application to support this permit.

The amount of water to be appropriated shall be limited to the amount which can be applied to beneficial use, **and not to exceed 0.138 cubic feet per second or 100.0 acre-feet annually**.

Work must be prosecuted with reasonable diligence and proof of completion of work shall be filed on or before: **December 19, 2010**

Water must be placed to beneficial use and proof of the application of water to beneficial use shall be filed on or before: **December 19, 2018**

Map in support of proof of beneficial use shall be filed on or before: **N/A**

IN TESTIMONY WHEREOF, I, TRACY TAYLOR, P.E.,

State Engineer of Nevada, have hereunto set my hand and the seal of my office, this 19th day of **December**, A.D. **2008**

P.E.

for State Engineer

Completion of work filed _____

Proof of beneficial use filed _____

Cultural map filed _____

Certificate No. _____ Issued _____

llb

Serial No 77295

APPLICATION FOR PERMISSION TO CHANGE POINT OF DIVERSION, MANNER OF USE AND PLACE OF USE OF THE PUBLIC WATERS OF THE STATE OF NEVADA HERETOFORE APPROPRIATED

THIS SPACE FOR OFFICE USE ONLY

Date of filing in State Engineer's Office AUG 1 3 2008

Returned to applicant for correction _____

Corrected application filed _____ Map filed AUG 1 3 2008 under 77292

The applicant Southern Nevada Water Authority

1001 S. Valley View Blvd (Street and No. Or P.O. Box No) of Las Vegas (City or Town) Nevada 89153 (State and Zip Code)

hereby makes application for permission to change the

☒ Point of diversion ☒ Place of use ☒ Manner of use ☐ Of a portion

of water heretofore appropriated under Permit 49661
Identify existing right by Permit, Certificate, Proof or Claim Nos. If Decreed, give title of Decree identify right in Decree.

1. The source of water is Underground
Name of stream, lake, underground, spring or other sources.

2. The amount of water to be changed 0.138 c.f.s [NTE 100 AFA]
Second feet, acre-feet. One second foot equals 448.83 gallons per minute.

3. The water to be used for Municipal
Irrigation, power, mining, commercial, etc. If for stock state number and kind of animals. Must limit to one major use.

4. The water heretofore used for Industrial
If for stock state number and kind of animals.

5. The water is to be diverted at the following Point within the NE ¼ NE ¼ , Section 26, T. 13 S., R. 63 E., M.D.B.&M., or at a point from which the NW corner of said Section 26 bears S. 87° 52' 54 " W., a distance of 5084.64 feet.

Describe as being within a 40-acre subdivision of public survey and by course and distance to a section corner. If on snsurveyed land, it should be stated.

6. The existing point of diversion is located within SE ¼ NE ¼ , Sec. 10, T. 12 S., R. 63 E., M.D.B.&M., or from whence the Northwest corner of said Section 10 bears N. 63° 45' 52" W., 5125 feet.
If point of diversion is not changed, do not answer.

REL

7. Proposed place of use Clark Co. Nevada as described in NRS 243.035 - 243.040
Describe by legal subdivisions. If for irrigation state number of acres to be irrigated.

210-CL

77295

8. Existing place of use Coyote Springs Valley (See Exhibit "A" attached for legal subdivision)

Describe by legal subdivisions. If permit is for irrigation, state number of acres irrigated. If changing place of use and/or manner of use of irrigation permit, describe acreage to be removed from irrigation.

9. Proposed use will be from 1/1 (Month and Day) to 12/31 (Month and Day) of each year.

10. Existing use permitted from 1/1 (Month and Day) to 12/31 (Month and Day) of each year.

11. Description of proposed works. (Under the provision of NRS 535.010 you may be required to submit plans and specifications of your diversion or storage works.) 628' depth – well currently installed [well log no. 22861]; Pumps, motor and pipelines
State manner in which water is to be diverted, i.e. diversion structure, ditches, pipes and flumes or drilled well, pump and motor, etc.

12. Estimated cost of works $5,000,000.00

13. Estimated time required to construct works 2 YEARS
If well completed, describe well.

14. Estimated time required to complete the application of water to beneficial use 10 YEARS

15. Provide a detailed description of the proposed project and its water usage (use attachments if necessary): (Failure to provide a detailed description may cause a delay in processing) Water will be diverted by a turbine pump, motor & pipeline. Water will be metered and delivered to the headwaters of the Muddy River at Warm Springs or delivered directly to Lake Mead. Water delivered to Lake Mead will be re-diverted at an existing pumping plant at Saddle Island or alternative plant on Lake Mead.

16. Miscellaneous Remarks: Existing POU and POD map filed under Permit 49661. It is the intent of the applicant to use this water from either of two points of diversions with a combined duty. An application to appropriate water [diversion rate only] will be submitted along with this change application.

(702) 862-3708
Phone No.

By: Kay Brothers
Print or type name clearly

Kay Brothers
Signature, applicant or agent

kay.brothers@snwa.com
E-mail

SNWA – Deputy General Manager
Company Name

1001 S. Valley Blvd.
Street and No., or P.O. Box No.

Las Vegas, Nevada 89153
City, State, Zip Code

2000 AUG 13 PM 2:52

APPLICATION MUST BE SIGNED
BY THE APPLICANT OR AGENT

$150 FILING FEE AND SUPPORTING MAP MUST ACCOMPANY APPLICATION

49661

77295

397.387
Revised Dec. 16, 1985
By: B.L.S.
Ckd. By: K.L.A.

EXHIBIT "A"

Description to accompany Michael W. Palmer's Coyote Springs Valley application.

PLACE OF USE

All of Sections 1, 2, 3, 4, 5, 9, 10, 11, 12, 13, 14, 15, 16, 21, 22, 23 and 24; and the E1/2, and the E1/2 of the W1/2 of Section 8; the E1/2 of Sections 17 and 20; and the N1/2 of Sections 25 and 26, in Township 13 South, Range 63 East, M.D.M., Clark County, Nevada.

All of Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 20, 21, 22, 23, 25, 26, 27, 28, 29, 32, 33, 34, 35 and 36; and the W1/2 of Sections 13 and 24; the E1/2 of Sections 18, 19, 30 and 31; and the W1/2 of the W1/2 of Section 12, in Township 12 South, Range 63 East M.D.M., Lincoln County, Nevada.

All of Sections 1, 2, 3, 10, 11, 12, 13, 14, 15, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34 and 35 in Township 11 South, Range 63 East, M.D.M., Lincoln County, Nevada.

All of Sections 18 and 19; and the N1/2 of Section 30; and the W1/2 and the W1/2 of the SE1/4 of Section 7; and the W1/2 of Section 6 in the unsurveyed Township 13 South, Range 64 East, M.D.M., Clark County, Nevada.

The W1/2 of the SW1/4 of Section 31 in the unsurveyed Township 12 South, Range 64 East, M.D.M., Lincoln County, Nevada.

RECEIVED
2000 AUG 13 PM 2:52
STATE ENGINEER'S OFFICE

THE STATE OF NEVADA

PERMIT TO CHANGE POINT OF DIVERSION, MANNER OF USE AND PLACE OF USE OF THE PUBLIC WATERS OF THE STATE OF NEVADA HERETOFORE APPROPRIATED

Name of applicant:	**SOUTHERN NEVADA WATER AUTHORITY**
Source:	**UNDERGROUND**
Basin:	**COYOTE SPRING VALLEY**
Manner of Use:	**MUNICIPAL**
Period of Use:	**January 1st to December 31st**
Priority Date:	**01/27/1986**

****

APPROVAL OF STATE ENGINEER

This is to certify that I have examined the foregoing application, and do hereby grant the same, subject to the following limitations and conditions:

This permit to change the point of diversion, place and manner of use of the waters of an underground source as heretofore granted under Permit 49662 is issued subject to the terms and conditions imposed in said Permit 49662 and with the understanding that no other rights on the source will be affected by the change proposed herein. The well shall be equipped with a 2-inch opening and a totalizing meter must be installed and maintained in the discharge pipeline near the point of diversion and accurate measurements must be kept of water placed to beneficial use. The totalizing meter must be installed before any use of the water begins or before the proof of completion of work is filed. If the well is flowing, a valve must be installed and maintained to prevent waste. This source is located within an area designated by the State Engineer pursuant to NRS 534.030. The State retains the right to regulate the use of the water herein granted at any and all times.

Monthly records shall be kept of the amount of water pumped from this well and the records submitted to the State Engineer on a quarterly basis within 15 days after the end of each calendar quarter.

This permit does not extend the permittee the right of ingress and egress on public, private or corporate lands.

The total combined duty of water under Permits 77291 though 77306 shall not exceed 9000 acre-feet annually.

The issuance of this permit does not waive the requirements that the permit holder obtain other permits from State, Federal and local agencies.

This permit must comply with the monitoring requirements of Order 1169.

(Continued on Page 2)

The point of diversion and place of use are as described on the submitted application to support this permit.

The amount of water to be appropriated shall be limited to the amount which can be applied to beneficial use, **and not to exceed 0.138 cubic feet per second or 100.0 acre-feet annually.**

Work must be prosecuted with reasonable diligence and proof of completion of work shall be filed on or before: **December 19, 2010**

Water must be placed to beneficial use and proof of the application of water to beneficial use shall be filed on or before: **December 19, 2018**

Map in support of proof of beneficial use shall be filed on or before: **N/A**

IN TESTIMONY WHEREOF, I, TRACY TAYLOR, P.E.,

State Engineer of Nevada, have hereunto set my hand and the seal of my office, this 19th day of **December**, A.D. **2008**

For State Engineer

Completion of work filed _____

Proof of beneficial use filed _____

Cultural map filed _____

Certificate No. _____ Issued _____

llb

Serial No 77296

APPLICATION FOR PERMISSION TO CHANGE POINT OF DIVERSION, MANNER OF USE AND PLACE OF USE OF THE PUBLIC WATERS OF THE STATE OF NEVADA HERETOFORE APPROPRIATED

THIS SPACE FOR OFFICE USE ONLY

Date of filing in State Engineer's Office AUG 1 3 2008

Returned to applicant for correction _____

Corrected application filed _____ Map filed AUG 1 3 2008 under 77292

The applicant Southern Nevada Water Authority

1001 S. Valley View Blvd (Street and No. Or P.O. Box No) of Las Vegas (City or Town) Nevada 89153 (State and Zip Code)

hereby makes application for permission to change the

☒ Point of diversion ☒ Place of use ☒ Manner of use ☐ Of a portion

of water heretofore appropriated under Permit 49662
Identify existing right by Permit, Certificate, Proof or Claim Nos. If Decreed, give title of Decree identify right in Decree.

1. The source of water is Underground
   Name of stream, lake, underground, spring or other sources.
2. The amount of water to be changed 0.138 c.f.s [NTE 100 AFA]
   Second feet, acre-feet. One second foot equals 448.83 gallons per minute.
3. The water to be used for Municipal
   Irrigation, power, mining, commercial, etc. If for stock state number and kind of animals. Must limit to one major use.
4. The water heretofore used for Industrial
   If for stock state number and kind of animals.
5. The water is to be diverted at the following Point within the NE ¼ NE ¼ , Section 26, T. 13 S., R. 63 E., M.D.B.&M., or at a point from which the NW corner of said Section 26 bears S. 87° 52' 54 " W., a distance of 5084.64 feet.

   Describe as being within a 40-acre subdivision of public survey and by course and distance to a section corner. If on snsurveyed land, it should be stated.
6. The existing point of diversion is located within SE ¼ NE ¼ , Sec. 10, T. 13 S., R. 63 E., M.D.B.&M., or from which the Northeast corner of said Section 10 bears N. 37° 00' 00" E., 2150 feet.
   If point of diversion is not changed, do not answer.
7. Proposed place of use Clark Co. Nevada as described in NRS 243.035 - 243.040
   Describe by legal subdivisions. If for irrigation state number of acres to be irrigated.

210-CL

8. Existing place of use Coyote Springs Valley (See Exhibit "A" attached for legal subdivision)

Describe by legal subdivisions. If permit is for irrigation, state number of acres irrigated. If changing place of use and/or manner of use of irrigation permit, describe acreage to be removed from irrigation.

9. Proposed use will be from 1/1 (Month and Day) to 12/31 (Month and Day) of each year.

10. Existing use permitted from 1/1 (Month and Day) to 12/31 (Month and Day) of each year.

11. Description of proposed works. (Under the provision of NRS 535.010 you may be required to submit plans and specifications of your diversion or storage works.) 628' depth – well currently installed [well log no. 22861]; Pumps, motor and pipelines
State manner in which water is to be diverted, i.e. diversion structure, ditches, pipes and flumes or drilled well, pump and motor, etc.

12. Estimated cost of works $5,000,000.00

13. Estimated time required to construct works 2 YEARS
If well completed, describe well.

14. Estimated time required to complete the application of water to beneficial use 10 YEARS

15. Provide a detailed description of the proposed project and its water usage (use attachments if necessary): (Failure to provide a detailed description may cause a delay in processing) Water will be diverted by a turbine pump, motor & pipeline. Water will be metered and delivered to the headwaters of the Muddy River at Warm Springs or delivered directly to Lake Mead. Water delivered to Lake Mead will be re-diverted at an existing pumping plant at Saddle Island or alternative plant on Lake Mead.

16. Miscellaneous Remarks: Existing POU and POD map filed under Permit 49662. It is the intent of the applicant to use this water from either of two points of diversions with a combined duty. An application to appropriate water [diversion rate only] will be submitted along with this change application.

(702) 862-3708
Phone No.

By: Kay Brothers
Print or type name clearly

Kay Brothers
Signature, applicant or agent

kay.brothers@snwa.com
E-mail

SNWA – Deputy General Manager
Company Name

1001 S. Valley Blvd.
Street and No., or P.O. Box No.

Las Vegas, Nevada 89153
City, State, Zip Code

APPLICATION MUST BE SIGNED
BY THE APPLICANT OR AGENT

2008 AUG 13 PM 2: 52
STATE ENGINEER'S OFFICE

$150 FILING FEE AND SUPPORTING MAP MUST ACCOMPANY APPLICATION

49662

77296

397.387
Revised Dec. 16, 1985
By: B.L.S.
Ckd. By: K.L.A.

EXHIBIT "A"

Description to accompany Michael W. Palmer's Coyote Springs Valley application.

PLACE OF USE

All of Sections 1, 2, 3, 4, 5, 9, 10, 11, 12, 13, 14, 15, 16, 21, 22, 23 and 24; and the E1/2, and the E1/2 of the W1/2 of Section 8; the E1/2 of Sections 17 and 20; and the N1/2 of Sections 25 and 26, in Township 13 South, Range 63 East, M.D.M., Clark County, Nevada.

All of Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 20, 21, 22, 23, 25, 26, 27, 28, 29, 32, 33, 34, 35 and 36; and the W1/2 of Sections 13 and 24; the E1/2 of Sections 18, 19, 30 and 31; and the W1/2 of the W1/2 of Section 12, in Township 12 South, Range 63 East M.D.M., Lincoln County, Nevada.

All of Sections 1, 2, 3, 10, 11, 12, 13, 14, 15, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34 and 35 in Township 11 South, Range 63 East, M.D.M., Lincoln County, Nevada.

All of Sections 18 and 19; and the N1/2 of Section 30; and the W1/2 and the W1/2 of the SE1/4 of Section 7; and the W1/2 of Section 6 in the unsurveyed Township 13 South, Range 64 East, M.D.M., Clark County, Nevada.

The W1/2 of the SW1/4 of Section 31 in the unsurveyed Township 12 South, Range 64 East, M.D.M., Lincoln County, Nevada.

2008 AUG 13 PM 2:52
STATE ENGINEER'S OFFICE

Permit No. 77297

THE STATE OF NEVADA

PERMIT TO CHANGE POINT OF DIVERSION, MANNER OF USE AND PLACE OF USE OF THE PUBLIC WATERS OF THE STATE OF NEVADA HERETOFORE APPROPRIATED

Name of applicant:	**SOUTHERN NEVADA WATER AUTHORITY**
Source:	**UNDERGROUND**
Basin:	**COYOTE SPRING VALLEY**
Manner of Use:	**MUNICIPAL**
Period of Use:	**January 1st to December 31st**
Priority Date:	**07/15/1986**

****

APPROVAL OF STATE ENGINEER

This is to certify that I have examined the foregoing application, and do hereby grant the same, subject to the following limitations and conditions:

This permit to change the point of diversion, place and manner of use of the waters of an underground source as heretofore granted under Permit 49978 is issued subject to the terms and conditions imposed in said Permit 49978 and with the understanding that no other rights on the source will be affected by the change proposed herein. The well shall be equipped with a 2-inch opening and a totalizing meter must be installed and maintained in the discharge pipeline near the point of diversion and accurate measurements must be kept of water placed to beneficial use. The totalizing meter must be installed before any use of the water begins or before the proof of completion of work is filed. If the well is flowing, a valve must be installed and maintained to prevent waste. This source is located within an area designated by the State Engineer pursuant to NRS 534.030. The State retains the right to regulate the use of the water herein granted at any and all times.

Monthly records shall be kept of the amount of water pumped from this well and the records submitted to the State Engineer on a quarterly basis within 15 days after the end of each calendar quarter.

This permit does not extend the permittee the right of ingress and egress on public, private or corporate lands.

The total combined duty of water under Permits 77291 though 77306 shall not exceed 9000 acre-feet annually.

The issuance of this permit does not waive the requirements that the permit holder obtain other permits from State, Federal and local agencies.

This permit must comply with the monitoring requirements of Order 1169.

(Continued on Page 2)

The point of diversion and place of use are as described on the submitted application to support this permit.

The amount of water to be appropriated shall be limited to the amount which can be applied to beneficial use, **and not to exceed 2.0 cubic feet per second or 1447.93 acre-feet annually.**

Work must be prosecuted with reasonable diligence and proof of completion of work shall be filed on or before:	**December 19, 2010**
Water must be placed to beneficial use and proof of the application of water to beneficial use shall be filed on or before:	**December 19, 2018**
Map in support of proof of beneficial use shall be filed on or before:	**N/A**

IN TESTIMONY WHEREOF, I, TRACY TAYLOR, P.E.,

State Engineer of Nevada, have hereunto set my hand and the seal of my office, this 19th day of **December,** A.D. **2008**

P.E.

for State Engineer

Completion of work filed _____

Proof of beneficial use filed _____

Cultural map filed _____

Certificate No. _____ Issued _____

llb

Serial No 77297

APPLICATION FOR PERMISSION TO CHANGE POINT OF DIVERSION, MANNER OF USE AND PLACE OF USE OF THE PUBLIC WATERS OF THE STATE OF NEVADA HERETOFORE APPROPRIATED

THIS SPACE FOR OFFICE USE ONLY

Date of filing in State Engineer's Office AUG 1 3 2008

Returned to applicant for correction _____

Corrected application filed _____ Map filed AUG 1 3 2008 under 77292

The applicant Southern Nevada Water Authority

1001 S. Valley View Blvd (Street and No. Or P.O. Box No) of Las Vegas (City or Town) Nevada 89153 (State and Zip Code)

hereby makes application for permission to change the

☒ Point of diversion ☒ Place of use ☒ Manner of use ☐ Of a portion

of water heretofore appropriated under Permit 49978
Identify existing right by Permit, Certificate, Proof or Claim Nos. If Decreed, give title of Decree identify right in Decree.

1. The source of water is Underground
Name of stream, lake, underground, spring or other sources.

2. The amount of water to be changed 2.0 c.f.s [1447.93 AFA]
Second feet, acre-feet. One second foot equals 448.83 gallons per minute.

3. The water to be used for Municipal
Irrigation, power, mining, commercial, etc. If for stock state number and kind of animals. Must limit to one major use.

4. The water heretofore used for Industrial
If for stock state number and kind of animals.

5. The water is to be diverted at the following Point within the NE ¼ NE ¼ , Section 26, T. 13 S., R. 63 E., M.D.B.&M., or at a point from which the NW corner of said Section 26 bears S. 87° 52' 54 " W., a distance of 5084.64 feet.

Describe as being within a 40-acre subdivision of public survey and by course and distance to a section corner. If on unsurveyed land, it should be stated.

6. The existing point of diversion is located within SW ¼ NW ¼ , Sec. 13, T. 11 S., R. 63 E., M.D.B.&M., or at a point from which the SW corner of said Section 13 bears S. 08° 37' 22" W., 3493 feet.
If point of diversion is not changed, do not answer.

7. Proposed place of use Clark Co. Nevada as described in NRS 243.035 - 243.040
Describe by legal subdivisions. If for irrigation state number of acres to be irrigated.

210-LL

77297

8. Existing place of use See attached "Place of Use" for Permit 49978

Describe by legal subdivisions. If permit is for irrigation, state number of acres irrigated. If changing place of use and/or manner of use of irrigation permit, describe acreage to be removed from irrigation.

9. Proposed use will be from 1/1 (Month and Day) to 12/31 (Month and Day) of each year.

10. Existing use permitted from 1/1 (Month and Day) to 12/31 (Month and Day) of each year.

11. Description of proposed works. (Under the provision of NRS 535.010 you may be required to submit plans and specifications of your diversion or storage works.) 628' depth – well currently installed [well log no. 22861]; Pumps, motor and pipelines
State manner in which water is to be diverted, i.e. diversion structure, ditches, pipes and flumes or drilled well, pump and motor, etc.

12. Estimated cost of works $5,000,000.00

13. Estimated time required to construct works 2 YEARS
If well completed, describe well.

14. Estimated time required to complete the application of water to beneficial use 10 YEARS

15. Provide a detailed description of the proposed project and its water usage (use attachments if necessary): (Failure to provide a detailed description may cause a delay in processing) Water will be diverted by a turbine pump, motor & pipeline. Water will be metered and delivered to the headwaters of the Muddy River at Warm Springs or delivered directly to Lake Mead. Water delivered to Lake Mead will be re-diverted at an existing pumping plant at Saddle Island or alternative plant on Lake Mead.

16. Miscellaneous Remarks: Existing POU and POD map filed under Permit 49978. It is the intent of the applicant to use this water from either of two points of diversions with a combined duty. An application to appropriate water [diversion rate only] will be submitted along with this change application.

(702) 862-3708
Phone No.

By: Kay Brothers
Print or type name clearly

Kay Brothers
Signature, applicant or agent

kay.brothers@snwa.com
E-mail

SNWA – Deputy General Manager
Company Name

1001 S. Valley Blvd.
Street and No., or P.O. Box No.

Las Vegas, Nevada 89153
City, State, Zip Code

2008 AUG 13 PM 2:53
STATE ENGINEER'S OFFICE

APPLICATION MUST BE SIGNED BY THE APPLICANT OR AGENT

$150 FILING FEE AND SUPPORTING MAP MUST ACCOMPANY APPLICATION

PLACE OF USE

All of Sections 1, 2, 3, 4, 5, 9, 10, 11, 12, 13, 14, 15, 16, 21, 22, 23 and 24; the E 1/2 and the E 1/2 of the W 1/2 of Section 8; the E 1/2 of Sections 17 and 20; and the N 1/2 of Sections 25 and 26, in Township 13 South, Range 63 East, M.D.M., Clark County, Nevada.

All of Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 20, 21, 22, 23, 25, 26, 27, 28, 29, 32, 33, 34, 35, and 36; the W 1/2 of Sections 13 and 24; the E 1/2 of Sections 18, 19, 30, and 31; and the W 1/2 of the W 1/2 of Section 12, in Township 12 South, Range 63 East, M.D.M., Lincoln County, Nevada.

All of Sections 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34 and 35, in Township 11 South, Range 63 East, M.D.M., Lincoln County, Nevada.

All of Sections 18 and 19; the N 1/2 of Section 30; the W 1/2 and the W 1/2 of the SE 1/4 of Section 7; and the W 1/2 of Section 6, in the unsurveyed Township 13 South, Range 64 East, M.D.M., Clark County, Nevada.

The W 1/2 of the SW 1/4 of Section 31, in the unsurveyed Township 12 South, Range 64 East, M.D.M., Lincoln County, Nevada.

2000 AUG 13 PM 2:53
STATE ENGINEER'S OFFICE

Permit No. 77298

THE STATE OF NEVADA

PERMIT TO CHANGE POINT OF DIVERSION, MANNER OF USE AND PLACE OF USE OF THE PUBLIC WATERS OF THE STATE OF NEVADA HERETOFORE APPROPRIATED

Name of applicant:	**SOUTHERN NEVADA WATER AUTHORITY**
Source:	**UNDERGROUND**
Basin:	**COYOTE SPRING VALLEY**
Manner of Use:	**MUNICIPAL**
Period of Use:	**January 1st to December 31st**
Priority Date:	**07/15/1986**

****

APPROVAL OF STATE ENGINEER

This is to certify that I have examined the foregoing application, and do hereby grant the same, subject to the following limitations and conditions:

This permit to change the point of diversion, place and manner of use of the waters of an underground source as heretofore granted under Permit 49979 is issued subject to the terms and conditions imposed in said Permit 49979 and with the understanding that no other rights on the source will be affected by the change proposed herein. The well shall be equipped with a 2-inch opening and a totalizing meter must be installed and maintained in the discharge pipeline near the point of diversion and accurate measurements must be kept of water placed to beneficial use. The totalizing meter must be installed before any use of the water begins or before the proof of completion of work is filed. If the well is flowing, a valve must be installed and maintained to prevent waste. This source is located within an area designated by the State Engineer pursuant to NRS 534.030. The State retains the right to regulate the use of the water herein granted at any and all times.

Monthly records shall be kept of the amount of water pumped from this well and the records submitted to the State Engineer on a quarterly basis within 15 days after the end of each calendar quarter.

This permit does not extend the permittee the right of ingress and egress on public, private or corporate lands.

The total combined duty of water under Permits 77291 though 77306 shall not exceed 9000 acre-feet annually.

The issuance of this permit does not waive the requirements that the permit holder obtain other permits from State, Federal and local agencies.

This permit must comply with the monitoring requirements of Order 1169.

(Continued on Page 2)

The point of diversion and place of use are as described on the submitted application to support this permit.

The amount of water to be appropriated shall be limited to the amount which can be applied to beneficial use, **and not to exceed 2.0 cubic feet per second or 1447.93 acre-feet annually.**

Work must be prosecuted with reasonable diligence and proof of completion of work shall be filed on or before:	**December 19, 2010**
Water must be placed to beneficial use and proof of the application of water to beneficial use shall be filed on or before:	**December 19, 2018**
Map in support of proof of beneficial use shall be filed on or before:	**N/A**

IN TESTIMONY WHEREOF, I, TRACY TAYLOR, P.E.,

State Engineer of Nevada, have hereunto set my hand and the seal of my office, this 19th day of **December**, A.D. **2008**

P.E.

For State Engineer

Completion of work filed _____

Proof of beneficial use filed _____

Cultural map filed _____

Certificate No. _____ Issued _____

llb

Serial No. 77298

APPLICATION FOR PERMISSION TO CHANGE POINT OF DIVERSION, MANNER OF USE AND PLACE OF USE OF THE PUBLIC WATERS OF THE STATE OF NEVADA HERETOFORE APPROPRIATED

THIS SPACE FOR OFFICE USE ONLY

Date of filing in State Engineer's Office AUG 1 3 2008

Returned to applicant for correction _____

Corrected application filed _____ Map filed AUG 1 3 2008 under 77292

The applicant Southern Nevada Water Authority

1001 S. Valley View Blvd (Street and No. Or P.O. Box No) of Las Vegas (City or Town) Nevada 89153 (State and Zip Code)

hereby makes application for permission to change the

☒ Point of diversion ☒ Place of use ☒ Manner of use ☐ Of a portion

of water heretofore appropriated under Permit 49979
Identify existing right by Permit, Certificate, Proof or Claim Nos. If Decreed, give title of Decree identify right in Decree.

1. The source of water is Underground
   Name of stream, lake, underground, spring or other sources.
2. The amount of water to be changed 2.0 c.f.s [1447.93 AFA]
   Second feet, acre-feet. One second foot equals 448.83 gallons per minute.
3. The water to be used for Municipal
   Irrigation, power, mining, commercial, etc. If for stock state number and kind of animals. Must limit to one major use.
4. The water heretofore used for Industrial
   If for stock state number and kind of animals.
5. The water is to be diverted at the following Point within the NE ¼ NE ¼, Section 26, T. 13 S., R. 63 E., M.D.B.&M., or at a point from which the NW corner of said Section 26 bears S. 87° 52' 54 " W., a distance of 5084.64 feet.

   Describe as being within a 40-acre subdivision of public survey and by course and distance to a section corner. If on snsurveyed land, it should be stated.
6. The existing point of diversion is located within SE ¼ SE ¼, Sec. 28, T. 11 S., R. 63 E., M.D.B.&M., or at a point from which the SW corner of said Section 28 bears S. 88° 03' 13" W., 5053.64 feet.
   If point of diversion is not changed, do not answer.
7. Proposed place of use Clark Co. Nevada as described in NRS 243.035 - 243.040
   Describe by legal subdivisions. If for irrigation state number of acres to be irrigated.

210-CL

77298

8. Existing place of use See attached "Place of Use" for Permit 49979

Describe by legal subdivisions. If permit is for irrigation, state number of acres irrigated. If changing place of use and/or manner of use of irrigation permit, describe acreage to be removed from irrigation.

9. Proposed use will be from 1/1 (Month and Day) to 12/31 (Month and Day) of each year.

10. Existing use permitted from 1/1 (Month and Day) to 12/31 (Month and Day) of each year.

11. Description of proposed works. (Under the provision of NRS 535.010 you may be required to submit plans and specifications of your diversion or storage works.) 628' depth – well currently installed [well log no. 22861]; Pumps, motor and pipelines
State manner in which water is to be diverted, i.e. diversion structure, ditches, pipes and flumes or drilled well, pump and motor, etc.

12. Estimated cost of works $5,000,000.00

13. Estimated time required to construct works 2 YEARS
If well completed, describe well.

14. Estimated time required to complete the application of water to beneficial use 10 YEARS

15. Provide a detailed description of the proposed project and its water usage (use attachments if necessary): (Failure to provide a detailed description may cause a delay in processing) Water will be diverted by a turbine pump, motor & pipeline. Water will be metered and delivered to the headwaters of the Muddy River at Warm Springs or delivered directly to Lake Mead. Water delivered to Lake Mead will be re-diverted at an existing pumping plant at Saddle Island or alternative plant on Lake Mead.

16. Miscellaneous Remarks: Existing POU and POD map filed under Permit 49979. It is the intent of the applicant to use this water from either of two points of diversions with a combined duty. An application to appropriate water [diversion rate only] will be submitted along with this change application.

(702) 862-3708
Phone No.

By: Kay Brothers
Print or type name clearly

Kay Brothers
Signature, applicant or agent

kay.brothers@snwa.com
E-mail

SNWA – Deputy General Manager
Company Name

1001 S. Valley Blvd.
Street and No., or P.O. Box No.

Las Vegas, Nevada 89153
City, State, Zip Code

2008 AUG 13 PM 2:53
STATE ENGINEER'S OFFICE

APPLICATION MUST BE SIGNED BY THE APPLICANT OR AGENT

$150 FILING FEE AND SUPPORTING MAP MUST ACCOMPANY APPLICATION

~~49979~~

77298

PLACE OF USE

All of Sections 1, 2, 3, 4, 5, 9, 10, 11, 12, 13, 14, 15, 16, 21, 22, 23 and 24; the E 1/2 and the E 1/2 of the W 1/2 of Section 8; the E 1/2 of Sections 17 and 20; and the N 1/2 of Sections 25 and 26, in Township 13 South, Range 63 East, M.D.M., Clark County, Nevada.

All of Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 20, 21, 22, 23, 25, 26, 27, 28, 29, 32, 33, 34, 35, and 36; the W 1/2 of Sections 13 and 24; the E 1/2 of Sections 18, 19, 30, and 31; and the W 1/2 of the W 1/2 of Section 12, in Township 12 South, Range 63 East, M.D.M., Lincoln County, Nevada.

All of Sections 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34 and 35, in Township 11 South, Range 63 East, M.D.M., Lincoln County, Nevada.

All of Sections 18 and 19; the N 1/2 of Section 30; the W 1/2 and the W 1/2 of the SE 1/4 of Section 7; and the W 1/2 of Section 6, in the unsurveyed Township 13 South, Range 64 East, M.D.M., Clark County, Nevada.

The W 1/2 of the SW 1/4 of Section 31, in the unsurveyed Township 12 South, Range 64 East, M.D.M., Lincoln County, Nevada.

2008 AUG 13 PM 2:53
STATE ENGINEER'S OFFICE

Permit No. 77299

THE STATE OF NEVADA

PERMIT TO CHANGE POINT OF DIVERSION, MANNER OF USE AND PLACE OF USE OF THE PUBLIC WATERS OF THE STATE OF NEVADA HERETOFORE APPROPRIATED

Name of applicant:	**SOUTHERN NEVADA WATER AUTHORITY**
Source:	**UNDERGROUND**
Basin:	**COYOTE SPRING VALLEY**
Manner of Use:	**MUNICIPAL**
Period of Use:	**January 1st to December 31st**
Priority Date:	**07/15/1986**

****

APPROVAL OF STATE ENGINEER

This is to certify that I have examined the foregoing application, and do hereby grant the same, subject to the following limitations and conditions:

This permit to change the point of diversion, place and manner of use of the waters of an underground source as heretofore granted under Permit 49980 is issued subject to the terms and conditions imposed in said Permit 49980 and with the understanding that no other rights on the source will be affected by the change proposed herein. The well shall be equipped with a 2-inch opening and a totalizing meter must be installed and maintained in the discharge pipeline near the point of diversion and accurate measurements must be kept of water placed to beneficial use. The totalizing meter must be installed before any use of the water begins or before the proof of completion of work is filed. If the well is flowing, a valve must be installed and maintained to prevent waste. This source is located within an area designated by the State Engineer pursuant to NRS 534.030. The State retains the right to regulate the use of the water herein granted at any and all times.

Monthly records shall be kept of the amount of water pumped from this well and the records submitted to the State Engineer on a quarterly basis within 15 days after the end of each calendar quarter.

This permit does not extend the permittee the right of ingress and egress on public, private or corporate lands.

The total combined duty of water under Permits 77291 though 77306 shall not exceed 9000 acre-feet annually.

The issuance of this permit does not waive the requirements that the permit holder obtain other permits from State, Federal and local agencies.

This permit must comply with the monitoring requirements of Order 1169.

(Continued on Page 2)

The point of diversion and place of use are as described on the submitted application to support this permit.

The amount of water to be appropriated shall be limited to the amount which can be applied to beneficial use, **and not to exceed 2.0 cubic feet per second or 1447.93 acre-feet annually.**

Work must be prosecuted with reasonable diligence and proof of completion of work shall be filed on or before: **December 19, 2010**

Water must be placed to beneficial use and proof of the application of water to beneficial use shall be filed on or before: **December 19, 2018**

Map in support of proof of beneficial use shall be filed on or before: **N/A**

IN TESTIMONY WHEREOF, I, TRACY TAYLOR, P.E.,

State Engineer of Nevada, have hereunto set my hand and the seal of my office, this 19th day of **December**, A.D. **2008**

P.E.

For State Engineer

Completion of work filed _____

Proof of beneficial use filed _____

Cultural map filed _____

Certificate No. _____ Issued _____

llb

Serial No 77299

APPLICATION FOR PERMISSION TO CHANGE POINT OF DIVERSION, MANNER OF USE AND PLACE OF USE OF THE PUBLIC WATERS OF THE STATE OF NEVADA HERETOFORE APPROPRIATED

THIS SPACE FOR OFFICE USE ONLY

Date of filing in State Engineer's Office AUG 1 3 2008

Returned to applicant for correction _____

Corrected application filed _____ Map filed AUG 1 3 2008 under 77292

The applicant Southern Nevada Water Authority

1001 S. Valley View Blvd (Street and No. Or P.O. Box No) of Las Vegas (City or Town) Nevada 89153 (State and Zip Code)

hereby makes application for permission to change the

☒ Point of diversion ☒ Place of use ☒ Manner of use ☐ Of a portion

of water heretofore appropriated under Permit 49980
Identify existing right by Permit, Certificate, Proof or Claim Nos. If Decreed, give title of Decree identify right in Decree.

1. The source of water is Underground
Name of stream, lake, underground, spring or other sources.

2. The amount of water to be changed 2.0 c.f.s [1447.93 AFA]
Second feet, acre-feet. One second foot equals 448.83 gallons per minute.

3. The water to be used for Municipal
Irrigation, power, mining, commercial, etc. If for stock state number and kind of animals. Must limit to one major use.

4. The water heretofore used for Industrial
If for stock state number and kind of animals.

5. The water is to be diverted at the following Point within the NE ¼ NE ¼ , Section 26, T. 13 S., R. 63 E., M.D.B.&M., or at a point from which the NW corner of said Section 26 bears S. 87° 52' 54 " W., a distance of 5084.64 feet.

Describe as being within a 40-acre subdivision of public survey and by course and distance to a section corner. If on unsurveyed land, it should be stated.

6. The existing point of diversion is located within NE ¼ NE ¼ , Sec. 3, T. 12 S., R. 63 E., M.D.B.&M., or at a point from which the NE corner of said Section 3 bears N. 45° 00' 00" E., 300 feet.
If point of diversion is not changed, do not answer.

7. Proposed place of use Clark Co. Nevada as described in NRS 243.035 - 243.040
Describe by legal subdivisions. If for irrigation state number of acres to be irrigated.

210-CL

77299

8. Existing place of use See attached "Place of Use" for Permit 49980

Describe by legal subdivisions. If permit is for irrigation, state number of acres irrigated. If changing place of use and/or manner of use of irrigation permit, describe acreage to be removed from irrigation.

9. Proposed use will be from 1/1 (Month and Day) to 12/31 (Month and Day) of each year.

10. Existing use permitted from 1/1 (Month and Day) to 12/31 (Month and Day) of each year.

11. Description of proposed works. (Under the provision of NRS 535.010 you may be required to submit plans and specifications of your diversion or storage works.) 628' depth – well currently installed [well log no. 22861]; Pumps, motor and pipelines
State manner in which water is to be diverted, i.e. diversion structure, ditches, pipes and flumes or drilled well, pump and motor, etc.

12. Estimated cost of works $5,000,000.00

13. Estimated time required to construct works 2 YEARS
If well completed, describe well.

14. Estimated time required to complete the application of water to beneficial use 10 YEARS

15. Provide a detailed description of the proposed project and its water usage (use attachments if necessary): (Failure to provide a detailed description may cause a delay in processing) Water will be diverted by a turbine pump, motor & pipeline. Water will be metered and delivered to the headwaters of the Muddy River at Warm Springs or delivered directly to Lake Mead. Water delivered to Lake Mead will be re-diverted at an existing pumping plant at Saddle Island or alternative plant on Lake Mead.

16. Miscellaneous Remarks: Existing POU and POD map filed under Permit 49980. It is the intent of the applicant to use this water from either of two points of diversions with a combined duty. An application to appropriate water [diversion rate only] will be submitted along with this change application.

(702) 862-3708
Phone No.

By: Kay Brothers
Print or type name clearly

Kay Brothers
Signature, applicant or agent

kay.brothers@snwa.com
E-mail

SNWA – Deputy General Manager
Company Name

1001 S. Valley Blvd.
Street and No., or P.O. Box No.

Las Vegas, Nevada 89153
City, State, Zip Code

APPLICATION MUST BE SIGNED
BY THE APPLICANT OR AGENT

2008 AUG 13 PM 2:53

$150 FILING FEE AND SUPPORTING MAP MUST ACCOMPANY APPLICATION

49980

77299

PLACE OF USE

All of Sections 1, 2, 3, 4, 5, 9, 10, 11, 12, 13, 14, 15, 16, 21, 22, 23 and 24; the E 1/2 and the E 1/2 of the W 1/2 of Section 8; the E 1/2 of Sections 17 and 20; and the N 1/2 of Sections 25 and 26, in Township 13 South, Range 63 East, M.D.M., Clark County, Nevada.

All of Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 20, 21, 22, 23, 25, 26, 27, 28, 29, 32, 33, 34, 35, and 36; the W 1/2 of Sections 13 and 24; the E 1/2 of Sections 18, 19, 30, and 31; and the W 1/2 of the W 1/2 of Section 12, in Township 12 South, Range 63 East, M.D.M., Lincoln County, Nevada.

All of Sections 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34 and 35, in Township 11 South, Range 63 East, M.D.M., Lincoln County, Nevada.

All of Sections 18 and 19; the N 1/2 of Section 30; the W 1/2 and the W 1/2 of the SE 1/4 of Section 7; and the W 1/2 of Section 6, in the unsurveyed Township 13 South, Range 64 East, M.D.M., Clark County, Nevada.

The W 1/2 of the SW 1/4 of Section 31, in the unsurveyed Township 12 South, Range 64 East, M.D.M., Lincoln County, Nevada.

RECEIVED
2008 AUG 13 PM 2:53
STATE ENGINEER'S OFFICE

Permit No. 77300

THE STATE OF NEVADA

PERMIT TO CHANGE POINT OF DIVERSION, MANNER OF USE AND PLACE OF USE OF THE PUBLIC WATERS OF THE STATE OF NEVADA HERETOFORE APPROPRIATED

Name of applicant:	**SOUTHERN NEVADA WATER AUTHORITY**
Source:	**UNDERGROUND**
Basin:	**COYOTE SPRING VALLEY**
Manner of Use:	**MUNICIPAL**
Period of Use:	**January 1st to December 31st**
Priority Date:	**07/15/1986**

****

APPROVAL OF STATE ENGINEER

This is to certify that I have examined the foregoing application, and do hereby grant the same, subject to the following limitations and conditions:

This permit to change the point of diversion, place and manner of use of the waters of an underground source as heretofore granted under Permit 49981 is issued subject to the terms and conditions imposed in said Permit 49981 and with the understanding that no other rights on the source will be affected by the change proposed herein. The well shall be equipped with a 2-inch opening and a totalizing meter must be installed and maintained in the discharge pipeline near the point of diversion and accurate measurements must be kept of water placed to beneficial use. The totalizing meter must be installed before any use of the water begins or before the proof of completion of work is filed. If the well is flowing, a valve must be installed and maintained to prevent waste. This source is located within an area designated by the State Engineer pursuant to NRS 534.030. The State retains the right to regulate the use of the water herein granted at any and all times.

Monthly records shall be kept of the amount of water pumped from this well and the records submitted to the State Engineer on a quarterly basis within 15 days after the end of each calendar quarter.

This permit does not extend the permittee the right of ingress and egress on public, private or corporate lands.

The total combined duty of water under Permits 77291 though 77306 shall not exceed 9000 acre-feet annually.

The issuance of this permit does not waive the requirements that the permit holder obtain other permits from State, Federal and local agencies.

This permit must comply with the monitoring requirements of Order 1169.

(Continued on Page 2)

The point of diversion and place of use are as described on the submitted application to support this permit.

The amount of water to be appropriated shall be limited to the amount which can be applied to beneficial use, **and not to exceed 2.0 cubic feet per second or 1447.93 acre-feet annually.**

Work must be prosecuted with reasonable diligence and proof of completion of work shall be filed on or before:	**December 19, 2010**
Water must be placed to beneficial use and proof of the application of water to beneficial use shall be filed on or before:	**December 19, 2018**
Map in support of proof of beneficial use shall be filed on or before:	**N/A**

IN TESTIMONY WHEREOF, I, TRACY TAYLOR, P.E.,

State Engineer of Nevada, have hereunto set my hand and the seal of my office, this 19th day of **December,** A.D. **2008**

P.E.

For State Engineer

Completion of work filed _____

Proof of beneficial use filed _____

Cultural map filed _____

Certificate No. _____ Issued _____

llb

Serial No 77300

APPLICATION FOR PERMISSION TO CHANGE POINT OF DIVERSION, MANNER OF USE AND PLACE OF USE OF THE PUBLIC WATERS OF THE STATE OF NEVADA HERETOFORE APPROPRIATED

THIS SPACE FOR OFFICE USE ONLY

Date of filing in State Engineer's Office AUG 1 3 2008

Returned to applicant for correction _____

Corrected application filed _____ Map filed AUG 1 3 2008 under 77292

The applicant Southern Nevada Water Authority

1001 S. Valley View Blvd (Street and No. Or P.O. Box No) of Las Vegas (City or Town) Nevada 89153 (State and Zip Code)

hereby makes application for permission to change the

☒ Point of diversion ☒ Place of use ☒ Manner of use ☐ Of a portion

of water heretofore appropriated under Permit 49981
Identify existing right by Permit, Certificate, Proof or Claim Nos. If Decreed, give title of Decree identify right in Decree.

1. The source of water is Underground
   Name of stream, lake, underground, spring or other sources.
2. The amount of water to be changed 2.0 c.f.s [1447.93 AFA]
   Second feet, acre-feet. One second foot equals 448.83 gallons per minute.
3. The water to be used for Municipal
   Irrigation, power, mining, commercial, etc. If for stock state number and kind of animals. Must limit to one major use.
4. The water heretofore used for Industrial
   If for stock state number and kind of animals.
5. The water is to be diverted at the following Point within the NE ¼ NE ¼ , Section 26, T. 13 S., R. 63 E., M.D.B.&M., or at a point from which the NW corner of said Section 26 bears S. 87° 52' 54 " W., a distance of 5084.64 feet.

   Describe as being within a 40-acre subdivision of public survey and by course and distance to a section corner. If on unsurveyed land, it should be stated.
6. The existing point of diversion is located within SE ¼ NE ¼ , Sec. 10, T. 12 S., R. 63 E., M.D.B.&M., or at a point from which the NW corner of said Section 10 bears N. 63° 45' 52" W., 5125 feet.
   If point of diversion is not changed, do not answer.
7. Proposed place of use Clark Co. Nevada as described in NRS 243.035 - 243.040
   Describe by legal subdivisions. If for irrigation state number of acres to be irrigated.

210-cl

77300

8. Existing place of use See attached "Place of Use" for Permit 49981

Describe by legal subdivisions. If permit is for irrigation, state number of acres irrigated. If changing place of use and/or manner of use of irrigation permit, describe acreage to be removed from irrigation.

9. Proposed use will be from 1/1 (Month and Day) to 12/31 (Month and Day) of each year.

10. Existing use permitted from 1/1 (Month and Day) to 12/31 (Month and Day) of each year.

11. Description of proposed works. (Under the provision of NRS 535.010 you may be required to submit plans and specifications of your diversion or storage works.) 628' depth – well currently installed [well log no. 22861]; Pumps, motor and pipelines
State manner in which water is to be diverted, i.e. diversion structure, ditches, pipes and flumes or drilled well, pump and motor, etc.

12. Estimated cost of works $5,000,000.00

13. Estimated time required to construct works 2 YEARS
If well completed, describe well.

14. Estimated time required to complete the application of water to beneficial use 10 YEARS

15. Provide a detailed description of the proposed project and its water usage (use attachments if necessary): (Failure to provide a detailed description may cause a delay in processing) Water will be diverted by a turbine pump, motor & pipeline. Water will be metered and delivered to the headwaters of the Muddy River at Warm Springs or delivered directly to Lake Mead. Water delivered to Lake Mead will be re-diverted at an existing pumping plant at Saddle Island or alternative plant on Lake Mead.

16. Miscellaneous Remarks: Existing POU and POD map filed under Permit 49981. It is the intent of the applicant to use this water from either of two points of diversions with a combined duty. An application to appropriate water [diversion rate only] will be submitted along with this change application.

(702) 862-3708
Phone No.

kay.brothers@snwa.com
E-mail

By: Kay Brothers
Print or type name clearly

Kay Brothers
Signature, applicant or agent

SNWA – Deputy General Manager
Company Name

1001 S. Valley Blvd.
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Las Vegas, Nevada 89153
City, State, Zip Code

2008 AUG 13 PM 2:53
STATE ENGINEER'S OFFICE

APPLICATION MUST BE SIGNED BY THE APPLICANT OR AGENT

$150 FILING FEE AND SUPPORTING MAP MUST ACCOMPANY APPLICATION

~~49981~~

77300

PLACE OF USE

All of Sections 1, 2, 3, 4, 5, 9, 10, 11, 12, 13, 14, 15, 16, 21, 22, 23 and 24; the E 1/2 and the E 1/2 of the W 1/2 of Section 8; the E 1/2 of Sections 17 and 20; and the N 1/2 of Sections 25 and 26, in Township 13 South, Range 63 East, M.D.M., Clark County, Nevada.

All of Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 20, 21, 22, 23, 25, 26, 27, 28, 29, 32, 33, 34, 35, and 36; the W 1/2 of Sections 13 and 24; the E 1/2 of Sections 18, 19, 30, and 31; and the W 1/2 of the W 1/2 of Section 12, in Township 12 South, Range 63 East, M.D.M., Lincoln County, Nevada.

All of Sections 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34 and 35, in Township 11 South, Range 63 East, M.D.M., Lincoln County, Nevada.

All of Sections 18 and 19; the N 1/2 of Section 30; the W 1/2 and the W 1/2 of the SE 1/4 of Section 7; and the W 1/2 of Section 6, in the unsurveyed Township 13 South, Range 64 East, M.D.M., Clark County, Nevada.

The W 1/2 of the SW 1/4 of Section 31, in the unsurveyed Township 12 South, Range 64 East, M.D.M., Lincoln County, Nevada.

2008 AUG 13 PM 2:53
STATE ENGINEER'S OFFICE

THE STATE OF NEVADA

PERMIT TO CHANGE POINT OF DIVERSION, MANNER OF USE AND PLACE OF USE OF THE PUBLIC WATERS OF THE STATE OF NEVADA HERETOFORE APPROPRIATED

Name of applicant:	**SOUTHERN NEVADA WATER AUTHORITY**
Source:	**UNDERGROUND**
Basin:	**COYOTE SPRING VALLEY**
Manner of Use:	**MUNICIPAL**
Period of Use:	**January 1st to December 31st**
Priority Date:	**07/15/1986**

****

APPROVAL OF STATE ENGINEER

This is to certify that I have examined the foregoing application, and do hereby grant the same, subject to the following limitations and conditions:

This permit to change the point of diversion, place and manner of use of the waters of an underground source as heretofore granted under Permit 49982 is issued subject to the terms and conditions imposed in said Permit 49982 and with the understanding that no other rights on the source will be affected by the change proposed herein. The well shall be equipped with a 2-inch opening and a totalizing meter must be installed and maintained in the discharge pipeline near the point of diversion and accurate measurements must be kept of water placed to beneficial use. The totalizing meter must be installed before any use of the water begins or before the proof of completion of work is filed. If the well is flowing, a valve must be installed and maintained to prevent waste. This source is located within an area designated by the State Engineer pursuant to NRS 534.030. The State retains the right to regulate the use of the water herein granted at any and all times.

Monthly records shall be kept of the amount of water pumped from this well and the records submitted to the State Engineer on a quarterly basis within 15 days after the end of each calendar quarter.

This permit does not extend the permittee the right of ingress and egress on public, private or corporate lands.

The total combined duty of water under Permits 77291 though 77306 shall not exceed 9000 acre-feet annually.

The issuance of this permit does not waive the requirements that the permit holder obtain other permits from State, Federal and local agencies.

This permit must comply with the monitoring requirements of Order 1169.

(Continued on Page 2)

The point of diversion and place of use are as described on the submitted application to support this permit.

The amount of water to be appropriated shall be limited to the amount which can be applied to beneficial use, **and not to exceed 2.0 cubic feet per second or 1447.93 acre-feet annually.**

Work must be prosecuted with reasonable diligence and proof of completion of work shall be filed on or before: **December 19, 2010**

Water must be placed to beneficial use and proof of the application of water to beneficial use shall be filed on or before: **December 19, 2018**

Map in support of proof of beneficial use shall be filed on or before: **N/A**

IN TESTIMONY WHEREOF, I, TRACY TAYLOR, P.E.,

State Engineer of Nevada, have hereunto set my hand and the seal of my office, this 19th day of **December**, A.D. **2008**

P.E.

For State Engineer

Completion of work filed _____

Proof of beneficial use filed _____

Cultural map filed _____

Certificate No. _____ Issued _____

llb

Serial No 77301

APPLICATION FOR PERMISSION TO CHANGE POINT OF DIVERSION, MANNER OF USE AND PLACE OF USE OF THE PUBLIC WATERS OF THE STATE OF NEVADA HERETOFORE APPROPRIATED

THIS SPACE FOR OFFICE USE ONLY

Date of filing in State Engineer's Office AUG 1 3 2008

Returned to applicant for correction _____

Corrected application filed _____ Map filed AUG 1 3 2008 under 77292

The applicant Southern Nevada Water Authority

1001 S. Valley View Blvd (Street and No. Or P.O. Box No) of Las Vegas (City or Town) Nevada 89153 (State and Zip Code)

hereby makes application for permission to change the

☒ Point of diversion ☒ Place of use ☒ Manner of use ☐ Of a portion

of water heretofore appropriated under Permit 49982
Identify existing right by Permit, Certificate, Proof or Claim Nos. If Decreed, give title of Decree identify right in Decree.

1. The source of water is Underground
   Name of stream, lake, underground, spring or other sources.
2. The amount of water to be changed 2.0 c.f.s [1447.93 AFA]
   Second feet, acre-feet. One second foot equals 448.83 gallons per minute.
3. The water to be used for Municipal
   Irrigation, power, mining, commercial, etc. If for stock state number and kind of animals. Must limit to one major use.
4. The water heretofore used for Industrial
   If for stock state number and kind of animals.
5. The water is to be diverted at the following Point within the NE ¼ NE ¼ , Section 26, T. 13 S., R. 63 E., M.D.B.&M., or at a point from which the NW corner of said Section 26 bears S. 87° 52' 54 " W., a distance of 5084.64 feet.

   Describe as being within a 40-acre subdivision of public survey and by course and distance to a section corner. If on snsurveyed land, it should be stated.
6. The existing point of diversion is located within NW ¼ SE ¼ , Sec. 29, T. 12 S., R. 63 E., M.D.B.&M., or at a point from which the NW corner of said Section 29 bears N. 52° 00' 13" W., 4601.82 feet.
   If point of diversion is not changed, do not answer.
7. Proposed place of use Clark Co. Nevada as described in NRS 243.035 - 243.040
   Describe by legal subdivisions. If for irrigation state number of acres to be irrigated.

210-LL

77301

8. Existing place of use See attached "Place of Use" for Permit 49982

Describe by legal subdivisions. If permit is for irrigation, state number of acres irrigated. If changing place of use and/or manner of use of irrigation permit, describe acreage to be removed from irrigation.

9. Proposed use will be from 1/1 (Month and Day) to 12/31 (Month and Day) of each year.

10. Existing use permitted from 1/1 (Month and Day) to 12/31 (Month and Day) of each year.

11. Description of proposed works. (Under the provision of NRS 535.010 you may be required to submit plans and specifications of your diversion or storage works.) 628' depth – well currently installed [well log no. 22861]; Pumps, motor and pipelines
State manner in which water is to be diverted, i.e. diversion structure, ditches, pipes and flumes or drilled well, pump and motor, etc.

12. Estimated cost of works $5,000,000.00

13. Estimated time required to construct works 2 YEARS
If well completed, describe well.

14. Estimated time required to complete the application of water to beneficial use 10 YEARS

15. Provide a detailed description of the proposed project and its water usage (use attachments if necessary): (Failure to provide a detailed description may cause a delay in processing) Water will be diverted by a turbine pump, motor & pipeline. Water will be metered and delivered to the headwaters of the Muddy River at Warm Springs or delivered directly to Lake Mead. Water delivered to Lake Mead will be re-diverted at an existing pumping plant at Saddle Island or alternative plant on Lake Mead.

16. Miscellaneous Remarks: Existing POU and POD map filed under Permit 49982. It is the intent of the applicant to use this water from either of two points of diversions with a combined duty. An application to appropriate water [diversion rate only] will be submitted along with this change application.

(702) 862-3708
Phone No.

By: Kay Brothers
Print or type name clearly

Kay Brothers
Signature, applicant or agent

kay.brothers@snwa.com
E-mail

SNWA – Deputy General Manager
Company Name

1001 S. Valley Blvd.
Street and No., or P.O. Box No.

Las Vegas, Nevada 89153
City, State, Zip Code

2008 AUG 13 PM 2:53

APPLICATION MUST BE SIGNED BY THE APPLICANT OR AGENT

$150 FILING FEE AND SUPPORTING MAP MUST ACCOMPANY APPLICATION

~~49982~~

77301

PLACE OF USE

All of Sections 1, 2, 3, 4, 5, 9, 10, 11, 12, 13, 14, 15, 16, 21, 22, 23 and 24; the E 1/2 and the E 1/2 of the W 1/2 of Section 8; the E 1/2 of Sections 17 and 20; and the N 1/2 of Sections 25 and 26, in Township 13 South, Range 63 East, M.D.M., Clark County, Nevada.

All of Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 20, 21, 22, 23, 25, 26, 27, 28, 29, 32, 33, 34, 35, and 36; the W 1/2 of Sections 13 and 24; the E 1/2 of Sections 18, 19, 30, and 31; and the W 1/2 of the W 1/2 of Section 12, in Township 12 South, Range 63 East, M.D.M., Lincoln County, Nevada.

All of Sections 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34 and 35, in Township 11 South, Range 63 East, M.D.M., Lincoln County, Nevada.

All of Sections 18 and 19; the N 1/2 of Section 30; the W 1/2 and the W 1/2 of the SE 1/4 of Section 7; and the W 1/2 of Section 6, in the unsurveyed Township 13 South, Range 64 East, M.D.M., Clark County, Nevada.

The W 1/2 of the SW 1/4 of Section 31, in the unsurveyed Township 12 South, Range 64 East, M.D.M., Lincoln County, Nevada.

2008 AUG 13 PM 2:53
STATE ENGINEER'S OFFICE

Permit No. 77302

THE STATE OF NEVADA

PERMIT TO CHANGE POINT OF DIVERSION, MANNER OF USE AND PLACE OF USE OF THE PUBLIC WATERS OF THE STATE OF NEVADA HERETOFORE APPROPRIATED

Name of applicant:	**SOUTHERN NEVADA WATER AUTHORITY**
Source:	**UNDERGROUND**
Basin:	**COYOTE SPRING VALLEY**
Manner of Use:	**MUNICIPAL**
Period of Use:	**January 1st to December 31st**
Priority Date:	**07/15/1986**

****

APPROVAL OF STATE ENGINEER

This is to certify that I have examined the foregoing application, and do hereby grant the same, subject to the following limitations and conditions:

This permit to change the point of diversion, place and manner of use of the waters of an underground source as heretofore granted under Permit 49983 is issued subject to the terms and conditions imposed in said Permit 49983 and with the understanding that no other rights on the source will be affected by the change proposed herein. The well shall be equipped with a 2-inch opening and a totalizing meter must be installed and maintained in the discharge pipeline near the point of diversion and accurate measurements must be kept of water placed to beneficial use. The totalizing meter must be installed before any use of the water begins or before the proof of completion of work is filed. If the well is flowing, a valve must be installed and maintained to prevent waste. This source is located within an area designated by the State Engineer pursuant to NRS 534.030. The State retains the right to regulate the use of the water herein granted at any and all times.

Monthly records shall be kept of the amount of water pumped from this well and the records submitted to the State Engineer on a quarterly basis within 15 days after the end of each calendar quarter.

This permit does not extend the permittee the right of ingress and egress on public, private or corporate lands.

The total combined duty of water under Permits 77291 though 77306 shall not exceed 9000 acre-feet annually.

The issuance of this permit does not waive the requirements that the permit holder obtain other permits from State, Federal and local agencies.

This permit must comply with the monitoring requirements of Order 1169.

(Continued on Page 2)

The point of diversion and place of use are as described on the submitted application to support this permit.

The amount of water to be appropriated shall be limited to the amount which can be applied to beneficial use, **and not to exceed 2.0 cubic feet per second or 1447.93 acre-feet annually.**

Work must be prosecuted with reasonable diligence and proof of completion of work shall be filed on or before:	**December 19, 2010**
Water must be placed to beneficial use and proof of the application of water to beneficial use shall be filed on or before:	**December 19, 2018**
Map in support of proof of beneficial use shall be filed on or before:	**N/A**

IN TESTIMONY WHEREOF, I, TRACY TAYLOR, P.E.,

State Engineer of Nevada, have hereunto set my hand and the seal of my office, this 19th day of **December,** A.D. **2008**

P.E.

for State Engineer

Completion of work filed _____

Proof of beneficial use filed _____

Cultural map filed _____

Certificate No. _____ Issued _____

llb

Serial No 77302

APPLICATION FOR PERMISSION TO CHANGE POINT OF DIVERSION, MANNER OF USE AND PLACE OF USE OF THE PUBLIC WATERS OF THE STATE OF NEVADA HERETOFORE APPROPRIATED

THIS SPACE FOR OFFICE USE ONLY

Date of filing in State Engineer's Office AUG 1 3 2008

Returned to applicant for correction _____

Corrected application filed _____ Map filed AUG 1 3 2008 under 77292

The applicant Southern Nevada Water Authority

1001 S. Valley View Blvd (Street and No. Or P.O. Box No) of Las Vegas (City or Town) Nevada 89153 (State and Zip Code)

hereby makes application for permission to change the

☒ Point of diversion ☒ Place of use ☒ Manner of use ☐ Of a portion

of water heretofore appropriated under Permit 49983
Identify existing right by Permit, Certificate, Proof or Claim Nos. If Decreed, give title of Decree identify right in Decree.

1. The source of water is Underground
Name of stream, lake, underground, spring or other sources.

2. The amount of water to be changed 2.0 c.f.s [1447.93 AFA]
Second feet, acre-feet. One second foot equals 448.83 gallons per minute.

3. The water to be used for Municipal
Irrigation, power, mining, commercial, etc. If for stock state number and kind of animals. Must limit to one major use.

4. The water heretofore used for Industrial
If for stock state number and kind of animals.

5. The water is to be diverted at the following Point within the NE ¼ NE ¼ , Section 26, T. 13 S., R. 63 E., M.D.B.&M., or at a point from which the NW corner of said Section 26 bears S. 87° 52' 54 " W., a distance of 5084.64 feet.

Describe as being within a 40-acre subdivision of public survey and by course and distance to a section corner. If on snsurveyed land, it should be stated.

6. The existing point of diversion is located within NW ¼ NW ¼ , Sec. 3, T. 13 S., R. 63 E., M.D.B.&M., or at a point from which the NW corner of said Section 3 bears N. 45° 00' 00" W., 300 feet.
If point of diversion is not changed, do not answer.

7. Proposed place of use Clark Co. Nevada as described in NRS 243.035 - 243.040
Describe by legal subdivisions. If for irrigation state number of acres to be irrigated.

210 - CL

77302

8. Existing place of use See attached "Place of Use" for Permit 49983

Describe by legal subdivisions. If permit is for irrigation, state number of acres irrigated. If changing place of use and/or manner of use of irrigation permit, describe acreage to be removed from irrigation.

9. Proposed use will be from 1/1 (Month and Day) to 12/31 (Month and Day) of each year.

10. Existing use permitted from 1/1 (Month and Day) to 12/31 (Month and Day) of each year.

11. Description of proposed works. (Under the provision of NRS 535.010 you may be required to submit plans and specifications of your diversion or storage works.) 628' depth – well currently installed [well log no. 22861]; Pumps, motor and pipelines
State manner in which water is to be diverted, i.e. diversion structure, ditches, pipes and flumes or drilled well, pump and motor, etc.

12. Estimated cost of works $5,000,000.00

13. Estimated time required to construct works 2 YEARS
If well completed, describe well.

14. Estimated time required to complete the application of water to beneficial use 10 YEARS

15. Provide a detailed description of the proposed project and its water usage (use attachments if necessary): (Failure to provide a detailed description may cause a delay in processing) Water will be diverted by a turbine pump, motor & pipeline. Water will be metered and delivered to the headwaters of the Muddy River at Warm Springs or delivered directly to Lake Mead. Water delivered to Lake Mead will be re-diverted at an existing pumping plant at Saddle Island or alternative plant on Lake Mead.

16. Miscellaneous Remarks: Existing POU and POD map filed under Permit 49983. It is the intent of the applicant to use this water from either of two points of diversions with a combined duty. An application to appropriate water [diversion rate only] will be submitted along with this change application.

(702) 862-3708
Phone No.

By: Kay Brothers
Print or type name clearly

Kay Brothers
Signature, applicant or agent

kay.brothers@snwa.com
E-mail

SNWA – Deputy General Manager
Company Name

1001 S. Valley Blvd.
Street and No., or P.O. Box No.

Las Vegas, Nevada 89153
City, State, Zip Code

2008 AUG 13 PM 2:53
STATE ENGINEER'S OFFICE

APPLICATION MUST BE SIGNED BY THE APPLICANT OR AGENT

$150 FILING FEE AND SUPPORTING MAP MUST ACCOMPANY APPLICATION

~~49983~~

77302

PLACE OF USE

All of Sections 1, 2, 3, 4, 5, 9, 10, 11, 12, 13, 14, 15, 16, 21, 22, 23 and 24; the E 1/2 and the E 1/2 of the W 1/2 of Section 8; the E 1/2 of Sections 17 and 20; and the N 1/2 of Sections 25 and 26, in Township 13 South, Range 63 East, M.D.M., Clark County, Nevada.

All of Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 20, 21, 22, 23, 25, 26, 27, 28, 29, 32, 33, 34, 35, and 36; the W 1/2 of Sections 13 and 24; the E 1/2 of Sections 18, 19, 30, and 31; and the W 1/2 of the W 1/2 of Section 12, in Township 12 South, Range 63 East, M.D.M., Lincoln County, Nevada.

All of Sections 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34 and 35, in Township 11 South, Range 63 East, M.D.M., Lincoln County, Nevada.

All of Sections 18 and 19; the N 1/2 of Section 30; the W 1/2 and the W 1/2 of the SE 1/4 of Section 7; and the W 1/2 of Section 6, in the unsurveyed Township 13 South, Range 64 East, M.D.M., Clark County, Nevada.

The W 1/2 of the SW 1/4 of Section 31, in the unsurveyed Township 12 South, Range 64 East, M.D.M., Lincoln County, Nevada.

RECEIVED
2008 AUG 13 PM 2:53
STATE ENGINEERS OFFICE

Permit No. 77303

THE STATE OF NEVADA

PERMIT TO CHANGE POINT OF DIVERSION, MANNER OF USE AND PLACE OF USE OF THE PUBLIC WATERS OF THE STATE OF NEVADA HERETOFORE APPROPRIATED

Name of applicant:	**SOUTHERN NEVADA WATER AUTHORITY**
Source:	**UNDERGROUND**
Basin:	**COYOTE SPRING VALLEY**
Manner of Use:	**MUNICIPAL**
Period of Use:	**January 1st to December 31st**
Priority Date:	**07/15/1986**

****

APPROVAL OF STATE ENGINEER

This is to certify that I have examined the foregoing application, and do hereby grant the same, subject to the following limitations and conditions:

This permit to change the point of diversion, place and manner of use of the waters of an underground source as heretofore granted under Permit 49984 is issued subject to the terms and conditions imposed in said Permit 49984 and with the understanding that no other rights on the source will be affected by the change proposed herein. The well shall be equipped with a 2-inch opening and a totalizing meter must be installed and maintained in the discharge pipeline near the point of diversion and accurate measurements must be kept of water placed to beneficial use. The totalizing meter must be installed before any use of the water begins or before the proof of completion of work is filed. If the well is flowing, a valve must be installed and maintained to prevent waste. This source is located within an area designated by the State Engineer pursuant to NRS 534.030. The State retains the right to regulate the use of the water herein granted at any and all times.

Monthly records shall be kept of the amount of water pumped from this well and the records submitted to the State Engineer on a quarterly basis within 15 days after the end of each calendar quarter.

This permit does not extend the permittee the right of ingress and egress on public, private or corporate lands.

The total combined duty of water under Permits 77291 though 77306 shall not exceed 9000 acre-feet annually.

The issuance of this permit does not waive the requirements that the permit holder obtain other permits from State, Federal and local agencies.

This permit must comply with the monitoring requirements of Order 1169.

(Continued on Page 2)

The point of diversion and place of use are as described on the submitted application to support this permit.

The amount of water to be appropriated shall be limited to the amount which can be applied to beneficial use, **and not to exceed 2.0 cubic feet per second or 1447.93 acre-feet annually**.

Work must be prosecuted with reasonable diligence and proof of completion of work shall be filed on or before:	**December 19, 2010**
Water must be placed to beneficial use and proof of the application of water to beneficial use shall be filed on or before:	**December 19, 2018**
Map in support of proof of beneficial use shall be filed on or before:	**N/A**

IN TESTIMONY WHEREOF, I, TRACY TAYLOR, P.E.,

State Engineer of Nevada, have hereunto set my hand and the seal of my office, this 19th day of **December**, A.D. **2008**

P.E.

For State Engineer

Completion of work filed _____

Proof of beneficial use filed _____

Cultural map filed _____

Certificate No. _____ Issued _____

llb

Serial No 77303

APPLICATION FOR PERMISSION TO CHANGE POINT OF DIVERSION, MANNER OF USE AND PLACE OF USE OF THE PUBLIC WATERS OF THE STATE OF NEVADA HERETOFORE APPROPRIATED

THIS SPACE FOR OFFICE USE ONLY

Date of filing in State Engineer's Office AUG 1 3 2008

Returned to applicant for correction _____

Corrected application filed _____ Map filed AUG 1 3 2008 under 77292

The applicant Southern Nevada Water Authority

1001 S. Valley View Blvd (Street and No. Or P.O. Box No) of Las Vegas (City or Town) Nevada 89153 (State and Zip Code)

hereby makes application for permission to change the

☒ Point of diversion ☒ Place of use ☒ Manner of use ☐ Of a portion

of water heretofore appropriated under Permit 49984
Identify existing right by Permit, Certificate, Proof or Claim Nos. If Decreed, give title of Decree identify right in Decree.

1. The source of water is Underground
Name of stream, lake, underground, spring or other sources.

2. The amount of water to be changed 2.0 c.f.s [1447.93 AFA]
Second feet, acre-feet. One second foot equals 448.83 gallons per minute.

3. The water to be used for Municipal
Irrigation, power, mining, commercial, etc. If for stock state number and kind of animals. Must limit to one major use.

4. The water heretofore used for Industrial
If for stock state number and kind of animals.

5. The water is to be diverted at the following Point within the NE ¼ NE ¼ , Section 26, T. 13 S., R. 63 E., M.D.B.&M., or at a point from which the NW corner of said Section 26 bears S. 87° 52' 54 " W., a distance of 5084.64 feet.

Describe as being within a 40-acre subdivision of public survey and by course and distance to a section corner. If on snsurveyed land, it should be stated.

6. The existing point of diversion is located within SE ¼ NE ¼ , Sec. 10, T. 13 S., R. 63 E., M.D.B.&M., or at a point from which the NE corner of said Section 10 bears N. 37° 00' 00" E., 2150 feet.
If point of diversion is not changed, do not answer.

7. Proposed place of use Clark Co. Nevada as described in NRS 243.035 - 243.040
Describe by legal subdivisions. If for irrigation state number of acres to be irrigated.

210-CL

77303

8. Existing place of use See attached "Place of Use" for Permit 49984

Describe by legal subdivisions. If permit is for irrigation, state number of acres irrigated. If changing place of use and/or manner of use of irrigation permit, describe acreage to be removed from irrigation.

9. Proposed use will be from 1/1 (Month and Day) to 12/31 (Month and Day) of each year.

10. Existing use permitted from 1/1 (Month and Day) to 12/31 (Month and Day) of each year.

11. Description of proposed works. (Under the provision of NRS 535.010 you may be required to submit plans and specifications of your diversion or storage works.) 628' depth – well currently installed [well log no. 22861]; Pumps, motor and pipelines
State manner in which water is to be diverted, i.e. diversion structure, ditches, pipes and flumes or drilled well, pump and motor, etc.

12. Estimated cost of works $5,000,000.00

13. Estimated time required to construct works 2 YEARS
If well completed, describe well.

14. Estimated time required to complete the application of water to beneficial use 10 YEARS

15. Provide a detailed description of the proposed project and its water usage (use attachments if necessary): (Failure to provide a detailed description may cause a delay in processing) Water will be diverted by a turbine pump, motor & pipeline. Water will be metered and delivered to the headwaters of the Muddy River at Warm Springs or delivered directly to Lake Mead. Water delivered to Lake Mead will be re-diverted at an existing pumping plant at Saddle Island or alternative plant on Lake Mead.

16. Miscellaneous Remarks: Existing POU and POD map filed under Permit 49984. It is the intent of the applicant to use this water from either of two points of diversions with a combined duty. An application to appropriate water [diversion rate only] will be submitted along with this change application.

(702) 862-3708
Phone No.

By: Kay Brothers
Print or type name clearly

Kay Brothers
Signature, applicant or agent

kay.brothers@snwa.com
E-mail

SNWA – Deputy General Manager
Company Name

1001 S. Valley Blvd.
Street and No., or P.O. Box No.

Las Vegas, Nevada 89153
City, State, Zip Code

2008 AUG 13 PM 2:53
STATE ENGINEER'S OFFICE

APPLICATION MUST BE SIGNED BY THE APPLICANT OR AGENT

$150 FILING FEE AND SUPPORTING MAP MUST ACCOMPANY APPLICATION

~~49984~~

77303

PLACE OF USE

All of Sections 1, 2, 3, 4, 5, 9, 10, 11, 12, 13, 14, 15, 16, 21, 22, 23 and 24; the E 1/2 and the E 1/2 of the W 1/2 of Section 8; the E 1/2 of Sections 17 and 20; and the N 1/2 of Sections 25 and 26, in Township 13 South, Range 63 East, M.D.M., Clark County, Nevada.

All of Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 20, 21, 22, 23, 25, 26, 27, 28, 29, 32, 33, 34, 35, and 36; the W 1/2 of Sections 13 and 24; the E 1/2 of Sections 18, 19, 30, and 31; and the W 1/2 of the W 1/2 of Section 12, in Township 12 South, Range 63 East, M.D.M., Lincoln County, Nevada.

All of Sections 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34 and 35, in Township 11 South, Range 63 East, M.D.M., Lincoln County, Nevada.

All of Sections 18 and 19; the N 1/2 of Section 30; the W 1/2 and the W 1/2 of the SE 1/4 of Section 7; and the W 1/2 of Section 6, in the unsurveyed Township 13 South, Range 64 East, M.D.M., Clark County, Nevada.

The W 1/2 of the SW 1/4 of Section 31, in the unsurveyed Township 12 South, Range 64 East, M.D.M., Lincoln County, Nevada.

2000 AUG 13 PM 2:53
STATE ENGINEERS OFFICE

THE STATE OF NEVADA

PERMIT TO CHANGE POINT OF DIVERSION, MANNER OF USE AND PLACE OF USE OF THE PUBLIC WATERS OF THE STATE OF NEVADA HERETOFORE APPROPRIATED

Name of applicant:	**SOUTHERN NEVADA WATER AUTHORITY**
Source:	**UNDERGROUND**
Basin:	**COYOTE SPRING VALLEY**
Manner of Use:	**MUNICIPAL**
Period of Use:	**January 1st to December 31st**
Priority Date:	**07/15/1986**

****

APPROVAL OF STATE ENGINEER

This is to certify that I have examined the foregoing application, and do hereby grant the same, subject to the following limitations and conditions:

This permit to change the point of diversion, place and manner of use of the waters of an underground source as heretofore granted under Permit 49985 is issued subject to the terms and conditions imposed in said Permit 49985 and with the understanding that no other rights on the source will be affected by the change proposed herein. The well shall be equipped with a 2-inch opening and a totalizing meter must be installed and maintained in the discharge pipeline near the point of diversion and accurate measurements must be kept of water placed to beneficial use. The totalizing meter must be installed before any use of the water begins or before the proof of completion of work is filed. If the well is flowing, a valve must be installed and maintained to prevent waste. This source is located within an area designated by the State Engineer pursuant to NRS 534.030. The State retains the right to regulate the use of the water herein granted at any and all times.

Monthly records shall be kept of the amount of water pumped from this well and the records submitted to the State Engineer on a quarterly basis within 15 days after the end of each calendar quarter.

This permit does not extend the permittee the right of ingress and egress on public, private or corporate lands.

The total combined duty of water under Permits 77291 though 77306 shall not exceed 9000 acre-feet annually.

The issuance of this permit does not waive the requirements that the permit holder obtain other permits from State, Federal and local agencies.

This permit must comply with the monitoring requirements of Order 1169.

(Continued on Page 2)

The point of diversion and place of use are as described on the submitted application to support this permit.

The amount of water to be appropriated shall be limited to the amount which can be applied to beneficial use, **and not to exceed 2.0 cubic feet per second or 1447.93 acre-feet annually.**

Work must be prosecuted with reasonable diligence and proof of completion of work shall be filed on or before: **December 19, 2010**

Water must be placed to beneficial use and proof of the application of water to beneficial use shall be filed on or before: **December 19, 2018**

Map in support of proof of beneficial use shall be filed on or before: **December 19, 2018**

IN TESTIMONY WHEREOF, I, TRACY TAYLOR, P.E.,

State Engineer of Nevada, have hereunto set my hand and the seal of my office, this 19th day of **December,** A.D. **2008**

For State Engineer

Completion of work filed _____

Proof of beneficial use filed _____

Cultural map filed _____

Certificate No. _____ Issued _____

llb

Serial No. 77304

APPLICATION FOR PERMISSION TO CHANGE POINT OF DIVERSION, MANNER OF USE AND PLACE OF USE OF THE PUBLIC WATERS OF THE STATE OF NEVADA HERETOFORE APPROPRIATED

THIS SPACE FOR OFFICE USE ONLY

Date of filing in State Engineer's Office AUG 1 3 2008

Returned to applicant for correction _____

Corrected application filed _____ Map filed AUG 1 3 2008 under 77292

The applicant Southern Nevada Water Authority

1001 S. Valley View Blvd (Street and No. Or P.O. Box No) of Las Vegas (City or Town) Nevada 89153 (State and Zip Code)

hereby makes application for permission to change the

☒ Point of diversion ☒ Place of use ☒ Manner of use ☐ Of a portion

of water heretofore appropriated under Permit 49985
Identify existing right by Permit, Certificate, Proof or Claim Nos. If Decreed, give title of Decree identify right in Decree.

1. The source of water is Underground
   Name of stream, lake, underground, spring or other sources.
2. The amount of water to be changed 2.0 c.f.s [1447.93 AFA]
   Second feet, acre-feet. One second foot equals 448.83 gallons per minute.
3. The water to be used for Municipal
   Irrigation, power, mining, commercial, etc. If for stock state number and kind of animals. Must limit to one major use.
4. The water heretofore used for Industrial
   If for stock state number and kind of animals.
5. The water is to be diverted at the following Point within the NE ¼ NE ¼ , Section 26, T. 13 S., R. 63 E., M.D.B.&M., or at a point from which the NW corner of said Section 26 bears S. 87° 52' 54 " W., a distance of 5084.64 feet.

   Describe as being within a 40-acre subdivision of public survey and by course and distance to a section corner. If on snsurveyed land, it should be stated.
6. The existing point of diversion is located within NE ¼ NE ¼ , Sec. 20, T. 13 S., R. 63 E., M.D.B.&M., or at a point from which the NE corner of said Section 20 bears N. 44° 55' 00" E., 300 feet.
   If point of diversion is not changed, do not answer.
7. Proposed place of use Clark Co. Nevada as described in NRS 243.035 - 243.040
   Describe by legal subdivisions. If for irrigation state number of acres to be irrigated.

210-CL

77304

8. Existing place of use See attached "Place of Use" for Permit 49985

Describe by legal subdivisions. If permit is for irrigation, state number of acres irrigated. If changing place of use and/or manner of use of irrigation permit, describe acreage to be removed from irrigation.

9. Proposed use will be from 1/1 (Month and Day) to 12/31 (Month and Day) of each year.

10. Existing use permitted from 1/1 (Month and Day) to 12/31 (Month and Day) of each year.

11. Description of proposed works. (Under the provision of NRS 535.010 you may be required to submit plans and specifications of your diversion or storage works.) 628' depth – well currently installed [well log no. 22861]; Pumps, motor and pipelines
State manner in which water is to be diverted, i.e. diversion structure, ditches, pipes and flumes or drilled well, pump and motor, etc.

12. Estimated cost of works $5,000,000.00

13. Estimated time required to construct works 2 YEARS
If well completed, describe well.

14. Estimated time required to complete the application of water to beneficial use 10 YEARS

15. Provide a detailed description of the proposed project and its water usage (use attachments if necessary): (Failure to provide a detailed description may cause a delay in processing) Water will be diverted by a turbine pump, motor & pipeline. Water will be metered and delivered to the headwaters of the Muddy River at Warm Springs or delivered directly to Lake Mead. Water delivered to Lake Mead will be re-diverted at an existing pumping plant at Saddle Island or alternative plant on Lake Mead.

16. Miscellaneous Remarks: Existing POU and POD map filed under Permit 49985. It is the intent of the applicant to use this water from either of two points of diversions with a combined duty. An application to appropriate water [diversion rate only] will be submitted along with this change application.

(702) 862-3708
Phone No.

By: Kay Brothers
Print or type name clearly

Kay Brothers
Signature, applicant or agent

kay.brothers@snwa.com
E-mail

SNWA – Deputy General Manager
Company Name

1001 S. Valley Blvd.
Street and No., or P.O. Box No.

Las Vegas, Nevada 89153
City, State, Zip Code

2008 AUG 13 PM 2:54
STATE ENGINEER'S OFFICE

APPLICATION MUST BE SIGNED BY THE APPLICANT OR AGENT

$150 FILING FEE AND SUPPORTING MAP MUST ACCOMPANY APPLICATION

49985

77304

PLACE OF USE

All of Sections 1, 2, 3, 4, 5, 9, 10, 11, 12, 13, 14, 15, 16, 21, 22, 23 and 24; the E 1/2 and the E 1/2 of the W 1/2 of Section 8; the E 1/2 of Sections 17 and 20; and the N 1/2 of Sections 25 and 26, in Township 13 South, Range 63 East, M.D.M., Clark County, Nevada.

All of Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 20, 21, 22, 23, 25, 26, 27, 28, 29, 32, 33, 34, 35, and 36; the W 1/2 of Sections 13 and 24; the E 1/2 of Sections 18, 19, 30, and 31; and the W 1/2 of the W 1/2 of Section 12, in Township 12 South, Range 63 East, M.D.M., Lincoln County, Nevada.

All of Sections 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34 and 35, in Township 11 South, Range 63 East, M.D.M., Lincoln County, Nevada.

All of Sections 18 and 19; the N 1/2 of Section 30; the W 1/2 and the W 1/2 of the SE 1/4 of Section 7; and the W 1/2 of Section 6, in the unsurveyed Township 13 South, Range 64 East, M.D.M., Clark County, Nevada.

The W 1/2 of the SW 1/4 of Section 31, in the unsurveyed Township 12 South, Range 64 East, M.D.M., Lincoln County, Nevada.

RECEIVED
2008 AUG 13 PM 2:54
STATE ENGINEER'S OFFICE

Permit No. 77305

THE STATE OF NEVADA

PERMIT TO CHANGE POINT OF DIVERSION, MANNER OF USE AND PLACE OF USE OF THE PUBLIC WATERS OF THE STATE OF NEVADA HERETOFORE APPROPRIATED

Name of applicant:	**SOUTHERN NEVADA WATER AUTHORITY**
Source:	**UNDERGROUND**
Basin:	**COYOTE SPRING VALLEY**
Manner of Use:	**MUNICIPAL**
Period of Use:	**January 1st to December 31st**
Priority Date:	**07/15/1986**

****

APPROVAL OF STATE ENGINEER

This is to certify that I have examined the foregoing application, and do hereby grant the same, subject to the following limitations and conditions:

This permit to change the point of diversion, place and manner of use of the waters of an underground source as heretofore granted under Permit 49986 is issued subject to the terms and conditions imposed in said Permit 49986 and with the understanding that no other rights on the source will be affected by the change proposed herein. The well shall be equipped with a 2-inch opening and a totalizing meter must be installed and maintained in the discharge pipeline near the point of diversion and accurate measurements must be kept of water placed to beneficial use. The totalizing meter must be installed before any use of the water begins or before the proof of completion of work is filed. If the well is flowing, a valve must be installed and maintained to prevent waste. This source is located within an area designated by the State Engineer pursuant to NRS 534.030. The State retains the right to regulate the use of the water herein granted at any and all times.

Monthly records shall be kept of the amount of water pumped from this well and the records submitted to the State Engineer on a quarterly basis within 15 days after the end of each calendar quarter.

This permit does not extend the permittee the right of ingress and egress on public, private or corporate lands.

The total combined duty of water under Permits 77291 though 77306 shall not exceed 9000 acre-feet annually.

The issuance of this permit does not waive the requirements that the permit holder obtain other permits from State, Federal and local agencies.

This permit must comply with the monitoring requirements of Order 1169.

(Continued on Page 2)

The point of diversion and place of use are as described on the submitted application to support this permit.

The amount of water to be appropriated shall be limited to the amount which can be applied to beneficial use, **and not to exceed 2.0 cubic feet per second or 1447.93 acre-feet annually.**

Work must be prosecuted with reasonable diligence and proof of completion of work shall be filed on or before:	**December 19, 2010**
Water must be placed to beneficial use and proof of the application of water to beneficial use shall be filed on or before:	**December 19, 2018**
Map in support of proof of beneficial use shall be filed on or before:	**December 19, 2018**

IN TESTIMONY WHEREOF, I, TRACY TAYLOR, P.E.,

State Engineer of Nevada, have hereunto set my hand and the seal of my office, this 19th day of **December**, A.D. **2008**

P.E.

For State Engineer

Completion of work filed _____

Proof of beneficial use filed _____

Cultural map filed _____

Certificate No. _____ Issued _____

llb

Serial No. 77305

APPLICATION FOR PERMISSION TO CHANGE POINT OF DIVERSION, MANNER OF USE AND PLACE OF USE OF THE PUBLIC WATERS OF THE STATE OF NEVADA HERETOFORE APPROPRIATED

THIS SPACE FOR OFFICE USE ONLY

Date of filing in State Engineer's Office AUG 1 3 2008

Returned to applicant for correction _____

Corrected application filed _____ Map filed AUG 1 3 2008 under 77292

The applicant Southern Nevada Water Authority

1001 S. Valley View Blvd (Street and No. Or P.O. Box No) of Las Vegas (City or Town) Nevada 89153 (State and Zip Code)

hereby makes application for permission to change the

☒ Point of diversion ☒ Place of use ☒ Manner of use ☐ Of a portion

of water heretofore appropriated under Permit 49986
Identify existing right by Permit, Certificate, Proof or Claim Nos. If Decreed, give title of Decree identify right in Decree.

1. The source of water is Underground
   Name of stream, lake, underground, spring or other sources.
2. The amount of water to be changed 2.0 c.f.s [1447.93 AFA]
   Second feet, acre-feet. One second foot equals 448.83 gallons per minute.
3. The water to be used for Municipal
   Irrigation, power, mining, commercial, etc. If for stock state number and kind of animals. Must limit to one major use.
4. The water heretofore used for Industrial
   If for stock state number and kind of animals.
5. The water is to be diverted at the following Point within the NE ¼ NE ¼ , Section 26, T. 13 S., R. 63 E., M.D.B.&M., or at a point from which the NW corner of said Section 26 bears S. 87° 52' 54 " W., a distance of 5084.64 feet.

   Describe as being within a 40-acre subdivision of public survey and by course and distance to a section corner. If on unsurveyed land, it should be stated.
6. The existing point of diversion is located within NE ¼ NE ¼ , Sec. 21, T. 13 S., R. 63 E., M.D.B.&M., or at a point from which the NW corner of said Section 21 bears N. 87° 44' 46" W., 5050.92 feet.
   If point of diversion is not changed, do not answer.
7. Proposed place of use Clark Co. Nevada as described in NRS 243.035 - 243.040
   Describe by legal subdivisions. If for irrigation state number of acres to be irrigated.

210 - CL

77305

8. Existing place of use See attached "Place of Use" for Permit 49986

Describe by legal subdivisions. If permit is for irrigation, state number of acres irrigated. If changing place of use and/or manner of use of irrigation permit, describe acreage to be removed from irrigation.

9. Proposed use will be from 1/1 (Month and Day) to 12/31 (Month and Day) of each year.

10. Existing use permitted from 1/1 (Month and Day) to 12/31 (Month and Day) of each year.

11. Description of proposed works. (Under the provision of NRS 535.010 you may be required to submit plans and specifications of your diversion or storage works.) 628' depth – well currently installed [well log no. 22861]; Pumps, motor and pipelines
State manner in which water is to be diverted, i.e. diversion structure, ditches, pipes and flumes or drilled well, pump and motor, etc.

12. Estimated cost of works $5,000,000.00

13. Estimated time required to construct works 2 YEARS
If well completed, describe well.

14. Estimated time required to complete the application of water to beneficial use 10 YEARS

15. Provide a detailed description of the proposed project and its water usage (use attachments if necessary): (Failure to provide a detailed description may cause a delay in processing) Water will be diverted by a turbine pump, motor & pipeline. Water will be metered and delivered to the headwaters of the Muddy River at Warm Springs or delivered directly to Lake Mead. Water delivered to Lake Mead will be re-diverted at an existing pumping plant at Saddle Island or alternative plant on Lake Mead.

16. Miscellaneous Remarks: Existing POU and POD map filed under Permit 49986. It is the intent of the applicant to use this water from either of two points of diversions with a combined duty. An application to appropriate water [diversion rate only] will be submitted along with this change application.

(702) 862-3708
Phone No.

By: Kay Brothers
Print or type name clearly

Kay Brothers
Signature, applicant or agent

kay.brothers@snwa.com
E-mail

SNWA – Deputy General Manager
Company Name

1001 S. Valley Blvd.
Street and No., or P.O. Box No.

Las Vegas, Nevada 89153
City, State, Zip Code

2008 AUG 13 PM 2:54

APPLICATION MUST BE SIGNED BY THE APPLICANT OR AGENT

$150 FILING FEE AND SUPPORTING MAP MUST ACCOMPANY APPLICATION

~~49086~~

77305

PLACE OF USE

All of Sections 1, 2, 3, 4, 5, 9, 10, 11, 12, 13, 14, 15, 16, 21, 22, 23 and 24; the E 1/2 and the E 1/2 of the W 1/2 of Section 8; the E 1/2 of Sections 17 and 20; and the N 1/2 of Sections 25 and 26, in Township 13 South, Range 63 East, M.D.M., Clark County, Nevada.

All of Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 20, 21, 22, 23, 25, 26, 27, 28, 29, 32, 33, 34, 35, and 36; the W 1/2 of Sections 13 and 24; the E 1/2 of Sections 18, 19, 30, and 31; and the W 1/2 of the W 1/2 of Section 12, in Township 12 South, Range 63 East, M.D.M., Lincoln County, Nevada.

All of Sections 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34 and 35, in Township 11 South, Range 63 East, M.D.M., Lincoln County, Nevada.

All of Sections 18 and 19; the N 1/2 of Section 30; the W 1/2 and the W 1/2 of the SE 1/4 of Section 7; and the W 1/2 of Section 6, in the unsurveyed Township 13 South, Range 64 East, M.D.M., Clark County, Nevada.

The W 1/2 of the SW 1/4 of Section 31, in the unsurveyed Township 12 South, Range 64 East, M.D.M., Lincoln County, Nevada.

2008 AUG 13 PM 2:54
STATE ENGINEERS OFFICE

THE STATE OF NEVADA

PERMIT TO CHANGE POINT OF DIVERSION, MANNER OF USE AND PLACE OF USE OF THE PUBLIC WATERS OF THE STATE OF NEVADA HERETOFORE APPROPRIATED

Name of applicant:	**SOUTHERN NEVADA WATER AUTHORITY**
Source:	**UNDERGROUND**
Basin:	**COYOTE SPRING VALLEY**
Manner of Use:	**MUNICIPAL**
Period of Use:	**January 1st to December 31st**
Priority Date:	**07/15/1986**

****

APPROVAL OF STATE ENGINEER

This is to certify that I have examined the foregoing application, and do hereby grant the same, subject to the following limitations and conditions:

This permit to change the point of diversion, place and manner of use of the waters of an underground source as heretofore granted under Permit 49987 is issued subject to the terms and conditions imposed in said Permit 49987 and with the understanding that no other rights on the source will be affected by the change proposed herein. The well shall be equipped with a 2-inch opening and a totalizing meter must be installed and maintained in the discharge pipeline near the point of diversion and accurate measurements must be kept of water placed to beneficial use. The totalizing meter must be installed before any use of the water begins or before the proof of completion of work is filed. If the well is flowing, a valve must be installed and maintained to prevent waste. This source is located within an area designated by the State Engineer pursuant to NRS 534.030. The State retains the right to regulate the use of the water herein granted at any and all times.

Monthly records shall be kept of the amount of water pumped from this well and the records submitted to the State Engineer on a quarterly basis within 15 days after the end of each calendar quarter.

This permit does not extend the permittee the right of ingress and egress on public, private or corporate lands.

The total combined duty of water under Permits 77291 though 77306 shall not exceed 9000 acre-feet annually.

The issuance of this permit does not waive the requirements that the permit holder obtain other permits from State, Federal and local agencies.

This permit must comply with the monitoring requirements of Order 1169.

(Continued on Page 2)

The point of diversion and place of use are as described on the submitted application to support this permit.

The amount of water to be appropriated shall be limited to the amount which can be applied to beneficial use, **and not to exceed 2.0 cubic feet per second or 1447.93 acre-feet annually**.

Work must be prosecuted with reasonable diligence and proof of completion of work shall be filed on or before: **December 19, 2010**

Water must be placed to beneficial use and proof of the application of water to beneficial use shall be filed on or before: **December 19, 2018**

Map in support of proof of beneficial use shall be filed on or before: **N/A**

IN TESTIMONY WHEREOF, I, TRACY TAYLOR, P.E.,

State Engineer of Nevada, have hereunto set my hand and the seal of my office, this 19th day of **December,** A.D. **2008**

P.E.

For State Engineer

Completion of work filed _____

Proof of beneficial use filed _____

Cultural map filed _____

Certificate No. _____ Issued _____

llb

Serial No 77306

APPLICATION FOR PERMISSION TO CHANGE POINT OF DIVERSION, MANNER OF USE AND PLACE OF USE OF THE PUBLIC WATERS OF THE STATE OF NEVADA HERETOFORE APPROPRIATED

THIS SPACE FOR OFFICE USE ONLY

Date of filing in State Engineer's Office AUG 1 3 2008

Returned to applicant for correction _____

Corrected application filed _____ Map filed AUG 1 3 2008 under 77292

The applicant Southern Nevada Water Authority

1001 S. Valley View Blvd (Street and No. Or P.O. Box No) of Las Vegas (City or Town) Nevada 89153 (State and Zip Code)

hereby makes application for permission to change the

☒ Point of diversion ☒ Place of use ☒ Manner of use ☐ Of a portion

of water heretofore appropriated under Permit 49987
Identify existing right by Permit, Certificate, Proof or Claim Nos. If Decreed, give title of Decree identify right in Decree.

1. The source of water is Underground
   Name of stream, lake, underground, spring or other sources.
2. The amount of water to be changed 2.0 c.f.s [1447.93 AFA]
   Second feet, acre-feet. One second foot equals 448.83 gallons per minute.
3. The water to be used for Municipal
   Irrigation, power, mining, commercial, etc. If for stock state number and kind of animals. Must limit to one major use.
4. The water heretofore used for Industrial
   If for stock state number and kind of animals.
5. The water is to be diverted at the following Point within the NE ¼ NE ¼ , Section 26, T. 13 S., R. 63 E., M.D.B.&M., or at a point from which the NW corner of said Section 26 bears S. 87° 52' 54 " W., a distance of 5084.64 feet.

   Describe as being within a 40-acre subdivision of public survey and by course and distance to a section corner. If on unsurveyed land, it should be stated.
6. The existing point of diversion is located within NE¼ NE ¼ , Sec. 1, T. 13 S., R. 63 E., M.D.B.&M., or at a point from which the NE corner of said Section 1 bears N. 45° 00' 00" E., 300 feet.
   If point of diversion is not changed, do not answer.
7. Proposed place of use Clark Co. Nevada as described in NRS 243.035 - 243.040
   Describe by legal subdivisions. If for irrigation state number of acres to be irrigated.

210-cc

77306

8. Existing place of use See attached "Place of Use" for Permit 49987

Describe by legal subdivisions. If permit is for irrigation, state number of acres irrigated. If changing place of use and/or manner of use of irrigation permit, describe acreage to be removed from irrigation.

9. Proposed use will be from 1/1 (Month and Day) to 12/31 (Month and Day) of each year.

10. Existing use permitted from 1/1 (Month and Day) to 12/31 (Month and Day) of each year.

11. Description of proposed works. (Under the provision of NRS 535.010 you may be required to submit plans and specifications of your diversion or storage works.) 628' depth – well currently installed [well log no. 22861]; Pumps, motor and pipelines
State manner in which water is to be diverted, i.e. diversion structure, ditches, pipes and flumes or drilled well, pump and motor, etc.

12. Estimated cost of works $5,000,000.00

13. Estimated time required to construct works 2 YEARS
If well completed, describe well.

14. Estimated time required to complete the application of water to beneficial use 10 YEARS

15. Provide a detailed description of the proposed project and its water usage (use attachments if necessary): (Failure to provide a detailed description may cause a delay in processing) Water will be diverted by a turbine pump, motor & pipeline. Water will be metered and delivered to the headwaters of the Muddy River at Warm Springs or delivered directly to Lake Mead. Water delivered to Lake Mead will be re-diverted at an existing pumping plant at Saddle Island or alternative plant on Lake Mead.

16. Miscellaneous Remarks: Existing POU and POD map filed under Permit 49987. It is the intent of the applicant to use this water from either of two points of diversions with a combined duty. An application to appropriate water [diversion rate only] will be submitted along with this change application.

(702) 862-3708
Phone No.

By: Kay Brothers
Print or type name clearly

Kay Brothers
Signature, applicant or agent

kay.brothers@snwa.com
E-mail

SNWA – Deputy General Manager
Company Name

1001 S. Valley Blvd.
Street and No., or P.O. Box No.

Las Vegas, Nevada 89153
City, State, Zip Code

2008 AUG 13 PM 2:54
STATE ENGINEER'S OFFICE

APPLICATION MUST BE SIGNED
BY THE APPLICANT OR AGENT

$150 FILING FEE AND SUPPORTING MAP MUST ACCOMPANY APPLICATION

~~49987~~
77306

PLACE OF USE

All of Sections 1, 2, 3, 4, 5, 9, 10, 11, 12, 13, 14, 15, 16, 21, 22, 23 and 24; the E 1/2 and the E 1/2 of the W 1/2 of Section 8; the E 1/2 of Sections 17 and 20; and the N 1/2 of Sections 25 and 26, in Township 13 South, Range 63 East, M.D.M., Clark County, Nevada.

All of Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 20, 21, 22, 23, 25, 26, 27, 28, 29, 32, 33, 34, 35, and 36; the W 1/2 of Sections 13 and 24; the E 1/2 of Sections 18, 19, 30, and 31; and the W 1/2 of the W 1/2 of Section 12, in Township 12 South, Range 63 East, M.D.M., Lincoln County, Nevada.

All of Sections 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34 and 35, in Township 11 South, Range 63 East, M.D.M., Lincoln County, Nevada.

All of Sections 18 and 19; the N 1/2 of Section 30; the W 1/2 and the W 1/2 of the SE 1/4 of Section 7; and the W 1/2 of Section 6, in the unsurveyed Township 13 South, Range 64 East, M.D.M., Clark County, Nevada.

The W 1/2 of the SW 1/4 of Section 31, in the unsurveyed Township 12 South, Range 64 East, M.D.M., Lincoln County, Nevada.

RECEIVED
2008 AUG 13 PM 2:54
STATE ENGINEERS OFFICE

SOUTHERN NEVADA WATER AUTHORITY
100 City Parkway, Suite 700 • Las Vegas, NV 89106
MAILING ADDRESS: P.O. Box 99956 • Las Vegas, NV 89193-9956
(702) 862-3400 • snwa.com

RECEIVED MAR 1 5 2013

March 12, 2013

Bryan Mortensen
Water Production Superintendent
Moapa Valley Water District
601 N. Moapa Valley Boulevard
Overton, Nevada 89040

Dear Mr. Mortensen:

SNWA would like to confirm the volume of water from Coyote Spring Valley that SNWA and Moapa Valley Water District (MVWD) delivered into the Muddy Valley Irrigation Company's Bowman Reservoir. This letter of concurrence verifies the volumes of water delivered to Bowman Reservoir and will be provided to the Bureau of Reclamation and the Nevada State Engineer's Office in support of SNWA's accounting of its Coyote Spring Valley Imported Intentionally Created Surplus project. Please review the CY 2012 delivered volumes outlined below and sign this letter, if MVWD concurs with these volumes.

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
Into Bowman Reservoir (acre-feet)	*223*	*3*	*2*	*123*	*470*	*465*	*389*	*473*	*457*	*417*	*449*	*449*	***3,918***

Thank you for your assistance. If you have any questions, please contact me at (702) 862-3748 or Sean Collier at (702) 691-5375.

Sincerely,

Jeffrey Johnson, SNWA Division Manager
Water Management and Accounting Division

JJ:lmv

Concurrence by:

4/16/13

Bryan Mortensen, Water Production Superintendent Date
Moapa Valley Water District

Verification of ICS Water Reaching Lake Mead

Since the entire flow of the Muddy River is decreed, it is important to perform a water balance on the Lower Muddy River to verify that the water to which SNWA is claiming Tributary Conservation ICS credits is reaching Lake Mead. This water balance is outlined in Exhibit A of the Forbearance Agreement and approved ICS Plan as follows:

Flows measured by USGS at the Glendale gage
- (minus) consumptive uses by agriculture below the Glendale gage
- (minus) direct uses by industry below the Glendale gage
- (minus) channel evapotranspiration below Glendale gage to Lake Mead
- (minus) evapotranspiration from the managed acreage on the Overton Wildlife Management Area (OWMA)

= Total Flow to Lake Mead (Elevation 1,220 AMSL)

This comprehensive water balance uses the Muddy River at Glendale gage as the input, which was also used to calculate the af/share associated with MVIC shares. To account for consumptive uses in the riparian corridor and agricultural areas, detailed GIS coverages delineating the ground-truthed fields and mapped riparian corridors, combined with Lower Colorado River Accounting System (LCRAS) data were used to derive consumptive uses by crops and plants influenced by the Muddy River. Other consumptive uses by industry and open water evaporation were also calculated. The resulting outflow is a combination of surface flow measured at the USGS gage *09419507 Muddy River at Lewis Avenue near Overton Nevada* (Lewis Avenue gage) and underflow to Lake Mead, bypassing this gage. Downstream of the Lewis Avenue gage, consumptive uses of Muddy River water by the Nevada Division of Wildlife's Overton Wildlife Management Area (OWMA) are deducted from the total flows to Lake Mead. A final comparison is then made to ensure that the conserved Muddy River water reaching Lake Mead exceeds or is equal to the volume of Muddy River water controlled by SNWA.

An itemized seasonal calculation of the water balance is presented in Table 17. The following sub-sections describe each component of the water balance. When data used in the water balance is described, a reference is given to the row in Table 17 where the data was applied.

Glendale Gage Flows

As previously discussed in the Section "Divertible Flows by MVIC at Wells Siding", the water used by MVIC equals the Glendale gage flows minus: 1) flood flows; 2) consumptive uses by phreatophytes in the riparian corridor between the Glendale gage and Wells Siding; and 3) Upper Muddy River rights owned or leased by SNWA. This "divertible flow" is used as the inflow component of the water balance verification.

The Glendale gage, for the purposes of calculating Tributary Conservation ICS credits, is believed to capture all surface water flows entering the lower reach of the Muddy River. The gage is located in a narrow cut of carbonate rocks that are tilted almost vertically due to a thrust fault. Any shallow alluvial underflow is thought to ramp up and be measured by the gage. Downstream of the narrows, the Muddy River enters the lower reach of the Muddy River and the floodplain begins to widen, until reaching Wells Siding. The Muddy River, downstream of Wells Siding, is an incised narrow channel that has artificially been constrained to facilitate

farming on the river's historic floodplain, and act a flood channel. The Glendale gage, Wells Siding, vegetated areas, and open water bodies discussed in this section are shown on Figure 34.

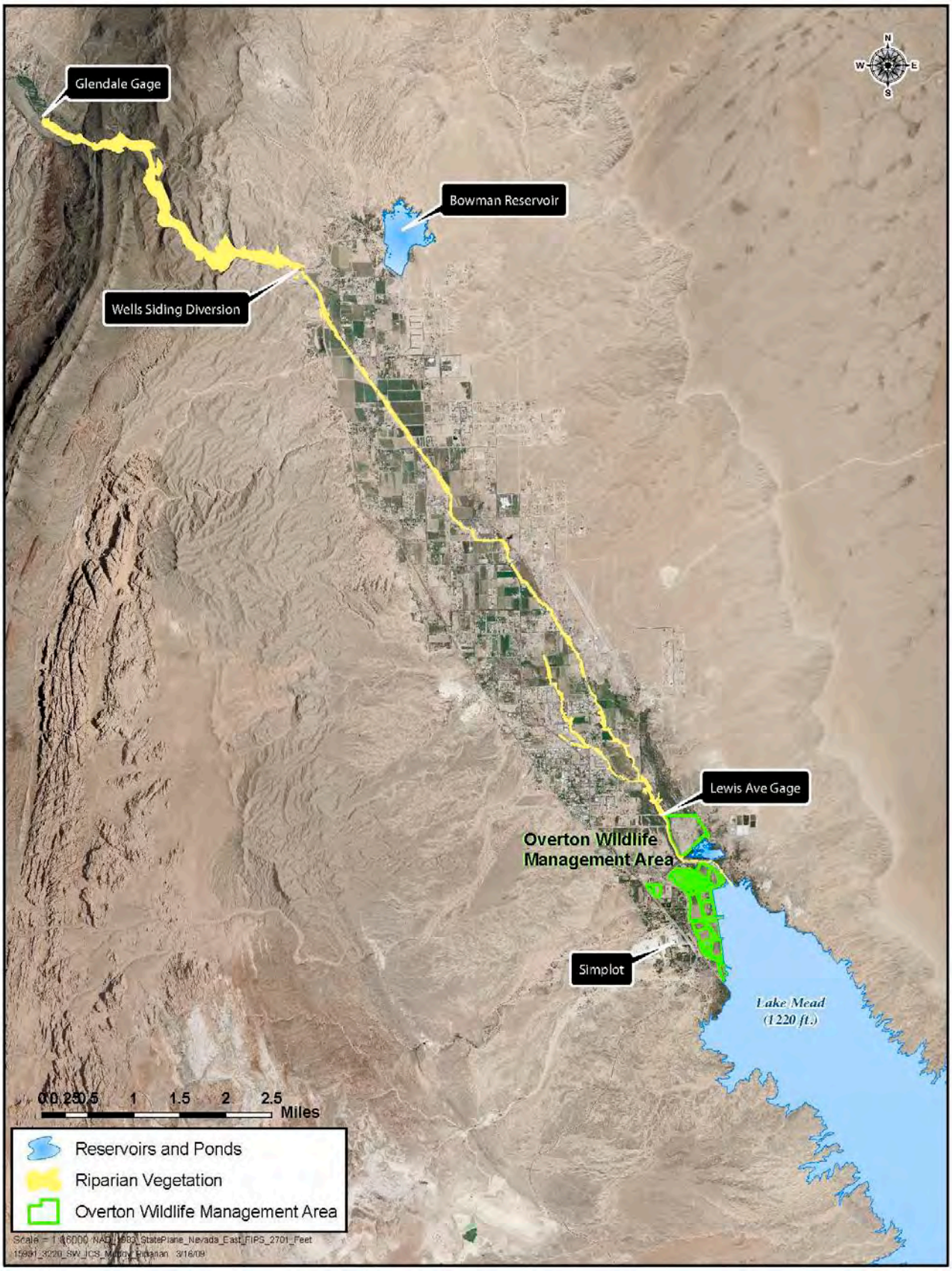

Figure 34 - Map of Lower Muddy River Riparian Area, Open Water, and the OWMA

Crop, Phreatophyte, and Open Water Consumptive Use

Lower Colorado River Accounting System (LCRAS)

To calculate ET demands by crops and phreatophytes on the Muddy River, a literature search for ET data with a long period-of-record and monthly time-step data was performed. The LCRAS was chosen because it contained monthly data in a similar climate for a relatively long period, 1995-2007.

The LCRAS is conducted annually by Reclamation to assist with determining consumptive water use along the Lower Colorado River. The LCRAS ET rates are determined by collecting data from meteorological towers, determining potential ET, and applying various crop coefficients to the ET values.

The LCRAS data chosen for use in this analysis utilize data collected from two Arizona Meteorological Network (AZMET) stations located in the Mohave Valley in Arizona, which are used to calculate local phreatophyte and crop ET (Figure 35). This is the most northern area examined in LCRAS and most closely represents climatic conditions of the Lower Muddy River. The Mohave Valley is, however, at a lower elevation and experiences higher temperatures than the Lower Muddy River, resulting in higher ET values. This makes the Mohave Valley ET values conservative, overestimating the actual ET demand in the Lower Muddy River.

Application of LCRAS to the Lower Muddy River

Phreatophyte vegetation on the Lower Muddy River was mapped and classified using the Anderson-Ohmart classification system. LCRAS uses a classification system that slightly differs from the Anderson-Ohmart system. To apply ET rates from LCRAS to the Lower Muddy River, the two vegetation classification systems were correlated. Table 12 shows an SNWA derived correlation between the two classification systems.

The LCRAS "Sc-low" phreatophyte classification was used for all of the salt-cedar classifications in the Anderson-Ohmart classification and is supported by a USGS Scientific Investigations Report 2008-5116 titled *Quantifying Ground-Water and Surface-Water Discharge from Evapotranspiration Processes in 12 Hydrographic Areas of the Colorado Regional Ground-Water Flow System, Nevada, Utah, and Arizona*. The purpose of the report was to estimate ground and surface water discharge from 12 hydrographic basins via ET. For the study the USGS placed ET measurement sites in various locations in Utah, Arizona, and Nevada including the Upper Muddy and Lower Virgin Rivers. The Virgin River ET station was placed in a "dense woodland vegetation" area which was predominantly salt cedar. The Virgin River site measured an annual ET rate of 3.9 ft/yr without subtracting precipitation. This rate is less than the LCRAS Sc-low value of 4.39 ft/yr using LCRAS Mohave Valley data. The USGS's Muddy River ET site was located in a stand of mesquite trees, in the Upper Muddy River. The USGS value of 3.6 ft/yr (without subtracting precipitation) is more than 1 ft less than the LCRAS "Ms-high" value of 5.0 ft/yr.

The USGS study demonstrates that by correlating the LCRAS Sc-low and Ms-high classifications to salt cedar and mesquite on the Lower Muddy River, a conservative estimate of ET can be determined. These variations in ET rates demonstrate the challenges of trying to estimate ET over large areas, as ET can only be physically measured at a single point. Conditions such as soil type, depth to groundwater below land surface, and calculation method used can all affect ET rates greatly. Comparison of the LCRAS rates used by SNWA (Sc-low) in

the water balance (in this analysis) to the measurements performed by the USGS show that using the LCRAS rates tends to slightly overestimate ET along the Lower Muddy River based these recent reports.

The equation used in this analysis for calculating ET by phreatophytes is:

Phreatophyte ET Demand in af = (Riparian Phreatophyte Acreage) x (Correlated LCRAS ET Rate)

The agricultural crop types in LCRAS were directly correlated with crop types on the Muddy River. Water use by crop type in LCRAS is adjusted for precipitation by using an effective precipitation coefficient. To more accurately represent conditions on the Lower Muddy River, provisional precipitation data recorded for CY 2012 by the Overton Nevada Community Environmental Monitoring Program (CEMP) Weather Station (http://www.cemp.dri.edu/) was used for calculating the effective precipitation used to derive crop consumptive uses. The equation for calculating Crop ET is listed below. The crop rates adjusted to Overton Nevada Precipitation are shown in Table 13.

Crop ET Demand in af = (Crop Acreage) x [(Correlated LCRAS ET Rate) – (Overton CEMP Effective Precipitation)]

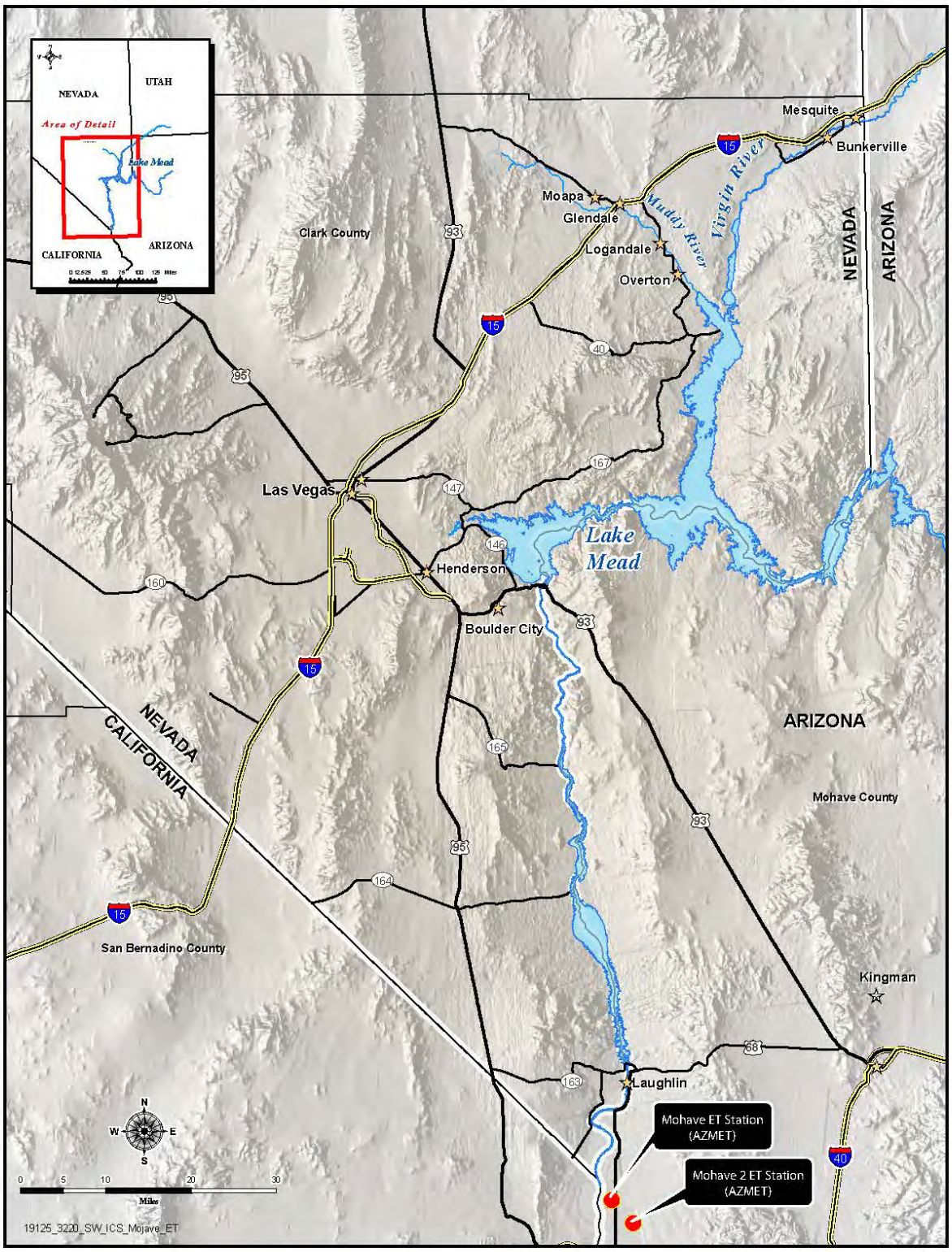

Figure 35 – Mohave Valley AZMET ET Stations

Table 12 – Anderson Ohmart to LCRAS Vegetation Classification Correlation

Anderson Ohmart Mapped Class	Correlating LCRAS Class
A	Low Veg
AW	AW
Acacia	Ms-high
Baccharis	Low Veg
C	CW
CW	CW
HM	Ms-high
I	Ms-high
L	Ms-high
MA	Marsh
RIV	Open Water
SC	Sc-low
SM	Sc/ms

Table 13 through Table 15 in this section details the calculations performed to estimate the amount of consumptive uses by crops, phreatophytes, and open water. The Mohave Valley monthly ET rates for the crops and phreatophytes adjusted to local precipitation collected at DRI's Overton Nevada Community Environmental Monitoring Program station.

The measured acreages of each vegetation type and open water are in Table 14. Vegetation mapping of the Muddy River riparian corridor was performed in 2006. In 2010, the survey data was updated to reflect removal of vegetation due to the construction of a bridge crossing the Muddy River. Given the incised nature of the channel, the total vegetated acreage along the riparian corridor has remained the same and is anticipated to remain the same into the future. The phreatophyte acreages were mapped in the field by biologists and verified using the high resolution 6-in aerial photography. The measured acreage values for the phreatophytes and crops are shown in Table 14. The final consumptive use calculations for the phreatophytes and crops are shown monthly in Table 15 and these results are then shown seasonally on Rows B, F, and H in Table 17.

Vegetation acreage mapped for OWMA is also shown in Table 14. OWMA is the downstream extent of MVIC's service area and is located immediately above the full pool elevation of Lake Mead. Water use by OWMA is described in the subsequent sections of this report.

Future ET Studies

To enhance the accuracy of ET consumptive use calculations along the Lower Muddy River, SNWA has installed a meteorological (MET) tower adjacent to an alfalfa field in the Lower Muddy River. With the cooperation of the Moapa Valley High School Future Farmers of America Farm, SNWA was able to place the MET tower in an area with the ideal fetch and agricultural conditions for measuring the meteorological parameters necessary to calculate reference ET using the ASCE Standardized Reference ET Equation –a similar method used by The Arizona Meteorological Network (AZMET) and California Irrigation Management Information System (CIMIS) for the LCRAS program. The reference ET calculated from the MET tower could then be multiplied by the LCRAS crop coefficients to obtain a more accurate ET consumptive use estimate for the Lower Muddy River, once data from the site is reviewed.

In addition to SNWA's data collection efforts, the NDWR recently published a report titled *Evapotranspiration and Net Irrigation Requirements for Nevada*. The report and ET database can be found on the NDWR website (http://water.nv.gov/NVET/). Since there are not many MET stations collecting ET data under ideal conditions, data from National Weather Service Cooperative Observer Program weather stations was used to approximate reference ET. The NDWR report also modified standard crop curves to the climate and agricultural practices of Nevada. Using the NDWR database (http://water.nv.gov/NVET/ET.html), the calculated alfalfa ET for the Lower Moapa Valley is 4.9 ft per year. This value is lower than the Mohave Valley value of 5.7 ft. These lower values are to be expected as the Muddy River is at a higher elevation and latitude than Mohave Valley. AZ. SNWA will continue collecting MET data and may use the data collected from the Moapa Valley High School MET tower, possibly with the modified crop curves from the NDWR report in future ICS Certification Reports.

Open Water Evaporation

Open water bodies on the Lower Muddy River include Bowman Reservoir, the Muddy River channel, and a few small ponds on the OWMA. Bowman Reservoir is used by MVIC to augment irrigation flows during the summer irrigation season. The reservoir is also where SNWA's Coyote Spring Valley Imported ICS is delivered. Historically the 3,000 to 4,000 af

capacity reservoir was filled in the winter months from the Muddy River via gravity flow and then a pump to reach higher storage volumes. The reservoir storage was then used to augment the summer irrigation season. Since the end of CY 2010, the majority of the water in Bowman Reservoir was delivered via the MVWD distribution system as opposed to coming from MVIC diversions from the Muddy River. This addition of water from the MVWD system is discussed in greater detail in the report *Coyote Spring Valley Imported Intentionally Created Surplus Certification Report Calendar Year 2012*.

The open water evaporation rate used for Bowman Reservoir, the Muddy River channel, and the ponds on the OWMA was 7.50 ft/yr. This value is the open water evaporation rate determined and published by the USGS for Lake Mead. The monthly average evaporation data was published in the USGS SIR 2006-5252 titled *Evaporation from Lake Mead, Arizona, and Nevada, 1997-99*. The average monthly evaporation data from the report can be found in Table 13. The surface area of Bowman Reservoir and other open water on the Lower Muddy River can be found in Table 14, and the total evaporative loss can be found in Table 15 and in Row G of Table 17. Changes in storage in Bowman Reservoir along with inflows from SNWA's Imported ICS project are shown in Rows J and K of Table 17. Monthly water level elevations in Bowman Reservoir were manually recorded by MVIC personnel utilizing a surveyed stage measurement gage located on the side of the reservoir. A stage capacity curve was created by SNWA using high resolution LiDAR data collected when the reservoir was empty. This allows MVIC and SNWA to obtain a very accurate reservoir storage volume at any given reservoir elevation. Month-to-month Bowman Reservoir volumes were used to calculate changes in storage in the reservoir which translated to inflows and outflows of the reservoir.

Table 13 - ET Rates in Feet for the Lower Muddy River from LCRAS, USGS, and CEMP

	January	February	March	April	May	June	July	August	September	October	November	December	Total
Crops:													
Alfalfa Perennial	0.22	0.33	0.42	0.56	0.68	0.73	0.69	0.66	0.56	0.39	0.25	0.23	5.70
Alfalfa-Annual	0.16	0.28	0.34	0.39	0.65	0.50	0.57	0.29	0.23	0.24	0.13	0.17	3.93
Small Grain	0.26	0.38	0.58	0.68	0.27	0.00	0.00	0.00	0.00	0.00	0.02	0.07	2.25
Orchard	0.15	0.18	0.28	0.45	0.66	0.70	0.67	0.64	0.51	0.37	0.25	0.14	4.98
Melons (Fall)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.09	0.32	0.42	0.31	0.14	1.27
Small Vegetables	0.30	0.35	0.43	0.15	0.00	0.00	0.00	0.00	0.08	0.15	0.20	0.21	1.85
Bermuda Grass w/ Rye	0.27	0.31	0.37	0.28	0.64	0.69	0.66	0.62	0.48	0.21	0.26	0.20	4.97
Seasonal Wetland	0.31	0.36	0.37	0.34	0.33	0.21	0.40	0.41	0.33	0.43	0.29	0.21	3.97
Moist Soil Unit	0.58	0.81	0.24	0.36	0.31	0.84	0.26	0.46	0.43	0.27	0.45	0.37	5.36
Phreatophytes:													
AW	0.08	0.10	0.20	0.41	0.69	0.80	0.76	0.68	0.51	0.31	0.12	0.07	4.73
CW	0.08	0.10	0.21	0.44	0.74	0.84	0.79	0.71	0.53	0.33	0.13	0.07	4.97
Low Veg	0.09	0.10	0.20	0.37	0.61	0.67	0.67	0.59	0.50	0.32	0.14	0.07	4.33
Marsh	0.07	0.08	0.37	0.74	0.92	0.96	0.91	0.82	0.67	0.27	0.07	0.06	5.94
Ms-High	0.08	0.10	0.21	0.43	0.71	0.82	0.77	0.70	0.57	0.38	0.16	0.07	5.00
Sc-ms	0.08	0.10	0.20	0.46	0.81	0.95	0.89	0.80	0.61	0.36	0.14	0.07	5.47
Sc-Low	0.07	0.08	0.14	0.29	0.61	0.77	0.73	0.66	0.54	0.33	0.12	0.05	4.39
Open Water Evaporation [1]	0.30	0.40	0.60	0.60	0.80	0.80	0.80	0.70	0.80	0.70	0.60	0.40	7.50
Precipitation [2]	0.00	0.01	0.03	0.04	0.00	0.00	0.01	0.10	0.04	0.06	0.00	0.09	0.37

Table 14 - Measured Acreages of Crops, Phreatophytes, and Open Water on the Lower Muddy River

	2012 (acres)											
	January	February	March	April	May	June	July	August	September	October	November	December
Bowman Reservoir	108.82	135.32	150.76	154.62	150.76	147.02	147.02	135.32	127.56	112.58	98.20	101.57
Riparian:												
Sc_Low above Wells Siding	261.77	261.77	261.77	261.77	261.77	261.77	261.77	261.77	261.77	261.77	261.77	261.77
AW	7.85	7.85	7.85	7.85	7.85	7.85	7.85	7.85	7.85	7.85	7.85	7.85
CW	6.73	6.73	6.73	6.73	6.73	6.73	6.73	6.73	6.73	6.73	6.73	6.73
Ms-High	7.92	7.92	7.92	7.92	7.92	7.92	7.92	7.92	7.92	7.92	7.92	7.92
Low Veg	16.90	16.90	16.90	16.90	16.90	16.90	16.90	16.90	16.90	16.90	16.90	16.90
Marsh	20.00	20.00	20.00	20.00	20.00	20.00	20.00	20.00	20.00	20.00	20.00	20.00
Sc-Low	97.73	97.73	97.73	97.73	97.73	97.73	97.73	97.73	97.73	97.73	97.73	97.73
Sc/ms	8.94	8.94	8.94	8.94	8.94	8.94	8.94	8.94	8.94	8.94	8.94	8.94
Open Water	2.11	2.11	2.11	2.11	2.11	2.11	2.11	2.11	2.11	2.11	2.11	2.11
Subtotal Below Wells Siding	168.18	168.18	168.18	168.18	168.18	168.18	168.18	168.18	168.18	168.18	168.18	168.18
Total	*429.95*	*429.95*	*429.95*	*429.95*	*429.95*	*429.95*	*429.95*	*429.95*	*429.95*	*429.95*	*429.95*	*429.95*
MVIC Ag:												
Alfalfa	248.56	248.56	248.56	248.56	333.47	333.47	333.47	333.47	333.47	149.45	149.45	149.45
Small Vegetables	3.26	3.26	3.26	3.26	3.26	3.26	3.26	3.26	3.26	3.70	3.70	3.70
Bermuda w/ Rye	88.69	88.69	88.69	88.69	303.07	303.07	303.07	303.07	303.07	188.91	188.91	188.91
Orchard	27.10	27.10	27.10	27.10	28.10	28.10	28.10	28.10	28.10	28.10	28.10	28.10
Melons (Fall)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Small Grain	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Moist Soil Unit	0.00	0.00	0.00	0.00	10.54	10.54	10.54	10.54	10.54	0.00	0.00	0.00
Total	*367.62*	*367.62*	*367.62*	*367.62*	*678.45*	*678.45*	*678.45*	*678.45*	*678.45*	*370.16*	*370.16*	*370.16*
OWMA:												
Alfalfa	31.67	31.67	31.67	31.67	52.35	52.35	52.35	52.35	52.35	40.07	40.07	40.07
Small Grain	0.00	0.00	0.00									
Seasonal Wetland	155.16	155.16	155.16	155.16	0.00	0.00	0.00	0.00	0.00	155.16	155.16	155.16
Sudan	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	31.02	31.02
Open Water	31.88	31.88	31.88	31.88	31.88	31.88	31.88	31.88	31.88	31.88	31.88	31.88
Total	*218.71*	*218.71*	*218.71*	*218.71*	*84.23*	*84.23*	*84.23*	*84.23*	*84.23*	*227.11*	*258.13*	*258.13*

Table 15 - Acre-Foot Values for Consumptive Uses of Crops, Phreatophytes, and Open Water on the Lower Muddy River

	2012 (af)												
	January	February	March	April	May	June	July	August	September	October	November	December	Total
Bowman Reservoir	32.65	53	87	87	121	118	116	81	97	72	59	32	954
Riparian:													
Sc_Low above Wells Siding	18.32	20.94	36.65	75.91	159.68	201.56	191.09	172.77	141.36	86.38	31.41	13.09	1,149
AW	0.63	0.78	1.57	3.22	5.42	6.28	5.96	5.34	4.00	2.43	0.94	0.55	37
CW	0.54	0.67	1.41	2.96	4.98	5.65	5.32	4.78	3.57	2.22	0.87	0.47	33
Ms-High	0.63	0.79	1.66	3.40	5.62	6.49	6.10	5.54	4.51	3.01	1.27	0.55	40
Low Veg	1.52	1.69	3.38	6.25	10.31	11.33	11.33	9.97	8.45	5.41	2.37	1.18	73
Marsh	1.40	1.60	7.40	14.80	18.40	19.20	18.20	16.40	13.40	5.40	1.40	1.20	119
Sc-Low	6.84	7.82	13.68	28.34	59.62	75.25	71.34	64.50	52.77	32.25	11.73	4.89	429
Sc/ms	0.71	0.89	1.79	4.11	7.24	8.49	7.95	7.15	5.45	3.22	1.25	0.63	49
Open Water	0.63	0.82	1.21	1.19	1.69	1.69	1.66	1.26	1.60	1.36	1.26	0.66	15
Subtotal Below Wells Siding	13	15	32	64	113	134	128	115	94	55	21	10	795
Total	**31**	**36**	**69**	**140**	**273**	**336**	**319**	**288**	**235**	**142**	**53**	**23**	**1,944**
MVIC Ag:													
Alfalfa	54.68	80.95	103.15	139.19	226.76	243.44	230.10	220.09	186.74	57.89	37.36	33.63	1,614
Small Vegetables	0.98	1.13	1.39	0.49	-	-	-	-	0.26	0.54	0.74	0.76	6
Bermuda w/ Rye	23.95	27.11	32.37	24.83	193.97	209.12	200.03	187.90	145.47	39.17	49.12	36.84	1,170
Orchard	4.06	4.76	7.45	12.19	18.55	19.67	18.83	17.99	14.33	10.32	7.03	3.79	139
Melons (Fall)	-	-	-	-	-	-	-	-	-	-	-	-	-
Sm Grain	-	-	-	-	-	-	-	-	-	-	-	-	-
Moist Soil Unit	-	-	-	-	6.96	7.38	7.06	6.75	5.38	-	-	-	-
Total	**83.67**	**114**	**144**	**177**	**446**	**480**	**456**	**433**	**352**	**108**	**94**	**75**	**2,963**
OWMA:													
Alfalfa	6.97	10.31	13.14	17.74	35.59	38.21	36.12	34.55	29.31	15.52	10.02	9.02	256
Small Grain	-	-	-	-	-	-	-	-	-	-	-	-	-
Seasonal Wetland	48.10	55.19	56.63	52.75	-	-	-	-	-	66.31	45.00	31.81	356
Sudan	-	-	-	-	-	-	-	-	-	-	6.20	6.36	13
Open Water	9.56	12.41	18.33	17.93	25.50	25.50	25.13	19.10	24.20	20.51	19.13	9.96	227
Total	**65**	**78**	**88**	**88**	**61**	**64**	**61**	**54**	**54**	**102**	**80**	**57**	**852**

Industrial Consumptive Use

A portion of MVIC's shares have been purchased and leased by Simplot, a sand and minerals operation in Overton, Nevada, which is using the water represented by shares they control for slurrying and washing sand for glass production. The water is 100% consumptively used, so the water represented by the shares controlled by Simplot is subtracted in its entirety from the water balance.

In 2012, Simplot controlled up to 215.67 preferred and 287.67 common shares (personal communication with Scott Millington, MVIC General Manager, May 2012). Using the acre-foot per share values of 5.9813 af/share preferred and 0.5046 af/share common, Simplot consumptively used 1,435 af of MVIC water in CY 2012. While the water delivered to Simplot is not directly measured, they are located at the end of the ditch and are subject to all users upstream obtaining their rights. Even SNWA's rights are taken on turn and returned to the natural channel above Simplot. Therefore, calculating their use at 100% of their controlled shares ensures a conservative estimate for their annual use. The monthly breakdown of Simplot's consumptive use is shown in Row E of the Water Budget Table 17.

Total Flows Passing Lewis Avenue Gage

Lewis Avenue in Overton is generally considered to be the lower most extent of agricultural uses within MVIC's service area. The OWMA is located downstream of the Lewis Avenue gage and abuts Lake Mead. Discharge data for CY 2012 at the Lewis Avenue gage is shown in Table 16 (data is provisional from October through December), which measured approximately 20,971 af in CY 2012. The flow data from this gage was not filtered for flood flows since the flow data only represents an intermediate measurement point between the Glendale gage and Lake Mead and is not a direct input into the water balance.

Table 16 – Lewis Avenue Gage Record for CY 2012

09419507 Muddy River at Lewis Avenue at Overton, NV - Units cfs													
Day	Jan-12	Feb-12	Mar-12	Apr-12	May-12	Jun-12	Jul-12	Aug-12	Sep-12	Oct-12	Nov-12	Dec-12	Total
1	40	14	11	22	22	34	27	22	17	35	38	27	
2	42	16	12	32	33	30	25	28	37	36	34	28	
3	42	15	14	36	33	28	16	15	37	31	29	25	
4	45	15	16	33	33	21	14	35	34	30	22	25	
5	45	17	19	30	29	10	16	35	31	28	29	34	
6	37	15	21	28	21	13	30	32	27	18	41	39	
7	20	13	18	28	13	32	32	37	17	12	42	38	
8	21	8	13	27	13	33	30	38	14	27	42	37	
9	19	11	16	24	33	30	27	15	31	35	34	37	
10	13	12	16	37	35	26	24	12	39	35	35	35	
11	12	15	15	33	30	23	17	32	72	35	23	33	
12	7	19	20	33	28	14	15	31	637	42	23	37	
13	11	24	17	33	26	14	31	30	49	28	37	38	
14	15	24	19	35	14	27	32	31	27	25	39	41	
15	12	23	18	33	11	24	31	29	22	36	40	43	
16	16	20	16	33	29	24	31	17	36	39	39	44	
17	15	15	11	27	32	24	33	12	39	42	46	40	
18	12	18	10	31	29	22	15	27	33	39	44	43	
19	10	19	22	34	27	14	15	37	32	36	41	42	
20	5	17	22	32	28	16	23	42	30	30	41	43	
21	14	14	21	29	15	23	35	31	18	23	38	42	
22	16	13	17	21	10	27	34	57	13	25	41	42	
23	16	17	18	15	21	31	26	64	18	34	42	42	
24	15	13	15	24	30	25	27	45	34	36	41	42	
25	14	8	14	33	30	26	17	34	37	36	41	41	
26	15	15	30	34	28	13	12	38	34	34	40	42	
27	13	16	39	32	29	8	17	36	31	33	36	38	
28	17	34	37	32	19	14	29	34	22	24	34	36	
29	22	27	38	27	12	27	31	36	15	23	35	36	
30	19	--	38	19	23	29	29	26	17	41	34	37	
31	18	--	33	--	34	--	30	16	--	41	--	38	
					4								
Mean	20	17	20	30	25	23	25	31	50	32	37	38	
Cnt	31	29	31	30	31	30	31	31	30	31	30	31	
Min	5	8	10	15	10	8	12	12	13	12	22	25	
Max	45	34	39	37	35	34	35	64	637	42	46	44	
Acre Feet	**1,230**	**965**	**1,241**	**1,760**	**1,530**	**1,352**	**1,529**	**1,930**	**2,980**	**1,960**	**2,184**	**2,310**	**20,971**

Overton Wildlife Management Area

The OWMA is located just above the Muddy River's confluence with Lake Mead, downstream of the Lewis Avenue gage. OWMA is managed for migrating birds, hunting, and most recently, a refugia for Razorback suckers in a small impoundment called Honey Bee Pond. The managed part of the facility, located above Lake Mead, is about 280 acres in size and consists of a series of seasonal wetlands that are flooded in the winter for migrating waterfowl, along with several fields of Alfalfa, Sudan grass, and Bermuda grass for bird habitat and minor farming, along with Honey Bee Pond and a couple other small impoundments.

The OWMA receives most of its water directly from the Muddy River and is permitted to do so under tail-water permits. In addition to the tail-water rights, OWMA owns shares in MVIC. In 2012, OWMA owned 347 afy of MVIC rights represented by 51.25 preferred and 80.50 common shares (personal communication with Scott Millington, MVIC General Manager, May 2012). MVIC water delivered to OWMA is diverted at Wells Siding and travels via ditch to OWMA, therefore bypassing the Lewis Avenue gage.

The managed area of OWMA above Lake Mead uses approximately 852 afy (Row P of Table 17) in addition to the 347 afy from MVIC shares, based on the type of vegetation/management practices for OWMA lands above Lake Mead. Aerial photography and discussions with OWMA management were used to determine the appropriate LCRAS Vegetation ET rates to apply to the managed areas.

Flows Entering Lake Mead and SNWA Tributary Conservation ICS

After the OWMA consumptive uses from the Muddy River are subtracted from the total flows measured at the Lewis Avenue gage, the total outflows to Lake Mead as both surface- and under-flows can be derived (Row Q of Table 17). As outlined in Table 17, 23,652 af of Muddy River water entered Lake Mead in CY 2012. In CY 2012, SNWA controlled 17,313 af of Muddy River water rights (Row T).

In addition, SNWA delivered 3,918 af of Coyote Spring Valley Imported ICS (Imported) water to the Lower Muddy River for conveyance to Lake Mead (Row U). Since the Imported water is discharged into the Lower Muddy River at Bowman Reservoir (Row J), it must be accounted for in the water balance of the Lower Muddy River in Table 17. The total amount of SNWA Muddy River and Imported rights is totaled in Row V. More detail of SNWA's Coyote Springs Imported ICS Project is provided in the separate report titled *Coyote Spring Valley Imported Intentionally Created Surplus Certification Report Calendar Year 2012*.

The difference between the total outflows to Lake Mead and Tributary Conservation and Imported rights held by SNWA is 2,421 af (Row W). Since SNWA's rights fall within the total flow volume of water reaching Lake Mead, SNWA created Tributary Conservation ICS with the full volume of rights owned and controlled on the Muddy River – 17,313 af prior to overrun payback and the one-time deduction of 5% for the benefit of additional system storage in Lake Mead.

Table 18 applies the results shown in Table 17 in the format of the Water Balance from Exhibit A of the Forbearance Agreement.

Table 17 - 2012 Muddy River Intentionally Created Surplus Water Balance Sheet

2012 Muddy River Intentionally Created Surplus Water Balance Sheet (all units in Acre-Feet)						
		Winter (Jan - Apr)	Summer (May-Sep)	Winter (Oct-Dec)	Total	Row Reference
Total Inflows To Lower Muddy River	Muddy River at Glendale Gage	9,910.00	11,300.00	6,960.00	28,170.00	A
	Phreatophyte Consumptive Use to Wells Siding	151.83	866.46	130.89	1,149.17	B
	Leased Upper Muddy River Water Rights	3,517.91	3,522.59	2,888.65	9,929.15	C
	Acre-feet per Share Basis	**6,240.26**	**6,910.95**	**3,940.47**	**17,092**	D = A - B - C
Consumptive Uses Above Lewis Avenue	Simplot	512.93	537.48	384.70	1,435.12	E
	MVIC Crop Use	518.70	2,166.77	277.18	2,962.65	F
	Bowman Reservoir Evaporation	258.97	532.04	163.09	954.10	G
	Phreatophyte Consumptive Use (Wells Siding to Lake Mead)	124.37	584.23	86.52	795.12	H
	MVIC Consumptive Uses above Lewis Ave	1,414.97	3,820.52	911.49	6,147	I = E + F + G + H
Bowman Reservoir Operations						
	Coyote Springs Imported ICS	351.48	2,253.06	1,313.77	3,918	J
	Net Muddy River Water In (+) or Out (-) of Bowman	1,725.57	(3,240.51)	(2,114.42)	(3,629)	K
	Total Change in Bowman Reservoir Storage	2,077.05	(987.44)	(800.66)	289	L=J+K
Outflows from MVIC Service Area	Total Calculated Flows Passing Lewis Avenue	6,617.64	9,853.53	8,032.05	24,503	M=A-B-I+J-L
	Flows Measured at USGS Lewis Avenue Gage	5,196.00	9,321.00	6,454.00	20,971	N
	Calculated Unmeasured Sub-Surface Flows	1,421.64	532.53	1,578.05	3,532	O=M-N
	Total Calculated Flows Passing Lewis Avenue	**6,618.00**	**9,854.00**	**8,032.00**	**24,504**	M
Overton Wildlife Management Area Water Use	OWMA Consumptive Use	319.07	293.23	239.83	852	P
	Total Flows to Lake Mead	6,298.93	9,560.77	7,792.17	23,652	Q=M-P
SNWA Water Rights	Upper Muddy River Water Rights	3,517.91	3,522.59	2,888.65	9,929	R
	MVIC Rights	2,801.66	2,812.76	1,769.13	7,384	S
	Muddy River Water Rights Controlled by SNWA	**6,319.57**	**6,335.35**	**4,657.78**	**17,313**	T
	Coyote Spring Imported ICS	351.48	2,253.06	1,313.77	3,918	U
	Total Muddy River and Coyote Spring Water Rights Controlled by SNWA	**6,671.05**	**8,588.42**	**5,971.55**	**21,231**	V=T+U
Flow Check	Difference Between total Flows to Lake Mead and SNWA Water Rights	(372.12)	972.35	1,820.63	2,421	W=Q-V
	Is conservation > than SNWA rights	Yes	Yes	Yes	Yes	Q > V

Table 18 - Exhibit A from the Forbearance Agreement with CY 2012 Results

	Water Balance from Exhibit A of Forbearance Agreement with CY 2012 Data (afy)	
	Flows measured by USGS at the Glendale gage	28,170
-	consumptive uses by agriculture below the Glendale gage	(4,625)
-	direct uses by industry below the Glendale gage	1,435
-	channel evapotranspiration below Glendale gage to Lake Mead	2,898
-	evapotranspiration from the managed acreage on the Overton Wildlife Management Area (OWMA)	852
=	Total Flow to Lake Mead (Elevation 1,220 AMSL)	27,609
-	Total Muddy River Water Rights Controlled by SNWA	**17,313**
=	**Total Flows to Lake Mead are greater than SNWA Water Rights** ---------->	**YES**

References

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