

# Colorado River Basin Salinity Control Program: Utah Units Monitoring and Evaluation Report, FY2016

USDA, Natural Resources Conservation Service

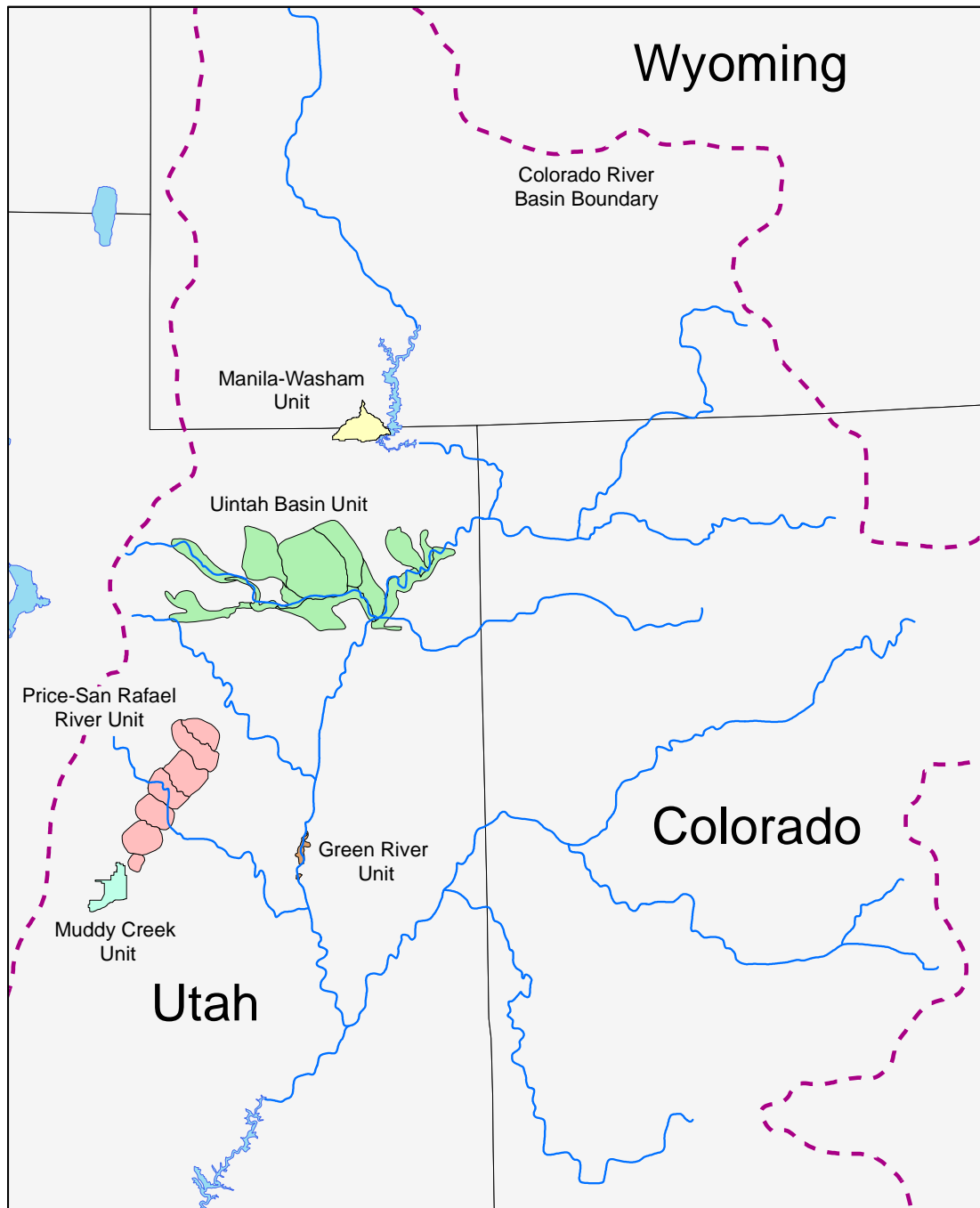


Figure 1: Salinity Unit Map

## **Salinity Control Project Overview**

It is estimated that in the 1960's more than two-thirds of water taken from the Colorado River was used to irrigate agricultural lands. Excessive deep percolation from flood irrigation (a common irrigation practice in the west) dissolves salt from saline soils commonly found in the Upper Colorado River Basin. Highly saline groundwater eventually returns to the Colorado River increasing its salinity. Elevated salinity in the river results in significant damage to agricultural, municipal, and industrial users in the Lower Colorado River Basin.

The Colorado River Basin Salinity Control Act (SCA) of 1974 authorized federal funding of salinity control projects to manage salinity in the Colorado River. Salinity studies determined that irrigation system improvements that increase irrigation efficiencies (thus reducing deep percolation), both on-farm and off-farm, are the most economical salinity control. In Utah five Salinity Control Units were facilitated through the Salinity Control Act (PL-93-320) and subsequent legislation authorizes the USDA Soil Conservation Service, now the Natural Resources Conservation Service (NRCS), to implement and manage salinity control throughout the Colorado River Basin. (See Appendix 1) The Uintah Basin Unit was established in 1982, Price-San Rafael Rivers Unit in 1997, Manila-Washam Unit in 2007, Green River Unit in 2010 and Muddy Creek Unit in 2010. (Figure 1: Salinity Unit Map)

USDA/NRCS initiated a funding program to promote irrigation system improvements on the land to reduce deep percolation and subsequent salt loading in the Colorado River. The Colorado River Salinity Control Forum (CRSCF), through Basin States funding, has supported many special projects in the designated salinity units. In 2010 CRSCF recommended to the NRCS that irrigation improvement work should include Basin State Funding for small individual projects in areas of the Colorado River basin not included in the established Units. These projects became known as Out-of-Project Units-Tier 2 improvement projects and are funded based on their predicted salinity control savings in tons per year of salt reduction.

### **Achievement Summary**

The Price San Rafael and Uintah Basin units, the largest and oldest units in the salinity area, have achieved over 90% of their projected acreage implementation goals (Figure 2: Acres Treated, FY 2016). The Green River, Manila-Washam, and Muddy Creek units, while proportionally incomplete, are relatively small. In all, a combined total of 211,960 acres of farmland have been goaled for treatment under the salinity control program in the state of Utah. Approximately 199,000 acres (94% of the goaled total acreage) have been treated to date. Estimated cumulative salt removal has lagged behind acreage (Figure 3: Salt Savings, FY 2016).

Figure 2: Acres Treated, FY 2016

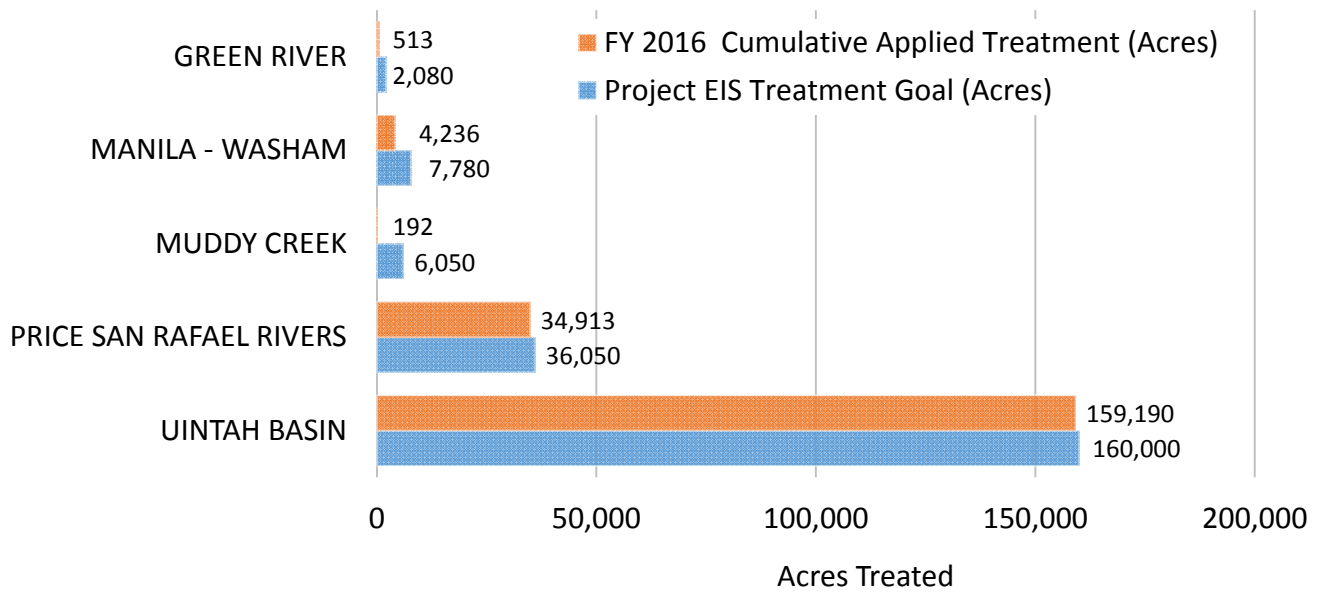
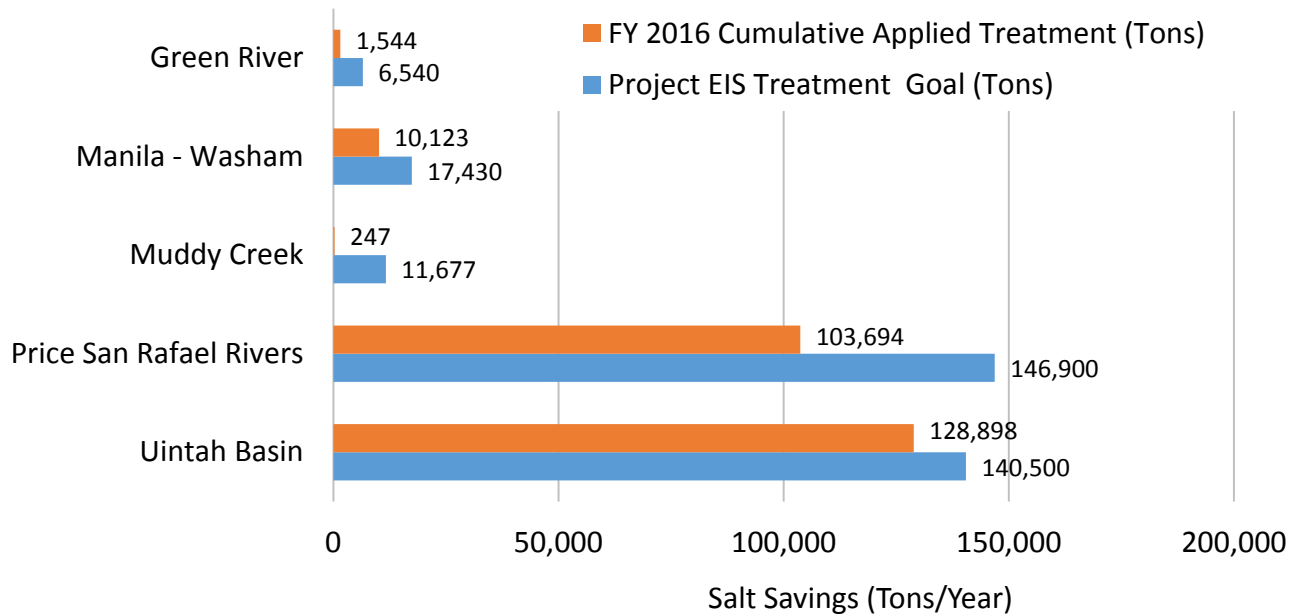


Figure 3: Salt Savings, FY 2016



## Applications and Contracts

In FY2016 the NRCS received new applications to the salinity control program and obligated new contracts at rates in line with historic trends (See Table 1: Salinity Control Units Applications and Contracting, FY2016). There has been some decline in interest in the past couple years; likely due to the negative economic impact on the region from challenges in the energy extraction economy.

Table 1: Salinity Control Units Applications and Contracting, FY2016

Project Unit	New Applications**	Contracts Obligated***	Contract Costs	Contract Area
			\$	Acres
Green River	4	2	\$340,581	244
Green River Wildlife	0	0	\$0	0
Manila – Washam	5	3	\$479,156	250
Manila - Washam Wildlife	0	0	\$0	0
Muddy Creek	1	1	\$398,081	159
Muddy Creek Wildlife	0	0	\$0	0
Price - San Rafael Rivers	44	28	\$1,950,825	988
Price - San Rafael Wildlife	3	1	\$21,421	5
Uintah Basin	94	36	\$1,827,370	906
Uintah Basin Wildlife	1	1	\$10,897	11.5
Tier 2*	0	0	\$0	0
<b>Total</b>	<b>149</b>	<b>70</b>	<b>\$ 5,029,089</b>	<b>2,564</b>

\*Projects outside of salinity units. Tier 2 Projects are not required to provide offsetting wildlife habitat.

\*\* Applications received during the fiscal year

\*\*\* Contracts obligated under the EQIP program during the fiscal year

The Muddy Creek Unit has obligated approximately 2% of the EIS goaled treatment acreage annually. The Muddy Creek and Green River units both obligate approximately 6-7% of their EIS goaled treatment acreage annually. This disparity may be due to the fact that the Muddy Creek Canal, which delivers municipal and irrigation water to the community of Emery, UT, has yet to be piped. It is more desirable to operate sprinkler systems connected to piped conveyances than open channel canals. As described in the Muddy Creek unit section of this report it is possible that the canal could be piped in the near future resulting in increased demand for sprinkler systems.

Off-farm canal improvements in the Vernal, UT area could also increase demand in the Uintah Basin unit on approximately 3,000 acres (see the Uintah Basin section of this report).

## Wildlife Habitat Replacement

The Salinity Control Act EA requires voluntary replacement of wildlife habitat values foregone as a result of irrigation improvements within the designated project units. To be concurrent and proportional NRCS and U.S. Fish and Wildlife Service have agreed that wildlife habitat replacement shall be greater than 2% of the cumulative irrigation improvement acres for each project unit. NRCS continues to promote wildlife habitat replacement. See Table 2: Salinity Wildlife Habitat Replacement.

Table 2: Salinity Wildlife Habitat Replacement

Project Unit	Habitat Replacement Goal*	Cumulative Habitat Applied	Current Status of Habitat Required	Habitat Surplus/ (Deficit)	Habitat in Active Contracts
	Acres	Acres	%	Acres	Acres
<b>Green River</b>	10	0	0%	(10)	0
<b>Manila - Washam</b>	85	12	14%	(73)	2
<b>Muddy Creek</b>	4	9	234%	5	0
<b>Price San RaFael Rivers</b>	698	3,365	482%	2,667	5
<b>Uintah Basin (Amended)</b>	3,184	21,349	671%	18,165	5

\* Habitat Replacement Goal shown is 2% of the improvement acres completed to date.

## Economic Impacts

The regional economic impact of the salinity program has been studied and reported in previous monitoring and evaluation reports. The salinity program is assumed to impact the region much the same as it has in the past.

# Utah Salinity Unit Progress Reports

## Green River Unit

The Green River, Utah Salinity Control Unit (GR) straddles the Green River and the county line between Emery and Grand Counties including 4,000 agricultural acres irrigated with water diverted from the Green River. This area is approximately 3 miles east to west and 16 miles north to south. Water diverted to irrigate cropland and pasture deep percolates through the Cretaceous marine deposits dissolving and transporting salts to the river system.

The Green River Unit was established by a 2009 Environmental Assessment (EA) with a Finding of No Significant Impact (FONSI). The first USDA projects were funded in FY 2010. Salt load reduction is achieved by improving irrigation efficiency and reducing deep percolation. The 2009 EA anticipated treating 2,080 acres, controlling 6,540 tons/year of salt at a cost of \$115/ton.

During FY 2016 NRCS treated 264 acres, controlling 859 tons of salt annually at a cost of \$16/ton. Cumulative through FY 2016 NRCS has treated 478 acres (23% of the project goal), controlling 1,544 tons of salt annually on-farm at a cost of \$20/ton (2016 dollars).

In FY 2016 no wildlife habitat replacement has taken place in the Manila-Washam Unit. Total habitat replacement through FY 2016 is 0 acres of 10 acres required to be concurrent and proportional.





## Manila – Washam Unit

The Manila-Washam Salinity Control Unit (MW) located on the north slope of the Uinta Mountains, encompasses 11,100 agricultural acres irrigated with water diverted from tributaries to Flaming Gorge Reservoir in Daggett County, Utah. The irrigated portion of the area is approximately 20 miles east to west and 8 miles north to south. Water diverted to irrigate cropland and pasture deep percolates through Tertiary Lacustrine deposits in the south and Cretaceous marine Mancos Shale deposits in the north dissolving and transporting salts to the river system.

Manila-Washam was established by a 2006 Environmental Assessment (EA) with a Finding of No Significant Impact (FONSI). NRCS first funded salinity control projects in FY 2007. Salt load reduction is achieved by improving irrigation efficiency and reducing deep percolation. The 2006 EA anticipated treating 7,780 acres, controlling 17,430 tons of salt annually at a cost of \$98/ton.

During FY 2016 NRCS treated 250 acres, controlling 602 tons of salt annually at a cost of \$41/ton. Through FY 2016, NRCS has treated 4,236 acres (54% of the project goal), controlling 10,123 tons of salt annually on-farm at a cost of \$65/ton (2016 dollars). Approximately 3,545 acres (46% of the project goal) remains to be treated.

In FY 2016 no salinity related wildlife habitat replacement took place in Manila-Washam Unit. Total habitat replacement through FY 2016 is 12 acres required to be concurrent and proportional.



## Muddy Creek Unit

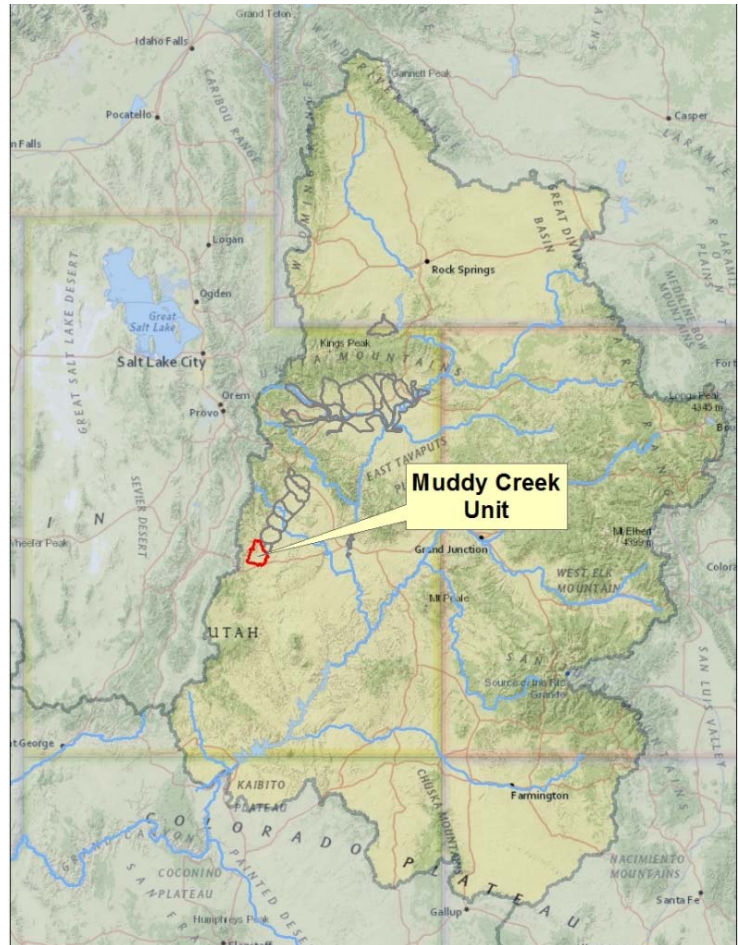
The Muddy Creek Salinity Control Unit (MC) located in the southern portion of Emery County, Utah, includes 6,050 agricultural acres irrigated with water diverted from Muddy Creek and its tributaries. The Unit is approximately 13 miles east to west and 17 miles north to south. Water diverted to irrigate cropland and pasture deep percolates through Cretaceous marine deposits dissolving and transporting salts to the river system.

Muddy Creek Unit was established by a 2004 Environmental Assessment (EA) with a Finding of No Significant Impact (FONSI). The first NRCS projects were funded in FY 2010. Salt load reduction is achieved by improving irrigation efficiency and reducing deep percolation. The 2004 EA anticipated treating 6,050 acres, controlling 11,677 tons of salt annually at a cost of \$153/ton.

During FY 2016 NRCS did not complete any irrigation improvement projects in the unit. Through FY 2016, NRCS has treated 192 acres (3% of the project goal), controlling 253 tons of salt annually on-farm at a cost of \$144/ton (2016 dollars). Of the original 6,050 acres to be treated, another 5,858 acres (97% of the project goal) remains to be treated.

It is likely that a lack of pressurized irrigation water supply is contributing to low demand for sprinkler systems in the Unit. The Muddy Creek Canal, which delivers municipal and irrigation water to the community of Emery, UT, has yet to be piped. It is more desirable to operate sprinkler systems connected to piped conveyances than open channel canals. Local officials anticipate receipt of mine offset funding from the Southern Utah Fuel Company (SUFCO) mine that could potentially be used to pipe the canal. Additional funding would likely be required to complete the project, however, and a source of funding would need to be secured. Applications to the salinity control program would likely increase in the Muddy Creek unit if the canal is piped.

In FY 2016 no wildlife habitat replacement has taken place in the Price San Rafael Unit. Total habitat replacement through FY 2016 is 9 acres of 4 acres required to be concurrent and proportional.





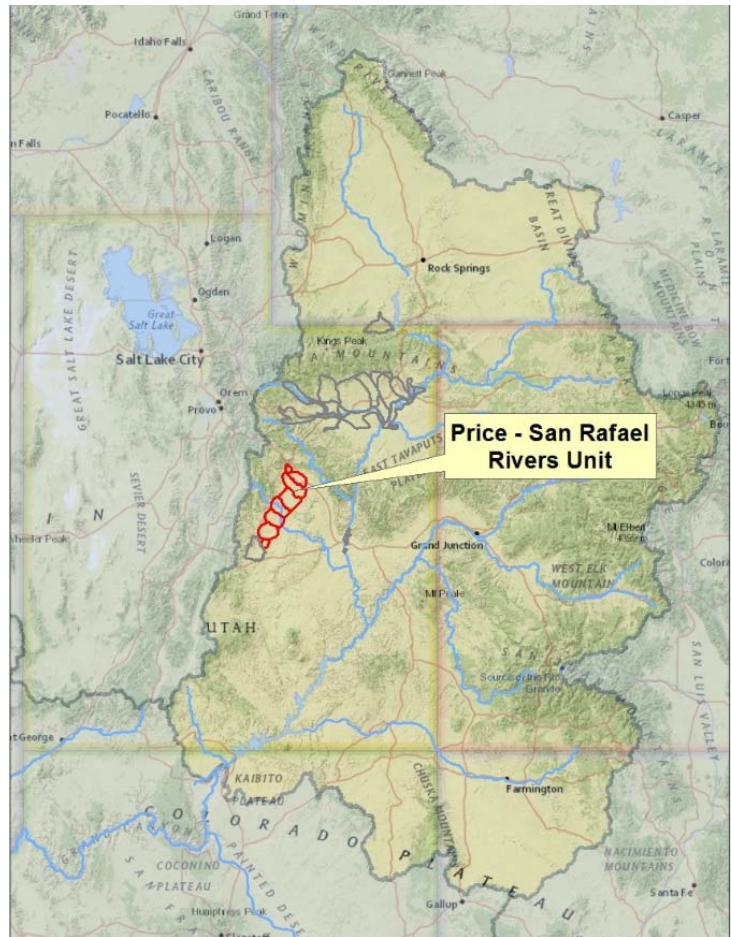
## Price San Rafael Rivers Unit

The Price San Rafael Rivers Unit (PSR) is located in east central Utah and encompasses 66,450 agricultural acres of irrigated land. Water is diverted for irrigation from tributaries of the Price and San Rafael Rivers in Carbon and Emery Counties. Irrigation water diverted to grow crops deep percolates through the surface soil originating from Cretaceous marine Mancos Shale deposits dissolving and transporting salts back into the river system.

In 1993 an Environmental Impact Statement (EIS) prepared jointly by U.S. Bureau of Reclamation (USBR) and Soil Conservation Service (now NRCS), established the PSR Salinity Control Unit. The first salinity control projects in the PSR were funded in FY1996. Salt load reduction is achieved by improving irrigation efficiency to reduce deep percolation in saline soils. The 1993 EIS anticipated treating 36,050 acres, controlling 146,900 tons of salt annually on-farm salt at a cost of \$65/ton.

During FY 2016 NRCS treated 1,233 acres, controlling 3,473 tons of salt annually at a cost of \$62/ton. Through FY 2016 NRCS has treated 34,913 acres, controlling 103,694 tons of salt annually on-farm at a cost of \$52/ton (2016 dollars). The PSR is goaled to treat 36,050 acres; 1,137 acres (3% of the project goal) remain to be treated.

In FY 2016 13 acres of wildlife habitat replacement has taken place in the Price San Rafael Unit. Total habitat replacement through FY 2016 is 3,365 acres of 696 acres required to be concurrent and proportional.



## Uintah Basin Unit

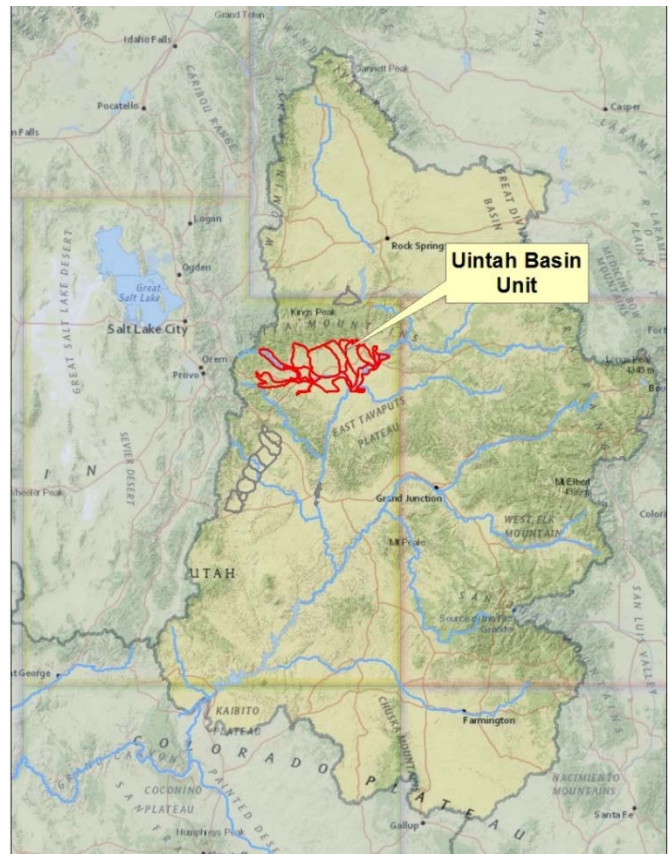
The Uintah Basin Salinity Control Unit (UB) located in northeastern Utah, encompasses 225,000 irrigated agricultural acres irrigated with water diverted from tributaries of the Duchesne and Green Rivers south of the Uinta Mountains and north of Ouray, Utah. This area is approximately 95 miles east to west by 40 miles north to south. Water diverted to irrigate cropland and pasture deep percolates through Tertiary saline lacustrine deposits transporting dissolved salts to the river system.

The 1974 SCA named four specific salinity control projects (Paradox Valley Unit, Grand Valley Unit, Crystal Geyser Unit, Las Vegas Wash Unit) which directed expedited planning reports for irrigation source control in Uinta Basin (UB), Lower Gunnison, Colorado River Indian Reservation, and Palo Alto Irrigation District. After multiple studies, UB was established by a 1982 environmental impact statement, although USDA funding of salinity control projects started in 1980 using grant programs already in place. Salt load reduction is achieved by improving irrigation efficiency and reducing deep percolation. The 1982 EIS anticipated treating 122,200 acres, controlling 76,600 tons of salt annually at a cost of \$197/ton (2014 dollars). Initial success of the program resulted in the preferred treatment shifting from improved flood to more efficient sprinkler systems. A second EIS was written in 1991 expanding UB. It is now expected that more than 160,000 (70% of the original 225,000 irrigated acres) will ultimately be treated.

During FY 2016 NRCS treated 906 acres, controlling 592 tons of salt annually at a cost of \$100/ton. Through FY 2016 NRCS has treated 159,190 acres, controlling 156,801 tons of salt annually on-farm at a cost of \$143/ton (2016 dollars). Of the original 160,000 acres to be treated 811 acres (about 0.5% of the original project goal) remain to be treated.

In the past piping canals has led to increased interest in sprinkler systems. In the Vernal area the Whiterocks-Mosby, Ashley Upper-Highline, and Rockpoint canal systems are currently in the process of being piped and will likely result in additional demand for on-farm improvements on 3,000 acres.

In FY 2016 no wildlife habitat replacement was completed in the Uintah Basin Unit. Total habitat replacement through FY 2016 is 21,349 acres of 3,184 acres required to be concurrent and proportional.



## **Contact Information**

For additional information on the Colorado River Salinity Control Program USDA – NRCS Utah for the Green River Unit, Manila-Washam Unit, Muddy Creek Unit, Price San Rafael Rivers Unit, and Uintah Basin Unit visit:

USDA – NRCS Web site: [www.nrcs.usda.gov/wps/portal/nrcs/detail/ut/programs/financial/equip/](http://www.nrcs.usda.gov/wps/portal/nrcs/detail/ut/programs/financial/equip/)

Bureau Reclamation web site: [www.usbr.gov/uc/progact/salinity/](http://www.usbr.gov/uc/progact/salinity/)

Also search the internet under USDA Monitoring & Evaluation Reports for Salinity Projects for each one of the five Units reports “Unit name UT – 2016”.

Other information needed please contact:

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## **APPENDIX 1. Summary of legislation providing authority to USDA to conduct Colorado River Basin Salinity Control activities**

### **First Legislation**

#### **Public Law (PL) 93-320 “Colorado River Basin Salinity Control Act, June 6, 1974 (SCA)**

**Title II-Measures Upstream from Imperial Dam Section 201.** *(c) In conformity with section 201(a) of this title and the authority of the Environmental Protection Agency under Federal Laws, the Secretary (of Interior), the Administrator of the Environmental Protection Agency, and the Secretary of Agriculture are directed to cooperate and coordinate their activities effectively to carry out the objective of this title.”*

The Secretary of the Interior is directed in **Section 202** to construct four salinity control units: (1) The Paradox Valley unit, Montrose County, Colorado, (2) The Grand Valley Unit, Colorado, (3) the Crystal Geyser Unit, Utah and (4) the Las Vegas Wash Unit, Nevada.

### **First USDA Project**

The Grand Valley unit would include all measures to reduce seepage from canals and laterals as well as limiting excess water application to irrigated lands. *“The Secretary (of Interior) will enter into agreement with the Secretary of Agriculture to develop a unified control plan for the Grand Valley unit. The Secretary of Agriculture is directed to cooperate in the planning and construction of on-farm systems measures under programs available to that Department.”* This language provided the first authority for USDA to conduct Colorado River Basin salinity control activities. USDA used its authority provided in the Food and Agriculture Act of 1977. Title XV. Section 1501 – **the Agricultural Conservation Program (ACP)**.

### **Projects Planned**

The **(SCA) Section 203**, also authorized and directed the Secretary (of Interior) to expedite planning reports for (a) Irrigation source control: Lower Gunnison, Uinta Basin, Colorado River Indian Reservation, Palo Verde Irrigation District (b) Point source control: LaVerkin Springs, Littlefield Springs, Glenwood-Dotsero Springs and (c) Diffuse source control: Price River, San Rafael River, Dirty Devil River, McElmo Creek, Big Sandy River. USDA cooperated with USDI in the preparation of all of these reports.



## CRSC Program Created

**PL98-569 “Colorado River Basin Salinity Control Act, Amendment.** October 30, 1984, provided that (c)(1) *“The Secretary of Agriculture may establish a voluntary cooperative salinity control program with landowners to improve on-farm water management and reduce watershed erosion on non-Federal lands and on lands under the control of the Department of Agriculture for the purpose of assisting in meeting the objective of this title. (2) In carrying out such program, the Secretary of Agriculture shall-*

- (A) *identify salt-source areas and determine the salt load resulting from irrigation and watershed management practices;*
- (B) *develop, in consultation with the public and affected governmental interests, plans for implementing measures that will reduce the salt load of the Colorado River by improving on-farm irrigation water management including improvement of related laterals and by improving watershed erosion management practices, such measures to include voluntary replacement of incidental fish and wildlife values foregone;*
- (C) *provide technical and cost-sharing assistance for the voluntary implementation of plans through contracts and agreements with individuals or groups of owners and operators of farms, ranches, and other lands as well as with local governmental and nongovernmental entities such as irrigation districts and canal companies, except that a portion of the costs of implementing such plans shall be shared by the participants on the basis of benefits received and other appropriate factors, as determined by the Secretary of Agriculture, and except that such contracts and agreements shall provide for continuing operation and maintenance of measures installed under this subsection, including measures to replace incidental fish and wildlife values foregone, with additional cost-sharing assistance;*
- (D) *provide continuing technical assistance for irrigation water management as well as monitoring and evaluation of changes in salt contributions to the Colorado river to determine program effectiveness;*
- (E) *carry out related research, demonstration, and education activities; and*
- (F) *in entering into contracts or agreements pursuant to section 202©(2)©, require a minimum of 30 per centum cost-sharing contribution from individuals or groups of owners and operators of farms, ranches, and other lands as well as from local governmental and nongovernmental entities such as irrigation districts and canal companies, unless the Secretary finds in his discretion that such cost-sharing requirement would result in a failure to proceed with needed on-farm measures.”*

## **New Projects Approved**

This **SCA amendment** led to the establishment of USDA's **Colorado River Salinity Control Program (CRSCP)**. Under this program, six project areas were planned and authorized: Grand Valley, Lower Gunnison, McElmo Creek, Colorado; Uinta Basin, Price-San Rafael Rivers, Utah; and Big Sandy River, Wyoming. Each project area is described by its respective environmental impact statement (EIS) except the Lower Gunnison and Uinta Basin which are included in a single, combined EIS.

**PL104-127 the Federal Agricultural Improvement and Reform Act of 1996**, April 4, 1996, Section 336(c) amended the **Salinity Control Act** and established a new authority for USDA, i.e. the **Environmental Quality Incentives Program**.

## **EQIP Created**

*“(c) COLORADO RIVER BASIN SALINITY CONTROL PROGRAM- (I) IN GENERAL-Section 202 of the Colorado River Basin Salinity Control Act (43 U.S.C. 1592) is amended by striking subsection (c) and inserting the following: (c) SALINITY CONTROL MEASURES – The Secretary of Agriculture shall carry out salinity control measures (including watershed enhancement and cost-share measures with livestock and crop producers) in the Colorado River Basin as part of the environmental quality incentives program established under chapter 4 of subtitle D of title XII of the Food Security Act of 1985.”*

*Additionally, Section 334 of the 1996 Farm Bill amended the Food Security Act of 1985 by adding a new Chapter 4 to Subtitle D of Title XII of the 1985 Act (i.e. EQIP). In particular, as amended, Section 1240 of the 1985 Act provided as follows:*

*“Sec. 1240. PURPOSES.*

*The purposes of the environmental quality incentives program established by this chapter are to-*

*(1) combine into a single program the functions of-*

*(A) the agricultural conservation program authorized by sections 7 and 8 of the Soil Conservation and Domestic Allotment Act (as in effect before the amendments made by section 336(a)(1) of the Federal Agriculture Improvement and Reform act of 1996);*

*(B) the Great Plains conservation program established under section 16(b) of the Soil Conservation and Domestic Allotment Act (as in effect before the amendments made by section 336(b)(1) of the Federal Agriculture Improvement and Reform Act of 1996);*

(C) *the water quality incentives program established under chapter 2 (as in effect before the amendment made by section 336(h) of the Federal Agriculture Improvement and Reform Act of 1996); and*

(D) *the Colorado River Basin salinity control program established under section 202(c) of the Colorado River Basin Salinity Control Act (as in effect before the amendment made by section 336(c)(1) of the Federal Agricultural Improvement and Reform Act of 1996)."*

**CRSC language removed** "Section 2301 of the Farm Security and Rural Investment Act of 2002 (the 2002 Farm Bill) amended Section 1240 of the Food Security Act of 1985 and the reference to the Colorado River Basin salinity control program was removed, presumably since its purposes had already been incorporated into EQIP and thus the reference to the former program was no longer needed."

(Communication from Martha Joseph, Special Assistant to the Deputy Chief for Programs, NRCS, Washington , D.C. 16 March 2016.)

EQIP was reauthorized in the Food Security and Rural Investment Act of 2002 (2002 Farm Bill), the Food, Conservation and Energy Act of 2008 (2008 Farm Bill) and the Agricultural Act of 2014 (2014 Farm Bill) that is in effect through fiscal year 2018.

### **Basin States Program**

The 2008 Farm Bill amended the Colorado River Basin Salinity Control Act to create the "Basin States Program" as follows:

#### Subsection 202(a) (7) BASIN STATES PROGRAM-

(A) **IN GENERAL** – A Basin States Program that the Secretary, acting through the Bureau of Reclamation, shall implement to carry out salinity control activities in the Colorado River Basin using funds made available under section 205(f).

(B) **ASSISTANCE** – The Secretary, in consultation with the Colorado River Basin Salinity Control Advisory Council, shall carry out this paragraph using funds described in subparagraph (A) directly or by providing grants, grant commitments, or advance funds to Federal or non-Federal entities under such terms and conditions as the Secretary may require.

(C) **ACTIVITIES** – Funds described in subparagraph (A) shall be used to carry out, as determined by the Secretary-

(i) Cost effective measures and associated works to reduce salinity from saline springs, leaking wells, irrigation sources, industrial sources, erosion of public and private land, or other sources;

- (ii) Operation and maintenance of salinity control measures constructed under the Colorado River Basin salinity control program; and
- (iii) Studies, planning and administration of salinity control activities.

The Basin States Program authority provides the U.S. Bureau of Reclamation a mechanism to cooperate with the USDA-NRCS to identify, plan, fund and implement salinity control projects that might otherwise not be assisted through the EQIP.