Monitoring and Evaluation Report
Grand Valley Unit

Colorado River Salinity Control Project
2012

USDA-NRCS
Grand Junction, Colorado

IWM MONITORING & EVALUATION REPORT
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EXECUTIVE SUMMARY
GRAND VALLEY UNIT
2012

Hydro-Salinity -

- The original project plan was to treat approximately **60,000 acres** with improved irrigation systems.
- The field inventory conducted in 2010 indicated there are **47,600 irrigated cropland acres** remaining in Grand Valley and **2,900 irrigated acres** with unimproved irrigation systems, most on fields of 5 acres or less.
- The adjusted potential full treatment goal for the NRCS program is at 90% of the remaining irrigated acres or approximately **42,800 acres**.
- To date **41,989 acres** [1] or 98 percent have been treated with improved irrigation systems.
- The project plan is to reduce salt loading to the Colorado River system by **132,000 tons/year** of salt.
- In FY 2012, salt loading has been reduced an additional **1,096 tons/year** as a result of installed salinity reduction practices.
- The cumulative salt load reduction is **141,099 tons/year**, or 107 percent of the project goal.

[1] Note: The 41,989 acres include acres that have been treated a second time to a higher level of irrigation improvement and salt savings over the course of this salinity project.

Cost Effectiveness -

- The planned cost per ton of salt saved with FY 2012 contracts (one year) is **$76.23 /ton**. This figure is calculated as follows:

(FA + TA = Total Cost) X Amortization factor = Amortized cost
Amortized cost / Tons salt reduced = Cost/Ton
FA = Total dollars obligated in EQIP and Basin States/ Parallel Program (including wildlife)
Amortization for 2012 = 0.0668
TA = technical assistance cost: (FA x 0.67)

Wildlife Habitat Replacement -

- The original Grand Valley habitat replacement goal is **1,200 acres** of habitat developed or significantly enhanced.
- The inclusion of DeBeque and Whitewater irrigation improvements to date have added an additional **6 acres** of replacement for a current total of **1,206 acres**
- For Fiscal Year 2012 there were **17 acres** of habitat replacement applied
- Most FY 2012 habitat projects were targeted for BSP funding and the lack of a signed funding agreement prevented additional implementation.
- To date, **752 acres** or 62% of the original wildlife habitat replacement goal has been established and is being maintained.
- Additional efforts are being made through wildlife only sign-ups, with various conservation groups, and with other Federal and State agencies to accelerate the implementation of wildlife habitat enhancement projects.

Key Considerations and Conclusions –

- Announcing the wind-down of the Grand Valley Salinity Control Project seems to have accelerated the implementation and sign-ups were significantly higher for FY 2011, and dropped for FY2012, and appear to be similar for 2013.
- A meeting was conducted with Bureau of Land Management, Bureau of Reclamation, US Fish and Wildlife Service, and NRCS to look for additional opportunities to develop or enhance wildlife habitat to meet the replacement goals.
- Planning is complete on 490 acres of Colorado Parks and Wildlife (CPW) property that are not currently under contract. Colorado State Conservation Board is working to complete an inner agency transfer/contract to obligate $800,000 of BSP funds to the project.
- The Field Office inventory indicates there are about 2,900 acres of agricultural land with untreated or unknown irrigation system improvements.
- The follow-up sample inventory of irrigation improvement practices installed throughout the 1979-2011 salinity control program identified 98.3% of the reported salinity reduction is still being accomplished.
- **Activities are being planned with the salinity partners for May of 2013 to celebrate the conclusion of the salinity control portion of a highly successful NRCS Salinity Control Unit.**
- **It is noted however, the conclusion of the on-farm salinity control portion of the Grand Valley unit does not negate or end the habitat replacement responsibilities for the project area. A strong emphasis and effort is still on-going to meet the full habitat replacement requirements. Future staff and management support is essential to meeting the habitat replacement goals necessary for the final conclusion of all critical project goals for the NRCS Grand Valley Salinity Control Unit.**
- Future improvements and public cost-share funding will still be available in the Grand Valley area through the Environmental Quality Incentives Program for irrigation improvements, salinity control, and other water quality resource concerns.
- A follow-up assessment will be done on a three-year interval to evaluate the salinity control projects installed through the program to assure the retention and maintenance of the publically supported salinity control benefit. The data from the analysis will be reported to the Salinity Control Forum to support their triennial review. The duration of this assessment is unknown at this time.
- The agency Salinity Program Managers should work with the Salinity Control Forum to develop policy defining a recommended period of assessment after the conclusion of each Salinity Control Project.
- The goal for the Colorado River Salinity Control Program is to replace the wildlife values negatively impacted by irrigation improvements, and the impacted habitat will be replaced by habitat providing similar values for the wildlife species affected.
- In western Colorado many of the irrigated areas have relatively small land units, and the parcels that provide the opportunity to develop water enhanced habitats are often small in size. Thus many of the habitat projects are complex in planning and habitat enhancement options, and although they offer the opportunity to provide significant habitat improvements the private land habitat projects in the western irrigated valleys frequently provide relatively small acreages per project.
- To qualify as suitable habitat replacement, each project needs to develop or significantly enhance the habitat values for the types of species whose habitats are negatively impacted by the irrigation improvements for salinity control.

- To meet the habitat replacement goals in each project area a combination of habitat improvements on private lands, and on lands with a combined public and/or public-private partnership are being considered. The goal of expanding the replacement options are to find and fund a sufficient acreage of suitable habitat projects to meet program obligations, and to encourage habitat replacement projects with better connectivity and a longer-term life expectancy.
- Many of the wildlife habitat replacement projects take a period of time to fully develop and reach their full habitat potential. Continued follow-up with management support and habitat evaluations in the field are important to support the landowner in accomplishing their habitat goals, and to assure the reported program habitat replacement goals are being maintained.

HYDRO-SALINITY MONITORING AND EVALUATION, COLORADO

Introduction

The Water Quality Act of 1965 (Public Law 89-234), as amended by the Federal Water Pollution Control Act of 1972, mandated efforts to maintain water quality standards in the United States. Congress enacted the Colorado River Basin Salinity Control Act (PL 93-320) in June 1974. Title I of the Act addresses the United States' commitment to Mexico and provided means for the U.S. to comply with provisions of Minute 242. Title II of the Act created a water quality program for salinity control in the United States. Primary responsibility was assigned to the Secretary of Interior and the US Bureau of Reclamation (USBR). USDA was instructed to support USBR's program with its existing authorities.

The Environmental Protection Agency (EPA) promulgated a regulation in December, 1974, which established a basin wide salinity control policy for the Colorado River Basin and also established a water quality standards procedure requiring basin states to adopt and submit for approval to the EPA, standards for salinity, including numeric criteria and a plan of implementation. In 1984, PL 98-569 amended the Salinity Control Act, authorizing the USDA Colorado River Salinity Control Program. Congress appropriated funds to provide financial assistance through Long-Term Agreements administered by Agricultural Stabilization and Conservation Service (ASCS) with technical support from the Soil Conservation Service (SCS). PL 98-569, also required continuing technical assistance along with monitoring and evaluation to determine the effectiveness of measures applied.

In 1995, PL 103-354 reorganized several agencies of USDA, transforming SCS into the Natural Resources Conservation Service (NRCS) and ASCS into the Farm Services Agency (FSA). In 1996, the Federal Agricultural Improvement and Reform Act (PL 104-127) combined four existing programs, including the Colorado River Basin Salinity Control Program, into the Environmental Quality Incentives Program (EQIP). The Farm Security and Rural Investment Act of 2002 and Food, Conservation, and Energy Act of 2008 reauthorized and amended EQIP, continue opportunities for USDA funding of salinity control measures.

Colorado River Salinity Control

The USDA-Natural Resources Conservation Service (NRCS), formerly USDA-Soil Conservation Service (SCS), both herein referenced as NRCS, initiated a program to make a variety of irrigation improvements to reduce deep percolation and on-farm ditch seepage to reduce the salt load potential to the Colorado River. Salinity control projects were initiated in Colorado starting with Grand Valley Unit in 1979, Lower Gunnison Unit in 1988, McElmo Creek Unit in 1989, Mancos Valley in 2004, and Silt in 2005. The NRCS irrigation improvement work included piping or lining irrigation ditches and small laterals, and improving the on-farm irrigation systems. In 1982 the NRCS identified the need to establish an irrigation monitoring and evaluation program for Grand Valley to assess the effects to deep percolation and seepage from making the various irrigation improvements, and to assess economic impacts and wildlife habitat replacement activities.

Irrigation in the Colorado salinity control areas is characterized by mostly gravity-fed systems installed on heavy clayey soils or medium textured soils derived from or overlaying a marine

shale formation (typically Mancos shale) that is very saline. The intake rates of the soils are generally low to medium. Plentiful and inexpensive irrigation water coupled with the long irrigation set times, and typically abundant flow rates contribute to the potential salinity mobilization. The available irrigation water and lower efficiency irrigation systems leads to excess deep percolation loss of water and low application efficiencies. The excess water from deep percolation contacts the underlying Mancos shale and subsequently loads salt to the Colorado River. Deep percolation and ditch seepage are considered to be the primary indicators of the effectiveness of the irrigation application.

A variety of irrigation systems were evaluated including earthen ditches with earth feeder ditches, earthen ditches with siphon tubes, concrete ditches with siphon tubes, ported concrete ditches, pipeline to gated pipe, side roll sprinklers, and micro spray. Crops included alfalfa, corn, small grain, dry beans, orchards, grapes, onions, pasture, and vegetables. This monitoring of irrigation system performance took place through the Salinity Program period from 1984 through 2003. The monitoring of wildlife and economic impacts started with each project and continues throughout the life of the project.

The NRCS developed a Monitoring and Evaluation Plan to assess the effects of the Colorado River Basin Salinity Control Program being implemented, "Monitoring and Evaluation Plan, Colorado River Basin Salinity Control Program for Grand Valley Unit, Colorado and Uinta Basin Unit, Utah, July 1982." The long-range monitoring plan described uniform guidelines and procedures to assess the effectiveness of the NRCS program to reduce salt loading to the Colorado River, to determine the effects of the irrigation improvements on wildlife, and to identify the monetary benefits to the individual participants.

Colorado NRCS initiated irrigation monitoring in the Grand Valley Unit in 1984 and to a limited extent in the Lower Gunnison Unit in 1992 and the McElmo Unit in 1993. The irrigation monitoring was designed to assess deep percolation changes and estimate changes to the salt loading derived from irrigated agricultural lands. Those assessments provided a baseline of deep percolation characteristics on agricultural land, and have been used by NRCS to make management decisions related to salinity control projects. Colorado State University, Cooperative Extension took over the irrigation monitoring activities from 1999 through 2003 utilizing the NRCS equipment and similar sampling techniques. The NRCS also conducted selected economic analysis and wildlife habitat analysis in all of the project areas.

The irrigated monitoring sites were selected to represent the variety of conditions common in the salinity control units. The need was identified for each irrigation event to be monitored and evaluated throughout the irrigation season for each site. From the NRCS Monitoring and Evaluation Plan, "Data will be collected to determine the amount of irrigation water infiltrated into the soil." "For each site on-farm water budgets will be prepared for each irrigation event, starting with pre-plant or start of growing season until crop harvest. The most significant output from the water budget is deep percolation." The plan proposed water budget was, "…deep percolation equals the amount of inflow plus rainfall prior to or during the irrigation event, less surface runoff and the net irrigation requirement [expressed as the amount of water needed to bring the soils profile to field capacity]." Data was compiled for 289 site years of measured irrigation inflows, outflows, crop consumptive use, precipitation, and deep percolation.

The data indicate that the salinity projects in Colorado are typically achieving a deep percolation plus field ditch seepage reduction of at least 10 to 15 inches for each acre treated which meets or exceeds the deep percolation reduction estimated in the original project reports.

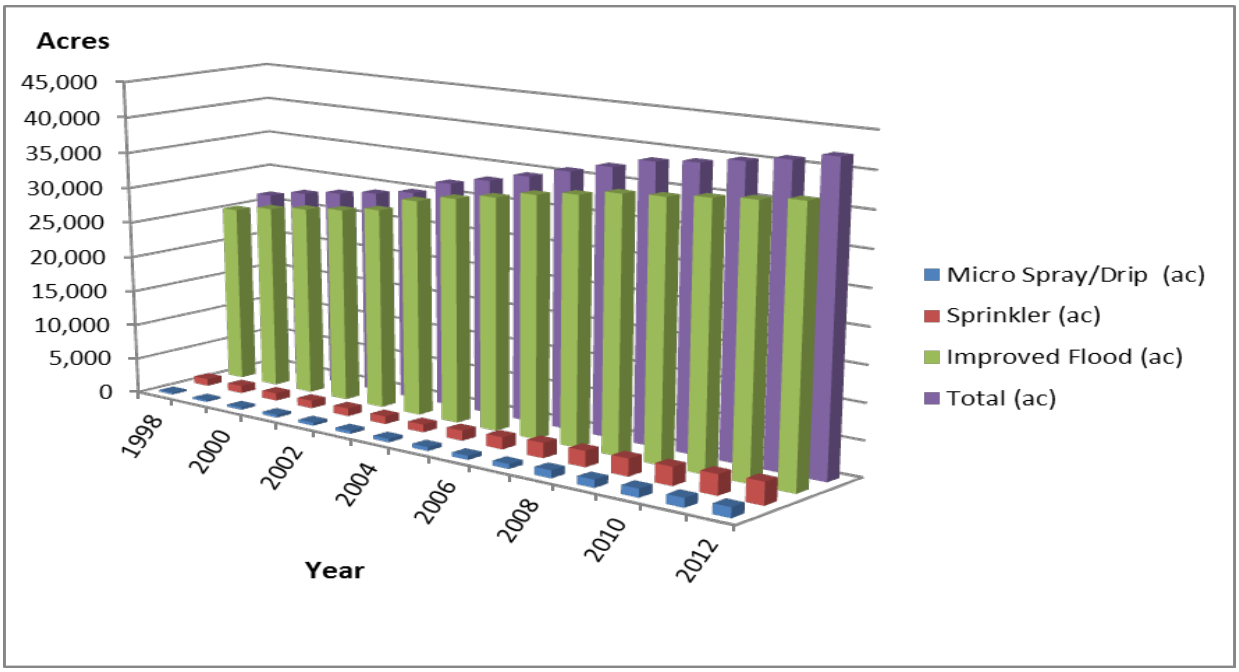
Areas with a greater conversion to sprinkler or micro spray will be at the 15 inch reduction and areas with predominantly flood irrigation will be at the 10 inch reduction. Areas that are converting from unimproved flood systems will have deep percolation plus seepage reductions in the 25 to 30 inch range. Areas that are converting very old flood irrigation systems with limited improvements, will most likely be somewhere between the higher values and the lower values, but probably closer to the 10 to 15 inch reduction.

Table 1 - NRCS Irrigation Application Efficiency Standards for Evaluation

TYPE OF IRRIGATION SYSTEM	% OF MONITORED EFFICIENCY
Open ditch	35%
Open ditch w/ siphon tubes	40%
Concrete ditch w/siphon tubes	50%
Gated pipe	50%
Underground pipe & Gated pipe	50%
Underground pipe/Gated pipe/Surge	55%
Center Pivot Sprinkler	90%
Big Gun Sprinkler	70%
Side roll Sprinkler	75%
Micro spray	90%
Drip Irrigation	95%

Note: Efficiencies listed are the NRCS planning standards for the various types of irrigation systems.

Graph 1 – Grand Valley Unit Cumulative Irrigation Systems Installed



IRRIGATION SYSTEMS APPLIED (acres)	FY2012	CUMULATIVE
Sprinkler	286	3,144
Improved Surface System	658	37,417
Micro-Spray/Drip System	133	1,428
TOTAL	**1,077**	**41,989**

Graph 1 and sub-set table display the cumulative acres of the various irrigation improvements in the Grand Valley Unit. The earliest micro-spray systems were installed in the 1980's, and there has been a relatively consistent, although comparatively small acreage of micro-spray irrigation systems installed through-out the life of the project.

The Grand Valley Unit typically has somewhat small field sizes where sprinkler systems have not been a popular choice. In addition, the relatively flat topography in the portions of the project area with the larger field sizes, limits the opportunity to build gravity pressure through pipeline delivery systems so the sprinkler systems in this area typically require some type of pumped pressure to operate. Regardless, there has been a small increase in the number of sprinkler systems installed on some of the larger and more uniform fields in more recent years. The ease of operation and uniformity of application make sprinklers a desirable option for many irrigators, although when the installation includes a regulating pond, pump installation, and the associated energy and maintenance costs, it complicates the decision and increases both the installation and operating costs for the operator.

The number of vineyard and orchard operations in the Grand Valley Unit account for most of the drip and micro-spray systems installed, and although they represent a significant number of systems, the fields are typically small and do not account for a large acreage. The systems

perform very well from an irrigation application efficiency perspective, but are often relatively expensive on a per acre treatment basis and typically are more attractive for the high value crops.

In the project area the deep percolation reduction and subsequent salinity control is typically about 50 to 60% reduction for a well-managed improved flood system, about 75 to 85% reduction for a well-managed sprinkler system, and about 85 to 95% reduction for a well-managed drip or micro-spray system.

Graph 2 – Grand Valley Unit Cumulative On-Farm Salinity Load Reduced

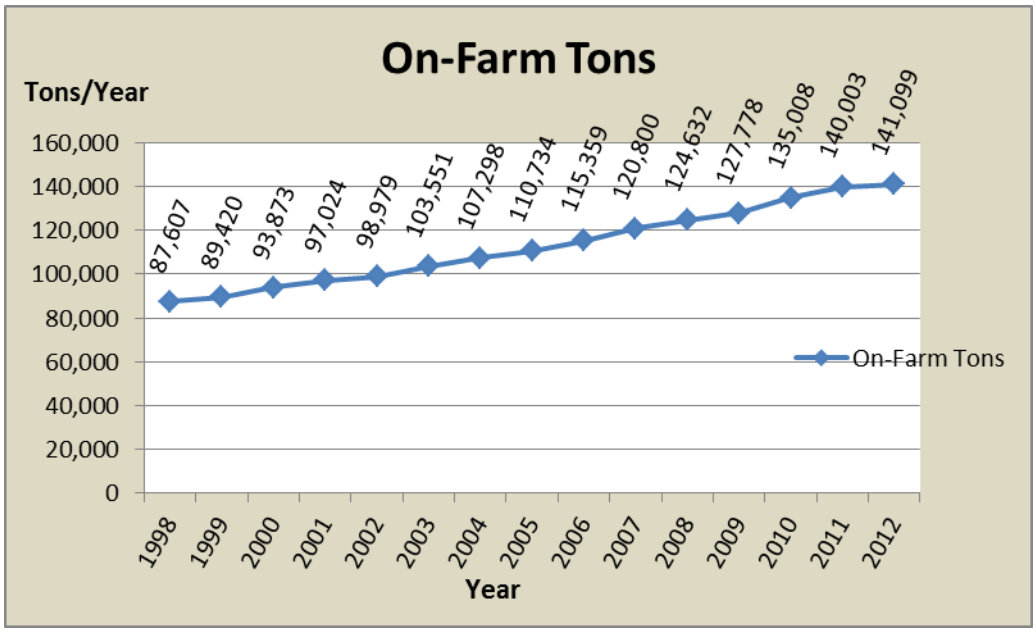


Table 2 - USGS Trend Analysis and Agency Reported Salinity Reduction

Unit	Trend Years	NRCS Project Start Year	NRCS Reported Reduction (tons/year) /1	BOR Reported Reduction (tons/year) /1	Total Predicted Reduction (tons/year) /1	Measured Reduction (tons/year)	Unclaimed Reduction (tons/year)
Grand Valley	1986 - 2003	1979	103,551	122,300	225,851	322,200	96,349
Lower Gunnison	1986 - 2003	1988	66,486	43,675	110,161	201,600	91,439
McElmo	1978 - 2006	1989	20,012	32,000	52,012	90,450 /2	38,438

/1 The ton/year number is the cumulative salt load reduction reported for the final trend analysis year for each study, either 2003 or 2006

/2 Includes a measured ton/year reduction plus projected ton/year salinity increase due to the introduction of the Dolores Project Water

USGS completed two salinity trend analysis reports for the gaging stations that include salt loading trends below three of the Colorado River Salinity Control Projects, and their analysis covered part of the salinity control implementation period. The measured salinity trends in the river exceeded the salinity control reductions claimed by the participating agencies for all three locations for the years represented. Certainly other management and land-use changes contributed to either increases and/or reductions to salt loading in the river, however the USGS trend analysis was corrected to account for the salt variations with changes in annual flow, and is intended to represent a flow adjusted annual change in salinity loading trends. The fact the trend reductions exceed the predicted loading reductions from the program helps support the irrigation improvement work is significantly reducing the annual load contribution from irrigation, and possibly the amount of improvement is somewhat greater than predicted.

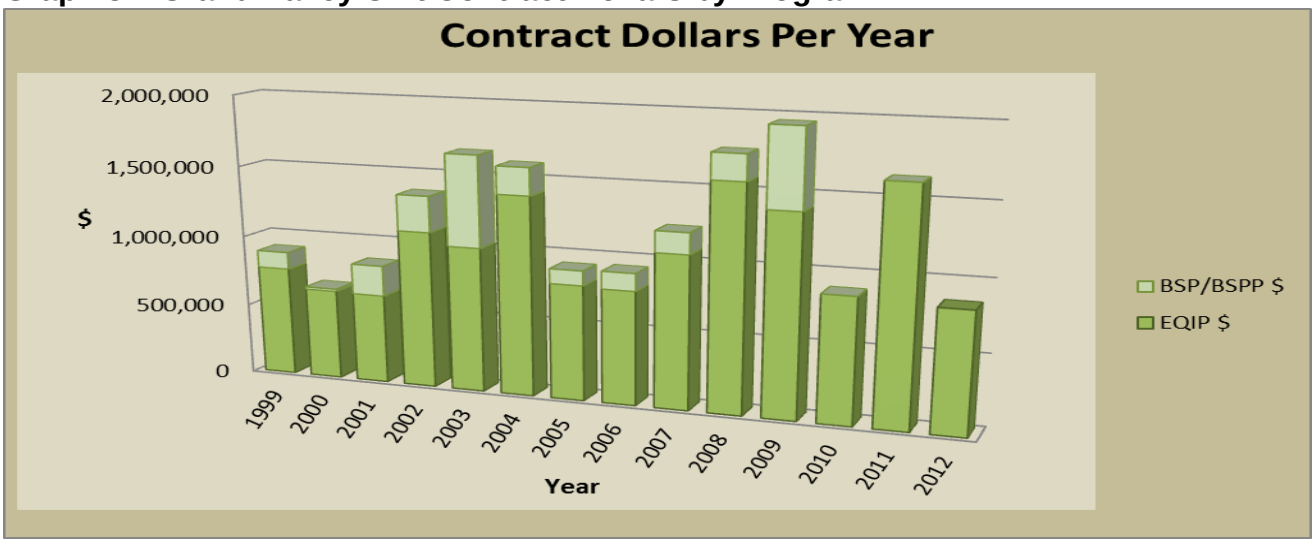
Table 2 References

"Salinity Trends in the Upper Colorado River Basin Upstream from the Grand Valley Salinity Control Unit, Colorado, 1986—2003", USGS Scientific Investigations Report 2007-5288, Kenneth J. Leib and Nancy J. Bauch, 2008.

"Characterization of Hydrology and Salinity in the Dolores Project Area, McElmo Creek Region, Southwest Colorado, Water Years 1978-2006", USGS Scientific Investigations Report 2010-5218, Rodney J. Richards and Kenneth J. Leib, 2011.

USBR Reported Salt Load Reductions from personal communication with Nicholas Williams, Environmental Engineer, US Bureau of Reclamation, Salt Lake City, Utah.

Graph 3 – Grand Valley Unit Contract Dollars by Program



Note: The funding programs represented include the NRCS Environmental Quality Incentives Program (EQIP), and the Bureau of Reclamation funded Basin States Program (BSP, formerly known as the Basin States Parallel Program BSPP).

Graph 3 displays the Environmental Quality Incentive Program (EQIP) and Basin States Program (BSP/BSPP) contract dollars per year from 1999 through 2012. The amounts varied significantly on an annual basis in part due to program allocations, the local economy, the cost of the installed systems, and the landowner's ability to cover their portion of the cost. The public funding was typically intended to cover approximately 75 percent of the installation cost, however many of the peripheral costs such as getting power to the site, possible non-irrigation equipment changes, additional management costs, the cost of learning and adapting new technologies, etc. were paid by the landowner and were not eligible for public cost-share.

Although the numbers fell within some of the previous annual contract dollar ranges, 2010 was a relatively low contract year. The recession, low hay prices, and higher input costs made farmers apprehensive about signing contracts for irrigation improvements. There is an on-going opportunity to make significant irrigation improvements and outreach efforts were increased. The estimated number of contracts during this period was down by about two thirds as a result of the recession. It is assumed the increased outreach and publicity announcing the formal conclusion of the on-farm portion of the salinity control program stimulated the increase in interest in FY 2011. The re-funding of the Basin States Program should allow for additional future contracts with landowner's who may not be EQIP eligible, and it is assumed the amount of both EQIP and BSP contracts will continue to increase[/1] as the local economy improves.

[/1] Note: The FY 2011 EQIP salinity sign-up increased significantly from FY 2010. FY 2012 returned to a level similar to 2010 and FY 2013 appears to be on a similar track, however the 2013 payment schedules changed significantly at the national level and it is uncertain how the changes to payment schedule might affect the rate of sign-up and participation for FY 2013.

Table 3 - On-Farm Programs for Funding Salinity Control

Program	Years
USDA Salinity Control Program (USDA-ACP)	1979 -1986
Colorado River Salinity Control Program (CRSCP)	1987 – 1995
Interim Environmental Quality Incentives Program (IEQIP)	1996
Environmental Quality Incentives Program (EQIP)	1997 -2012
Colorado River Basin States Program (BSP/BSPP)	1998 – 2012

The trend in the Grand Valley Unit is to continue the installation of new systems, and to upgrade and improve some of the previous improved flood systems. Improvements to technology and design offer additional salinity reduction by upgrading the more primitive flood systems to pipeline gated pipe with or without surge irrigation valves, or in some cases change from improved flood irrigation to either sprinkler or micro-spray/drip irrigation. The salinity reductions claimed in these situations are based on the incremental improvement offered by making the change from the current system to the improved system. Additionally the higher levels of irrigation system improvement typically have more management built into the system and the level of application efficiency has a higher assured performance.

The economic value to the community and adjacent states is significant. The projects offer a downstream benefit from reduced damages through the amortized cost per ton that typically covers the public cost of installation. In addition the landowners receive economic benefits from improved crop quality, better utilization of fertilizers, reduced irrigation labor costs, etc. The local community benefits though the economic turnover in the area from the public cost-share funds, the improved crop qualities, agricultural sustainability, etc.

2012 Highlights

Since the salinity program's inception in 1979, the Natural Resources Conservation Service (NRCS) in partnership with Conservation Districts have been applying improved irrigation systems and practices with cooperators in the Grand Valley Unit under the Colorado River Salinity Control Program (CRSCP). Funding for the CRSCP has been primarily possible through the Environmental Quality Incentives Program (EQIP) and the Basin States Program (BSP). Within the past year former Basin States Parallel Program (BSPP) is transitioning to the new Basin States Program (BSP). This transition is gradually shifting the focus from on-farm improved surface delivery systems to that of piping large scale main lateral off farm canal and ditch delivery systems. This has created a great deal of interest from group and irrigation companies in future participation in BSP. Also, there is a greater trend toward conversion of existing improved surface systems to highly efficient, advanced irrigation technology (AIT) and in particular with micro-spray irrigation. Currently, this trend is primarily occurring in Palisade area within the Salinity Control Unit.

Beginning in 2004, NRCS, in cooperation with the Mesa Conservation District and the Colorado State Conservation Board began a program designed to place emphasis on Irrigation Water Management (IWM). During 2006, a full-time IWM position was established to increase emphasis on IWM.

Visits were made to provide water management assistance, and to check and certify Irrigation Water Management (IWM) on 83 farms during FY 2012.
The FY 2012 irrigation water management activities included completing 63 IWM reviews on 1,316 acres for all the contracts with planned IWM for FY 2012, and an additional 20 irrigators were provided in-field assistance on water management, and irrigation system and crop management options. IWM plans were developed for 33 new contracts funded in FY 2102 on 836 acres. Hanson Data Loggers and soil moisture sensors were installed on 16 sites covering most of the contracted acres to assist the irrigators with soil moisture monitoring and irrigation scheduling.

Additional FY 2012 IWM and Out-Reach Assistance
Completed 7 events that included IWM field talks and hands-on teaching
- Rocky Mountain Expeditionary School – 10/09/2012 - Group 1
- Rocky Mountain Expeditionary School – 10/09/2012 - Group 2
- Rocky Mountain Expeditionary School – 10/16/2012 - Group 1
- Rocky Mountain Expeditionary School – 10/16/2012 - Group 2
- Field session at the CSU Extension Service Center Fruita to work with students on IWM, Underground Drip Irrigation, and Flood Irrigation with gated pipe & siphon tubes.
- IWM training/workshop in Plateau Valley - 11/3/2012
- Colorado Mesa University Soils Lab. – 11/6/2012 – The District and NRCS Soils staff used the mobile Soils Lab, to open up a soil pit to discuss water penetration and IWM requirements for crops on different soil types

The Mesa Conservation District added two district technicians to help with the backlog of engineering practices waiting for survey and design. The NRCS added an engineer to help with the project design workload. The engineering equipment is being upgraded with GPS and Auto-CAD to help speed up survey and design for landowner projects.

For the upcoming irrigation season, the Grand Valley Unit is increasing efforts to promote the use of sprinklers for smaller acreage units. The smaller and subdivided parcels can cause additional problems with the traditional tail water delivery and disposal methods. The subdivided fields often break the established tail-water drainage systems causing water to flow more slowly and water can stand in tail-water ditches for longer periods of time. The potential for additional seepage and deep percolation from this ponding situation could cancel out some of the positive effects of the salinity control program. Sprinkler systems significantly reduce the possibility of runoff and will help solve the tail-water ponding problem from the subdivided flood delivery systems. One of the main barriers to the adoption of sprinkler irrigation has been the need to install pumps, since there typically is no gravity pressure available in these areas. Other irrigation alternatives will be studied this irrigation season. In addition there is increasing interest in small-scale center pivots for use on larger fields in the Grand valley. Colorado State University (CSU) received a grant to carry out irrigation audits on small acreages, typically for units 10 acres or less in size.

CSU, the Mesa Conservation District and NRCS are working on a project to study the feasibility of using drip irrigation on Alfalfa in the Grand Valley.

The Conservation District IWM Specialist is initiating a program with local students to use ball probes to measure soil water penetration and to evaluate irrigation system performance at their home, and is working with small acreage land-owners to improve water management on their irrigated pasture and hayland.

FY 2012 Salinity Outreach Activities include:

- October 2011 - EQIP Brochure distribution to agricultural producers in Mesa County
- October 2011 – Basin States Program presentation at the Colorado River Watershed Annual Meeting
- October 2011 - Irrigation Water Management presentation at the Colorado River Watershed Annual Meeting
- October 2011 - Irrigation Water Management presentation at the Mesa Conservation District meeting
- November 2011 - EQIP Brochure distribution to agricultural producers in Mesa County
- January 2012 - Presentation for W. Horticultural Society on the Salinity Control Program & EQIP
- January 2012 - Salinity Display w/ info at Farm and Ranch Days at Fruita Co-op
- February 2012 - Assisted with Soil Health Workshop for IWM
- February 2012 – Participated in Tamarisk Symposium
- March 2012 – Salinity Display w/ info at Farm and Ranch Days at Fruita Co-op
- April 2012 – Salinity Display at Outdoor Heritage Days in Palisade
- July 2012 – Salinity Tour for Colorado College Research Team

Urban Use of Irrigation Water

Although not a part of EQIP and the NRCS monitoring and reporting requirements of the salinity control program, there have been concerns about the potential overuse of irrigation water by suburban and urban users, both with newcomers to the area as well as homeowners familiar with the area and the local conditions. In late 2004, the Mesa Conservation District received a grant to study the effects of ex-urban and suburban development on irrigation water use and deep percolation. Monitoring and study of this segment of land use continued in 2006, and was completed at the end of the irrigation season.

A final report[/1] of results has been published. The project goal was to characterize the deep percolation from urban irrigation, and compare it to historic levels of deep percolation from agricultural irrigation.

The report shows a wide range of deep percolation on small acreage and urban lot-size units, similar to the variability found in traditional farmland. It was thought that overall water use would be reduced due to an increase of impervious areas such as streets, curbs and gutters, and

rooftops in these urbanizing areas. The study found that the conversion of land use from agricultural land use to urban land use reduces water use by about 74 percent and deep percolation as much as about 90 percent. Estimated reductions in salt loading were as much as 92 percent.

/1 Estimating the Effects of Conversion of Agricultural Land to Urban Land on Deep Percolation of Irrigation Water in the Grand Valley, Western Colorado, USGS Scientific Investigations Report 2008-5086, John W. Mayo, 2008

Conservation District and CSU Extension Projects

Mesa Conservation District is working with CSU Extension to conduct a deficit irrigation project on peach orchards. Withholding water and deliberately stressing peaches can actually reduce the amount of water applied and may not hurt crop production or crop quality. In agriculture, the actual reduction in crop water use or a defined water savings are typically not possible, because the crop is going to consume the same amount of water regardless of the irrigation system application efficiency. However the stress study indicated with some crops a reduction in consumed water may be possible. On one peach orchard site, 9.6 inches of water was saved with a $10 per acre saved in pumping costs, and a predicted reduction of 668 lbs of salt per acre into the river, with no net change in the crop production. On the second site there was a 21 inch reduction in the amount of water consumed with a $22 per acre saving in pumping costs, and a predicted reduction of 1,467 lbs salt per acre into the river. However at this level of water deficit, there was a noted reduction in peach size. The deficit study project will be continued in 2013.

Mesa Conservation District (MCD) and CSU Extension are also working with the Grand River Mosquito Control District to evaluate how excess irrigation and poor field drainage contribute to mosquito problems. The Mosquito District has direct contact with landowners, MCD and CSU can help provide the landowners with proper irrigation techniques, helping all parties meet their resource management goals.

Demographic and Area Changes in the Grand Valley

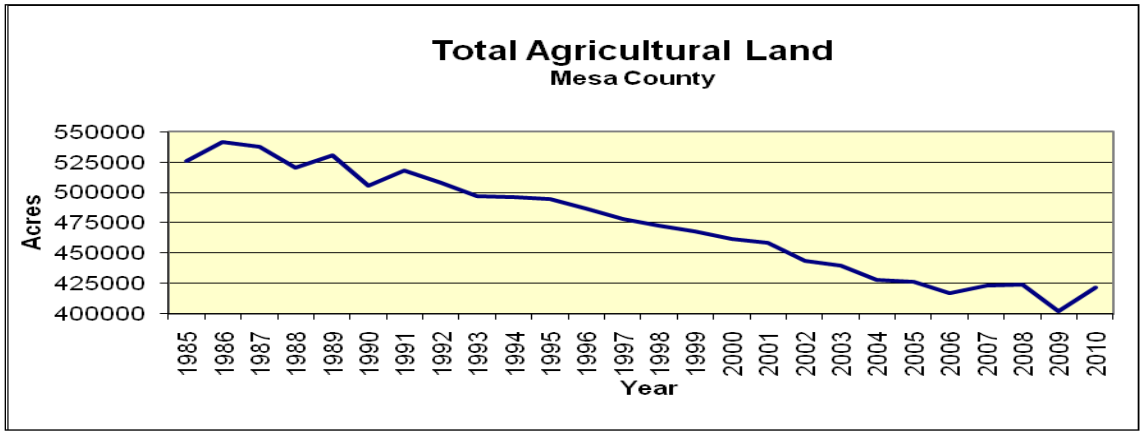
For several years it was noted the parcel and field sizes were changing in the Grand Valley Unit. It was also noted the changing land units were beginning to limit the number of potential applicants and eligible property for further agricultural irrigation implement the Grand Valley portion of the salinity control program. For 2008, a field study was conducted with data was gathered and compiled to determine the extent of these changes. During the 25 year period from 1985 to 2006, the information collected showed a 19.85% decrease in the total irrigated agricultural acres in Mesa County. Acres include reductions in irrigated cropland, hayland, pasture and orchards.

The NRCS field evaluation was continued and updated through 2010. From 2006 to 2010, the data showed an increase of 1.01% in total agricultural acres *(See graph 4)*. Basically this change is within the average annual range in agricultural lands, and does not represent an increase. However, during this same period the number of new and beginning farmers applying for salinity control programs increased. It is assumed much of this increase is due to the

change in land ownership and the conversion to rural/urban small acreages. Most fields are still in some type of irrigated crop production, but typically are combined with some type of rural home site and are no longer considered traditional irrigated agriculture.

Data was collected from Mesa County Planning and Development Department's subdivision land development records, and Mesa County Assessor records to estimate parcel and ownership size changes for the Grand Valley area. Additionally, an estimate of parcel size change was determined by utilizing ArcView (GIS) information. Based on this combination of information sources, it was determined that the average irrigated field size in the Grand Valley area is still less than 5 acres.

Graph 4 – Mesa County Total Agricultural Land



Note: The general trend in the amount of agricultural lands is down due to development and other land-use changes. The difference between 2009 and 2010 is likely due to either annual changes in cropland acres or some type of statistical blip due to reporting and compiling data.

Project Area Future Outlook

Recommendations for Future Monitoring and Discussion

- For 2013, efforts will continue on all new EQIP and BSP contract recipients to assist them with irrigation water management and the proper use of newly installed irrigation systems.
- Emphasis will be placed on landowner irrigation scheduling tools and methods, such as "checkbook" and field probing for soil moisture observation.
- For 2013, data will continue to be collected and compiled from the urban and small acreage sites. The effects of conversion to urban and small acreage land units will continue to be evaluated to assess the effects from the changes on the projected salinity reduction. Many of the areas previously treated under the salinity control program are being converted to the smaller 1 to 2 acre parcels. The areas closest to the urban centers near Grand Junction, Fruita, and Loma are transitioning to these smaller parcels. This trend is likely to continue even with the overall community's desire for larger lots that create the appearance of more open space, etc. The subdivided acres continue to be irrigated, but by a new landowner, and with different crops, usually hay or pasture, and lawn and garden.

- In addition, many of the larger parcels are being subdivided into 20 to 40 acre parcels that remain in some type of agricultural crop production, but under a new owner/manager who works a primary job off the farm and may have limited previous experience with irrigation and crop management.
- Significant problems still exist in the delivery of water through unimproved and outdated laterals, and other group delivery systems. There is an opportunity for these groups to incorporate and improve these systems through the salinity control program however it is a complicated process for this to occur. Many of these delivery laterals have doubled or tripled the number of water users due to subdivision, and the influx of people with limited understanding of irrigation water delivery has led to additional complaints and operation problems. The EQIP requirements for being a qualified agricultural producer and each participant having an individual contract are not well suited to provide cost share for improving these mixed agriculture and sub-urban systems. The Basin States Program (BSP) and the Agricultural Water Enhancement Program (AWEP) are probably more flexible with the mix of agricultural and non-agricultural water users, and will be the programs used to address these problems in the future.
- Many of the irrigation system improvements installed during the early years of the salinity program are nearing the end of their practice life. The policy questions and on-going salinity reduction benefits from updating and replacing the aging systems will need to be addressed. Many of the improved irrigation systems are capable of lasting far longer than the stated practice life, e.g. underground pipeline, however other surface installed portions of the irrigation improvements have deteriorated. From a salinity control perspective, the maintenance of the improved irrigation system is important. The policy questions center on whether the maintenance of previously installed systems is solely the landowner's responsibility or whether there is still some role for public participation through the salinity control program.
- The participation level in the program and the acres treated to date meet or exceed the salinity goals for the program. There is still interest for some irrigation improvements and systems upgrades, particularly in the areas with vineyards and fruit crops. For the more traditional agricultural crops on the larger acreages, there is a continued decrease in applications, since the majority of these acres are already under some type of improved irrigation system and there has not been much interest in upgrading to some type of higher performance irrigation system. Many of the current applications received are for irrigation improvements for parcels as small as one acre. Unless there is a shift to the higher efficiency irrigation systems, or there are significant improvements to flood irrigation technology, this trend is expected to continue.
- There are on-going opportunities to assist new and inexperienced land owners with education and training on effective irrigation water management and irrigation system operation. There has been an increase in absentee landowners which is an additional management challenge.
- The projected salinity reduction for these changing land units should continue to be evaluated, so appropriate adjustments to cumulative salinity loading information can be based on some type of assessed value.
- Additional efforts to promote quality wildlife habitat projects will continue in the Grand Valley
- Staff will continue to receive training in the latest irrigation technology to improve technical and management assistance to landowners

- Given the past and current trends in land-use changes, design consideration is needed for each project to accommodate some likely future changes. Designs may provide a longer term salinity control benefit if they anticipate and take into account potential future development, which may drive up the initial construction cost.
- Cost effectiveness of the Grand Valley program is being affected by the increase in overall construction costs, and by the reduction of the size of parcels being treated through the cost-share programs.

Wildlife Monitoring and Evaluation

History

Salinity control work by the Natural Resources Conservation Service (NRCS) has gone through different funding programs during the duration of the Grand Valley salinity control project. The first was the Colorado River Salinity Control program (CRSCP) from 1984-1995. The next program was the Interim Environmental Quality Incentives Program (I-EQIP) for fiscal year 1996. The current program, from 1997 through 2012 is the EQIP Program which includes matching funds from the Bureau of Reclamation delivered through the Basin States Program (BSP/BSPP).

The wildlife replacement activities during the initial program implementation in the original project areas were based on a process that specified the "**replacement of wildlife values foregone" and impacts to wildlife will be accounted for using a habitat value system**. To meet this specification the NRCS chose to use the Habitat Evaluation Procedure (HEP) developed by the U.S. Fish and Wildlife Service (USFWS) for tracking "on farm" changes in wildlife habitat values. Seven species models were chosen to represent different aspects of wildlife habitat in the unit that may be impacted by the project. Pheasant was chosen to represent habitat diversity, edge effect and edge habitat. Yellow warbler represents cottonwood-willow and other woody habitat associated with irrigation ditches and tail water. Mallard breeding habitat represents shallow wetlands and nesting habitat surrounding these wetlands. Mallard –winter habitat represents winter roosting areas (large water bodies and ice free water) and management of crop residues. Meadow vole represents sedge- rush wet meadows often associated with leaky ditches and inefficient irrigation. Marsh wren represents cattail- bulrush (robust emergent) wetlands and the screech owl is associated with groups of large deciduous trees. The models are custom models that underwent peer review and were developed explicitly for this project with the assistance of USFWS. Changes in wetland values are supposed to be tracked using the Avian Richness Evaluation Method (AREM) developed by Paul Adamus under contract with the Environmental Protection Agency (EPA).

Adjustments

It was determined the evaluation and accounting using the HEP process was an effective tool to measure the impacts and to determine the habitat replacement needs to offset the habitat values lost from making the irrigation improvements for salinity control. However, continuing the use of the full analysis process was consuming too much of the field Biologist's time and reduced their opportunities to promote good habitat replacement projects with willing landowners. In addition the initial program efforts looked to accomplish all of the replacement goals within the project areas and attempted to get cooperation with the replacement projects from each participating landowner. This approach created a scattering of small and disconnected projects and often poorly managed projects that were not really supplying either the quality or quantity of habitat necessary to meet program goals.

The NRCS and USFWS entered into discussions and developed correspondence to address the two primary issues. It was decided a desirable goal was to promote larger and more connected habitat projects, and to make sure the wetland projects were located in positions on the landscape where wetlands made sense. It was important to position wetland and water enhanced habitat projects in areas with high water tables and along existing riparian corridors to avoid perched wetlands that could contribute to additional water quality problems and to utilize the existing water tables to assure the wetland project would be sustainable. In addition the protection of the riparian corridors for wildlife provided connected habitats advantageous to many of the affected species.

To accomplish this goal it was mutually agreed the developed replacement and enhancement projects would count towards meeting replacement goals whether they were within or outside of an official project area as long as salinity funds were used to cover the cost of the habitat replacement and enhancement, the project was within a reasonable proximity of a salinity project area, and the type of habitats supplied met similar habitat types to the ones affected by the salinity control irrigation improvements.

In addition the USFWS concurred with changing the HEP driven accounting process to a pre-determined replacement rate of 2 acres of habitat developed or significantly enhanced for each 100 acres or irrigation system improvement. This rate was based on the multi-year analysis from the HEP process for the Lower Gunnison and McElmo Units, and the agreed change also included the Mancos Valley Unit.

The Grand Valley Unit had a separate negotiated number based on previous analysis from the NRCS and USFWS of 1,200 acres [/1] of habitat replaced and/or enhanced and was not changed to the 2 acres per 100 acres treated. However the Whitewater area and the DeBeque areas, added to the Grand Valley Unit, were not part of the negotiated 1,200 acre replacement. The replacement needs to those small additions will be added to the 1,200 acres number based a site visit for each project to calculate the expected losses and to add the needed replacement acres to the Grand Valley replacement goal.

[/1] The 1,200 acre habitat replacement goal is from written correspondence with the USFWS establishing a set project goal based on 60,000 irrigated acres, regardless of final treatment completed. Numerous biological assessments and habitat analysis were conducted in the Grand Valley Unit, and the 1,200 acre fixed goal was a negotiated amount based on these assessments and other factors.

The current habitat replacement goal for the combined Grand Valley Unit is at 1,206 acres with the inclusion of the acres needed to cover the Whitewater and DeBeque irrigation improvements to date. Based on project reporting the NRCS has reached approximately 98% of the acreage treatment goal at 41,989 acres or and approximately 107% of the projected salinity reduction treatment goals in the Grand Valley Unit. The goal for each project area is to be concurrent, meaning the habitat replacement should be adequate to meet the replacement values for the applied irrigation system improvements in place. To date 752 acres of habitat have been applied and are being maintained. The Grand Valley Unit needs 1,206 acres of habitat replacement to meet the concurrent and final habitat replacement goal, so the project area is still 454 acres short of reaching both the concurrent and final goal.

In addition, a key issue raised by the U.S. Fish and Wildlife Service is the expectation the credited replacement acres must be on the ground and functioning as effective habitat when the salinity project is considered complete. Some loss of wildlife habitat will continue to take place as operation and maintenance agreements expire and land uses change in the Valley. To account for the loss, it is likely NRCS will need to apply more habit replacement acres than the goal amount. NRCS Biologists will visit all habitat replacement projects every three (3) years and adjust credited acres to what is actually on the ground and functioning. Acres lost for whatever reason will be removed from the credited replacement acres.

The Grand Valley wildlife habitat site monitoring consist of an initial “drive by” by a trained Wildlife Biologist to determine if the project appears to continue to meet the habitat objectives stated in the plan. If the condition of the habitat project cannot be easily determined by a quick look at the project or the habitat project is not readily visible by vehicle access, then a “walk through” of the project is conducted to evaluate the visible habitat condition. Habitat evaluation models are used if the project appears to have deteriorated to a point where it no longer provides the benefits needed to be considered as acceptable replacement habitat. A common reason for a significant loss of habitat value is due to the encroachment from development. When an established wildlife project has houses surrounding it that are closer than 300 feet, it no longer meets the requirements of replacement habitat and is removed from the cumulative project total.

There has been no specific decision on how long this follow-up assessment will be conducted in the Grand Valley Unit, but it is assumed follow-up assessments will end with the conclusion of the region wide Colorado River Salinity Control Program in western Colorado. The agency Salinity Program Managers should work with the Salinity Control Forum to develop a policy defining a recommended period of assessment and reporting after the conclusion of each Salinity Control Project.

Table 4 – Wildlife Habitat Replacement Table – Grand Valley Unit

Habitat Replacement	Acres
Salinity Program Irrigated Acres Treated to Date	41,989
Habitat Replacement Goal (GV @ 1,200 ac + WW&DB @ 6.0 ac) [1/]	1,206
Habitat Replacement Acres Applied and Maintained through FY 2011	735
Habitat Replacement Acres Applied During FY 2012	17
Total Habitat Replacement Acres Through FY 2012	752
Remaining Acres to Meet Concurrent Habitat Replacement Goal	454
Remaining Acres Needed to Meet Full Project Replacement Goal [3/]	454

Note the rose colored boxes are negative or a deficit

[1/] Includes habitat replacement acres for the Whitewater(WW) and DeBeque(DB) areas, added to the Grand Valley Unit 1,200 acre number based a site visit to each individual project to calculate the expected habitat losses.

[2/] Assume a full project implementation at 42,000 acres of irrigation treatment plus WW and DB at 6 acres. Concurrent habitat replacement at 1,206 ac.

[3/] The full project replacment goal may increase due to additional acres in the Whitewater(WW) and DeBeque(DB) areas, and the calculated habitat losses.

As displayed in Table 4, the Grand Valley Unit is currently 454 acres below the concurrent replacement needed. However significant efforts are being made working with other agencies, wildlife groups, and willing landowners to accelerate the rate of replacement to meet concurrent and future goals. There are currently 198 acres of habitat enhancement under contract and there is one large project with the planning completed on an additional 490 acres of habitat improvement. If all of these projects are fully funded and installed as planned, the Grand Valley Unit will exceed the full habitat replacement requirements for the Colorado River Salinity Control Program, and should have excess acres sufficient to cover any program habitat losses for the foreseeable future.

While the goal for habitat replacement is to be concurrent with irrigation improvements, it must also be understood that the hydrologic effects of the irrigation improvements and the wildlife benefits from developing fully functional wildlife habitat may take several years to be fully realized. Although some habitat losses from irrigation improvements are immediate, such as removal of ditch bank vegetation, other losses occur over time as the hydrologic effects of reduced ditch seepage and excess deep percolation change the net flow of subsurface water. The full hydrologic impacts of reducing excess seepage and deep percolation may take a period of time sufficient to change and/or eliminate wetland or riparian vegetation completely. Similarly, it will take several years for replacement wildlife habitat to become fully functional. Thus concurrent means the habitat is certified as applied and the habitat benefits are based on the projected values for wildlife.

Table 5 - Wildlife Habitat Planned and Applied with Funded Contracts- Grand Valley Unit

Program	Year	Wetland Habitat Planned (ac)	Cumulative Wetland Habitat Planned (ac)	Wetland Habitat Applied (ac)	Cumulative Wetland Habitat Applied (ac)	Cumul. Planned Wetland Applied (%)	Upland Habitat Planned (ac)	Cumulative Upland Habitat Planned (ac)	Upland Habitat Applied (ac)	Cumulative Upland Habitat Applied (ac)	Cumul. Planned Upland Applied (%)
CRSCP	1987-1995	111.4	**111.4**	30.0	**30.0**	**27%**	892.2	**892.2**	147.3	**147.3**	**17%**
IEQIP/EQIP	1996 - 2006	56.7	**56.7**	18.8	**18.8**	**33%**	253.1	**253.1**	92.3	**92.3**	**36%**
EQIP	2007	0.0	0.0	0.0	0.0	1/	2.3	2.3	2.3	2.3	1/
	2008	0.0	0.0	0.0	0.0	1/	4.7	7.0	1.6	3.9	1/
	2009	0.0	0.0	0.0	0.0	1/	12.8	19.8	12.8	16.7	1/
	2010	0.0	0.0	0.0	0.0	1/	3.8	23.6	3.8	20.5	1/
	2011	0.0	0.0	0.0	0.0	1/	65.5	89.1	0.0	20.5	1/
	2012 /2	0.0	**0.0**	0.0	**0.0**	1/	42.5	**131.6**	0.0	**20.5**	1/
BSP/BSPP	1997-2011	36.3	**36.3**	15.7	**15.7**	**43%**	253.8	**253.8**	72.3	**72.3**	**28%**
BSP/BSPP	2012 /2	0.0	0.0	0.0	0.0	1/	0.0	0.0	0.0	0.0	1/
	Total		**204.4**		**64.4**	**32%**		**1,530.7**		**332.4**	**22%**
Total Habitat Replacement Acres Applied											**396.9**

Note: Each of the program yearly incremental cumulatives are the bold numbers in the darker green boxes.

1/ The majority of the 2007 though 2012 contracts are active and practices are still being applied. The planned versus applied percentage is not applicable until the majority of the contracts have been completed.

2/ The Grand Junction Field Office reports the applied habitat acres on the row for the year each project was planned. The 17 acres of habitat replacement reported as applied in FY 2012, is included as part of the applied number for each of the years the projects were planned.

Table 6 – Salinity Wildlife Funding NRCS On-Farm Programs – Grand Valley Unit

CRSCP/EQIP/ I-EQIP Salinity Wildlife Funding	Amount
Funds Obligated to Salinity 1979 to 2011	$35,401,432
Funds Obligated to Salinity 2012	$788,254
Funds Obligated to Wildlife Projects 1979 to 2011	$2,631,584
Funds Obligated to Wildlife Projects 2012	$65,419
Funds Spent on Wildlife Projects 1979 to 2011	$855,056
Funds Spent on Wildlife Projects 2012	$0
Percent of Total Salinity Funds Obligated to Wildlife Projects 1979 to 2012	7.5%
Percent of Total Salinity Funds Spent on Wildlife Projects 1979 to 2012	2.4%

Table 7 – Salinity Wildlife Funding BSP/BSPP On-Farm Programs – Grand Valley Unit

BSP/BSPP Salinity Wildlife Funding	Amount
Funds Obligated to Salinity 1997 to 2011	$2,659,788
Funds Obligated to Salinity 2012	$0
Funds Obligated to Wildlife Projects 1997 to 2011	$638,395
Funds Obligated to Wildlife Projects 2012	$0
Funds Spent on Wildlife Projects 1997 to 2011	$178,040
Funds Spent on Wildlife Projects 2012	$0
Percent of Total Salinity Funds Obligated to Wildlife Projects 1997 to 2012	24.0%
Percent of Total Salinity Funds Spent on Wildlife Projects 1997 to 2012	6.7%

Table 8 – Salinity Wildlife Funding All On-Farm Programs – Grand Valley Unit

All Salinity Wildlife Funding	Amount
Funds Obligated to Salinity 1979 to 2011	$38,061,220
Funds Obligated to Salinity 2012	$788,254
Funds Obligated to Wildlife Projects 1979 to 2011	$3,269,979
Funds Obligated to Wildlife Projects 2012	$65,419
Funds Spent on Wildlife Projects 1979 to 2011	$1,033,096
Funds Spent on Wildlife Projects 2012	$0
Percent of Total Salinity Funds Obligated to Wildlife Projects 1979 to 2012	8.6%
Percent of Total Salinity Funds Spent on Wildlife Projects 1979 to 2012	2.7%

Funding Discussion

The dollars spent at any given time will always be lower than the obligated funds due to unexpended funds in active contracts pending practice installation, delays between practice installation and practice certification with payment, and using estimated costs that obligate more funds than are typically needed to install all of the habitat improvements. The differences displayed in the tables above are likely due to the estimated versus actual costs and the active contracts that have not currently applied all of the practices scheduled to earn incentive payments.

During the early implementation years of the program many operators reluctantly agreed to make small and typically expensive habitat improvements as a condition to getting the funding for their irrigation improvements. Many applicants fulfilled this agreement, but a number eventually canceled or never installed the scheduled habitat improvements, so the money was obligated, but never spent. This unfortunate trend was part of what necessitated the changes in how projects approached the habitat replacement agreements under salinity control. The rates

of obligated versus expended funds for wildlife have been improving significantly with this new approach.

Funding of wildlife projects from all salinity programs is outlined in Table 8. To date, $1,033,096 has been spent on wildlife projects in the Grand Valley Unit, which is 2.7% of the total obligated funds for all salinity programs. A total of $65,419 was obligated to wildlife projects in FY2012.

The NRCS under the BSP/BSPP program planned 290 acres of wildlife habitat since 2001 (Table 5), and 88 acres have been applied. In FY 2012 NRCS completed planning on 490 acres to utilize additional BSP/BSPP once a funding agreement is finalized. Through FY 2012 A total of $638,395 BSP/BSPP funds have been obligated to wildlife projects, with $178,040 spent to date on wildlife projects (Table 7), which is 6.7% of the total BSP/BSPP salinity funding.

Wildlife Habitat Replacement Discussion

Over the last 32 years 5 salinity programs have been utilized to replace wildlife acreage (Table 3). A majority of the successful replacement efforts have been a result of the CRSCP and BSP/BSPP salinity programs. The EQIP program has only produced a net 86 acres of habitat replacement in 12 years. During the first 7 years of the EQIP program, wildlife and irrigation projects were encouraged with each landowner and were combined in a single contract with their salinity control work, and there was a high cancellation rate for the wildlife portions of the contract. Since 2004, all wildlife contracts under EQIP are separate contracts and cancellation rates have decreased significantly.

During 2012, 17 acres of wildlife habitat replacement were applied (Table 4). Including FY 2012 the NRCS replacement effort has resulted in a net 397 acres of wildlife habitat applied and existing. The applied and existing acres account for about 25% of all planned projects. In addition, in the Grand Valley Unit USBR completed significant delivery system improvement projects and agreed, as part of the combined off-farm on-farm irrigation improvement projects, to provide part of the replacement acres for the NRCS on-farm projects. To meet this agreement the USBR purchased 355 acres and developed wildlife habitat in the Grand Valley Unit to offset a portion of the NRCS habitat replacement obligation. This 355 acre offset combined with NRCS funded projects has resulted in a total of 752 acres of wildlife habitat developed or significantly enhanced in the Grand Valley Unit.

Since 1991, a total of 48 acres of wetlands have been improved through salinity programs in the Grand Valley Unit with a net AREM change of +26.49; however, these values do not reflect any additional wetlands lost due to irrigation impacts. In 2010, 1 wetland was created with 0 net AREM change. Wetlands created in 2009 and 2010 will be evaluated for AREM after 3 years to allow for vegetation to establish and wetland functions to develop.

Current expected habitat losses for the DeBeque Unit are a cumulative 3 acres and a change in AREM values of -0.17, and current expected habitat losses for the Whitewater Unit are cumulative 3 acres with no change in AREM values. There are 6 acres of habitat replacement included in the Grand Valley Unit total to offset these predicted losses.

Wildlife Habitat Summary Discussion and Conclusion

Replacement efforts in the Grand Valley Unit to offset wildlife habitat values lost is dynamic as urban development impacts areas that once were managed for wildlife under the salinity control program. Each year wildlife acres are applied throughout the Grand Valley Unit, and additional acres are also removed as identified by periodic field checks by an NRCS biologist. Efforts must be placed on increasing the interest of landowners to establish and maintain wildlife habitat. Direct contact with landowners who own large parcels or land along natural washes and drainages will be beneficial.

Cancellation rates of EQIP wildlife contracts have decreased with the advent of separate contracts for wildlife only projects, and with landowners specifically interested in developing and/or improving wildlife habitat. Retention rates should also improve as established practice lifespan for practices associated with wildlife habitat have increased from 10 years under the GVSP program, to either a 20 or and 25 year practice lifespan under the current EQIP program.

Guaranteed retention of applied wildlife habitat acres may also be increased by working with lands that have conservation easements in place. The cooperative efforts involve working closely with land trust organizations to identify possible landowners with conservation easements that are interested in providing wildlife habitat. A combination of salinity funds to develop wildlife habitat with the partner funds to acquire the easement, benefits both interests. Working with Mesa County and the cities of Grand Junction, Fruita, and Palisade to establish projects located in development buffer zones may increase opportunities for wildlife projects with willing landowners. Working with the Colorado Parks and Wildlife has provided opportunities on medium to large sized parcels along the Colorado River corridor in the Grand Valley.

In 2007 the NRCS Biologist field checked all acres that had been reported as habitat replacement. The inventory resulted in a reduction of acres considered habitat replacement from 776 acres in 2006, to 684 acres in 2007. Urban development, changes in management and changes in land ownership are the major reasons that some acres no longer met habitat replacement criteria and were removed from the accounting system. In 2012, 42 acres of habitat replacement were planned. There were 8 contracts cancelled, of which 1 had wildlife practices planned.

As previously stated, the combined habitat replacement goal for the Grand Valley Unit is 1,206 acres. To date 41,989 acres have been treated with irrigation improvement practices, or 98% of the total adjusted acreage treatment goal, and 107% of the salinity reduction goal has been met. To be concurrent with project application, 1,206 acres of habitat replacement should currently be on the ground and functioning. To date 752 acres of habitat replacement are applied on the ground and provide replacement habitat. The project is currently at 62% of the concurrent habitat replacement goals, however addition habitat replacement acres are currently in active contracts or are planned and waiting for funding approval sufficient to exceed the full project replacement goals.

To be concurrent with salinity project implementation and to replace additional habitat replacement acres lost during the life of the program, the NRCS will need to continue to place high priority on habitat replacement.