Monitoring and Evaluation Report
McElmo Creek Unit

Colorado River Salinity Control Project
2012

USDA-NRCS
Cortez, Colorado

IWM MONITORING & EVALUATION REPORT
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EXECUTIVE SUMMARY
MCELMO CREEK UNIT
2012

Hydro-Salinity -

- The project plan was to treat approximately **21,550 acres** with improved irrigation systems.
- To date **14,608 acres** [/1] have been treated with improved irrigation systems.
- The project plan is to reduce salt loading to the Colorado River system by **48,600 tons/year** of salt.
- In FY 2012, salt loading has been reduced an additional **1,906 tons/year** as a result of installed salinity reduction practices.
- The cumulative salt load reduction is **27,254 tons/year**, or 56 percent of the project goal.

[/1] Note: The 14,608 acres include fields 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 **$100.13 /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 habitat replacement goal is at 2% of the current irrigation improvement acres, or 2% of 14,608 acres irrigation improvement acres equals **292 acres** of habitat developed or significantly enhanced.
- In Fiscal Year 2012, **2.1 acres** of wetland habitat and **11.0 acres** of upland habitat were reported as applied.
- To date, a cumulative **451 acres** [1/] or **155%** [2/] of the current wildlife habitat replacement goal has been established.
- Additional efforts are being made through wildlife only sign-ups, with various conservation groups, and with other Federal and State agencies to promote the implementation of wildlife habitat enhancement projects.

[1/] Within the McElmo Creek project area there are 451 acres of wetland habitat reported through FY2012 and 809 acres of upland habitat reported. It is assumed all of the wetland acres will provide suitable replacement habitat, however it is unknown whether any of the upland habitat will meet suitable replacement requirements, so those acres are not included in the total. An ongoing inventory is being conducted to verify the wetland projects are still being applied and maintained, meet the habitat enhancement requirements, and to determine if any of the upland projects meet suitable habitat replacement requirements.

[2/] Assume a full project implementation at 21,550 acres of irrigation treatment at 2 acres of habitat replacement per 100 acres of irrigation improvements, for a total 431 acres of habitat replacement needed, or the project currently meets 105% of the full project habitat replacement needs.

Key Considerations and Conclusions –

- Based on the habitat acres applied, there may be sufficient replacement to account for all the acres needed for a full project implementation of 431 acres of habitat improvements implemented at 2 percent of 21,550 acres irrigation improvement applied, however the current habitat status assessment is needed to assure the goal is met.
- The ongoing wildlife habitat assessment should be completed sometime in 2013.
- The number of applications increased slightly for 2012 however, the average contract is smaller and obligated fewer program dollars per contract.
- The goal for the Colorado River Salinity Control Program is to replace 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 marine shale

formations, 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.

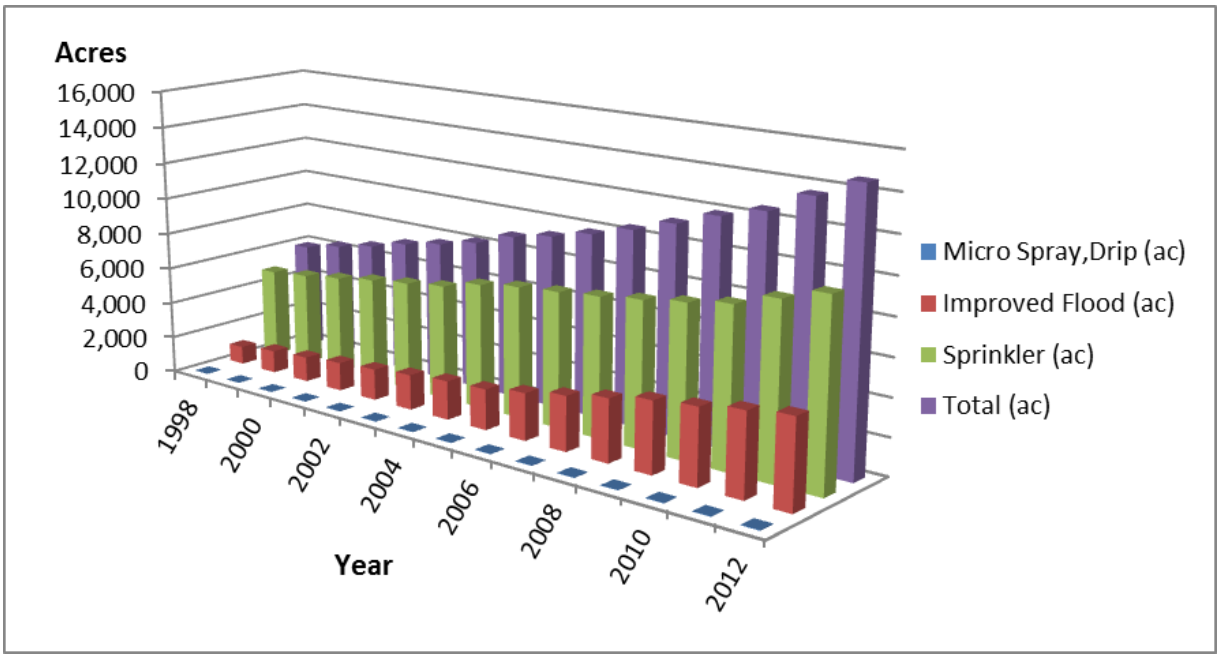
Areas with a greater conversion to sprinkler or micro spray will be at the 15 inch reduction and areas with predominantly flood irrigation will be at the 10 inch reduction. Areas that are converting from unimproved flood systems will have deep percolation plus seepage reductions in the 25 to 30 inch 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 – McElmo Creek Unit Cumulative Irrigation Systems Installed



IRRIGATION SYSTEMS APPLIED (acres)	FY2012	CUMULATIVE
Sprinkler	682	9,867
Improved Surface System	293	4,710
Micro-Spray/ Drip System	9	31
TOTAL	**984**	**14,608**

Graph 1 and sub-set table display the cumulative acres of the various irrigation improvements in the McElmo Creek Unit. The earliest micro-spray systems were installed in the late 1980's, and there has been intermittent installation and very limited acreage of micro-spray irrigation systems installed through-out the life of the project.

The McElmo Creek Unit typically has some areas with larger and more uniform field sizes where sprinkler systems are popular, however many areas have relatively small and sometimes irregular field sizes that make the installation of field sprinkler systems problematic. There have been a relatively consistent number of sprinkler systems installed in the unit, although it is lagging behind the predicted levels of treatment in the original plan. The ease of operation and uniformity of application make sprinklers a desirable option for many irrigators, although if 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 change in land ownership and subdivision of some units into rural ranchettes, make the selection of flood irrigation more common on the smaller and sometimes irregular shaped fields.

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 – McElmo Creek Unit Cumulative On-Farm Salinity Load Reduced

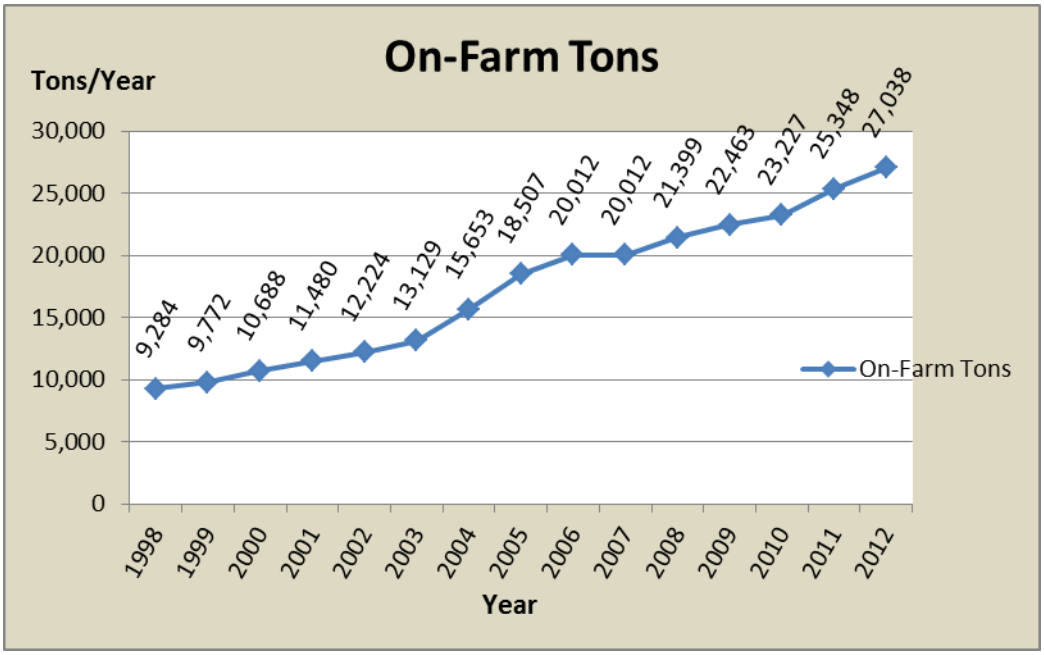


Table 2 - USGS Trend Analysis and Agency Reported Salinity Reduction

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.

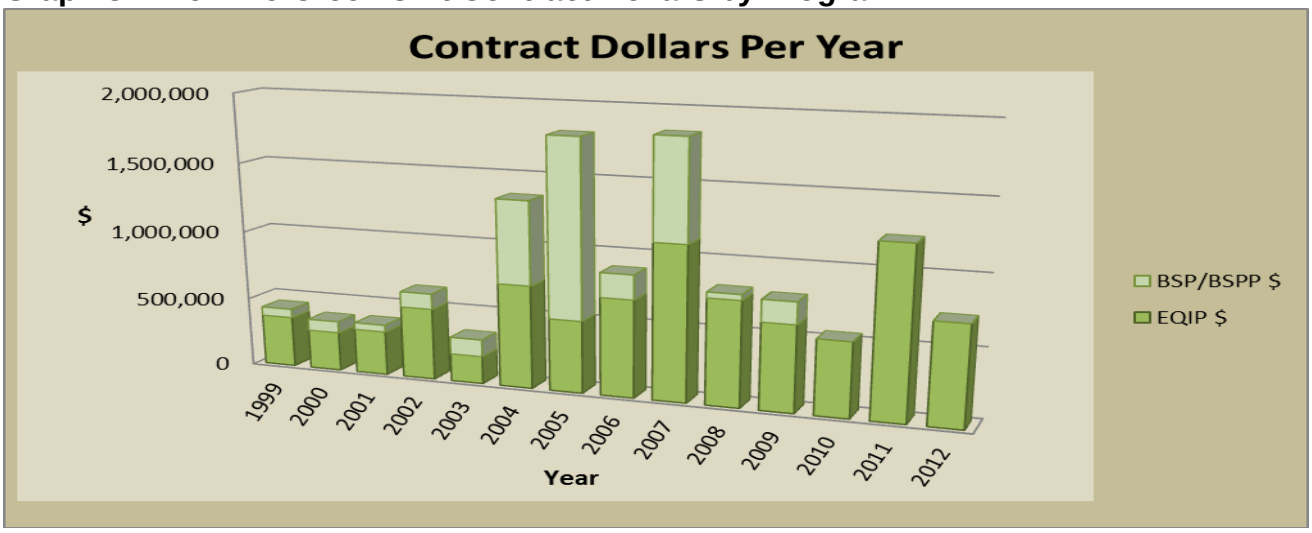
Table 2 References

"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 – McElmo Creek 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. The estimated number of contracts was down by about two thirds during this period as a result of the recession. Since there was still the opportunity to make significant irrigation improvements, outreach efforts were increased and there was a significant increase in contracts for FY 2011.

The number of applications for FY 2012 was similar to the number processed in 2011 however the average contract was smaller in size and obligated fewer contract dollars. In addition the re-funding of the Basin States Program should allow for 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 agricultural economy improves.

[/1] Note: 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 the 2013 FY.

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 McElmo Creek 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 the McElmo Creek Unit in 1989, the Natural Resources Conservation Service (NRCS) in partnership with the local Conservation District have been applying improved irrigation systems and practices with cooperators in the McElmo Creek Unit as part of 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 the 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 interest from group and irrigation companies in future participation in BSP.

A large emphasis was placed on irrigation water management in FY 2012. Staff conducted an "In-the-Field Irrigation Water Management Class" that included participants from both the McElmo and Mancos project areas. An Irrigation Water Management booklet was provided to each participant. Conservation District and Field Office staff conducted 11 sideroll sprinkler evaluations on 200 acres in the McElmo Project area. Staff developed 26 IWM Plans on 507 acres in McElmo, and developed 5 IWM Plans on 109 acres in Mancos.

FY 2012 Salinity Outreach Activities include:

- March 2012 – Provide salinity program information at the Mancos and Dolores conservation district annual meetings
- March 2012 – Provided information and met with the local irrigation company to explain details and promote salinity program
- February 2012 - KSJD Radio interview promoting NRCS programs
- February 2012 – Provide salinity program information at local soil health workshop
- February 2012 - Presented information about the salinity control program at the annual cattlemen's meeting
- June 2012 – Presented EQIP salinity program information at IWM Workshop
- June 2012 – Presentation including salinity control with local youth at recreation center using water trailer
- July 2012 - Presented EQIP/Salinity program at EWP public meeting in Mancos
- July 2012 – Presented salinity program information at the Rotary Club meeting
- August 2012 - Presented EQIP/Salinity program at EWP public meeting in Mancos
- September 2012 - Article in 4 corners area paper regarding irrigation improvements and the reason for the salinity program

Future Irrigation Water Management (IWM) Goals & Recommendations & Tasks

1. Future monitoring efforts should focus on the changing land-use conversion of large agricultural tracts into smaller tracts to monitor the effects the change in land use has on salinity control. Future monitoring efforts should also focus on the aging irrigation conservation practices to address their potential decline in irrigation performance. This monitoring and evaluation should include the investigation of cost-share methods to help producers adapt their existing systems to the new technologies and to bring these systems up to new NRCS Irrigation standards.
2. It is recommended that the Irrigation Water Management Specialists continue to provide assistance to the landowners during the first season of use for the improved irrigation systems installed under the Salinity Program.
3. The goal of IWM program is to provide the necessary assistance and information to help the Salinity Program achieve the highest level of salinity reduction possible with the combined irrigation improvements and enhance water management. This IWM activity will provide the much needed follow up assistance and irrigator support with participating landowners to help them maximize their irrigation efficiencies and over-all success.
4. Utilizing and partnering with other skilled professionals like the CSU Extension, irrigation suppliers, Conservation District Boards, and Irrigation Districts can accelerate the success of the IWM Program and its acceptance.
5. The Field Office staff will be conducting two additional Irrigation Water Management 101 courses for program participants during the 2013 irrigation season.
6. Twenty side-roll sprinkler systems will be evaluated for system performance and to assist the irrigator with water management options during the 2013 irrigation season.

Project Area Future Outlook

The McElmo Creek Unit is undergoing significant changes in landownership and the size of many of the operating units. Urban/rural small acreage units are more common and are changing the types of operators applying for program assistance. The smaller units still offer good opportunities for making irrigation delivery and system improvements for salinity control, but the operators often have full-time employment off-farm and higher levels of management and production may not be their main goal in making irrigation improvements.

It is anticipated there may be emerging issues as applicants adjust to the financial uncertainties with a somewhat soft economy and the new national level payment schedules. It is unclear at this time what level of net compensation a participant will receive relative to their actual cost of financing and adapting to the improved irrigation systems. During periods of transition and change the rates of participation are often a little lower as the local community waits to see how it works for their neighbors.

The implementation of the NRCS IWM tool for 2012 contracts and the 2 year commitment for follow-up will provide additional salinity control for the program, and help the producer improve crop quality. Two years of follow-up assistance is being included in the current conservation plans. NRCS planners will continue using the IWM Tool to assist in developing the conservation plans for all salinity control and water quality improvement contracts.

Advancements in sprinkler irrigation technology and adoption of the more precision irrigation application systems are occurring at an accelerated pace in the project area. Adoption of these advanced technologies may help provide a means of sustaining agricultural production on irrigated land that is competing with the on-going development pressures and economics. Linking improved irrigation technology with value added crops may provide additional economic opportunity for producers interested in continuing commercial agricultural production. The Irrigation Water Management Specialists funded through USBR matching technical assistance and by NRCS technical assistance, are an excellent source of specialist support to help transfer these technologies and management options to irrigators in western Colorado.

Energy efficiency is an increasing concern both nationally and locally, and the potential energy savings resulting from the use of higher water application efficiency irrigation systems provides an opportunity for additional benefits to the producer by selecting the higher efficiency systems. Advocating the use, highlighting the additional benefits, and incorporating these additional benefits into the ranking and prioritization of salinity projects will encourage additional irrigation improvements that support both salinity control and water use efficiency in the project area.

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 McElmo Creek 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. Snipe represent very shallow water and moist soil flooded meadow 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 great horned 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, protection of 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 environmental assessment work done on the Grand Valley and Silt Units.

The McElmo Creek Unit is set at 2 acres of habitat replaced or enhanced per 100 acres of irrigation system improvements per written concurrence from the USFWS in 2007.

Based on project reporting the NRCS has reached approximately 68% of the acreage treatment goal at 14,608 acres and approximately 54% of the projected salinity reduction treatment goals for the McElmo Creek 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 at 2 acres of habitat per 100 acres of irrigation system treatment the concurrent habitat replacement goal is 292 acres, see Table 3. The McElmo Creek Unit exceeds the concurrent wildlife habitat replacement goal by 159 acres of wetland habitat.

Pending the results of the habitat inventory and evaluation the project area may have sufficient habitat replacement in place to exceed 100% of NRCS goals at the time of project completion [1/]. 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 take place as operation and maintenance agreements expire and land uses change in the McElmo Creek Unit. To account for the loss, it is likely NRCS will need to apply more habit replacement acres than the goaled amount. NRCS biologists will visit all habitat replacement projects every 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.

[/1]Depending on how many irrigated acres are ultimately treated for salinity control, it is estimated that the final habitat replacement goal will be approximately 413 acres dependent on the final irrigated acres treated.

Table 4 - Wildlife Habitat Replacement Table - McElmo Creek Unit

Habitat Replacement	Acres
Salinity Program Irrigated Acres Treated to Date	14,608
Habitat Replacement Goal @ 2 acres per 100 acres Irrigation Treatment	292
Habitat Replacement Acres Applied and Maintained through FY 2011 [1/]	449
Habitat Replacement Acres Applied During FY 2012	2
Total Habitat Replacement Acres Through FY 2012	451
Remaining Acres to Meet Concurrent Habitat Replacement Goal	159
Remaining Acres Needed to Meet Full Project Replacement Goal [2/]	20

Note the green boxes indicate extra or plus acres

[1/] Within the McElmo Creek project area there are 451 acres of wetland habitat reported through FY2012 and 809 acres of upland habitat reported. It is assumed all of the wetland acres will provide suitable replacement habitat, however it is unknown whether any of the upland habitat will meet suitable replacement requirements, so those acres are not included in the total. An ongoing inventory is being conducted to verify the wetland projects are still being applied and maintained, meet the habitat enhancement requirements, and to determine if any of the upland projects meet suitable habitat replacement requirements.

[2/] Assume a full project implementation at 21,550 acres of irrigation treatment at 2 acres per 100 acres irrigation improvement, for a total 431 acres of habitat replacement needed, or the current habitat acres are sufficient to meet 105% of the full project replacement goal.

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. The McElmo Creek Unit is concurrent with replacement needs.

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 Versus Applied with Funded Contracts - McElmo Creek 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	1990-1996	297.3	**297.3**	294.7	**297.3**	**100%**	277.8	**277.8**	152.9	**152.9**	**55%**
IEQIP/EQIP	1996 - 2006	93.3	**93.3**	35.6	**35.6**	**38%**	494.1	**494.1**	450.4	**450.4**	**91%**
EQIP	2007	35.2	35.2	0.0	0.0	1/	70.9	70.9	0.0	0.0	1/
	2008	37.0	72.2	67.7	67.7	1/	78.1	149.0	145.9	145.9	1/
	2009	25.9	98.1	12.0	79.7	1/	40.7	189.7	0.0	145.9	1/
	2010	0.0	98.1	28.2	107.9	1/	7.1	196.8	7.1	153.0	1/
	2011	4.8	102.9	8.7	116.6	1/	9.7	206.5	42.5	195.5	1/
	2012 /2	30.7	**133.6**	2.1	**118.7**	1/	0.0	**206.5**	11.0	**206.5**	1/
BSP/BSPP	1997-2011	0.0	**0.0**	0.0	**0.0**	na	0.0	**0.0**	0.0	**0.0**	na
BSP/BSPP	2012 /2	0.0	0.0	0.0	0.0	1/	0.0	0.0	0.0	0.0	1/
	Total		**524.2**		**451.6**	**86%**		**978.4**		**809.8**	**83%**
Total Habitat Replacement Acres Applied /3											**1,261.4**

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 Cortez Field Office reports the applied habitat acres on the row for the year it was certified as fully implemented and not for the year each project was planned.

3/ Note, until the on-going field inventory is complete to verify which wildlife habitat replacement projects as still in place and meet program enhancement requirements, and to determine which if any of the upland wildlife projects provide suitable replacement habitat, the actual amount of salinity program habitat replacement currently claimed is the 451.6 acres of wetland habitat reported as applied.

Table 6 – Salinity Wildlife Funding NRCS On-Farm Programs – McElmo Creek Unit

CRSCP/EQIP/ I-EQIP Salinity Wildlife Funding	Amount
Funds Obligated to Salinity 1989 to 2011	$13,031,526
Funds Obligated to Salinity 2012	$727,453
Funds Obligated to Wildlife Projects 1989 to 2011	$148,195
Funds Obligated to Wildlife Projects 2012	$32,256
Funds Spent on Wildlife Projects 1989 to 2011	$148,195
Funds Spent on Wildlife Projects 2012	$110
Percent of Total Salinity Funds Obligated to Wildlife Projects 1989 to 2012	1.3%
Percent of Total Salinity Funds Spent on Wildlife Projects 1989 to 2012	1.1%

Table 7 – Salinity Wildlife Funding BSP/BSPP On-Farm Programs – McElmo Creek Unit

BSP/BSPP Salinity Wildlife Funding	Amount
Funds Obligated to Salinity 1997 to 2011	$3,385,883
Funds Obligated to Salinity 2012	$0
Funds Obligated to Wildlife Projects 1997 to 2011	$0
Funds Obligated to Wildlife Projects 2012	$0
Funds Spent on Wildlife Projects 1997 to 2011	$0
Funds Spent on Wildlife Projects 2012	$0
Percent of Total Salinity Funds Obligated to Wildlife Projects 1997 to 2012	0.0%
Percent of Total Salinity Funds Spent on Wildlife Projects 1997 to 2012	0.0%

Table 8 – Salinity Wildlife Funding All On-Farm Programs – McElmo Creek Unit

All Salinity Wildlife Funding	Amount
Funds Obligated to Salinity 1989 to 2011	$16,417,409
Funds Obligated to Salinity 2012	$719,555
Funds Obligated to Wildlife Projects 1989 to 2011	$148,195
Funds Obligated to Wildlife Projects 2012	$32,256
Funds Spent on Wildlife Projects 1989 to 2011	$148,195
Funds Spent on Wildlife Projects 2012	$110
Percent of Total Salinity Funds Obligated to Wildlife Projects 1989 to 2012	1.1%
Percent of Total Salinity Funds Spent on Wildlife Projects 1989 to 2012	0.9%

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.

To date the McElmo Creek Unit has not found it necessary to utilize the BSP/BSPP funding to meet the wildlife habitat replacement funding needs. The BSP funding is helpful for replacement projects with applicants that do not meet the EQIP program eligibility requirements and have been utilized to fund numerous habitat replacement projects in other salinity control units in western Colorado.

Wildlife Habitat Replacement Discussion and Conclusion

The habitat replacement goal is 2% of the acres treated for salinity. To date 14,608 acres have been treated with salinity control practices. To be concurrent with project application, 290 acres of habitat replacement should currently be on the ground and functioning. To date 451 acres of habitat replacement are reported as applied on the ground. The on-going field inventory and evaluation will assess the status of each reported habitat replacement project to assure the project is still being maintained and providing acceptable replacement habitat.

Pending the final determinations from the field inventory, the project is currently at approximately 155% of the concurrent habitat replacement goals and potentially is at 105% for full project replacement goals. Urban development, changes in management and changes in land ownership are major reasons that some acres no longer met habitat replacement criteria and may need to be removed from the accounting system. In 2012, no new acres of habitat replacement were planned and a combined 2 acres of wetland habitat and 11 acres of upland habitat where reported as applied.

NRCS is currently at concurrent habitat replacement goals. To assure the current project status and to continue to be concurrent with salinity project implementation, NRCS will need to conduct periodic field inventories and assure the habitat projects are managed and maintained to meet the goal of replacing habitat values foregone for the duration of the on-farm portion of the Colorado River Salinity Control Program. The current proposed schedule is a field review at least once every three (3) years to assess the habitat project status, management, and operation and maintenance.