

**MONITORING & EVALUATION REPORT--2007**  
**MANCOS VALLEY UNIT**  
**COLORADO RIVER SALINITY CONTROL PROJECT**  
**USDA-NRCS**



**IWM MONITORING & EVALUATION REPORT**

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**WILDLIFE MONITORING & EVALUATION**

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**M&E EXECUTIVE SUMMARY**  
**HYDROSALINITY**

**Project: Mancos Valley**

- The project plan is to treat **5,400** acres with improved irrigation systems.
- To date, **914** acres have improved irrigation systems planned/applied.
- The project plan is to reduce salt loading to the Colorado River system by **11,940** tons of salt.
- In FY 2007, salt loading has been reduced by **870** tons/year.

The cumulative salt load reduction is **2,198** tons/year.

**Cost effectiveness –**

- The *planned* cost per ton of salt saved with prior year contracts is **\$78.13/ton**. This is based on the following formula:

FA + TA = Total Cost X Amortization Factor = Total amortized cost  
Total amortized cost divided by total annual tons salt saved = Cost/Ton

FA is total dollars obligated in EQIP & Parallel Program (not including wildlife).

TA is 67% of the FA (This number includes education and monitoring).

Amortization factor for 2007 is **.07007**

## Hydro Salinity Monitoring & Evaluation Summary

2007

- Irrigation Systems Applied Acres
  - Acres Treat in 2007 = **501 Acres**
  - Program totals = **914 Acres**
- Irrigation water conveyance delivery/ gated pipe
  - Acres treated in 2007 = **27 Acres**
  - Program Totals = **95 Acres**
  - Average Efficiency = **50%**
- Sprinkler & Drip irrigation systems installed  
(Includes Linear, Center Pivot, Side Roll, & Big Gun)
  - Acres treated in 2007 = **474 Acres**
  - Program Totals = **819 Acres**
  - Average Efficiency = **75%**
- **Overall Average systems efficiency**
  - In 2007 = **74%**
  - Cumulative = **72%**

**MANCOS VALLEY IRRIGATION MONITORING & EVALUATION  
2007 REPORT  
USDA & NRCS**

**MANCOS VALLEY OVERVIEW**

The Mancos Valley is an agriculture valley situated in the middle and lower portions of a 203 square mile watershed of the Mancos River, in the vicinity of Mancos, Montezuma County, Colorado. The watershed, with elevations ranging from 6,200 ft to 13,192 ft, consists of semi-arid high valleys, canyons, forested mountains and alpine tundra. The watershed is bound by Mesa Verde National Park in the southwest, the Ute Mountain Reservation to the south, the ridge of the Montezuma-La Plata county line in the southeast, the La Plata Mountains in the northeast, and a low ridge line to the northwest. Mean annual precipitation ranges from 16 inches in the valley to 40 inches on the ridges. Agriculture is primarily limited to the lower elevations of the valley and composed of irrigated grass-pasture and alfalfa production.

The higher elevations of the watershed are dominated by Ponderosa, Spruce, Fir and Aspen. On non-agriculture land, the vegetation of the lower elevations of the valley is dominated by Sage and Pinon-Juniper, with willow in riparian areas and large stands of invasive Tamarisk in the Mancos Canyon.

Mancos River flow is dominated by precipitation falling on the higher elevations in the northeast portion of the watershed, in the San Juan National Forest. The East, Middle, and West branches of the Mancos River and Chicken Creek drain these higher precipitation areas. Mud creek drains the lower elevations in the northwest. The lower valley is divided by Weber and Menefee Mountains, between which the Weber Drainage flows. The confluence of the Mancos River and Weber drainage marks the lower end of the valley. Immediately below the valley is the Ute Mountain Reservation, through which the Mancos River flows to its confluence with the San Juan River in New Mexico.

**Irrigated Agriculture**

According to a US Bureau of Reclamation GIS study (U.S. Bureau of Reclamation 1994) agriculture in the valley is composed of 145,900 acres,

with 11,700 acres irrigated (9900 acres by flood practices and 1800 acres sprinkled). A breakdown of the acreage is provided below:

- a. Irrigated: 11,695 acres
  - (1) Flood 9900 acres
    - A. alfalfa: 280 acres
    - B. grass: 9541 acres
    - C. orchard: 41 acres
    - D. small grain: 38 acres
  - (2) Sprinklers: 1795 acres
    - A. alfalfa: 948
    - B. grass: 847 acres
    - C. Fallow: 61 acres
    - D. Intermittent: 80 acres
- b. Not Irrigated: 2996

There are approximately 46 diversions of water for Mancos Valley agriculture. Thirty six of these ditch diversions from the Mancos River and its tributaries provide water directly to 9290 acres of agriculture lands. Eight reservoir diversions provide water to an additional 2091 acres. Jackson Gulch, the primary storage reservoir for the valley, provides flow augmentation captured by a number of the 36 ditch systems.

**Basin Total Salt Load 42,300 - 43,000 Tons/Year \***

Salt Load Source	Tons/Year	Tons/Year from Irrigation	% Reduction Planned	Tons/Year Reduced	Tons/Year After
<b>Natural and Other Sources</b>	<b>16,300</b>				<b>16,300</b>
<b>Irrigation Salt Load</b>	<b>26,000</b>				
<b>Off Farm Ditch Seepage</b>		<b>14,500</b>			<b>7,060</b>
47 Systems, Deliver Water to 11,700 Acres					
26 Systems, Deliver Water to 10,800 Acres, 92%, 60% Participation			** 90%	7,440	
<b>On Farm Irrigation Systems</b>		<b>11,500</b>			<b>5,500</b>
Existing Improvements, 1,800 Acres			76%	1,500	
Proposed Improvements, 5,400 Acres			*** 76%	4,500	
<b>Totals</b>	<b>42,300</b>	<b>26,000</b>		<b>13,440</b>	<b>28,860</b>

\* Based on analysis of a 30-year (1969 through 1998) USGS record of water quantity and water quality to determine salt loading in average tons/year. The record includes a representative mix of wet and dry years.

\*\* Anticipate a 90% net reduction in seepage losses from the estimated 16 ditches to be treated.

\*\*\* Deep percolation reduction of 58% for conversion from unimproved flood to improved flood on 25 % of the treated acres; and a deep percolation reduction of 82% for conversion from un-improved flood to side roll sprinkler on 75% of the treated acres for a 76% net reduction in salt loading for each acre treated.

## **2007 Activities**

*Several activities were undertaken in 2007 to improve salinity management. The largest emphasis was placed on irrigation water management. In 2007 66 IWM plans were written on 501 acres of pasture and hayland and 194 acres if IWM was applied. The IWM specialist held 5 half day classes where the fundamentals of IWM were taught. These classes also include some hands on teachings on how to test for soil moisture. A stronger effort was put forth to provide on farm one on one training of IWM. This included multiple pivot evaluations to ensure that systems were nozzled correctly and being operated at the correct speed for optimal efficiency.*

*Other activities included outreach to educate people about the salinity program and its benefits. Some of the activities included displays at the Four Corners Ag Expo, newspaper articles, and radio announcements. Work was also done with the local conservation districts and irrigation water districts to encourage large canals and ditches to consider converting to pipeline systems to reduce seepage and improve efficiency.*

## **Future IWM Goals & Recommendations & Tasks**

1. Future monitoring efforts should focus on the conversion of large agricultural tracts into smaller tracts to monitor the effects the change in land use has had on Salinity. Future monitoring efforts should also focus on maturing irrigation conservation practices to address their declining Irrigation efficiencies. This should include the investigation of cost-share methods to help producers adapt their existing systems to the new technologies, 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. It is also recommended that the IWM Specialist use a random selection process to follow up with a representative sample of all the systems installed and funded by the Salinity Program. This random sampling will help evaluate the current efficiency and the operation and the maintenance of the designed irrigation systems.
4. The remaining time of the IWM Specialists should be spent assisting landowners whom are requesting a higher level of irrigation water management and technical assistance. Technical assistance can be provided, through workshops, field days, tours, news & media events and technical references.
5. It is also recommended that the IWM Specialists attend the necessary training to keep up to date on the new irrigation systems and technology.
6. The Goal of IWM program is to provide the necessary assistance and information to help the Salinity Program achieve the level of salinity reduction above what the program originally planned for. This IWM activity will provide the lacking and much needed follow up assistance and public relations, with the landowners to help them maximize their irrigation efficiencies and over-all success.
7. 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.

## **2008 OUTLOOK**

Several major endeavors are being planned or implemented in 2008. Several large ditches are being considered for conversion to pipeline. It is anticipated that the pipelines will aid tremendously in increasing the amount of on farm projects. It is anticipated that there will be a large amount of conversion from flood to sprinkler irrigation because the pressure generated from the pipeline will allow sprinklers to function without the added cost of pumping. The planning process is in the preliminary stages but it is anticipated that these projects could result in many new on farm contracts being developed.

Continued improvement of the IWM program offered by the NRCS is planned. It is anticipated that the new mobile irrigation labs might be able to be utilized to increase irrigation knowledge and effectiveness in the area. It



is also anticipated that more one on one attention will be given to educating landowners. More comprehensive field by field assessment of existing conditions and planned crops will be conducted by IWM Specialists prior to irrigation season. The mobile irrigation lab and other new tools will allow documentation of soil infiltration rates under sprinkler irrigation with consideration of current field status of tillage, crop residue, and available water holding capacity of soil profile will be accomplished by means of an infiltrometer. Increased accuracy of surface irrigation systems will result from flow metering devices. Monitoring of salinity issues will now be available to the area to identify and target control problem areas. Efforts are also underway with the cooperation of the local conservation districts to obtain an automated weather station to provide a local and more accurate source of ET data for agricultural producers to use when scheduling their irrigations. All of this equipment will also afford the chance to offer services and data never available to the area before.

Monitoring of projects in O&M phase of contracts will be expanded. Especially with the trend of sub-dividing old large farms and ranches into “ranch-ettes”, IWM assistance will be critical to maintaining good water management to ensure water quantity and quality for all users.

## Part 1. M&E EXECUTIVE SUMMARY- Mancos WILDLIFE

Fiscal year 2007 was the fourth year the Mancos Valley was funded under the Salinity Control Program. To date, 81 contracts have been approved for funding, eight of them being wildlife contracts (2 wildlife contracts were cancelled). 25 contracts have been completed. A total of \$5,478,990.00 has been obligated with \$196,777.00 (3.6%) obligated for wildlife contracts.

### Acres of Wildlife Habitat Applied 2007

	Cumulative acres 2006	Cumulative acres 2007	Net change for 2007
Upland	<b>406.6</b>	<b>453.3</b>	<b>46.7</b>
Wetland	<b>36.7</b>	<b>40.4</b>	<b>3.7</b>

### Wetland Data 2007

Cumulative acres impacted year 2006	Cumulative acres impacted year 2007	Net AREM Unit change 2006	Net AREM Unit change 2007	Net change for 2007
<b>39.26</b>	<b>42.96</b>	<b>23.27</b>	<b>.68</b>	<b>23.91</b>

### Funding for Wildlife Habitat 2007

% of total funds obligated for wildlife through 2006	% of total funds obligated for wildlife through 2007
<b>5.8%</b>	<b>3.6%</b>

% of total funds spent on wildlife through 2006	% of total funds spent on wildlife through 2007
<b>2.1%</b>	<b>2.4% (\$128,837.00)</b>

**Explanation of the above results and planned wildlife program adjustments for next fiscal year:** As of 2007 twenty five contracts were completed. Nine these had long term impacts to wetlands (please note last years report reflected planned acreage rather than applied). Five were negative impacts with a loss of 2.56 acres (5185') of wetland (willow/buffaloberry ditch banks) habitat. Four were positive impacts affecting 40.4 acres of Mancos river bottom and adjacent palustrine emergent wetland. Included in the Executive Summary is a table for percentage of funds spent on wildlife as well as obligated. Cumulative totals for dollars obligated for wildlife dropped which is to be expected as more dollars are spent for hydro-salinity projects. Focus is being placed more on wetland/riparian habitat enhancement and development but we are still achieving quite a bit of upland habitat improvement in our efforts. Our upland habitat disturbance resulting in losses is minor considering the historical farming and ranching activities as well as development activities currently going on in the valley.

## **PART 2. M&E REPORT, WILDLIFE**

### **History**

The Mancos Valley Salinity Control Unit is located within Eastern Montezuma County in the Southwest corner of Colorado. It lies between prominent physiographic features such as the LaPlata Mountains to the northeast, with peaks over 12,000 feet in elevation, and Mesa Verde rising to an elevation of about 8,400 feet to the southwest. The elevation at Mancos is approximately 7,000 feet above sea level.

Most of the moisture comes in the form of late summer rains and winter snowfall. The total drainage area of the Mancos Valley is 131,200 acres. This includes the Mancos River and its major tributaries Mud Creek, Weber Creek, and Chicken Creek.

The climate is semi-arid with an average annual precipitation of 16 inches. Most of the farmed land is irrigated by surface water. The major source of irrigation water is the Mancos River with a mean daily flow of 48 cubic feet per second. Other minor water sources include Chicken Creek and Lost Canyon Creek.

Much of the valley is underlain by Mancos shale usually only a few feet below the ground surface in the lower portions of the valley. Some portions are underlain by gravelly, cobbly and stony alluvium. Soils are fairly diverse ranging from predominant clay and silty clay loams to stony, gravelly loams to a lesser extent.

Most of the cropland in the valley is irrigated grass pasture. Some alfalfa is also grown.

For the Mancos Unit we are just monitoring habitat acreage changes. For the most part these changes are positive except for incidental losses of ditch associated wetlands and woody vegetation. Most impacts are short term in nature with re-vegetation occurring naturally or with manipulation (re-planting) in one to two growing seasons.

NRCS also conducted a wetland inventory which basically ground-truthed a 1982 U.S. Fish & Wildlife Service inventory. These wetlands were mapped, and classified according to the Cowardin System for Classification of Wetlands and Deepwater Habitats. Wetland types were mapped in ARCVIEW to come up with acreage estimates by type and a representative sample were given a wildlife value rating using a the Avian Richness Evaluation Method developed by Paul R. Adamus. This assessment yields bird species composition and richness of lowland wetlands and riparian areas within the Colorado Plateau region of western Colorado. This assessment is also being used with each land unit impacting wetlands.

All wildlife applications are presently being funded as long as they meet our objectives to improve, develop and protect quality habitat and meet the minimum requirements set forth in the ranking tool.

## **Methods**

### **A. AVIAN RICHNESS EVALUATION METHOD (AREM)**

Paul R. Adamus developed this evaluation method in cooperation with the Environmental Protection Agency for use in the “lowland wetlands of the Colorado Plateau” (specifically the Salinity Control Units in Utah, Colorado and Wyoming).

In 1994 the State of Colorado Natural Resources Conservation Service decided to adopt AREM for evaluating wetland impacts in the McElmo Creek, Lower Gunnison and Grand Valley salinity control units.

We will use this method in the Mancos Valley Unit also. The data from these evaluations is presented in table 3.

Values are obtained by averaging the “six habitat scores weighted by species,” multiplied by .01, and then multiplied by the acres to obtain unit values.

### **B. Wildlife Practices**

Habitat changes are currently being tracked by acreage (see table 3). They reflect the adaptation and implementation of the practices listed below. We are also tracking dollars spent on wildlife practices vs. those spent on irrigation improvement practices (see table 1).

- Grass/legume cover plantings for upland nesting and roosting
- Shallow water developments for waterfowl and shorebird feeding and resting
- Tree and shrub plantings for upland wildlife nesting, roosting and food
- Fencing to exclude livestock grazing either permanently or during critical use periods
- Bioengineering practices to improve or protect riparian habitat
- Occasional development of irrigation to improve forage quality for wildlife
- Rock drop structures to improve cold water fish habitat
- Forest Stand Improvement
- Brush Management
- Riparian Forest Buffer







## **Discussion & Conclusion:**

Voluntary replacement efforts are meeting the expectation for the area. This could change as we work with more landowners but that appears not to be the case. Much of what is happening with development in the McElmo Creek Unit is occurring at a much slower pace in the Mancos Valley. The “character” of the valley is important to it’s citizens and wildlife is a component of that character.

At this time habitat replacement is substantially exceeding habitat losses. The local conservation district and the Mancos community have placed a great deal of importance on the Mancos River. This has led to several landowners currently or in the process of protecting and enhancing riparian habitat that transects their property. It has also led to NRCS assisting those individuals in their efforts.

Approximately 2.15 miles of river bottom and associated wetland habitat have been or are being fenced out to exclude or restrict grazing. Within some of those stretches revegetation and rehabilitation practices have been or are being installed. Adjacent to the river almost 400 acres of upland habitat on one ranch/farm has been set aside and enhanced for wildlife. Further efforts to protect and enhance additional riparian acreage have been set in motion and we should see similar results in future years.

Several offsite wetland enhancement projects are presently being implemented. Additional upland habitat enhancement projects in mixed pinon/juniper and ponderosa communities are being conducted to improve turkey habitat.

The majority of the properties we have wildlife contracts on have been placed into perpetual conservation easements protecting them from development. For this reason and with a reasonable management ethic on the part of the landowner, the value (to wildlife) of the habitat on these properties should be preserved.