

Final
MEADOW VALLEY/CLOVER CREEK
WATERSHED MANAGEMENT
PLAN
(PHASE I)

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Meadow Valley/Clover Creek
Technical Review Team

Approved by

Lincoln County CRM Steering Committee

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EXECUTIVE SUMMARY

The Meadow Valley/Clover Creek Watershed Plan (Phase I) addresses impacts and solutions to the periodic high water and sediment flows to the city of Caliente, Nevada.

Caliente, population 1,110, is a small town located in Eastern Nevada in rural Lincoln County on Highway 93. The Meadow Valley Wash and adjacent Clover Creek Watersheds come together within the city limits of Caliente. Repeated flooding through Caliente has been documented since 1906. Current problems center around a high ground water table and threats from flooding to local facilities. Flooding, presents a clear and present danger to human life. This includes threats to the only county pharmacy and hospital, access and utilities to the State of Nevada Caliente Youth Center (CYC) and the city sewer plant and homes near the wash.

In March 1998 the Lincoln County Coordinated Resource Management Steering Committee commissioned a Technical Review Team to prepare a Meadow Valley/Clover Creek Watershed Plan. The team was to conduct an assessment of the above problems and recommend solutions. This Phase I plan was prepared in response to this request.

The plan recommends hiring or contracting with a watershed specialist (estimated cost \$100,000) to design the recommended channel restoration work needed through Caliente. Once the restoration design is completed, funds would be sought to complete the restoration as well as maintain the channel.

As part of the plan the Bureau of Land Management (BLM), Ely Field Office, is planning to conduct an intensive study of the lower Clover Creek watershed. This is designed to determine those vegetative improvements that are needed to increase water infiltration and reduce sediment movement in the Clover Creek (Ash Canyon) drainage. The BLM will then conduct a vegetative conversion project to improve watershed condition.

The plan outlines the need for continued funding for eradication of exotic tamarisk in the Meadow Valley Wash and Clover Creek watersheds. This will help control flooding and is also aimed at the restoration of the native vegetation.

The plan recommends that actions implemented within the scope of the plan result in no net loss of long term potential, or suitable,

habitat for the endangered southwestern willow flycatcher. If flood control projects result in the loss of habitat that may cause harm to the flycatcher, a permit or authorization may need to be obtained from the U.S. Fish and Wildlife Service (USFWS). If the project is funded, authorized, or carried out by a Federal agency, authorization for incidental take of a federally listed species may be obtained through section 7 consultation under the Endangered Species Act (ESA). The section 7 consultation process strives to minimize the effects of the action on listed species. It is expected that most actions taken to alleviate the threat of flooding through Caliente would require a permit from the Army Corps of Engineers (COE) under section 404 of the Clean Water Act. This would provide the federal nexus necessary for the COE to initiate consultation under the ESA. Additional measures to further minimize potential effects to the southwestern willow flycatcher may be required by the FWS and the COE for any loss of habitat resulting from flood control projects, and may be provided by planting willows or other native species in suitable areas of the wash.

The plan recommends numerous private, state and federal sources that are available to fund the implementation actions. It is hoped that Phase I can be completed within three years of the approval of the plan. Maintenance of the channel restoration will have to be an on-going effort. Future plans or amendments to this plan may be needed to address other watershed problems primarily involving threats to the Union Pacific Railroad tracks.

I. INTRODUCTION

The Lincoln County Coordinated Resource Management (CRM) Steering Committee established the Meadow Valley/Clover Creek Watershed Technical Review Team (TRT) at their March 28, 1998 meeting. The steering committee asked the TRT to prepare a plan which protects the watershed, as well as the residents and users within the watershed, and complies with all applicable Local, State and Federal Laws and Ordinances. The following is the charter given:

"Specifically the TRT will:

1. Conduct an assessment of the Meadow Valley/Clover Creek watershed within Lincoln County to determine site specific resource conditions which may require management actions and uses which are impacted by the watershed functions.
2. Work with all interested persons and groups to determine issues and concerns within the watershed.
3. Prepare a plan which addresses:
 - a. Concerns and issues within the watershed.
 - b. Current resource condition.
 - c. Current and historical uses which affect these conditions.
 - d. Constraints of laws, regulations and ordinances.
 - e. Other agency policies and plans.

The plan should provide for short and long term goals and objectives for resource conditions and uses within the watershed. The plan should also prioritize and schedule management actions necessary to achieve said goals and objectives. And lastly, the plan should identify responsible persons, groups and agencies to carry out the plan.

4. The TRT should explore and identify funding sources and grants which may be obtained to carry out the actions necessary to accomplish the goals and objectives of the plan.
5. Identify monitoring methods and develop a time line for

monitoring the implementation and revisiting and revising the plan, as necessary.

The TRT is expected to consult with the Steering Committee if problems arise in developing the plan, or if interim actions are necessary to protect resources and/or uses within the watershed. The TRT should recommend a TRT Chairperson to the Steering Committee Chairperson for appointment. If a facilitator should be needed, the TRT should arrange for one on their own, or request the steering Committee Chairperson to find one.

The TRT will meet with the Steering Committee to discuss the plan when drafts are ready for review and comment. The TRT should be prepared at all times to give a report of progress at all Steering Committee meetings."

II. BACKGROUND

The Meadow Valley Wash, below Echo Valley Reservoir, runs approximately 181 miles to the Lincoln/Clark County line. Of this, an estimated 77% (139 miles) is privately owned land and 23% (42 miles) is public land managed by the Bureau of Land Management (BLM). This compares to ownership of all lands in southern Lincoln County which is 98% BLM (3.4 million acres) and 1.3% private (45,600 acres). The Lower Meadow Valley watershed is estimated at 979 sq. miles. (6.3 million acres) Maps of the Meadow Valley/Clover Creek Watershed are included in Appendix A.

Clover Creek runs approximately 18 miles east to Barclay from its junction with the Meadow Valley Wash at Caliente. Of this, approximately 66% (12.5 miles) is publicly owned and 34% (6.5 miles) is in private ownership. The Clover Creek watershed covers 364 sq. miles including the Matthews (60 sq. miles) and Pine Canyons (80 sq. miles) side drainage.

Other significant drainages into Meadow Valley Wash are the Antelope Canyon (33 sq. miles) drainage west of Caliente and the Cottonwood Wash (80 sq. miles) located 22 miles south of Caliente. Meadow Valley Wash flows 70 miles south of Caliente to the Muddy River near Glendale. The Muddy River drains into the Colorado River above Lake Mead.

U.S. Geologic Survey (USGS) water flow records, from a gaging station 4.5 miles southwest of Caliente in Meadow Valley Wash, shows an average flow, from 1951-1960, of 8,620 acre feet. The peak annual

discharges ranged from 75 to 1,500 cubic feet per second (cfs). Minimum discharges for the same period ranged from 0.6 cfs to 2.0 cfs (State of Nevada 1964).

The Nevada State Unified Watershed Assessment List, completed in 1998, lists the Meadow Valley wash (HUC# 1501003) as a category 2 watershed. This predicated from the lack of listing stream segments within the watershed on the 3030d list. The TRT felt that the Meadow Valley Wash has sufficient segments that pose risks to human and aquatic life and has the support of public interest. Other important factors include the Caselton Acid Mine Tailings and the Federal transportation routes at risk. This watershed should easily qualify for listing some of the stream segments on the 303d list. Once this is accomplished, the watershed would be a category 1 watershed.

The further confinement of stream flow by the railroad beds and roads constructed in the narrow canyons in portions of Meadow Valley and Clover Creek watershed confine the water flow channel in the wash. This has increased the severity of flooding since waters can not spread out and tend to cut down to accommodate flows.

The Union Pacific Railroad (UPRR) constructed tracks along the wash shortly after 1900. Prior to 1900 it is assumed the portion of Meadow Valley Wash, in what is now Caliente, was a large marsh where the stream widened. The Meadow Valley and Clover Creek drainages most likely has always experienced periodic flooding especially from rain on snow events in the winter months. Large floods in 1906 and 1910 forced the railroad to move the tracks to the present "high line" location. A total of 15 tunnels were constructed from 1910-1912 to move the tracks out of the flood plain wherever possible. Flooding also was recorded in 1907, 1908, 1911, 1914, 1922 and 1938 (State of Nevada 1964). In 1955, Congress approved the construction of the Pine Canyon and Mathews Canyon flash flood control dams in the Clover Creek watershed upstream from Caliente. The dams have prevented the large cutting floods which, prior to construction of the dams, commonly came through the city. These high flows had kept a large channel through the city free of vegetation. However, since the dams were built, the slower and longer flows have brought increased sedimentation and vegetation growth in the channel through the city. The water table in Caliente has slowly risen due to the deposition of sediments and lack of flushing flows in the channel. This has caused increased problems in recent years with basement flooding and water infiltration in the city sewage system.

High water in the spring of 1998 threatened the Nevada Department of Transportation (NDOT) bridge on Highway 93 at the south end of

Caliente. NDOT excavated sediment from the channel as part of an emergency plan to protect the bridge. They estimated that four acres of vegetation were removed in the wash (on private/city lands) above and below the bridge in May and June 1998. This was done to allow high flows room to pass under the bridge. NDOT planted black and coyote willows in the wash below the bridge in March 2000 to mitigate the loss of vegetation.

III. MEMBERSHIP

The Lincoln County CRM Steering Committee requested the following persons serve as members of the TRT:

Stan Wallis	Caliente City Council
Steve Rowe	Caliente Youth Center (CYC)
Allen Newberry	Nevada State Parks (NSP)
Paul Sladish	Natural Resource Conservation Service (NRCS)
Mark Barber	Bureau of Land Management (BLM) - Ely
Gary Medlyn	Bureau of Land Management (BLM) - Ely
Jack Clifton	Nevada Division of Wildlife (NDOW)
Mr. and Mrs. Don Allen	Homeowners
Kevin Roukey	Army Corps of Engineers (COE)
Patty Manola	Nevada Department of Transportation (NDOT)
Al Pfister	U.S. Fish and Wildlife Service (USFWS)
Unassigned	Union Pacific Railroad (UPRR)

The following persons actually participated in one or more TRT meetings:

Stan Wallis (Chairman)	City of Caliente
Bryan Elkins	City of Caliente
Judy Martinson (Clerk)	NRCS- Las Vegas
Rick Orr	NRCS- Caliente
Paul Sladish	NRCS
Bill O'Donnell	NRCS-Las Vegas
Mark Barber (Clerk)	BLM - Ely
Gary Medlyn	BLM - Ely
Curtis Tucker	BLM - Ely
Ann Dernburg	BLM - Caliente
Kyle Teel	BLM - Caliente
Shirley Christman-Johnson	BLM - Caliente
Stephanie Byers	USFWS - Reno
Marcie Hayworth	USFWS - Reno
Jeri Krueger	USFWS - Las Vegas

Jack Clifton	NDOW - Panaca
Steve Rowe	Caliente Youth Center
Don Knox	NDOT
Frank Cheney	NDOT
Allan Jenne	NDOT
Gerald Braden	San Bernardino County Museum
Kevin Roukey	Army COE-Reno
Cody Tingey	Nevada State Parks, Caliente

There has been no direct participation in the TRT by the Union Pacific Railroad. They were sent copies of the draft plans and invited to attend meetings and/or provide comments in writing.

IV. PUBLIC LAND USE WITHIN THE WATERSHED

A. Livestock

Grazing by domestic livestock (cattle and sheep) occurs in most of the watershed on public lands. The season of use varies with each allotment and operator. Key BLM grazing allotments in the watersheds are:

Condor Canyon

N5
 Condor Canyon
 Black Hills
 Highland Peak

Clover Creek

Clover Creek
 Cottonwood
 Sheep Flat
 Little Mountain
 Crossroads
 Barclay

Lower Meadow Valley Wash (Rainbow Canyon)

Applewhite
 Meadow Valley
 Ash Flat
 Pennsylvania
 Schlarman
 Rainbow

Pennsylvania

Other allotments associated with the Meadow Valley Wash:

Henrie Complex
Breedlove
Rox-Tule
Oak Springs
Sand Hills
Sawmill

Appendix B is a map showing the location of the BLM grazing allotments in Lincoln County.

B. Wild Horses

Wild horses and burros are managed by the BLM under the Wild Free-Roaming Horse and Burro Act of 1971 (P.L. 92-195) as amended. Wild horse and burro herd management areas (HMA's) occur along much of the watersheds. Those of particular interest include the following:

Upper Meadow Valley

Little Mountain HMA
Deer Lodge Canyon HMA

Clover Creek

Miller Flat HMA
Clover Creek HMA
Clover Mountains HMA
Little Mountain HMA

Lower Meadow Valley Wash

Clover Creek HMA
Applewhite HMA
Delamar Mountains HMA
Meadow Valley Mountains HMA
Blue Nose Peak HMA
Mormon Mountains HMA

Also, the Miller Flat and Highland Peak HMA's have an indirect impact on the watershed.

The latest census figures show a total of 267 horses in the above allotments. Fences along Clover Creek are designed to prevent access

by wild horses and livestock. Portions of Meadow Valley Wash are also inaccessible to wild horses due to public or private fencing. Appendix C is a map showing the location of HMA's in Lincoln County.

C. Wildlife

Upland species using the watershed include, but are not limited to, mule deer, desert bighorn sheep, Gambel's quail, jackrabbit, mountain lions, coyotes, badgers, kangaroo rats and deer mice. The desert tortoise, a federally endangered species, occurs below Carp. Birds of prey include the prairie falcon, goshawk, red-tailed hawk, sharp-shinned hawk, American kestrel and golden eagle. These and many other species depend on the riparian habitats along Meadow Valley Wash and Clover Creek to meet part of their life cycle needs.

Wildlife that are obligates of the riparian (plants dependent on a high water table) or aquatic habitats within the watershed include the Big Springs spinedace (threatened species in the Condor Canyon portion of Meadow Valley Wash), rainbow trout, Meadow Valley desert sucker, Meadow Valley Wash speckled dace, golden shiner, Arizona southwestern toad and crayfish. Waterfowl and waterbirds also use open water portions of the wash.

Riparian nesting neotropical birds using the Meadow Valley Wash include Indigo bunting, black-headed grosbeak, Bell's vireo, plumbeous vireo, yellow warbler, Lucy's warbler and summer tanager. Cooper's hawks also nest along the wash.

In 1992 the BLM Caliente Resource Area, Las Vegas District, completed a habitat management plan (HMP) for Clover Creek/Cottonwood. The plan identifies up to six miles of Clover Creek on public lands that provides habitat for a wild rainbow trout fishery. The stream also contains two BLM Nevada State Sensitive native fish, the Meadow Valley Wash desert sucker and Meadow Valley Wash speckled dace. Stream discharge was listed as 8.75 cubic feet per second (cfs). One mile of the stream is within areas claimed by BLM as Federal Public Water Reserves. Big Spring, which provide the majority of water to Clover Creek, is appropriated to the Union Pacific Railroad for the first 2 cfs and the BLM has rights to the flow that exceeds 2 cfs. Studies indicate the normal flow is less than 2 cfs. BLM has filed for .0028 cfs at Little Springs #3 one mile downstream from Big Springs. Water quality sampling at 19 samples at seven sites over three years (1986-1989) showed that some samples exceeded standards for fecal coliform, temperature and pH. Objectives in the HMP for Clover Creek call for a reduction in the average summer temperature in the upper portion on BLM from 24 degree centigrade to 20 degrees

centigrade. Willows were planted along the creek in recent years by the BLM but the UPRR removed these during reclamation efforts following a train derailment. The railroad had committed to do further reclamation of the site. Gap fences have been built along the stream to control use by wild horses and livestock.

In addition, the endangered southwestern willow flycatcher (SWF) was found nesting along Meadow Valley Wash downstream from Caliente during the summer of 1998. A survey for nesting birds in the wash below Caliente was conducted by the San Bernardino County Museum. A SWF habitat survey of the wash was done by the BLM Ely Field Office. The surveys found that large areas of Meadow Valley Wash consist of high quality SWF habitat. Four sites were intensively surveyed by museum personnel in 1998 in the Meadow Valley Wash between Caliente and Elgin. Breeding birds were found at one site 12 kilometers (7.5 miles) south of Caliente. Evidence of SWF nesting, from previous years, was found at two other sites. Brown-headed cowbirds, which can cause problems by parasitizing SWF nests, were found to be low to moderate in abundance. The survey was repeated in 1999 and no birds were seen in the wash below Caliente. However, one bird was seen using the habitat just above the NDOT Highway 93 bridge but left before the nesting period.

A 1998 preliminary habitat survey of 30 miles of Meadow Valley Wash (south of the junction with Clover Creek) by the BLM found 5.2 miles of presently suitable SWF habitat and 23 miles of potentially suitable SWF habitat. The private land through Caliente was rated as currently suitable SWF habitat. No rating was done on Clover Creek.

D. Vegetation

Pinyon and juniper trees, sage and black brush, rabbit brush, crested wheatgrass and cheatgrass dominate the northern half of the watershed, while creosote bush, shadscale and hopsage dominate the southern portion of the upland portions of the watershed.

Riparian plants along the streams, springs and wet areas include cottonwood, box elder, black willow, coyote willow, cattail, carex and sedges.

Exotic salt cedar or tamarisk (Tamarix ramosissima) has invaded the riparian area in a number of locations. Tamarisk causes the following negative physical changes: (1) Increased soil salinity inhibiting native plant germination and growth, (2) Increased water consumption and loss, (3) Increased wildfire frequency, and (4) Increased frequency and intensity of flooding. Eradication of

tamarisk is done by hand cutting and hand application of the chemical Garlon. This may have to be done for several consecutive years. Planting of willows and cottonwoods to replace the tamarisk is done where native stock is not readily present.

Tables 1 and 2 (See Appendix E and F) were prepared by the Ely BLM Field Office in 1999 as the best current estimates of tamarisk in the watershed. There is an estimated 226 miles of tamarisk on public lands and 61 miles on private lands along streams in the watershed. The five reservoirs in the watershed have an estimated 830 acres of tamarisk.

In addition to the above-mentioned drainage and reservoirs, there are numerous springs, seeps, and other riparian features which are known to have small to dense infestations of tamarisk. All of these sites are within the broad Meadow Valley Wash watershed.

E. Mining

Mining has occurred in the Caselton Mining District (south of Pioche and west of Highway 93) periodically since the 1880s, with the most recent mining ending in 1979. The tailings have been mined off and on for several years and have been deposited on public land. A site investigation was conducted in 1989. The corresponding report stated that the tailings produced acid rock drainage and contained high concentrations of lead, zinc and arsenic which were above hazardous waste standards and drinking water standards. The pH at the site measured 0.6 to 3.0. In April 2000 the BLM funded an expanded site investigation and an engineering evaluation/cost analysis of the site. Once the report is received a decision will be made if there is a need to either stabilize or remove the toxic waste materials. Should the acid flows be washed downstream into the active stream portion of Meadow Valley wash they could pose a threat to fish and other wildlife.

V. PRIVATE, CITY, AND STATE OWNED LANDS USES WITHIN THE WATERSHED

The Clover Creek and Meadow Valley watersheds contain approximately 39,800 acres of private, city and state owned property. The state property is associated with four state parks, Cathedral Gorge, Echo Canyon, Kershaw-Ryan and Spring Valley. The remaining property is used primarily for agriculture and consists of approximately 40% rangeland, 30% irrigated pasture, and 30% irrigated hay or cropland. Much of the rangeland areas are gradually being broken into 2.5 to 10

acre ranchette style housing. Most private properties are located adjacent to the wash bottom.

Vegetation types vary between cattail marsh riparian, sparsely vegetated hills, and high mountain white fir forests. Most of the private properties are sagebrush bench lands, greasewood flats, saline meadows, and, or riparian stream corridor vegetation types. Information on vegetative communities and associated Range Site information can be found in the Meadow Valley Soil Survey (USDA 1976). Wildlife that occur on private land are similar to those described under the section on public lands.

Livestock grazing occurs on private lands throughout the county. Most private lands are located along the valley bottoms and stream courses where water could be found for use in agricultural production and irrigation. Most livestock grazing occurs on irrigated pastures or on native meadows. Farming and ranching operations in the county are dependent on public land permits for a good portion of their forage base. Grazing on private pasture or meadows generally occurs for only a short time during the year. The time of year varies but much occurs in the spring and summer. The exception being those individuals that have very few animals such as a few sheep or cattle, raised for meat, or horses for riding stock.

The 1997-1998 Nevada Agricultural Statistics book indicated that there is a total of 15,000 head of cattle (and calves) in Lincoln County. Sheep numbers are probably less than 200 head total in the county. Of these numbers, an estimated 60% of the cattle and 50% of the sheep are found in the Meadow Valley/Clover Creek watershed area. Domestic horse numbers are difficult to estimate and no statistics are available.

VI. EXISTING WATERSHED IMPROVEMENTS

The Clover Creek/Meadow Valley Watersheds contain many existing improvements to aid in managing and controlling outflow water. The Clover Creek Watershed contains two large controlled flow water retention dams built by the Army Corps of Engineers (COE) in the late 1950s in the Barclay area approximately 16 miles east of Caliente. These two structures are capable of capturing water volumes over 60 feet in depth and 10 or more surface acres in size. These are of primary concern to the citizens of Caliente since they release water at a fixed rate. This process reduces the chance of flash flooding in the city, but lower volume flood waters flow for a much longer period of time, reducing the chance of channel cutting but increasing

the sediment deposition.

The Meadow Valley Watershed contains numerous improvements, which were funded by several different sources. These include approximately 6,000 acres of crested wheatgrass seedings, a rock gabion type grade control structure and a debris/sediment basin. These are located approximately 50 miles north of Caliente.

Other structures include the Eagle Valley Reservoir built as a recreation reservoir by the State of Nevada. This is located approximately 45 miles north of Caliente and is approximately 35 surface acres in size. Downstream approximately 10 miles is the Echo Canyon Reservoir. This is also a state recreation reservoir of approximately 30 surface acres. There are three structures found between these two reservoirs that were installed by the Civilian Conservation Corps (CCC) in the 1930's and early 1940's. These include a water spreader dike and two grade stabilization structures. Downstream from Echo Reservoir, and located approximately 12 miles north of Caliente, is the last grade control structure installed by the CCC. These structures are adequate to control most of the sedimentation in the Meadow Valley drainage. During high water flows most sedimentation problems in Caliente originate from the Clover Creek drainage.

VII. PROBLEMS/ISSUES IDENTIFIED IN THE WATERSHED

The TRT identified the following problems within the Meadow Valley/Clover Creek Watershed areas:

- Clover Creek flooding/sedimentation
- High water table in Caliente
- Sewer system problems (infiltration of ground water into sewer lines and subsequent grey water releases due to excess water flow)
- Threat to Union Pacific Railroad (UPRR) tracks due to high flows washing out portions of the line.
- Threat of toxic spills from a UPRR derailment
- Potential loss of access to the Caliente Youth Center (CYC)
- Threats to Highway 93 bridge (main transportation route)

-Invasion of tamarisk and other noxious weeds are expanding in the watershed

-Threats to the endemic fish habitat

-Conflicts with endangered southwestern willow flycatcher nesting habitat in the wash

-Impacts to of flooding and high water tables to private land owners, agricultural and residential

Over the past three years, several meetings have been held to identify and address those issues that affect Caliente. Sedimentation in the channel through town has reduced the channel depth by as much as 12 feet in different locations over the last 15 years. The twelve foot diameter culverts on the Caliente Youth Center (CYC) access road now have only 1.5-2.0 feet of free flow area due to sediment accumulation.

The following identified issues are associated with the Clover Creek drainage:

1. Increased sedimentation in the channel through the city has increased the potential for flooding.
2. Sedimentation of the stream channel has been a factor in raising the water table in the city which has resulted in flooded basements. Upgrading of the system in 1999 helped resolve this problem.
3. Higher water tables have caused infiltration of groundwater into the older city sewer lines. This has resulted in excessive amounts of water entering the sewage treatment facility, and has caused overflows and gray water releases.
4. The increased acreage of older age pinyon and juniper plant communities has resulted in reduced ground cover which has increased the potential for runoff and increased sediment build up.
5. Invading tamarisk in the watershed is replacing native vegetation, increasing water consumption/loss and increasing frequency and intensity of flooding. Tamarisk stops the natural ecological succession which normally leads to a more open

cottonwood dominated plant community. The denser tamarisk tends to catch more sediments, raising water tables and spreading flood waters out. This increases the severity of even smaller flood events.

6. Two large COE flood control structures (Pine and Mathews Canyon Dams) provide excellent protection from peak flood events. However, because they are controlled release structures, the duration of water flow is longer and results in more sediment carried downstream.
7. U.S. Highway 93 is a federally designated interstate commerce transportation route. Flooding has deposited enough sediment in the channel that an emergency channel clearing operation had to be undertaken by NDOT to prevent the potential loss of the bridge structure at the south end of the city.
8. This threat to the Highway 93 bridge, at the south end of Caliente, also affects the city sewer main line, city water main line, power lines, and communication lines supported by the bridge structure.
8. The stream hydraulic process generally causes a stream channel to widen as it becomes shallower. This may increase the potential for flooding in Caliente, posing a threat to buildings and infrastructure located within the flood plain. Buildings and infrastructure include the only pharmacy in the county, the power line to the only hospital and the County Road Department yard with fuel storage facility. This amounts to a danger to human life. Most of Caliente is within the 100 year flood plain of the Meadow Valley Wash. (See Appendix D map).
10. The potential for contaminants to enter the stream from the under-cutting of county facilities and current gray water releases from the sewage treatment plant, are a threat to endemic fish, mammals and birds, as well as down stream water users.
11. The UPRR mainline passes through Clover Creek Canyon and the lower Meadow Valley Wash Canyon. Flooding is a constant threat to the road grade and bridges. Several floods have caused severe damage over the last 10 years resulting in delayed interstate and international commerce. UPRR efforts to divert flood waters from the tracks (Ash Canyon area) can also increase sedimentation deposition in Caliente.

12. Portions of the Meadow Valley Wash support both potential and suitable, habitat for the endangered southwestern willow flycatcher. Clover Creek drainage also has habitat for the willow flycatcher but have not yet been observed in this area.
13. Beavers have become established in the wash at and below Caliente, increasing the potential for trapping sediments in the channel.
14. The three major drainages above Caliente that contribute sediment loads are Ash Canyon, English Canyon, and the wash draining Miller Bench.
15. Concerns were voiced over maintaining minimum flows and proper temperatures in Clover Creek to support a rainbow trout fishery and two BLM Nevada sensitive fish species.

VIII. LOCAL OPINIONS ON THE PROBLEMS

Rick Orr, a 20 year Caliente resident and NRCS resource specialist, stated that he feels there are several causes of the high flows and sediment movements out of the Clover Creek watershed. A majority of the watershed is covered with mature pinyon-juniper woodlands which have very little understory. During rain or snow melt events, high water runoff causes soil erosion. Years of controlling wild fires have led to the dense stands. Livestock grazing of the watershed, was not believed to be contributing to the problem, in most cases. Wild horse and livestock usage along the creek has historically caused problems by overgrazing the riparian vegetation along the creek.

The confined nature of the wash within the narrow canyons, railroad grade, and adjacent roads, all contribute to the problem by increasing the height and speed of flood waters. Also, beaver dams that wash out have added to the problem. The two COE dams built in the 1950s in the upper watershed help control large flushing flows, but now result in longer lower flows which deposit sediments in the channel through Caliente and thus result in an increasingly higher water table.

Stan Wallis, long time Caliente resident, stated there are basements that have been dry for years but in recent years have had to be pumped. The number of houses with pumping stations went from 5 to 30 and beyond. A 1999 City of Caliente sewer drain project has reduced this number considerably. The channel through the city used to be 8 to 14 feet deeper than it is today. The deeper channel was established during flooding after the turn of the century. Flooding

was aggravated by the original railroad construction and placement of the track next to the streams.

Efforts by the UPRR to control flows from side canyons into Clover Creek, above Caliente, also may be contributing to the increasing sedimentation. The sediments move downstream into Meadow Valley Wash and are deposited in the channel through Caliente.

IX. ALTERNATIVE SOLUTIONS

The Technical Review Team (TRT) considered the following solutions:

Channel restoration through Caliente

Improvements in the Clover Creek Watershed (English/Ash Canyons)

Implementation of Nevada Watershed Best Management Practices
(State of Nevada, 1994)

Total diversion of water around Caliente

A new reservoir above Caliente

Complete relocation of the railroad to another location outside the watershed

Restrictions on activities conducted by UPRR and private land owners along Clover Creek above Caliente to restrict unnecessary disturbance or removal of sediments

X. PLAN GOALS AND OBJECTIVES/ACTIONS

A. Goals for Private/City Lands

1. Reduce the impact of a high water table on Caliente.

Objective/Actions:

- a. Hire or contract with a hydrologist/hydro geomorphologist or watershed planner (within the first year after the approval of the plan) to do an analysis of the problem watershed area and design the solutions including maintenance procedures needed. This would include incorporating natural watershed functions into any design to protect and enhance all wildlife species that

use the riparian area along the watershed.

b. Reduce sediment depth in the Meadow Valley Wash stream channel in Caliente consistent with recommendations of flood control project design developed by the watershed planner.

c. Maintain the channel restoration efforts, starting in year three and beyond as needed. If a major flood occurs, the maintenance procedure would automatically be carried out in compliance with all Federal and State laws and permits.

2. Assure no net loss in long term potential, or suitable, habitat for southwestern willow flycatcher in the Meadow Valley Wash drainage (includes private and public lands).

Objectives/Actions:

a. Minimize the amount of existing native riparian habitat removed in the channel through Caliente when doing channel restoration and later maintenance work. The existing riparian vegetation should be incorporated into the flood control plan design developed by the watershed planner.

b. Plant willows and cottonwoods in potential flycatcher habitat in Meadow Valley Wash below Caliente in the same year or before the channel restoration is completed. Acres of the plantings should equal acres of the removals.

c. Remove tamarisk on private/state lands (with permission of the landowner) in Meadow Valley Wash. This would occur in areas not identified as being used by willow flycatchers. Replant these sites with willows and cottonwoods as needed. Complete in conjunction with objective A.1.b.

3. Reduce impacts from flooding to main transportation routes adjacent and crossing the Meadow Valley Wash and Clover Creek.

Objective/Action:

a. Work with the Union Pacific Railroad (UPRR), Nevada Department of Transportation and the State of Nevada Caliente Youth Center (CYC) to design reasonable solutions that are consistent with the other objectives.

B. Goals for Public Lands

1. Reduce sediment transport from Ash and English Canyons watershed drainage's.

Objectives/Actions:

- a. As funding becomes available, the Bureau of Land Management (BLM) will conduct an inventory of approximately 325,400 acres of the Clover Creek Watershed using the Pacific Southwest Interagency Sediment Yield Procedures (PSISYP). The survey will concentrate on the south side drainage upstream from Caliente. This includes hiring or contracting with a geologist, soil scientist, range management specialist, and hydrologist. Complete this within two years of finalization of this plan.

- b. Using results of the inventory under objective B.1.a., select upland areas of the wash for vegetative conversion to increase water infiltration and reduce sediment movement into Clover Creek. Start the vegetative conversion project(s), estimate 1000 acres, the third year after completion of the inventory (B.1.a) as funding permits.

2. Improve or maintain riparian habitat on public lands in the Meadow Valley Wash to proper functioning condition (BLM Technical Reference 1739-9).

Objectives/Actions:

- a. Remove/eradicate tamarisk as needed in the Meadow Valley Wash and Clover Creek (started in 1999) stream courses not actively used by flycatchers. Replant these sites with willows and cottonwoods as needed. Begin this the year that this plan is completed; continue for two years or until complete.

- b. Do periodic intensive inventories of the current condition of riparian habitat on public lands in Clover Creek and Meadow Valley Wash in areas that could be affected by the other objectives. This will help better define where plantings and other improvements can be made in line with objective A.2.b. This would be accomplished in the first year after plan completion. This will also establish baseline conditions that can be used to compare with the results from implementation of the plan, thus affording a means for determining the success of the plan.

3. Maintain a minimum base flow in Clover Creek to support the existing rainbow trout fishery and two BLM sensitive fish species.
 - a. Work with Union Pacific Railroad and other water right holders to determine and maintain a minimum base flow needed in the public portion of Clover Creek which will maintain the wild rainbow trout fishery.
 - b. With NDOW do regular surveys of Clover Creek for presence of the Meadow Valley desert sucker and speckled dace. Maintain habitat suitable for these species on public lands.
4. Seek to reclassify the Meadow Valley Wash (15010013) as a Category I Watershed on the State of Nevada Clean Water Act 303D list.

The team was in agreement that Phase I of the plan should deal primarily with approximately 1.9 miles of Clover Creek/Meadow Valley Wash that runs from above the CYC to where the 1998 NDOT work stopped above the Highway 93 bridge. This is the section where the majority of the problems exist. This includes the access (including sewer and phone lines) to the CYC which is threatened by debris and high flows. If this bridge were washed out, it would cause closure of the center. This center serves as a State of Nevada home for over 150 troubled youth. Appendix D has a detailed map of the city and flood prone areas.

XI. FEDERAL PERMITS AND PROCEDURES

Due to the presence of suitable habitat for the endangered southwestern willow flycatcher in the section of the wash through Caliente and below, a permit or authorization may need to be obtained from the U.S. Fish and Wildlife Service (USFWS) to incidentally take a listed species or species proposed for listing. The term "take" means to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct. Incidental Take is the take of listed species that results from, but is not the purpose of, carrying out an otherwise lawful activity conducted by a Federal agency or applicant.

Projects that are authorized, carried out, or funded by the Federal government that may affect listed species or species proposed for listing would require consultation under section 7 of the Endangered

Species Act (ESA). Examples include projects occurring on public lands managed by the Bureau of Land Management (BLM), U.S. Forest Service (USFS), or U.S. Fish and Wildlife Service (USFWS); projects requiring a federal permit, such as a 404 permit from the Army Corps of Engineers (COE); or projects funded through a federal agency or program, such as Community Development Block Grants under the Department of Housing and Urban Development (HUD) or flood mitigation programs funded under the Federal Emergency Management Agency (FEMA). Results of section 7 consultation typically include the issuance of a biological opinion and "take statement", along with reasonable and prudent measures and terms and conditions that, when applied, would minimize or avoid the take of a listed species.

If a project occurs on privately-owned land without a Federal nexus, or connection with a Federal action, a Habitat Conservation Plan (HCP) would need to be developed to minimize and mitigate the effects of the project on listed species. Upon completion of an HCP, a permit may be issued by the USFWS for the incidental take of listed species. HCPs may take several years to develop and require substantial funds to develop and implement the plan. The development of regional and county-wide plans are capable of drawing more people together to help with development of the plan, and usually have a larger financial base in which to fund implementation of the plan.

It is expected that a majority of the projects needed to alleviate flooding and sedimentation problems in the Meadow Valley Wash watershed would require a permit issued by the COE under section 404 of the Clean Water Act (CWA). Section 404 of the CWA requires that a Department of the Army permit be issued prior to discharging dredged or fill materials into waters of the United States. This permit should provide the federal nexus needed to initiate section 7 consultation under the ESA.

All actions occurring on federal lands or involving federal funding need to have appropriate analysis under provisions of the National Environmental Policy Act (NEPA) to disclose impacts to the environment.

XII. IMPLEMENTATION AND FUNDING

A. Public Sector Funding Opportunities

1. Federal Fund Allocations

- a. Increased federal funding of BLM (or other federal agencies) to conduct inventories and projects on public lands.
- b. Funding from NRCS, USFWS, Environmental Protection Agency (EPA) and others to assist with projects on private land.
- c. City of Caliente can request assistance through Nevada Senator Reid or Congressman Gibbons' office for direct appropriation of federal add-on funding to assist with implementation of the plan.

2. Federal Programs

a. Wetlands Grant Program (Environmental Protection Agency -EPA). This program provides grants to states, tribes and local governments for various wetland/watershed restoration protection projects. Areas of emphasis include the following: river corridor and watershed protection demonstration projects, ecological monitoring and assessments, and wetlands protection training. Information about the program is provided by the EPA Regional Wetland Coordinator or by visiting the EPA Wetlands Division website, www.epa.gov/owow/wetlands/.

b. Watershed Protection Workshops (EPA)

EPA's watershed protection workshops assist local officials and decision-makers by providing information on how to protect their watershed through regulatory and non-regulatory approaches. Any community is eligible to request a workshop, for which EPA will provide funding. Funding is limited for this program. The direct contact for this program is Macara Lousberg; USEPA, Office of Water; 401 M St. SW (4504F), Washington, DC 20460; (202) 260-1952. E-mail address: lousberg.macara@epa.gov. General information about the program can be found on the internet by visiting the website:

www.livablecommunities.gov/toolsandresources/wr_workshops.htm.

c. Watershed Assistance Grants

These grants provide funding to support local partnerships for

watershed protection and restoration. EPA administers this grant through the River Network, a national organization working to build partnerships among river and watershed advocates at the local, state, and regional levels. Grants are given to projects that offer nationally applicable lessons about how to organize and take action to protect and restore local watersheds. The focus of the program is on building organizational capacity, the overall project should provide tangible results in the near future. More information, including application information is available on the internet by visiting the website at:
<www.livablecommunities.gov/toolsandresources/wr_watershed.htm>.

d. Watershed Academy (EPA)

The Watershed Academy provides training on watershed management issues. Training courses range from basic watershed management principles to the application of complex technical tools. More information may be obtained by contacting: Watershed Academy; USEPA (4503F); 401 M Street SW, Washington, DC 20460 or by visiting the website at www.epa.gov/OWOW/watershed/wacademy.htm.

e. Five Star Restoration Challenge Grants (EPA, others)

This multi-partnership grant program provides modest financial assistance to support community-based wetland and riparian restoration projects that build diverse partnerships and foster local natural resource stewardship. The average grant awarded in 1999 was \$10,000. Awarded projects must have a strong on-the-ground restoration component and should also include education, outreach and community stewardship. More information is available on the internet by visiting the website at:
www.nfwf.org/5star-rfp.htm.

f. Environmental Restoration Challenge Grant Program
(Bureau of Reclamation -BOR)

These grants are awarded to entities who submit projects based on an ecosystem approach to solving a watershed problem. Eligible projects include efforts to recover sensitive fish, plant, and wildlife species, restore riverine, wetland, riparian, and upland habitats, improve water quality, control noxious weeds, conserve endangered fish, or avoid listing of aquatic species. General information about the program can be found on the internet by visiting the website at: