

Chapter 9

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Purpose and Scope

This chapter develops a summary of the issues that are discussed in previous chapters, briefly discussing the work that has been performed to respond to issues identified in the 1995–2015 Regional Water Plan, and identifying the future work that is needed to respond to the remaining and newly identified regional water resource management issues.

Background

The 1995–2015 Regional Water Plan identified a number of issues to be resolved. Subsequent to the adoption of the plan, the Regional Water Planning Commission (RWPC) commenced to work on these issues in a cooperative way with local government and stakeholder entities. Issues that were beyond the purview of the RWPC have been addressed separately by local governments and water purveyors and brought forward to the RWPC for a finding of conformance with, or as amendments to, the Regional Water Plan. Following is a brief description of each major issue, the work that was undertaken to respond to the issue, a status update and identification of any additional work that might be needed. The additional work identified as numbered items are then carried forward to Chapter 11 - Action Plan.

9.1 Municipal Water Resources in the Central Truckee Meadows

(1995-2015 Regional Water Plan Issue)

Specific Issues and Linkages

In September 2000, Sierra Pacific announced its intention to sell the water utility business, which it had operated since 1861. In November 2000, a cooperative agreement was executed between Reno, Sparks and Washoe County to form TMWA. On June 11, 2001, TMWA officially opened for business upon the completion of bond sales and the transfer of title to all diversion, treatment, conveyance, water transmission, wells and distribution related facilities.

One specific requirement of the Reno, Sparks and Washoe County Joint Powers Authority (JPA) was for TMWA staff to produce a water resource plan to address specific goals. One such goal was to establish a water budget and a water resource plan for the Authority, which shall reflect, among other things:

- Water Supplies available to the Authority and separately to each Member from all sources,
- Demand within each Member's jurisdiction within the Authority's retail service area, and
- The peaking capacity required for delivery of Water Supplies by the Authority to each Purveyor Member, if applicable, and the means by which such requirements shall be met.

Linkages: Water rights balance with TROA implementation and wastewater effluent reuse. See Section 9.22 and Chapter 7.

Action Taken / Alternatives Evaluated to Address the Issues

On March 19, 2003 the TMWA Board of Directors adopted the Authority's 2005–2025 Water Resource Plan (WRP). Issues addressed by the Plan include: the Joint Powers Agreement, Water Demand Forecast, Water Production Facilities, Water Conservation, Water Meter Retrofit, Current Water Resources, Drought Standard, Water Rights Availability and Future

Water Resources.

Recommendations

The adopted TMWA 2005–2025 Water Resource Plan presents Key Findings and Recommendations associated with the issues identified above. These Key Findings and Recommendations are not reiterated within this Plan update; however, several of the significant recommendations are summarized below:

Water Demand Forecast: The Board accepts the water demand as a reasonable estimate of future water demands to be used for planning purposes.

Water Production Facilities: The Board acknowledges the efficiencies of a single purveyor and that the water treatment and delivery system be operated in a unified manner; Staff should review and update where necessary the 2002-2022 Facility Plan to incorporate the peak day projections in the WRP; and TMWA should continue its well development program to meet drought supply needs.

Drought Standard: The Board shall: (1) for planning purposes, design and manage TMWA's water resources to withstand the length of the worst drought cycle of hydrologic record (1987 to 1994) for the Truckee River, (2) recognize that although commitments could expand from 99,000 af annually to 113,000 af annually through the continued conversion of irrigation water rights to municipal use, manage commitments to 110,000 af; and (3) direct staff to continue review of the performance of this standard and update the Board when future conditions change and/or at the next Water Resource Plan update in 3-5 years.

Water Rights Availability: The Board direct TMWA staff to: (1) continue to purchase water rights under its Rule 17 and (2) expand its activities in cooperation with Reno, Sparks and Washoe County in identifying and purchasing fractionated Truckee River water rights under the streets within those jurisdictions.

Future Water Resources: The Board should continue to support the efforts to implement TROA and direct TMWA Staff to investigate, evaluate, and negotiate, where appropriate, other potential water supply projects.

Subsequent Activities and Additional Work Needed

- 1.A Negotiated Settlement (TROA) – NEPA and CEQA require an environmental evaluation of the TROA. This process is underway. From now until the execution of TROA, storage agreements must be negotiated, change applications filed and the change process completed contingent on the implementation of TROA.
- 1.B Drought Standard – The RWPC intends to review Policy 1.2.e – Conjunctive Management of Surface Water and Groundwater Supplies to Meet a 9-Year Drought Cycle, and revise it if necessary during the next update of this Plan.
- 1.C Water Supply Development – TMWA and Washoe County will continue to pursue water supply projects that are economically feasible and that can be implemented to ensure water supplies are available, as future demands require.
- 1.D Arsenic Compliance – TMWA and Washoe County are presently developing Arsenic Compliance Plans. Compliance strategies may impact off-river reliability goals.

- 1.E Hidden Valley WTP – Washoe County Utility Division is evaluating the feasibility and benefits of a surface water / groundwater treatment plant to reduce dependence on TMWA wholesale supplies, provide PCE and arsenic treatment on two wells, and increase system reliability.
- 1.F Verdi – Ongoing facility and water resource planning to serve anticipated growth in the Boomtown / Verdi area.

Relevant Planning Documents

- Truckee Meadows Water Authority, 2003, 2005–2025 Water Resource Plan
- Truckee River Operating Agreement, Draft, 2003, www.usbr.gov/mp/lbao/troa/docs/TROAdraft.pdf

9.2 Municipal Water Resources in the South Truckee Meadows

(1995-2015 Regional Water Plan Issue)

Specific Issues and Linkages

In 2002, Washoe County through the RWPC, WCDWR and STMGID, completed an update to the water facility plans for the South Truckee Meadows. The Facility Plan (ECO:LOGIC, 2002) provides a comprehensive water supply plan for build-out of the planning area, which encompasses an area stretching from just north of Double Diamond Ranch south to Pleasant Valley, east to the Virginia Foothills and west to Galena Forest. The major goals of the Facility Plan are to:

- Utilize the creek resources to their highest and best beneficial uses, and balance beneficial M&I uses with in-stream flow requirements for recharge, wildlife, riparian habitat, aesthetics and quality of life
- Ensure that recommended plans for water supplies and facilities conform to regional wastewater disposal / water quality requirements at the South Truckee Meadows Water Reclamation Facility (STMWRF) and Truckee Meadows Water Reclamation Facility (TMWRF)
- Allow development to proceed in a phased approach, keeping upfront capital costs low and total water service costs competitive, and provide reliable and economical utility service to the South Truckee Meadows
- Promote system integration, conjunctive use and expand reclaimed wastewater service to maximize the efficient use of water resources and facilities

Water supply needs also included consideration of existing and future domestic wells in the planning area.

Action Taken / Alternatives Evaluated to Address the Issues

Several water supply components are available in the South Truckee Meadows, including TMWA wholesale supplies from the Truckee River, groundwater, conversion of local tributary streams (Thomas, Whites, Galena and Steamboat Creeks) from agricultural irrigation to municipal use, and reclaimed water. The water supply plan addresses the natural variability of surface water and groundwater supplies during drought, and recognizes the needs of over 1,700 domestic well owners who share the local groundwater resource.

Recommendations

- Initially, a “creek exchange” concept is proposed, which provides a short-term means to expand water service while creek water rights and connection fees are accumulated.
- Prior to the wholesale demand level exceeding the existing contract maximum of 5,400 gallons per minute, the initial 2 MGD phase of the lower water treatment plant should be in service. The lower water treatment plant utilizes the combined flows from Thomas and Whites Creeks.
- During late summer and drought periods when flows in the creeks are diminished, unused treatment plant capacity is available to treat “secondary groundwater”, which will require treatment to meet water quality standards.

An upper 3 MGD water treatment plant located on Galena Creek is also included in the approved facilities. The upper water treatment plant relies on Galena Creek non-irrigation season diversions as its primary water supply. An upper treatment plant keeps more water in Galena Creek in the winter rather than diverting it to Washoe Lake; and most importantly, it offsets winter groundwater pumping and provides recharge water to the upper Mt. Rose fan area.

Subsequent Activities and Additional Work Needed

- Washoe County Department of Water Resources is presently conducting an alternative site analysis for the lower STM treatment facility.
- The wholesale agreement between Washoe County and TMWA was modified to provide a temporary increase in capacity up to 7,400 GPM, until such time as the South Truckee Meadows Water Treatment Plant is constructed.
- Washoe County Department of Water Resources is currently developing a tributary creek water rights dedication policy that considers the varying yield of different types of rights for the lower surface water treatment plant in the South Truckee Meadows.

Relevant Planning Documents

- ECO:LOGIC, 2002. South Truckee Meadows Facility Plan. Prepared for RWPC, Washoe County Department of Water Resources, and South Truckee Meadows General Improvement District.

9.3 Municipal Water Resources in the Stead/Lemmon Valley

(1995-2015 Regional Water Plan Issue)

Specific Issues and Linkages

In 2002, the RWPC performed a detailed analysis of water supply alternatives that will support the build-out land uses in the Stead, Lemmon Valley, and Cold Springs regions of Washoe County. Growth in these areas is currently constrained by existing water infrastructure that imports water from the Truckee Meadows and local groundwater supplies. The work included three major components:

- Develop facility requirements, opinions of probable cost and preliminary implementation schedules for two water importation projects to supply the Stead / Lemmon Valley area, including the northern Vidler Water Company / Intermountain Pipeline groundwater supply and the southern TMWA Truckee River based supply

- Develop facility requirements and an opinion of probable cost to provide additional water supplies to support the build-out of potential land uses in the Cold Springs Valley
- Determine the operational and distribution system improvements necessary to maximize the use of existing facilities and water resources in the Stead / Lemmon Valley area until such time as an import supply can be constructed

Linkages: Wastewater treatment and disposal requirements. Flood plain management in closed basins.

Action Taken / Alternatives Evaluated to Address the Issues

The importation projects considered are 1) a combined Vidler Water Company / Intermountain Pipeline importation project consisting of groundwater from Fish Springs Ranch, Dry Valley, Newcomb Lake, Bedell Flat and Warm Springs (northern option), and 2) increased TMWA Truckee River based water supply that would necessitate the replacement of the existing Stead Main with a larger pipe and pump station (southern option).

The water supply comparison work was built from prior facility planning work performed by ECO:LOGIC and Stantec Consulting Engineers. Using projected build-out planned land uses in the Stead, Lemmon Valley and Cold Springs areas, water distribution improvements and wastewater interceptor collection system options were evaluated, and potential effluent reuse customers and facility requirements were identified.

Recommendations

The projected build-out water demand for the Stead / Lemmon Valley area is 12,923 af, including 1,000 af for supplemental water resource needs. With estimated long-term groundwater withdrawals of 2,189 af based on present TMWA and Washoe County groundwater rights holdings, there is a need to import a total of 10,734 af to meet potential build-out demands in the Stead / Lemmon Valley area.

From a long-term, water supply perspective, development of a northern importation project to serve the Stead / Lemmon Valley area would provide greater benefits for the region compared to the Stead Main alternative, at a lower overall cost. The total cost per af to supply water to Cold Springs is higher than for Stead / Lemmon Valley.

Subsequent Activities and Additional Work Needed

- North Valleys Strategy, amendment to the Regional Water Plan, dated 7/14/98
- Implementation of the integrated operation of the TMWA and Washoe County water systems in the Stead / Lemmon Valley areas is underway. Integrated operation provides a short-term water supply while a long-term water importation project is implemented.
- Facility planning for the Stead / Lemmon Valley area has identified a potential long-term imbalance between water supply needs and wastewater disposal capacity. A thorough feasibility-level evaluation of several effluent disposal options is being undertaken.
- Draft EIS under preparation, North Valleys Water Supply Project

Relevant Planning Documents

- JBR / Montgomery Watson, 1997, Water Supply Alternatives for North Valleys. Prepared for Washoe County, Department of Comprehensive Planning.
- RWPC, 1998, Amendment to Regional Water Plan for North Valleys Strategy.
- ECO:LOGIC, 1999, North Valleys Water Facility Plan. Prepared for RWPC.
- ECO:LOGIC, 2002, North Valleys Water Supply Comparison. Prepared for RWPC.

9.4 Municipal Water Resources in Cold Springs

(Identified after 1995-2015 Regional Water Plan adoption)

Specific Issues and Linkages

There has been rapid development in the Cold Springs hydrographic basin subsequent to the publication of the 1995-2015 Regional Water Plan. Development in Cold Springs relies on the groundwater resources available in the Cold Springs and Long Valley hydrographic basins.

The lack of RWPC accepted data with respect to sustainable water resources leads to difficulties in determining whether there is an existing or potential future deficit with respect to water resources. This data is needed in order to implement RWPC water policies.

Wastewater and storm water linkages:

- Nitrate contamination of groundwater has been observed in areas with high densities of septic tanks. The 1995-2015 Regional Water Plan expressed concern over continued installation of septic tanks in this hydrographic basin.
- Importation of a new water supply into the Cold Springs hydrographic basin would result in the generation of additional effluent and storm water run-off volume in this closed basin.

Action Taken / Alternatives Evaluated to Address the Issues

- New development in Cold Springs is designed to minimize water consumption in order to extend the available water resources as far as possible.
- A developer in Cold Springs is undertaking work in consultation with WCDWR hydrology and RWPC staff to determine the sustainable yield of the existing and proposed Utilities Inc. production wells.
- The potential future water demands associated with development of Cold Springs were included in the RWPC analysis of water supply alternatives for the North Valleys.

Recommendations

The RWPC's North Valleys Water Supply Comparison was a presentation of alternatives for importation of water supplies to the Stead / Lemmon Valley area, and included a supplemental analysis of the additional water resources and infrastructure costs required to support the build-out of land use in Cold Springs (2,000 gpm, 3,200 af/yr, additional \$2 to \$3 million depending upon Northern supply or Stead Main option). See Section 9.3 for a discussion of the report conclusions.

Subsequent Activities and Additional Work Needed

4.A A facility plan needs to be completed for the build-out of approved land uses in the

Cold Springs Truckee Meadows Service Areas.

- 4.B A comprehensive water resource plan needs to be prepared for Cold Springs and portions of the Long Valley hydrographic basin to estimate the perennial yield for the water baseline.

Relevant Planning Documents

- ECO:LOGIC, 2002, North Valleys Water Supply Comparison. Prepared for the RWPC.
- JBR Environmental Consulting and Montgomery Watson, 1997, Water Supply Alternatives Evaluation for the North Valleys. Prepared for the Washoe County Department of Comprehensive Planning.

9.5 Municipal Water Resources in Spanish Springs

(1995-2015 Regional Water Plan Issue)

Specific Issues and Linkages

The Spanish Springs area has experienced rapid growth since publication of the 1995-2015 Regional Water Plan, both within the City of Sparks Sphere of Influence area and in the unincorporated area to the north.

The portion of the Spanish Springs hydrographic basin that lies within the City of Sparks Sphere of Influence area is served by TMWA from a combination of Truckee River water, Truckee Meadows groundwater and Spanish Springs groundwater pumped from TMWA wells. This portion of the hydrographic basin is managed in conjunction with TMWA's overall resource planning.

Many of the issues identified in the 1995-2015 Regional Water Plan were related to the demands that would be placed on water resources as a result of future growth in the unincorporated area of the hydrographic basin and the water quality impacts that were suspected to be occurring due to existing growth. Following are the key water supply issues and linkages identified in the 1995-2015 Regional Water Plan that affect the availability of future municipal water supplies in the unincorporated area of Spanish Springs:

- Over-allocation of groundwater resources in Spanish Springs resulted in a situation where cumulative groundwater pumping by all entities exceeded the perennial yield of groundwater resources.
- The potential exacerbation of groundwater deficits, as future land use changes, result in reduction of recharge occurring from surface water irrigation via the Orr Ditch.
- Importation of water from the Truckee Meadows was identified as a possible resource to supply the demands of future growth.

Wastewater and storm water linkages:

- Recharge of storm water as a possible method of supplementing groundwater resources
- The potential for future impacts to water resource availability due to nitrate contamination of groundwater. At the time of plan publication, the source of contamination had not been verified, but septic tanks were suspected.

Action Taken / Alternatives Evaluated to Address the Issues

A number of actions have been taken by the RWPC and other entities to manage water resources for long-term sustainability in the Spanish Springs Valley:

- The USGS developed a model of the Spanish Springs hydrographic basin detailing the sources and quantity of the groundwater resource.
- WCDWR entered into a wholesale agreement for importation of 3,000 af/yr of TMWA resources to serve future growth in the unincorporated area.
- WCDWR prepared a comprehensive water facility plan that identifies the water resources and infrastructure required to serve build-out of approved land uses in the unincorporated area.
- WCDWR has adopted policies requiring the dedication of water rights when new parcels are created via the parcel map process in an effort to better balance water rights and water resources and enable future mitigation of possible water level declines.
- WCDWR has developed a multi-faceted plan for the management of nitrates in the aquifer, including conversion of septic tanks to the sewer system as funding becomes available and use of non-potable shallow groundwater for irrigation.
- The RWPC sponsored preparation of an Orr Ditch Recharge Study that includes a long-term water balance and management strategies for the Spanish Springs hydrographic basin.
- The City of Sparks has extended TMWRF effluent reuse infrastructure far into the valley, enabling the use of effluent to offset demands on the municipal water system.
- The RWPC has developed water policies that seek to ensure that new commitments against the groundwater resource do not exceed its sustainable yield.

Recommendations

Extensive planning work has been accomplished for the Spanish Springs area since publication of the 1995-2015 Regional Water Plan. Following is a summary of the recommendations that have evolved out of the body of work completed to date:

- Implement conjunctive use of imported water and groundwater in the unincorporated area
- Integrate three separate WCDWR water systems into a single water system for operational flexibility and reliability
- Extend City of Sparks effluent infrastructure to the unincorporated area of Spanish Springs to offset potable water demands
- Implement phased conversion of areas with high densities of septic tanks to community sewer system for protection of groundwater quality
- Undertake further investigation of shallow groundwater extraction system to use poor quality groundwater as a water source for non-potable water demands

Subsequent Activities and Additional Work Needed

The sources of water required to satisfy the demands of approved development in the Spanish Springs Valley have been identified and secured through the wholesale agreement between Washoe County and TMWA.

5.A There is the possibility that WCDWR could pursue development of an additional water supply to the area with the importation of water from its surface water holdings in Warm Springs. The use of this potential alternative water supply would necessitate the development of an estimate of the sustainable yield of the resource and engineering analysis of the facilities required to convey the water to Spanish

Springs.

New drinking water standards for arsenic that take affect in 2006 will likely apply to five of the nine WCDWR wells in Spanish Springs. Washoe County anticipates that early implementation of planned infrastructure transmission and well improvements will enable compliance with the new rule by diluting water from wells that exceed the arsenic standard with high quality well and surface water resources from other parts of the system.

Section 9.14 discusses wastewater issues in Spanish Springs. The final configuration of wastewater treatment and effluent disposal options selected for Spanish Springs will need to be considered with respect to the long-term water balance for the valley.

Relevant Planning Documents

- US Geological Survey, 1997, Hydrogeology and Simulated Effects of Urban Development on Water Resources of Spanish Springs Valley, Washoe County, West-Central Nevada, Water Resources Investigations Report 96-4297.
- AMEC, 2000, Sparks Effluent Pipeline Extension. Prepared for City of Sparks.
- Washoe County Department of Water Resources, 2002, Spanish Springs Valley Nitrate Occurrence Facility Plan. Prepared for the Nevada Department of Environmental Protection.
- Washoe County Department of Water Resources, 2003, Spanish Springs Water Facility Plan.
- ECO:LOGIC, 2004, Orr Ditch Recharge Study. Prepared for RWPC.
- Truckee Meadows Water Authority, 2003, 2005–2025 Water Resource Plan.

9.6 Municipal Water Resources in the Lower Truckee River

(1995-2015 Regional Water Plan Issue)

Specific Issues and Linkages

Industrially zoned lands are concentrated in the Mustang and Patrick / Tracy areas. Existing wells are low volume producers, although there are three wells that show promise. Planning evaluations concluded that the use of existing wells has a lower overall cost than importation of water from Sparks, even with expected treatment requirements to meet drinking water standards.

Linkages: Joint water supply planning and facility sharing with Storey County may reduce overall costs and infrastructure requirements.

Action Taken / Alternatives Evaluated to Address the Issues

Facility planning identified proposed industrial development along the lower Truckee River, which will require the construction of water supply and distribution facilities. Key issues include cost, and phasing of facilities and water rights.

Recommendations

Mustang Area Water: Provide water supply improvements (existing wells) and distribution facilities to serve 20 parcels with 261 developable acres.

Tracy Area Water: Provide water supply improvements and distribution facilities serving three

pressure zones, serving 10 parcels covering 891 developable acres.

Subsequent Activities and Additional Work Needed

- 6.A Update to Water and Wastewater Corridor for East Truckee Corridor that includes analysis of the approved development potential within the Truckee Meadows Service Areas Boundary
- 6.B Coordination with Storey County regarding existing commitments and future potential demands for the entire Tracy Segment hydrographic basin
- 6.C RWPC development of a position statement regarding construction of surface water treatment facilities in the Lower Truckee River

Relevant Planning Documents

- AGRA Infrastructure, 2000, Water and Wastewater Facility Plans on Industrial Zoned Lands Along the Lower Truckee River within Washoe County. Prepared for RWPC.

9.7 Integrated Water Resource Planning in Washoe Valley

(Identified after 1995-2015 Regional Water Plan adoption)

Specific Issues and Linkages

The 1995-2015 Regional Water Plan identified a number of water resource issues in Washoe Valley including:

- Poor groundwater quality due to high concentrations of fluoride, iron and manganese
- Nitrate contamination of groundwater in New Washoe City due to high concentrations of septic tanks
- Limited groundwater resources to support new development

Another issue in Little Washoe Lake, Ophir Creek, and Steamboat Creek is mercury in sediments. There are not currently any actions underway to address mercury in these areas, but it needs to be part of the issues considered in overall planning for this area.

Action Taken / Alternatives Evaluated to Address the Issues

East Washoe Lake, an area with 1,174 septic tanks, was included in the study area for the RWPC Septic to Sewer Conversion study. The study evaluated options for sewerage in this area, including construction of a small regional treatment facility in Washoe Valley or conveying wastewater flows through the proposed Pleasant Valley interceptor to STMWRF.

The potential for importation of effluent from STMWRF was mentioned as a way to mitigate the loss of septic tank recharge if wastewater flows were sent out of the valley.

Recommendations

The Septic to Sewer Conversion study did not identify a preferred recommendation for management of septic tanks in Washoe Valley.

Subsequent Activities and Additional Work Needed

The ranches on the west side of the valley have been identified as desirable acquisitions as open space to preserve the rural character of the valley. As these ranches are acquired, the

water rights associated with the land are sometimes sold. Additionally, market conditions may improve the potential to develop the creek resources in Washoe Valley as a municipal supply in the Truckee Meadows. The combination of ranch acquisition and sale of water rights may lead to a change in the character of the valley as the ranch lands are no longer irrigated.

While the 1995-2015 Regional Water Plan mentions a limitation on groundwater resources, the RWPC's Water Resource Baseline completed in 2003 (Appendix D) identifies a potential surplus of groundwater resources when comparing potential municipal demands against available water resources. More effort could be spent on describing the availability of resources in Washoe Valley.

There is the potential to use wastewater effluent as a replacement water resource to continue the irrigation of preserved ranch lands.

Additionally, as Washoe Lake storage rights are acquired for municipal purposes, there is the opportunity to manage the lake in a way that might reduce the risk of flooding to low-lying properties and help achieve Truckee River water quality objectives.

7.A There is a need to develop an integrated water resource management plan in response to these changing conditions to sustain and enhance the quality of life in Washoe Valley, as well as investigate opportunities to meet water supply, wastewater treatment and disposal, flood control, and water quality objectives for the region.

This future planning needs to be coordinated with regional land use planning policies and criteria, with particular thought given to the fact that Washoe Valley is outside of the Truckee Meadows Service Areas Boundary.

Relevant Planning Documents

- AGRA Infrastructure, 2000, Strategies to Reduce the Cost of Converting Septic Tanks to Community Sewers in Washoe County (Septic to Sewer Conversion Study) Final Report. Prepared for the Washoe County Department of Water Resources and the RWPC

9.8 Reliability of Water Service in Response to Contamination Event on Truckee River or Tributaries

(1995-2015 Regional Water Plan Issue)

Specific Issues and Linkages

In 2001, the RWPC performed a detailed analysis of the ability of TMWA to provide a reliable water supply to meet water demands over a seven-day period in the event of a surface water contamination event on the Truckee River. It is assumed that water conservation measures would be initiated by both TMWA and its wholesale water customers to reduce demands to the maximum extent possible during this period.

Linkages: TMWA groundwater production, drought and arsenic compliance planning.

Action Taken / Alternatives Evaluated to Address the Issues

The analysis shows that, over the 20-year planning period, there will be a deficit ranging from 8–

18 MGD in meeting this standard of reliability. Sixteen water supply projects were evaluated and ranked to meet this deficit. Of the sixteen projects, five are recommended for continued evaluation.

Recommendations

The recommended projects include TMWA / County water system interties in the North Valleys, South Truckee Meadows, and Spanish Springs, use of the Hilton Pond as off-river raw water supply storage for the Glendale Water Treatment Plant and retrofit of the Wingfield Springs wells for use on an emergency basis.

Subsequent Activities and Additional Work Needed

- 8.A Ongoing TMWA investigation of Hilton Pond alternative coordinated with planned Glendale Diversion replacement project
- 8.B TMWA consideration of emergency supply recommendations during their ongoing infrastructure and water resource planning
- 8.C Washoe County management strategies to eliminate or greatly reduce wholesale water demand in the event of a surface water contamination event
- 8.D Washoe County management strategies to deal with risk of tributary creek contamination for new South Truckee Meadows Water Treatment Facility

Relevant Planning Documents

- ECO:LOGIC, 2002, Recommended Projects to Provide an Emergency Water Supply to the South Truckee Meadows. Prepared for RWPC.

9.9 Water Conservation

(1995-2015 Regional Water Plan Issue)

Specific Issues and Linkages

The 1995-2015 Regional Water Plan described the benefits of water conservation and characterized the status of water conservation efforts to date. There are some unique issues regarding water conservation in the TMWA system that affect the use of conserved water. A summary of conservation issues dealt with in the 1995-2015 Regional Water Plan include the following:

- At the time of writing of the conservation chapter in the 1995-2015 Regional Water Plan, only 12,734 of 56,760 Sierra Pacific services (now TMWA) were metered.
- The Preliminary Settlement Agreement (PSA) with the Tribe established certain requirements for metering of SPPCo services.
- Under existing regulatory and legal constraints, water that is not diverted from the Truckee River as a result of conservation is left in the river, stored upstream in reservoirs for use during droughts or for fish and wildlife purposes, or used to recharge groundwater. This conserved water is not available to supply additional growth.
- The 1995-2015 Regional Water Plan developed a “Base Case” conservation plan that included a suite of seven conservation measures to be implemented in the upcoming five-year timeframe. Conservation measures proposed included new building practices, showerhead retrofit, toilet retrofit, landscape efficiency conservation, good earth-keeping, increasing block water rates, and water meter retrofit for a total projected

savings when fully implemented of approximately 18,000 af/yr at 2015.

Action Taken / Alternatives Evaluated to Address the Issues

Conservation measures that have been implemented include:

- Conservation ordinances have been adopted by all three local governments.
- Evapotranspiration weather station and irrigation controller studies have been completed.
- TMWA and Washoe County have implemented tiered water rates.
- TMWA has accelerated the meter retrofit program.
- The toilet retrofit program is underway.
- TMWA has implemented a multi-faceted public awareness and education program.
- TMWA has been granted authority to enforce water-wasting regulations.
- Expansion of the effluent reuse system to offset demands on potable water supplies.

Recommendations

Section 8.5 of Chapter 8 includes an extensive listing of additional conservation measures that could be implemented for additional water savings. The water conservation goals identified in the 1995-2015 Regional Water Plan are still the goals of the Base Case conservation plan.

Subsequent Activities and Additional Work Needed

- 9.A Continued implementation of conservation measures to achieve Base Case conservation goals
- 9.B Section 8.7 of Chapter 8 includes an extensive listing of additional work that could be undertaken in an effort to expand the suite of available conservation measures

Relevant Planning Documents

- Carlos, W. J., Miller, W., Devitt, D. A., Fernandez, G., 2004, Evapotranspiration Satellite Irrigation Controller Study.
- Volt VIEWtech, 2003, Ultra Low Flush Toilet Rebate Program Final Report. Prepared for the RWPC.

9.10 Wastewater Management in the Central Truckee Meadows

(1995-2015 Regional Water Plan Issue)

Specific Issues and Linkages

Achieving a sustainable river and maintaining long-term Truckee River water quality objectives is essential to continue to provide for planned growth within the region. The TMWRF provides centralized wastewater treatment for the community. To meet NPDES river discharge permit requirements, TMWRF must achieve a complex balance between treatment process improvements, effluent reuse needs and water rights requirements, Truckee River water quality, and numerous other inter-related, regional water management objectives.

Close coordination with the Tribe is key to achieving long-term Truckee River objectives, as there are opportunities for TMWRF and the Tribe to work together to improve river water quality, particularly with nitrogen and TDS loads to the river and Pyramid Lake. These opportunities

include river restoration, seasonal modifications of total maximum daily loads (TMDLs) for the Truckee River, flow augmentation and water quality pollution trading.

Following is a concise listing of the issues. A more extensive discussion is included in both the 1995-2015 Regional Water Plan and Chapters 3 and 7 of this plan.

- Constraints on river discharge of effluent from the TMWRF due to TMDLs for the Truckee River and NDEP discharge permit requirements has resulted in the need to investigate a range of water quality management strategies, including:
 - Exploration of options to achieve water quality standards in the Truckee River, including facility modifications at TMWRF, implementation of pollutant trading projects and implementation of lower Truckee River and Steamboat Creek restoration projects.
 - Further analyses that could lead to a more complete understanding of the river system and possibilities for increased flexibility in TMWRF discharge permit conditions. Two new modeling tools are available to help predict Truckee River water quality: Truckee River HSPF and WARMF.
 - Exploration of effluent disposal options through irrigation of effluent, which reduces the reliance on river discharge through development of an effluent reuse program. The benefits of effluent reuse will be compared against potential benefits that might be realized from implementation of non-structural Truckee River water quality improvement projects and/or discharge permit modifications.
 - Water right dedications necessary to maintain Truckee River in-stream flows, which can increase the assimilative capacity of the river and improve water quality.
- The phasing of facility improvements required to treat projected wastewater flows within the TMWRF service area

The completion of the Lawton/Verdi Sewer Interceptor will provide the opportunity to begin reducing pollutant loads to the Truckee River in the Truckee Canyon hydrographic basin. In 2001, a federal grant was received to move forward with the extension of the Lawton/Verdi Sewer Interceptor. The Interceptor will allow for removal of numerous septic systems and three small wastewater treatment plants, including Boomtown, Verdi Meadows and Gold Ranch.

Linkages: Efficient use of water resources and water rights, refer to Section 9.22.

Action Taken / Alternatives Evaluated to Address the Issues

Work that has been completed, or is in progress to address these issues includes:

- Resolution of litigation with the Tribe via negotiation of the Water Quality Settlement Agreement, signed in 1996
- Completion of the Regional Wastewater Reclamation Facility Plan and a number of supplementary tasks to comprehensively address phasing of improvements to TMWRF and expansion of the TMWRF effluent reuse system
- Development of an HSPF Water Quality model of the Truckee River
- Development of a Watershed Assessment and Risk Management Framework (WARMF) model of the Truckee River watershed. The development and calibration of both models is complete. Personnel have been trained, and copies of the working models are available.

- NDEP issuance of a revised discharge permit for TMWRF
- Completion of design documents and commencement of construction to expand TMWRF treatment capacity to 46.48 MGD
- Commencement of a pollutant trading study to evaluate projects that would reduce total dissolved solids loading to Pyramid Lake
- Development of comprehensive effluent reuse programs in both the City of Reno and the City of Sparks
- TMWRF participation in, and strong support of, restoration projects on the lower Truckee River and Steamboat Creek

Recommendations

Obtaining the revised discharge permit for TMWRF was a key success for the region. The Truckee Meadows region needs to continue investigating and pursuing treatment and disposal alternatives that provide for a sustainable river, that support an integrated plan for the region's limited water resources, and that continue to maintain the economic vitality and environmental objectives of the region.

Subsequent Activities and Additional Work Needed

- 10.A Continue to evaluate implementation of effluent reuse programs, versus:
- TMDLs and “use attainability goals” for the river
 - Potentially beneficial modifications to the TMDL and waste load allocations for total nitrogen and dissolved organic nitrogen
 - Low flow toilets and TDS impacts
- 10.B Decommissioning of WWTPs as Lawton/Verdi Interceptor is extended
- 10.C Investigate and prioritize opportunities for reduction in nitrate loading to Truckee River through sewerage of areas served by septic tanks

Relevant Planning Documents

- Carollo Engineers, 1999, Regional Wastewater Reclamation Facility Plan. Prepared for City of Reno, City of Sparks, and Washoe County Department of Water Resources.
- AMEC, 2002, Sparks Effluent Pipeline Extension. Prepared for City of Sparks.
- ECO:LOGIC, Tetra Tech, Otis Bay Riverine Consultants, Desert Research Institute, Sue Oldham Esq., to be completed in 2004. Mud Lake Slough and Winnemucca Lake Wetland Restoration Feasibility Study. Prepared for the City of Reno and the City of Sparks.
- Tetra Tech, ECO:LOGIC, Desert Research Institute, Sue Oldham Esq., to be completed in 2004. Non-Point Source Pollutant Trading Program. Prepared for the RWPC.
- Stantec Consulting, 2002. Lawton/Verdi Wastewater Facility Plan. Prepared for Washoe County Department of Water Resources.

9.11 Wastewater Management in the South Truckee Meadows

(1995-2015 Regional Water Plan Issue)

Specific Issues and Linkages

Washoe County Department of Water Resources operates the STMWRF, which provides service primarily for the Double Diamond / Damonte Ranch area and unincorporated Washoe County including the Virginia Foothills and Mt. Rose fan. STMWRF is one of the few 100% water reclamation facilities in the United States, relying exclusively on effluent reuse for disposal of the treated wastewater, with the exception that sludge disposal is handled via a pipeline to TMWRF, where it enters the TMWRF treatment and disposal process.

Water Resource Linkages:

- Based on current wastewater flow projections and the water balance for Huffaker Reservoir, the Truckee River and creek water currently being used to supplement the STMWRF effluent supply may no longer be required for irrigation of existing sites after 2004. This water would then become available as potable water supplies, delivered either through TMWA and/or the planned South Truckee Meadows Water Treatment Plant.
- As new water supplies are brought into the area to support development, wastewater treatment and disposal capacity must also be expanded to accommodate the additional flows. The identified effluent demand potential is estimated at 6,179 af/yr. This compares to approximately 10,000 af/yr for the projected build-out wastewater flows to STMWRF.

Action Taken / Alternatives Evaluated to Address the Issues

- STMWRF has undergone a recent expansion, increasing capacity from 1.5 to 4.1 MGD at a cost of \$25.8 million. Washoe County is proceeding with the next phase of improvements, which will bring STMWRF to 6 MGD capacity by 2007.
- South Truckee Meadows Facility Plan identifies interceptor collection system improvements, both with and without capacity for converting septic systems within the study area. An update of projected effluent reuse demands and facilities was also completed.

Recommendations

The expanded use of reclaimed wastewater may extend potable water supplies by replacing existing water resources that could otherwise be used for M&I purposes, or by providing new, non-potable water supplies to existing and/or developing areas. For STMWRF in particular, securing additional effluent reuse sites is essential, since all of the treated effluent from STMWRF must be reclaimed.

Subsequent Activities and Additional Work Needed

- 11.A Promote and encourage expansion of the effluent reuse system, including appropriate changes to current policies.

Relevant Planning Documents

- Carollo Engineers, 1997, Regional Wastewater Facilities Master Plan. Prepared for City

of Reno, City of Sparks, and Washoe County Department of Water Resources.

- Carollo Engineers, 1999, Regional Wastewater Facilities Design Phases I & II. Prepared for City of Reno, City of Sparks, and Washoe County Department of Water Resources.
- ECO:LOGIC, 2002, South Truckee Meadows Facility Plan. Prepared for the RWPC, Washoe County Department of Water Resources, and South Truckee Meadows General Improvement District.

9.12 Wastewater Management in the Stead / Lemmon Valley

(1995-2015 Regional Water Plan Issue)

Specific Issues and Linkages

The Reno-Stead Water Reclamation Facility (RSWRF) is located in Stead and is operated by the City of Reno. It serves the area of Stead within the Reno city limits on the west side of the valley, including the Stead Airport and Silver Lake areas. The Lemmon Valley Wastewater Treatment Plant is located in East Lemmon Valley at the southeast end of Lemmon Lake and is operated by Washoe County.

Wastewater Linkages:

- Washoe County and the City of Reno are presently evaluating build-out wastewater collection, treatment and disposal facilities from the perspective of an integrated system within the Lemmon Valley and Stead area.
- Wastewater disposal is currently achieved by discharge to Swan Lake and effluent reuse. If a new water supply is brought into the valley to support additional development, wastewater treatment and disposal capacity must also be expanded to accommodate the additional flows.

Flood Plain Management Linkages:

- The Stead / Lemmon Valley areas form a closed hydrographic basin. Future changes to flood peaks and flood plain storage volume, particularly in the Swan Lake basin, will need to be evaluated to ensure that the effects of increased volumes of runoff associated with development are manageable.
- Proposals to increase effluent discharges to Swan Lake above 2 MGD from RSWRF need to be evaluated in conjunction with potential impacts to flood elevations.

Water Supply Linkages:

- BLM EIS – North Valleys Water Supply Projects. The BLM has initiated the preparation of an EIS to identify and analyze impacts resulting from the proposed North Valleys Water Supply Projects. The Project's proponents are two private companies that propose to construct facilities to import annually approximately 11,500 af of potable water to the North Valleys from groundwater sources located in northwest Washoe County (Fish Springs Ranch and Dry Valley). If approved, construction of the Projects may be initiated in 2005.

Action Taken / Alternatives Evaluated to Address the Issues

- The City of Reno is currently under final design of the RSWRF Phase 2

improvements, which will increase treatment and disposal capacity to 2.0 MGD, with specific improvements sized to accommodate flows up to 4.0 MGD.

- The feasibility of several wastewater disposal options and integrating wastewater collection and treatment within the study area continues to be evaluated. As previously approved by the RWPC, the Lemmon Valley Wastewater Treatment Plant (LVWWTP) may be decommissioned in the future with wastewater treatment and effluent reuse facilities for the area centralized at the RSWRF.
- Expanded disposal to Swan Lake, expanded effluent reuse including seasonal storage, conversion of TMWA's Stead Main to supply effluent to Northwest Reno, and disposal to Long Valley Creek or Bedell Flat are several of the long-term wastewater disposal alternatives currently being investigated for the Stead / Lemmon Valley area.
- Any new potable water source brought into the Stead or Lemmon Valley area that increases wastewater flow to the RSWRF above 2.0 MGD will necessitate the implementation of additional effluent management techniques, such as exportation from the hydrographic basin or irrigation reuse. One of the lower cost alternatives appears to be exportation of effluent from the basin. While this is a lower cost alternative, it brings up issues regarding the efficient use of water resources and expanding the total available resources to this hydrographic basin.

Recommendations

Reno and the RWPC should continue to investigate and pursue treatment and disposal alternatives for RSWRF that support an integrated plan for the region's limited water resources, particularly water supply, effluent management and flood plain management strategies for this closed basin.

Subsequent Activities and Additional Work Needed

Continue to evaluate timing and opportunities for decommissioning the LVWWTP.

- 12.A Washoe County and Reno Drainage and Flood Control Master Plans should be updated to reflect the Regional Plan and planned land uses, and consider project elements that may provide the opportunity to increase discharges to the Swan Lake playa and wetlands.
- 12.B Continue to investigate phased wastewater treatment and disposal options that are consistent with the plans for the region.

Relevant Planning Documents

- ECO:LOGIC, 2002, North Valleys Wastewater Facility Plan. Prepared for City of Reno, Washoe County Department of Water Resources and the RWPC.
- ECO:LOGIC, 2003, Reno-Stead Water Reclamation Facility Expansion, TM No. 1: LVWWTP Decommissioning. Prepared for City of Reno.
- ECO:LOGIC, to be completed in 2004. North Valleys Reuse System – Build-out Analysis. Prepared for City of Reno.
- ECO:LOGIC, to be completed in 2004. North Valleys Effluent Disposal Alternatives. Prepared for City of Reno and the RWPC.

9.13 Wastewater Management in Cold Springs

(Identified in 1995-2015 Regional Water Plan)

Specific Issues and Linkages

As mentioned in Section 9.4, the 1995-2015 Regional Water Plan identified a concern with the number of septic tanks being installed in Cold Springs. The specific issues were a concern over nitrate contamination of groundwater and rising water levels that could result from leach field disposal of effluent.

Linkage - There are potential long-term issues with water quality and quantity in the urbanization of closed basins.

Action Taken / Alternatives Evaluated to Address the Issues

- The septic tank issue was partially responded to in 1997 with the construction of the Cold Springs Wastewater Treatment Plant to serve all new development.
- The treatment plant is undergoing expansion to serve additional development and the conversion of certain areas with septic tanks to the community sewer.

Recommendations

Recommendations contained in the Cold Springs Wastewater Facility Plan include:

- Expansion of the Cold Springs Wastewater Treatment Plant to 0.80 MGD
- Connection of the Nancy Gomes Elementary School and a number of homes with septic tanks to the community sewer
- Ongoing monitoring of water quality in the shallow aquifer to monitor nitrate trends, with implementation of full sewer conversion of septic tanks should water quality not improve

Subsequent Activities and Additional Work Needed

13.A Investigate strategies to manage groundwater quality and the quantity of effluent in closed basins undergoing development

Relevant Planning Documents

- Kennedy/Jenks Consultants, 2002, Cold Springs Wastewater Facility Plan. Prepared for Washoe County Department of Water Resources.
- Broadbent and Associates, 2002, Groundwater Flow and Solute Transport Model North Cold Springs Valley, Washoe County, Nevada. Prepared for the Washoe County Department of Water Resources.

9.14 Wastewater Management in Spanish Springs

(1995-2015 Regional Water Plan Issue)

Specific Issues and Linkages

The primary issues relating to management of wastewater in Spanish Springs that were identified the 1995-2015 Regional Water Plan include:

- The need to determine the most appropriate location for treatment of wastewater

generated in the unincorporated area of Spanish Springs, whether that be through the routing of all wastewater flows to TMWRF or constructing a new wastewater treatment plant in Spanish Springs

- Concern over the number of septic tanks and potential impacts to groundwater quality
- Uncertainty as to the source of nitrate contamination observed in municipal water supply wells

Water supply linkage: The disposal of effluent to the river or to groundwater from the wastewater generated in Spanish Springs is a consideration in the long-term water balance for the basin.

Action Taken / Alternatives Evaluated to Address the Issues

- In 1995 the first regional interceptor was extended to the unincorporated area of Spanish Springs from the City of Sparks. From 1995 onward, all new development in the unincorporated area has been connected to the community sewer system.
- The City of Reno, City of Sparks, and Washoe County collaborated on development of a Regional Wastewater Facilities Master Plan, completed in 1997. The Regional Wastewater Reclamation Facility Plan included a comparison of alternatives for treatment of wastewater flows generated in Spanish Springs.

Recommendations

The Regional Wastewater Facilities Master Plan recommended that wastewater generated in Spanish Springs be conveyed to TMWRF for treatment and included a plan for effluent infrastructure to be extended to Spanish Springs as part of TMWRF's overall effluent management plan.

Subsequent Activities and Additional Work Needed

Septic tank issues have come to the forefront since publication of the 1995-2015 Regional Water Plan. Following are some of the major events that have transpired:

- In 1999, Ralph Seiler published a doctoral thesis indicating that the nitrate contamination observed in several locations in Spanish Springs was the result of septic tank effluent discharge.
- In 2001, NDEP issued a directive to WCDWR to develop a plan to mitigate nitrate contamination of the groundwater in Spanish Springs.
- In 2002, WCDWR submitted and received NDEP approval of a facility plan for the mitigation of nitrate contamination in Spanish Springs.
- In 2003, WCDWR received notification that close to \$3 million in federal funding had been made available as 75% matching funds for the first phase of a multi-year septic to sewer conversion project affecting approximately 2,000 homes in unincorporated Spanish Springs.
- WCDWR is seeking up to \$4 million in AB198 funds to help offset homeowner on-site costs associated with septic to sewer conversion.
- In 2003, Washoe County completed development of a comprehensive groundwater model that can be used for a number of purposes, including analysis of alternatives proposed for mitigation of nitrate contamination and development of a long-term water balance for the hydrographic basin.
- Washoe County has commenced a new investigation of the feasibility of a wastewater treatment plant in Spanish Springs.

Relevant Planning Documents

- Carollo Engineers, 1997, Regional Wastewater Facilities Master Plan. Prepared for City of Reno, City of Sparks, and Washoe County Department of Water Resources.
- Carollo Engineers, 1999, Regional Wastewater Facilities Design Phases I & II. Prepared for City of Reno, City of Sparks, and Washoe County Department of Water Resources.
- Seiler, Ralph, 1999, A Chemical Signature for Groundwater Contaminated by Domestic Wastewater. Ph.D. Thesis.
- Washoe County Department of Water Resources, 2002, Spanish Springs Valley Nitrate Occurrence Facility Plan. Prepared for the Nevada Division of Environmental Protection.
- AMEC, 2002, Sparks Effluent Pipeline Extension. Prepared for City of Sparks.
- Kennedy/Jenks Consultants, 2003, Feasibility Analysis Wastewater Treatment and Disposal Facilities in Spanish Springs Valley. Prepared for Washoe County Department of Water Resources.
- Kennedy/Jenks Consultants / Stantec Consulting, to be completed in 2004. Facility Plan for Spanish Springs Water Reclamation Facility. Prepared for Washoe County Department of Water Resources.

9.15 Wastewater Management in the Lower Truckee River

(1995-2015 Regional Water Plan Issue)

Specific Issues and Linkages

Wastewater disposal is one of the largest constraints on development for the area.

Linkages: Wastewater disposal to the river is not a favorable disposal option. While the connection between the local groundwater and the river, if any, is poorly understood, disposal options to groundwater may also impact river water quality in the long-term.

Planned development and wastewater disposal practices in Storey County may also have potential impacts to river water quality.

Action Taken / Alternatives Evaluated to Address the Issues

Facility planning identified proposed industrial development along the lower Truckee River, which will require the construction of wastewater treatment facilities. Key issues include cost, and phasing of facilities and disposal / reuse options.

Recommendations

- Mustang area wastewater: Provide collection system and package treatment plant with biological denitrification and subsurface disposal of effluent. Facilities would serve 21 parcels covering 267 acres.
- Tracy area wastewater: Assumes installation of dry sewers in new developments in conjunction with interim septic system usage. Provide treatment plant with biological denitrification and subsurface disposal of effluent. Facilities would serve 10 parcels covering 891 developable acres.

Subsequent Activities and Additional Work Needed

15.A Further planning and implementation of wastewater infrastructure in this area will be driven by parties interested in developing the land. Close coordination and

cooperation with Storey County is recommended to ensure long-term water quality objectives for the river are maintained.

Relevant Planning Documents

- AGRA Infrastructure, 2000, Water and Wastewater Facility Plans on Industrial Zoned Lands Along the Lower Truckee River within Washoe County. Prepared for the RWPC.

9.16 Septic Tanks and Water Quality

(1995-2015 Regional Water Plan Issue)

Specific Issues and Linkages

A number of areas have experienced deteriorating groundwater quality as a result of high concentrations of septic tanks in areas developed prior to the availability of regional sewer infrastructure. Specific areas of concern identified in the 1995-2015 Regional Water Plan included Spanish Springs, Cold Springs, Golden Valley, Lemmon Valley, and Washoe Valley.

Additionally, nitrate loading from septic tanks was identified as an issue of concern in the Truckee River corridor where effluent could ultimately reach the river. Significant work has been accomplished regarding the investigation of alternatives for septic tank conversions. A regional program to reduce the ongoing groundwater and surface water quality impacts from septic tank discharges has yet to be developed.

Linkage – Need for regional policies on when and under what conditions septic tanks may be constructed within Truckee Meadows Service Areas boundary.

Action Taken / Alternatives Evaluated to Address the Issues

- The RWPC and WCDWR jointly commissioned a study (Septic to Sewer Conversion Study) to evaluate options for the conversion of septic tanks to the community sewer system. The report provides an assessment of the number and location of septic tanks and groundwater quality conditions in each of the developed hydrographic basins under the jurisdiction of the RWPC and provides an evaluation of various infrastructure options for the conversion of septic tanks to community sewer.
- Subsequent to completion of the Septic to Sewer Conversion Study, more detailed analysis was performed for the Spanish Springs and Cold Springs areas by WCDWR (See Sections 9.13 and 9.14).

Recommendations

The Septic to Sewer Conversion Study provided a presentation of factual information and a review of the costs of sewer conversion. Recommendations for the type of infrastructure to be used, i.e. gravity sewer, vacuum sewer, pumped systems, or effluent collection, were developed for each of the sub-areas reviewed based on the lowest cost option appropriate for the particular area.

Subsequent Activities and Additional Work Needed

- The Washoe County District Health Department revised its regulations in 2001 to specify five-acre minimum lot size for septic tanks.
- WCDWR is investigating the feasibility of a shallow well groundwater extraction system as one component of an overall nitrate mitigation plan in Spanish Springs (See Section

9.14 for more discussion on Spanish Springs).

- WCDWR is recharging wholesale water purchased from TMWA in the Golden Valley area to supplement water resources available to domestic wells, with the added benefit of dilution of nitrate concentrations in the groundwater aquifer.

Additional work that needs to be completed includes:

- 16.A The establishment of regional goals and programs for the conversion of septic tanks in areas of concern
- 16.B The need for a regional funding mechanism to offset the costs of conversion both on-site and off-site
- 16.C Regional policies requiring dry sewerage of areas proposed for septic tank installation in advance of the availability of regional wastewater collection infrastructure
- 16.D Clear policies on when or whether septic tanks can be installed within the Truckee Meadows Service Areas boundary
- 16.E Pilot testing of advanced treatment septic systems pending review of results from Oregon Department of Environmental Quality study

Relevant Planning Documents

- AGRA Infrastructure, 2000, Strategies to Reduce the Cost of Converting Septic Tanks to Community Sewers in Washoe County (Septic to Sewer Conversion Study) final Report. Prepared for Washoe County Department of Water Resources and the RWPC.
- Washoe County Department of Water Resources, 2002, Spanish Springs Valley Nitrate Occurrence Facility Plan. Prepared for the Nevada Division of Environmental Protection.
- Oregon Department of Environmental Quality, Deschutes County, USEPA, and USGS, ongoing. La Pine National Decentralized Wastewater Demonstration Project.
- Washoe County Department of Water Resources, 2004, Washoe County Artificial Recharge Project, Golden Valley, Washoe County, Nevada, 2003 Annual Report.

9.17 Watershed Management and Protection

(1995-2015 Regional Water Plan Issue)

Specific Issues and Linkages

The need for watershed management and wellhead protection programs was identified as a priority in the 1995-2015 Regional Water Plan. At the time of plan publication, primary concerns were related to perchloroethylene (PCE) contamination of groundwater, nitrate contamination of groundwater, and total dissolved solids loading to the Truckee River.

Since that time, additional issues that have been identified include: river and stream bank erosion, the need to reduce non-point sources of pollution, the need to implement programs to comply with the regional NPDES Storm Water Discharge Permit, and the need to protect and/or enhance groundwater recharge. Chapter 5 includes an extensive discussion of watershed management and protection efforts underway in southern Washoe County.

Action Taken / Alternatives Evaluated to Address the Issues

Accomplishments to date include:

- Creation of Truckee Meadows Storm Water Permit Coordinating Committee
- Development of a Regional Storm Water Quality Management Program to comply with terms of the regional NPDES Storm Water Discharge Permit issued in 2000, which authorizes discharge of municipal storm water runoff to the Truckee River, Silver Lake Playa, Swan Lake Playa and Whites Lake Playa
- Completion of a comprehensive assessment of the condition and water quality of tributaries to the Truckee River
- Completion and RWPC acceptance of a watershed management and protection plan for tributaries to the Truckee River, as a guidance document
- Completion of a Construction Site Best Management Practices Handbook
- Progress towards completion of a Best Management Practices Handbook to address on-site storm water management practices
- Progress towards completion of a Low Impact Development Manual

Recommendations

Many of the recommendations of the Watershed Management and Protection strategy have been implemented and are not reiterated here. Recommendations that have yet to be implemented include:

- Inclusion of the public in the watershed protection effort
- Development of educational programs
- Prioritization of restoration needs and pursuit of funding for implementation of restoration activities
- Investigation of Low Impact Development techniques that are appropriate to this region with subsequent integration into local government development codes

The Regional Storm Water Quality Management Program includes nine elements, including: intergovernmental coordination, public outreach, municipal operations, storm water discharge monitoring, land use planning, structural controls, construction site discharge, illicit discharge detection and elimination, and industrial discharge regulation.

Subsequent Activities and Additional Work Needed

Additional work that may be undertaken by various entities in the future includes:

- 17.A Water purveyor completion of wellhead protection plans
- 17.B Further evaluation of recharge areas to prioritize and delineate the areas that have the highest recharge value
- 17.C Completion of Low Impact Development Manual

Relevant Planning Documents

- Kennedy/Jenks, Broadbent, ADGIS, 2001, Southern Washoe County Groundwater Recharge Analysis. Prepared for the RWPC.
- Kennedy/Jenks and AMEC, 2001, Truckee Meadows Storm Water Quality Management

Program. Prepared for Truckee Meadows Interlocal Storm Water Committee and Nevada Division of Environmental Protection.

- Kennedy/Jenks, to be completed in 2004. Truckee Meadows Structural Controls Design Manual. Prepared for the Truckee Meadows Interlocal Storm water Committee.
- Washoe County Department of Water Resources, 2002, Watershed Assessment for Tributaries to the Truckee River. Prepared for the RWPC.
- Washoe County Department of Water Resources, University of Nevada Cooperative Extension, Washoe Storey Conservation District, 2002, Watershed Management and Protection Plan for Tributaries to the Truckee River. Prepared for the RWPC.

9.18 Groundwater Remediation in Central Truckee Meadows

(1995-2015 Regional Water Plan Issue)

Specific Issues and Linkages

PCE in Central Truckee Meadows: In 1987, water quality tests on several of Sierra Pacific's (now TMWA's) production wells revealed the presence of PCE.

In 1995, the state legislature passed Senate Bill 489 requiring the formation of a remediation district once a groundwater contamination problem is certified by NDEP and/or the Washoe County District Health Department. Both agencies provided letters of certification in August of that year.

Central Truckee Meadows Remediation District (CTMRD) studies indicate that PCE contamination is widespread, covering more than 16-square miles to a depth greater than 350 feet. Eleven production wells are currently affected.

Hydrocarbon Fuel and Organic Solvents in Central Truckee Meadows: Hydrocarbon fuel and organic solvent contamination originating from the Sparks Tank Farm and adjacent rail yard affects groundwater underlying the southern-most part of Sparks. The contamination forms a plume that roughly parallels I-80, extending from the tank farm to Sparks Marina Lake.

PCE in Lemmon Valley: Groundwater underlying the West Lemmon Valley hydrographic basin, near the Reno-Stead Airport, is also affected by PCE contamination. This PCE plume, identified in 1994, is smaller than the one in the central Truckee Meadows. The contaminant source is connected with US Air Force activities at the Stead Air Force Base, which was active during the 1940s and 1950s.

Action Taken / Alternatives Evaluated to Address the Issues

PCE in Central Truckee Meadows: In 1997, the Nevada Revised Statute (540A) was amended to provide a funding mechanism to support groundwater remediation activities. The CTMRD was formed later that year.

District funding has paid for three air-stripping treatment facilities that remove PCE from five TMWA wells. Additionally, funding was used to develop a Remediation Plan (RMP), which was approved by the Board of County Commissioners and NDEP in 2003.

Hydrocarbon Fuel and Organic Solvents in Central Truckee Meadows: The plume is being hydraulically contained with extraction wells and contaminated groundwater is treated onsite. NDEP is overseeing and directing the ongoing, onsite remediation of contaminated soils and

groundwater.

PCE in Lemmon Valley: The potential exists for this contamination to migrate to a TMWA production well; however, TMWA is successfully controlling plume migration by injecting fresh water to form a hydraulic barrier. Investigations and the development of remediation plans are ongoing under the direction and oversight of NDEP.

Recommendations

PCE in Central Truckee Meadows: The three primary components of the RMP are:

- Clean Drinking Water Activities – focused on the removal of PCE from the public drinking water supply to the benefit of water users within the TMWA wholesale and retail service area
- Remedial Activities – focused on the identification, characterization, evaluation and remediation of sources of PCE, and the related monitoring programs requisite to all remedial actions to the benefit of residential and commercial property owners located above the areas containing or suspected of containing PCE contamination
- Program Outreach, Education, and Administration Activities – focused on the management of resources to optimize the remedial activities including outreach and educational tasks, and project administration and fund management to the benefit of water users and property owners

Subsequent Activities and Additional Work Needed

PCE in Central Truckee Meadows: The RMP was adopted by Washoe County and approved by NDEP.

Ongoing CTMRD activities include:

- Implementation of the Remediation Management Plan through:
 - Investigation of potential ongoing PCE discharges
 - Working with NDEP and the Cities of Reno and Sparks to revise sewer discharge ordinances and mitigate potential groundwater impacts associated with defects in the sewer lines
 - Working with NDEP to define a protocol whereby PCE hotspots and sources can be eliminated prior to impacting groundwater
 - Initiation of the Groundwater Monitoring Plan to better define the magnitude and extent of groundwater PCE contamination and support an evaluation of the behavior of PCE contaminated groundwater in response to various groundwater pumping and injection scenarios (early 2005)
 - Preparation of an annual report of 2003 CTMRD activities for presentation to the Board and the community (spring 2004)
 - Planned update of the CTMRD website (spring 2004)
(www.co.washoe.nv.us/remediation)
- Investigation of the source and nature of PCE impacts to the Sparks and Poplar II water wells (to be completed in mid to late 2004)

Hydrocarbon Fuel and Organic Solvents in Central Truckee Meadows: Recommendations yet to be developed

PCE in Lemmon Valley: Recommendations yet to be developed

Relevant Planning Documents

- Camp Dresser and McKee, Bouvette Consulting and Washoe County Department of Water Resources, 2002, Central Truckee Meadows Remediation District, Remediation Management Plan, prepared for the Central Truckee Meadows Remediation District.

9.19 Groundwater Resource Development and Impacts to Domestic Wells

(Identified after 1995-2015 Regional Water Plan adoption)

Specific Issues and Linkages

- Yield estimates for groundwater basins in Washoe County within the jurisdictional boundary of the RWPC are not of sufficient detail to allow exacting, sub-basin scale management of groundwater production.
- Existing domestic wells are failing in certain portions of the region because of declining water table elevations and with continued development, water table declines are projected to continue in some areas.
- Restoring water supply to affected homes is costly.
- Uncertainty and disagreement exist regarding responsibility for restoring water supply in areas where municipal production wells co-exist with domestic wells.
- Linkages – Conjunctive use of surface and groundwater resources in South Truckee Meadows (see Section 9.2)

Action Taken / Alternatives Evaluated to Address the Issues

- Golden Valley Recharge Project to enhance water resources available to domestic wells
- South Truckee Meadows Facility Plan for conjunctive use of surface and groundwater resources with limitation on overall groundwater pumping from municipal wells that considers impacts to domestic wells
- RWPC Groundwater Task Force formed in November 2001
- Groundwater Task Force Final Report completed in June 2003

Recommendations

The Groundwater Task Force Final Report contained a number of recommendations, including:

- Creation of a Washoe County Groundwater Program with two elements: Groundwater Resource Data Center. The Groundwater Resource Data Center would provide monitoring of groundwater production, water levels, water quality sampling, well mapping, aquifer characterization, educational projects, annual reporting and other data dissemination.
- Well Mitigation Program: The Well Mitigation Program would address the causes and responsibilities for impacts to domestic wells and the need for mitigation measures. The program would provide a process to determine the cause or causes of a domestic well impact, eligibility for mitigation and a funding mechanism that is equitable among the funding sources.
- District Board of Health adoption of new water quality and well yield standards and testing requirements for newly constructed domestic wells, some rehabilitated domestic wells, and upon sale of residential properties served by domestic wells.

Subsequent Activities and Additional Work Needed

In August 2003 the Board accepted the Final Report of the Groundwater Task Force with the following actions approved:

- 19.A Creation of a Groundwater Resources Data Center
- 19.B Implementation of a Well Mitigation Program

Relevant Planning Documents

- ECO:LOGIC, 2002, South Truckee Meadows Facility Plan. Prepared for the RWPC, Washoe County Department of Water Resources, and South Truckee Meadows General Improvement District.
- RWPC Groundwater Task Force, 2003, Final Report to the RWPC by the Groundwater Task Force.
- Board of County Commissioners, Washoe County, Nevada, Minutes of August 26, 2003, meeting.

9.20 Efficient Use of Water Rights

(Identified after 1995-2015 Regional Water Plan adoption)

Specific Issues and Linkages

The 1995-2015 Regional Water Plan identifies Truckee River and tributary water rights necessary to implement TROA. There are other demands for these water rights such as in-stream flows for water quality and return flow credit water for the non-consumptive use portion of Truckee River water that is not returned to the river. The various demands for water rights are discussed in detail in Section 6.6.1.

A water rights balance for six potential long-range water rights demand scenarios is presented in Chapter 6. In all six scenarios there are sufficient Truckee River and tributary water rights to meet the anticipated demands, subject to the assumption that, as the availability of water rights decreases, the price per acre-foot will increase, with the result being a greater incentive to sell water rights that have remained in agricultural use. Additionally, a higher cost per acre-foot will provide the incentive to seek out and secure water rights that require more effort to obtain, such as those that are associated with public rights of way.

Linkages:

- Truckee River agreements (Chapter 7: Constraints)
- Truckee River water quality standards and potential TMWRF discharge permit modifications (Chapter 3: Background on Water Quality and Wastewater)
- Yield of Tributary water rights and water rights dedication requirements under TROA (Chapter 6: Projections of Population, Water Demand and Wastewater Flow, Section 6.6)

Action Taken / Alternatives Evaluated to Address the Issues

In recognition of the concern over the availability of water rights to meet future demands, the RWPC completed a study of available Truckee River and tributary water rights (Stantec, 2001). This study is used in Chapter 6 as the basis of determining the availability of main stem Truckee River, Dog Creek, Evans Creek, and Hunter Creek water rights to meet future demands.

The remainder of water rights included in the Chapter 6 analysis, Thomas Creek, Whites Creek, Steamboat Creek and Galena Creek, were studied as part of the RWPC's South Truckee Meadows Facility Plan (ECO:LOGIC, 2002).

Recommendations

The key recommendations of the 2001 water rights study include:

- Develop an aggressive program to recover and convert inactive Truckee River water rights to municipal use
- Compare end-point water demand projections to upcoming planning area growth projections and resolve any major discrepancies in consideration of geographic constraints
- Compare end-point water demand projections to forthcoming TMWA growth and water demand projections
- Compare the water demand and water right recovery estimates to future conditions imposed by TROA
- Update the Water Right Status and Demand Projections once every 5 years, or as new data becomes available
- Support efforts to convert tributary water rights into usable municipal water resources, or to be used as return flow credits to the Truckee River
- Support efforts to develop alternative sources of water supply to the North Valleys

Subsequent Activities and Additional Work Needed

The RWPC, TMWA, Washoe County, and the Cities of Reno and Sparks have undertaken efforts to respond to all of the recommendations contained in the 2001 water rights study. Specific examples include the Water Resources Baseline (RWPC, 2003), the water rights balance in Chapter 6, the tributary water rights dedication policy under analysis and development by Washoe County, the TROA Environmental Impact Statement, and extensive effluent management planning for TMWRF.

Additional work that needs to be completed includes:

- 20.A Development and implementation of water rights recovery program to convert inactive Truckee River water rights to municipal use
- 20.B Continued analysis and development of non-structural measures to improve Truckee River water quality, enable increased TMWRF discharges, and ensure the future sustainability of the river
- 20.C Close coordination between water purveyors and wastewater treatment providers to ensure that Truckee River and tributary water rights are being utilized in a manner that maximizes the use of the region's water resources for multiple purposes

Relevant Planning Documents

- Stantec Consulting, 2001, Analysis of Available Decreed Truckee River Water Rights and Projections of Future Demand. Prepared for the RWPC.
- ECO:LOGIC, 2002, South Truckee Meadows Facility Plan, Phase II, Technical Memorandum No. 2: Tributary Water Availability Analysis. Prepared for the RWPC, Washoe County Department of Water Resources, and South Truckee Meadows General Improvement District.

- ECO:LOGIC, 2003, Water Resource Baseline. Prepared for the RWPC.

9.21 Water Resource Linkages to Land Use Planning

(Identified after 1995-2015 Regional Water Plan adoption)

Specific Issues and Linkages

The importance of integrating water resource management with land use planning has come to light in several forums since adoption of the 1995-2015 Regional Water Plan. Rapid growth in the Truckee Meadows urban area and outlying valleys has led to questions about the sustainability of existing and potential development within the region's limited pool of natural resources. Specific issues that have arisen include:

- The availability and cost of water resources to supply the demands of existing and future potential development
- The importance of flood plain management in reducing the risk of future flooding within the community
- The importance of maintaining natural recharge to sustain groundwater resources
- The potential of the region to employ the use of "green infrastructure" and Low Impact Development techniques to enhance regional aesthetics and quality of life while preserving or enhancing natural resources

Linkages – Septic Tanks (Section 9.18 and Chapter 3), Watershed Management and Protection (Section 9.19 and Chapter 5), Flood Plain Management (Section 9.25 and Chapter 4), Water Conservation (Chapter 8)

Action Taken / Alternatives Evaluated to Address the Issues

Following are some of the activities that have been undertaken by various entities in an effort to integrate water resource management into land use planning and development processes:

- Washoe County adoption of a new development code section entitled "Significant Hydrologic Resources". The model for the code section was developed by the RWPC Stream Advisory Committee.
- Adoption by the Regional Planning Governing Board of the 2002 Truckee Meadows Regional Plan, which includes the following water resource policies and criteria:
 - Establishment of the Truckee Meadows Service Areas boundary, the boundary within which municipal services are to be provided
 - Identification of Development Constraints Areas
 - Inclusion of Planning Principle No. 1: "Regional Form and Development Patterns" and relevant policies under Goal 1.2 for the provision of water resource infrastructure to support implementation of the Regional Plan
 - Inclusion of Planning Principle No. 2: "Management of the Region's Natural Resources" in the Regional Plan
- RWPC development and adoption of Interim Water Policies in response to the requirement of the October 2002 Regional Plan Settlement Agreement. The policies pertain to water resources and land use, water resource commitments, groundwater recharge, and flood storage mitigation in the Cooperative Planning Areas
- Inclusion of a land use planning element in the Regional Storm Water Quality Management Program

- Inclusion of a land use planning element in the RWPC Watershed Management and Protection Plan
- RWPC completion and acceptance of a Regional Flood Plain Management Strategy
- RWPC development of a Flood Storage Mitigation Plan for critical flood zones in the Truckee Meadows
- RWPC development of tools such as the Water Resource Baseline and Southern Washoe County Groundwater Recharge Study that can be used by local government staff and water purveyors when performing conformance reviews
- Establishment of a local branch of the Non-Point Source Education for Municipal Officials (NEMO) organization with representation from local and regional planning entities
- Truckee Meadows Regional Planning Governing Board commissioning of a study on the Truckee River watershed managing entities and programs that resulted in recommendations for Regional Planning to:
 - Facilitate the development and integration of specific resource management guidance at the regional level for inclusion in local government development codes. Specific examples include groundwater recharge protection and flood plain management techniques.
 - Facilitate the development of a mechanism to measure progress towards meeting regional resource management goals as they relate to land use planning and development
 - Facilitate the development of a closer working relationship between the RWPC and Regional Planning Commission

Recommendations

There are a number of recommendations contained in the Watershed Management and Protection Plan and Regional Storm Water Quality Management Program (Section 9.19 and Chapter 5), Flood Plain Management Strategy (Section 9.25 and Chapter 4), Flood Storage Mitigation Plan for Zones 1 & 2 (Section 9.25 and Chapter 4), Interim Water Policies and Truckee River Watershed Management Entities and Programs relating to the need to coordinate land use planning and water resource management.

Subsequent Activities and Additional Work Needed

- 21.A Review areas within the Truckee Meadows Service Areas (TMSA) Boundary for gaps in facility planning and develop a plan to respond to changes in land use and the TMSA that affect current facility plans
- 21.B Coordinate with other entities on the development of a GIS parcel based tool that can be used to estimate potential water demands and wastewater flows based on approved land use. Identify an entity or entities that would assume responsibility for maintaining the water resource element of the GIS tool.
- 21.C Develop guidelines and checklists to aid in the development and review of facility plans for conformance with regional water planning policies

Relevant Planning Documents

- Regional Plan Settlement Agreement, October 17, 2002.
- ECO:LOGIC, 2003, Water Resource Baseline. Prepared for the RWPC.
- ECO:LOGIC, 2003, Truckee River Watershed Management Entities and Programs. Prepared for the Truckee Meadows Regional Planning Agency.

- RWPC, 2003, Interim Water Policies and Criteria.
- RWPC Flood Plain Management Subcommittee, 2003, RWPC Flood Plain Management Strategy. Prepared for the RWPC.
- Washoe County Department of Water Resources, University of Nevada Cooperative Extension, Washoe Storey Conservation District, 2002, Watershed Management and Protection Plan for Tributaries to the Truckee River. Prepared for the RWPC.
- Truckee Meadows Regional Planning Agency, 2002, 2002 Truckee Meadows Regional Plan.
- Kennedy/Jenks Consultants, Broadbent, ADGIS, 2001, Southern Washoe County Groundwater Recharge Analysis. Prepared for the RWPC.
- Kennedy/Jenks Consultants and AMEC, 2001, Truckee Meadows Storm Water Quality Management Program. Prepared for Truckee Meadows Storm Water Permit Coordinating Committee and Nevada Division of Environmental Protection.

9.22 Consistency in Local Government Drainage Standards

(1995-2015 Regional Water Plan Issue)

Specific Issues and Linkages

The issue of consistency in local government drainage standards was identified in the 1995-2015 Regional Water Plan and has been raised as a topic of concern in several recent watershed based planning efforts. Consistency in standards between local governments provides a level of certainty to the development community as City limits change with new annexations. Also, it ensures that a property that was developed to a certain standard in the unincorporated area will still meet current standards if it undergoes annexation in the future.

Action Taken / Alternatives Evaluated to Address the Issues

Efforts to develop consistent standards have not been completely successful. The Cities of Reno and Sparks, and Washoe County, each have unique drainage design standards.

Most recent progress on the development of consistent standards has been through the efforts of the Truckee Meadows Regional Storm Water Permit Coordinating Committee that is charged with ensuring compliance with the regional NPDES permit. This committee has overseen the development of several manuals, including the Truckee Meadows Construction Site Discharge BMP Handbook (complete), the Truckee Meadows Structural Controls Design Manual (under development), the update to the Regional Hydrologic Criteria and Drainage Design Manual (under development), and the Low Impact Development Manual (under development).

Recommendations

The above referenced manuals will contain the details of drainage design standards that should be implemented by all three local governments.

Subsequent Activities and Additional Work Needed

- 22.A Adoption of regionally developed drainage design manuals by local governments when complete

Relevant Planning Documents

- Flood Plain Management Subcommittee, 2003. RWPC Flood Plain Management Strategy. Prepared for the RWPC.

- WRC, to be completed in 2004. Regional Hydrologic Criteria and Drainage Design Manual. Prepared for the RWPC.
- Washoe County, 1996, Draft Hydrologic Criteria and Drainage Design Manual.

9.23 Regional Flood Plain Management and Flood Control

(Identified after 1995-2015 Regional Water Plan adoption)

Specific Issues and Linkages

A number of flood control and flood plain management issues have resurfaced since the flood of 1997 and subsequent analysis of conditions in the watershed, including:

- The need to manage flood storage volumes
- The need to ensure that there is no adverse flood impact to existing development from new development, land use changes, or changes to hydrologic features
- The need to maintain existing flood protection as conditions change in the watershed
- The need to address areas subject to repeated flood events
- The need to fund implementation, operation and maintenance of Regional Flood Control projects that encompass several jurisdictions
- The need to implement the Truckee River Flood Management Project
- The further expansion of the flood warning system
- Continue regional flood control technical coordination to oversee flood control and flood plain management standards, issues, and projects within the Truckee River watershed and associated sub-basins
- The need to manage flood plains and plan for flood control improvements with consideration of build-out conditions
- The need to coordinate regional flood plain management issues with the FEMA flood insurance program to assure the FEMA Flood Insurance Rate Maps are consistent with regional flood planning and implementation efforts
- The need for consistent FEMA flood insurance regulations, guidelines, and standards in the region
- The need to acquire property that is critical to flood projects within the region and especially the Truckee River Flood Management Project

Action Taken / Alternatives Evaluated to Address the Issues

The most significant work with respect to flood control has been the development of the Community Coalition concept to develop a community acceptable flood management plan alternative in response to the 1997 flood event. The Truckee River Flood Management Project is discussed in Chapter 4.

Flood plain management is critical to maintaining the benefits provided by constructed flood control improvements. The first step towards development of a regional flood plain management strategy was the RWPC's "Regional Flood Plain Management Strategy", accepted in June 2003.

Recommendations

Recommendations relating to the configuration of the Truckee River Flood Control Project are included in Chapter 4.

The RWPC Regional Flood Plain Management Strategy Implementation Plan contains ten elements, including:

1. Implementation of the Truckee River Flood Management Project
2. Public education regarding flood hazards
3. Emergency response preparedness
4. Mitigation of the cumulative effects of development
5. Completion of watershed based master plans and models
6. Integrated watershed management
7. Reduce the cost to the community of regional flood control facilities
8. Reduce the cost to the community of flood insurance premiums
9. Specific flood damage reduction projects
10. River restoration projects

Subsequent Activities and Additional Work Needed

In addition to the activities referenced above, the RWPC adopted Interim Water Policies in February 2003 that included requirements for development of a Flood Plain Storage Mitigation Plan for Critical Flood Storage Zones 1 through 4. These zones are not the same as FEMA flood zones, but are locally defined zones for use in managing the impact to flooding in the Central Truckee Meadows.

Recommendations for additional work are identified in a number of documents, including:

- Flood Storage Volume Mitigation Plan for Critical Flood Storage Zones 1 and 2
- The Flood Plain Management Strategy
- Chapter 4 of this Plan

These recommendations and others that have been provided by local government staff are included under Items 23.A – 23.P of Chapter 11 - “Action Plan” and listed below:

- 23.A Complete mitigation and financing plan for Flood Storage Zones 1 and 2
- 23.B Develop a public information and outreach program for property owners within Flood Storage Zones 1 thru 4
- 23.C Develop mitigation options for Flood Storage Zones 3 and 4 as needed
- 23.D Develop modeling and analysis tools to validate flood storage mitigation efforts
- 23.E Develop a Resource Manual to document findings of Flood Storage Zone analysis
- 23.F Propose modifications to local government development codes to incorporate flood storage mitigation strategies
- 23.G Develop Threat Recognition Plan for areas that could be severely impacted by alluvial fan or flash flooding
- 23.H Develop Flood Plain Storage Mitigation Plan for areas outside the Truckee River watershed
- 23.I Propose modifications of local government development codes requiring the use of watershed based modeling tools to evaluate and mitigate the flood related impacts of changes in the watershed

- 23.J Develop hydrologic and hydraulic modeling of existing and build-out conditions for the purposes of flood control for all developing watersheds in Washoe County
- 23.K Suggest changes to “Development Constraint Areas” that reflect the regional flood planning as it relates to flood plain management, water bodies, and drainageways
- 23.L Recommend local government adoption of RWPC Regional Flood Plain Management Strategy after review of modifications that might result from flood storage mitigation planning
- 23.M Local government participation in the Community Rating System
- 23.N Develop strategies to reduce flood damages in existing areas not planned for protection by a regional flood control project
- 23.O Perform analysis of confirmed and suspected alluvial fan areas to: 1) determine active alluvial fan hazard areas and 2) modify Flood Insurance Rate Maps as necessary
- 23.P Develop flood damage reduction plans for: Virginia Foothills, Hidden Valley, Bailey Canyon, Eastside subdivision, Bellevue Ranch area of Washoe Valley, Lower Galena Creek, Silver Lake, Cold Springs, and Swan Lake

Relevant Planning Documents

- Harding ESE, a MACTEC Company, 2001, Spanish Springs Valley Flood Control Master Plan. Prepared for City of Sparks.
- RWPC Flood Plain Management Subcommittee, 2003, RWPC Flood Plain Management Strategy. Prepared for the RWPC.
- Stantec Consulting, 2000, Drainage Master Plan Stead, Nevada. Prepared for City of Reno.
- Nimbus Engineers, Moore Iacofano Goltsman, 2004, Flood Storage Volume Mitigation Phase I Report. Prepared for the RWPC.
- Otis Bay Riverine Consultants, 2001, Lockwood Conceptual Restoration Project. Prepared for Washoe County Department of Water Resources.
- WRC, to be completed in 2004. RWPC Regional Flood Control Master Plan. Prepared for the RWPC.

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- ECO:LOGIC, 2002, North Valleys Water Supply Comparison, prepared for Regional Water Planning Commission.
- JBR / Montgomery Watson, 1997, Water Supply Alternatives for North Valleys, prepared for Washoe County, Department of Comprehensive Planning.
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- ECO:LOGIC, 1999, North Valleys Water Facility Plan, prepared for RWPC.
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- AMEC, 2000, Sparks Effluent Pipeline Extension, prepared for City of Sparks.
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- Washoe County Department of Water Resources, 2003, Spanish Springs Water Facility Plan.
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- ECO:LOGIC, 2003, Water Resource Baseline, prepared for RWPC
- AGRA Infrastructure, 2000, Strategies to Reduce the Cost of Converting Septic Tanks to Community Sewers in Washoe County (Septic to Sewer Conversion Study) Final Report, prepared for the Washoe County Department of Water Resources and the RWPC
- ECO:LOGIC, 2002, Recommended Projects to Provide an Emergency Water Supply to the South Truckee Meadows, prepared for RWPC.
- University of Nevada Cooperative Extension, 2004, Evapotranspiration Controller Study.
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- Carollo Engineers, 1999, Regional Wastewater Reclamation Facility Plan, prepared for City of Reno, City of Sparks, and Washoe County Department of Water Resources.
- ECO:LOGIC, Tetra Tech, Otis Bay Riverine Consultants, Desert Research Institute, Sue Oldham Esq., to be completed in 2004, Mud Lake Slough and Winnemucca Lake Wetland Restoration Feasibility Study, prepared for the City of Reno and the City of Sparks.

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