Stewart Complex
System ID No. NV0004084

Water Conservation Plan
May 1, 2016

Prepared for:

Stewart Complex
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Introduction

The water supply in Nevada is a precious commodity and plays an important role in determining Nevada's future. Nevada is the one of the driest states in the nation as well as one of the fastest growing ones. Nevada's future, both from an economic and a quality of life view, depends heavily upon the wise management of the water supply.

Groundwater, in general, provides about 40 percent of the total water supply used in Nevada. In some areas, groundwater provides the entire water supply. Groundwater usage may vary considerably from year-to-year as it is sometimes pumped to supplement surface water sources.

Water use in Nevada can be classified as:

- Domestic (household, both indoor and outdoor) – Met by public supply or private supply (e.g. wells).
- Commercial (businesses) – Met by public supply or private supply (e.g. non-community systems).
- Industrial (manufacturing/construction) – Met by public supply or private supply (e.g. non-community systems).
- Thermoelectric (electric/fossil fuel/geothermal power generation) – Met by public supply in a minor fraction.
- Mining (mining processes) – Supply source varies widely from operation to operation and is dependent upon the mineral being recovered and the recovery process employed.
- Irrigation (land use) – Met by self-supplied or supplied by irrigation companies or districts.
- Livestock (farm needs) – Supply source varies.

While all classifications of water usages have shown an increase over the years, it has historically been irrigation water use which has accounted for the majority of the water use in Nevada.

It has been estimated that the domestic water use accounts for less than 15 percent of the water used in Nevada, but this is expected to rise to nearly 25 percent as the population increases (based upon existing water use patterns and conservation measures). It is expected that Nevada's population will become increasingly concentrated in its primary urban areas of Las Vegas (Clark County), Reno/Sparks (Washoe County) and Carson City, with varied spillover effects on neighboring counties.

It is vitally important that all residents understand the fundamental science of water, how it is managed in the state, and the issues affecting its management. Water education must become a priority and must include education of children as they are our future.

Because Nevada does not have a comprehensive state-wide conservation program, it is reliant upon the individual water suppliers for developing their own conservation programs. In 1991, Nevada enacted a law requiring adoption of conservations plans by water suppliers. Minimum

standards for plumbing fixtures were adopted in 1991 (Assembly Bill 359) by Nevada and in 1992 minimum flow standards for plumbing fixtures were adopted by the federal government (National Energy and Policy Conservation Act).

Conservation is an essential part of ensuring adequate water supply as it is no longer feasible to develop new sources. It has proven to be a cost-effective way to reduce demands and/or to extend a given water supply. It can easily be pursued by all water users regardless of the water system type. Key to evaluating the program's effectiveness is the water use measurement (through meters and other measurement devices). Various conservation measures can be put into place and the achievement of the goals set with these measures is vital to combating the expected increase in water usage.

Statutory Requirements

This water conservation plan was prepared for the Stewart Complex in accordance with Nevada Revised Statue (NRS) 540. As outlined in NRS 540.141, the provisions of this plan must include:

a. Public Education
b. Conservation Measures
c. Water Management
d. Contingency Plan
e. Schedule
f. Evaluation Measurements
g. Conservation Estimates

In addition to the provisions of the water conservation plan, listed above, NRS 540.141 also requires a rate analysis to be performed and included with the submittal.

This plan is being submitted to the Nevada Department of Conservation and Natural Resources (DCNR), Division of Water Resources (DWR) for review and approval prior to its adoption by Stewart Complex, as required by NRS 540.131.

This plan is available for inspection during normal business hours at 515 East Musser Street Carson City, NV 89701.

The original Water Conservation Plan for Stewart Complex was developed on May 1, 2016. This is the Original Plan.

In accordance with NRS 540.131, this plan will be reviewed from time-to-time to reflect changes and must be updated every five (5) years to comply with NRS 540.131 and NRS 540.141. The next update of this plan is to be on, or before, May 1, 2021.

System Description

The Stewart Complex is a non-transient, non-community operated by the State of Nevada. This water system has a current water operation permit, NV0004084. The Stewart Complex serves water to a commercial site for State agencies. The Facility is located in Carson City, which is located in Carson City County. The Stewart System consists of a ground water well located near the intersection of Clear Creek Ave. and Center Drive, and approximately 2,300 feet of dedicated 4-inch asbestos concrete pipeline (ACP) to the water treatment plant. The water treatment plant utilizes pressure greensand filtration to remove iron and manganese from the well water. The treated water is pumped to the elevated tank which is distributed throughout the complex. The water lines are ranging in size from 2-inch to 10-inch in diameter. The service area boundaries are Center Drive to the West, Clear Creek Ave. to Snyder Ave. to the North, then East on Biglow Drive to Clear Creek, and Clear Creek to the south up to Center Drive.

This area covers approximately 52 acres. The service area's terrain is upper desert. Wastewater collected from the service area is directed to Carson City Public Works. The Stewart Complex monitors and records water levels at the well and tank site. This system is monitored through the SCADA system. Working relationships with other local water purveyors are maintained to ensure adequate water supplies are available. The Stewart Complex has an inter-tie with the Carson City Water System. This inter-tie is used in the event of a well failure to insure proper flows and pressure demands.

The water supply is from ground water which is located within the Eagle Valley Basin. There is 1 groundwater well and 1 elevated storage tank. Each of these is identified in the tables below (Table 1 and Table 2).

Table 1 – Source of Supply

Well No.	Depth (feet)	Production (gpm)
WO1	325'	140gpm

Table 2 – Storage Tanks

Tank No.	Volume (gallons)
1	75,000

The Stewart Complex has been granted water rights in the total amount of 46.68 AFA per year. The current water rights are listed in the table below (Table 3).

Table 3 – Water Rights

Permit No.	Well No. & Name	Rate of Diversion (max, CFS)	Annual Use (MGA)
78070	WO6, Stewart Well	0.064	46.68

Plan Provisions

In accordance with NRS 540.131, this plan will be reviewed from time-to-time to reflect changes and must be updated every five (5) years to comply with NRS 540.131 and NRS 540.141. The next update of this plan is to be on, or before, May 1, 2021.

The Stewart Complex will appoint a staff member to oversee the conservation efforts and this staff member will be responsible for implementation of conservation programs, monitoring of water use, and will review /revise the conservation plan when needed.

In an effort to promote voluntary conservation and aid in Nevada's future, the Stewart Complex will enact the voluntary conservation measures found in the *Conservation Measures* section of this plan. When more stringent measures are needed, the Stewart Complex will enact the measures found in the *Contingency Measures* section of this plan. All measures can be found in Appendix A of this plan.

As required by NRS 540.141, the water conservation plan must include the following provisions:

a. Public Education
b. Conservation Measures
c. Water Management
d. Contingency Plan
e. Schedule
f. Evaluation Measures
g. Conservation Estimates

Each provision is discussed in detail below.

Public Education

Public education is a key for cooperation with conservation efforts, so funding for public education is crucial. The Stewart Complex recognizes this and will establish a conservation education program and corresponding budget.

It is the goal of the Stewart Complex to increase public awareness to conserve water, and will follow the plan of the State Governors Office.

The Stewart Complex conservation education program includes education materials such as, pamphlets, flyers, and posters. Posted Materials will be in the common area within the complex. Educational pamphlets will be provided to all customers upon request and should include an explanation of all costs involved in supplying drinking water and demonstrate how the water conservation practices will provide water users with long-term savings. Education materials should also encourage reduction of lawn sizes, use of drip irrigation, use of climate-appropriate plants, and conservation tips and techniques (see Appendix B).

Conservation Measures

In an effort to promote conservation and voluntarily conserve water, the Stewart Complex is adopting water-use regulations to promote water conservation during non-emergency situations. These regulations include the following non-essential water use:

1) Use of water through any connection when the Stewart Complex has notified the customer in writing to repair a broken or defective plumbing, sprinkler, watering or irrigation system and the customer has failed to make such repairs within 5 days after receipt of such notice.
2) Use of water which results in flooding or run-off in gutters, waterways, patios, driveway, or streets.
3) Use of water for washing, cars, buses, trailers or other vehicles without a positive shut-off nozzle on the outlet end of the hose. Exceptions include washing vehicles at commercial or fleet vehicle washing facilities operated at fixed locations where equipment using water is properly maintained to avoid wasteful use.
4) Use of water through a hose for washing buildings, structures, sidewalks, walkways, driveways, patios, parking lots, or other hard-surfaced areas in a manner which results in excessive run-off or waste.
5) Use of water for watering streets with trucks, except for initial wash-down for construction purposes (if street sweeping is not feasible), or to protect the health and safety of the public.
6) Use of water for construction purposes, such as consolidation of backfill, dust control, or other uses unless no other source of water or other method can be used.
7) Use of water for more than minimal landscaping in connection with any new construction.
8) Use of water for outside plants, lawn, landscape, and turf areas, shall not apply to commercial nurseries, golf courses and other water-dependent industries. Watering of plants, lawn, landscape, and turf areas are prohibited between the hours of 10:00AM to 6:00PM.

9) Use of water for watering outside plants and turf areas using a hand-held hose without a positive shut-off valve.
10) Use of water for decorative fountains or the filling or topping off of decorative lakes or ponds. Exceptions are made for those decorative fountains, lakes, or ponds which utilize recycled water.

In the event these conservation measures are insufficient to control the water shortage, the Stewart Complex may wish to implement the mandatory measures discussed in the *Contingency Plan* section below.

The Stewart Complex also promotes the development of water conserving principles into the planning, development, and management of new landscape projects such as public parks, building grounds.

The Stewart Complex provides the following incentives for conservation; at present, it is not viable to offer any water conservation incentives.

Water Management

The Stewart Complex does not actively monitor for unaccounted water losses. The Stewart Complex does not monitor unaccounted water losses because buildings are not metered and there is no comparison to be made between production and buildings usage. The Stewart Complex does plan to install individual water meters on each of its buildings to allow it to monitor production verses usage figures.

If a leak is found by State of Nevada Buildings & Grounds staff, a contractor is notified to perform the leak repair. The Stewart Complex has no formal leak detection program. Nevada Rural Water Association provides leak detection needs to Stewart complex staff as needed. All large leaks are repaired immediately and small leaks (less than 1 gallon per minute) are repaired within two (2) days.

A formal Wellhead Protection Program Plan is in place with the Carson City Public Works Department. The well has a locked, gated chain link fence enclosure around the wellhead.

A capital improvement plan is in place, currently being funded through the State's Capital Improvement Projects (CIP), and there are plans to replace distribution lines at their anticipated useful life. The system improvements would include the installation of new water mains, replacement of fire hydrants, and water service meter pits with meters and backflow devices on each connection. At the completion of this project the system would be turned over to the Carson City Public Works. This system would be included under Carson City Water Conservation Plan.

The Stewart Complex does not have a system for reusing of effluent. Effluent is treated at Carson City wastewater treatment plant. There are currently no plans for reuse at this time.

Contingency Plan

The objective of the contingency plan is to manage the available resources to ensure continued supply of potable water during periods of drought or extended drought.

It is envisioned that voluntary conservation will be sufficient to ensure an adequate supply of water and reduce water usage. However, if a sustained drought (lack of precipitation) is encountered, it may be necessary to implement mandatory restrictions in order to ensure an adequate supply of water to meet essential needs.

The Stewart Complex plans for drought response would be three (3) stages of drought response: (1) warning stage, (2) alert stage, and (3) emergency stage. The stages are describes as follows:

In Stage 1, the warning stage, the Stewart Complex would increase monitoring of its water supplies and would begin creating public awareness of the water supply situation and the need to conserve. Conservation measures at this stage would be voluntary. Retrofit kits (low-flow faucet aerators, low-flow showerheads, leak detection tables, and replacement flapper valves) can be made available, or at cost, and can be actively installed, if needed.

In Stage 2, the alert stage, the Stewart Complex would call for wide-based support to achieve conservation, limit the use of fire hydrants to fire protection uses, implement water use restrictions, and follow the direction of the Governor's office.

In Stage 3, the emergency stage, the Stewart Complex would declare a drought and water shortage emergency, would enforce water use restrictions, implement allocation of water (rationing) Media relations would be activated in order to inform the customers and monetary assistance may need to be secured in an effort to mitigate the effects of the drought (e.g. federal funding assistance). Conservation measures at this stage would be mandatory, rationing would be imposed, and follow the direction of the Governor's office.

When a drought is declared over, voluntary conservation measures (see *Conservation Measures* section in this plan) will be reinstated and water supplies would continue to be monitored.

Schedule

All of the provisions listed are not currently in place and are actively working to achieve results. A project is currently under design, and with the approval from the State Legislature to move forward with capital funding. The project would include replacement of old water mains, installation of new water mains, replacement of fire hydrants, metering of all buildings and appropriate backflow devices. This system currently has a fire loop, with two (2) buildings connected to this loop. Both building have fire sprinkler system connections with backflow devices and meters. One building is equipped with a domestic water meter and being read by Carson City Public Utilities. The project at completion should be calendar year 2020.

At completion of this project, the State of Nevada Buildings & Grounds will enter into an agreement with Carson City to take control of this system. At the current rate of installation, it can be anticipated that the entire system will be metered by approximately 2020. As that time approaches, the degree of metering will be evaluated to determine whether implementation of full metering is warranted.

Evaluation Measurements

Because individual buildings are not currently metered, it is impossible to determine the effectiveness of each plan element on an individual customer basis. However, the Stewart Complex can evaluate the effectiveness of each plan element from the perspective of the whole system. In that regard, as a plan element is activated (e.g. declaring a drought stage), production figures will be compared to same-month historical data to estimate the plan element's effectiveness. This information will be utilized as a basis for any future water conservation plan revision and plan elements.

If there is a decrease in production as a result of a particular measure/incentive, that measure/incentive can be expanded or improved upon, if possible. If it is discovered that a particular measure/incentive is ineffective, it will be discontinued and a new one can then be implemented to take its place.

In addition to changes resulting from audits, updates, and modifications to conservation measures/incentives there will be changes made to meet changing conditions (e.g. buildings and demand, changing use, new technologies, etc.).

Conservation Estimates

It is estimated that metering alone will be the major driver of conservation, by raising awareness of individual account use. Metering alone, without a rate structure change, but with the public education elements, can be expected to provide a 10 % reduction in water usage.

APPENDIX A
CONSERVATION MEASURES

Stage 1 – Warning Stage

1. The Stewart Complex would increase monitoring of water supplies.
2. The Stewart Complex would begin creating public awareness of the water supply situation and the need to conserve.
3. The Stewart Complex would inform customers of voluntary conservation measures (non-essential water uses, listed below).

Non-essential water uses are:

1) Use of water through any connection when the Stewart Complex has notified the customer in writing to repair a broken or defective plumbing, sprinkler, watering or irrigation system and the customer has failed to make such repairs within 5 days after receipt of such notice.
2) Use of water which results in flooding or run-off in gutters, waterways, patios, driveway, or streets.
3) Use of water for washing cars, buses, trailers or other vehicles without a positive shut-off nozzle on the outlet end of the hose. Exceptions include washing vehicles at commercial or fleet vehicle washing facilities operated at fixed locations where equipment using water is properly maintained to avoid wasteful use.
4) Use of water through a hose for washing buildings, structures, sidewalks, walkways, driveways, patios, parking lots, or other hard-surfaced areas in a manner which results in excessive run-off or waste.
5) Use of water for watering streets with trucks, except for initial wash-down for construction purposes (if street sweeping is not feasible), or to protect the health and safety of the public.
6) Use of water for construction purposes, such as consolidation of backfill, dust control, or other uses unless no other source of water or other method can be used.
7) Use of water for more than minimal landscaping in connection with any new construction.
8) Use of water for outside plants, lawn, landscape, and turf areas with even numbered addresses watering on and odd numbered addresses watering on, except that this provision shall not apply. Watering of plants, lawn, landscape, and turf areas are prohibited between the hours of 10:00am-6:00pm and on Monday.
9) Use of water for watering outside plants and turf areas using a hand-held hose without a positive shut-off valve.
10) Use of water for decorative fountains or the filling or topping off of decorative lakes or ponds. Exceptions are made for those decorative fountains, or ponds.

Stage 2 – Alert Stage

1. The Stewart Complex would set conservation goals and call for wide-based community support to achieve those goals.
2. The Stewart Complex would inform customers of mandatory conservation measures (non-essential water uses, listed in Stage 1 are now mandatory).
3. The Stewart Complex limit the use of fire hydrants to fire protection uses only.
4. The Stewart Complex would follow the direction of the Governor's office.

Stage 3 – Emergency Stage

1. The Stewart Complex would declare a drought and water shortage emergency and use media relations to supplement efforts to keep customers informed.
2. The Stewart Complex would inform customers of prohibited water uses (non-essential water uses, listed in Stage 1 are now prohibited).
3. The Stewart Complex would limit the use of fire hydrants to fire protection uses only.
4. The Stewart Complex would follow the direction of the Governor's office.

End of Appendix A

APPENDIX B
PUBLIC EDUCATION MATERIALS

Publications

There are several publications available for use at U.S. EPA website for general distribution (currently located at http://epa.gov/watersense/pubs/index.htm#ideas). These publications include such topics as:

- Simple Steps to Save Water,
- Ideas for Residences,
- Ideas for Commercial,
- Using Water Wisely In the Home,
- Outdoor Water Use in the US,
- Toilet Flush Facts,
- Watering Can Be Efficient,
- Irrigation Timers for the Homeowner, and
- Water Efficient Landscaping,

These publications can be utilized until the Stewart Complex develops system-specific publications.

There are also numerous website that provide tips for conserving water. One of these is: http://www.wateruseitwisely.com/100-ways-to-conserve/index.php. Customers can be directed to this website for tips to conserve water.

Specific tips for landscaping that can be provided to the customers are listed below. During drought conditions outdoor watering restrictions may be imposed, and therefore some of the following tips will not apply.

Tips for Landscaping

Watering:

- Detect and repair all leaks in irrigation systems.
- Use properly treated wastewater for irrigation where available.
- Water the lawn or garden during the coolest part of the day (early morning is best). Do not water on windy days.
- Water trees and shrubs, which have deep root systems, longer and less frequently than shallow-rooted plants which require smaller amounts of water more often. Check with the local nursery for advice on the amount and frequency of watering needed in your area.
- Set sprinklers to water the lawn or garden only—not the street or sidewalk.

- Use soaker hoses and trickle irrigation systems.
- Install moisture sensors on sprinkler systems.

Planting:

- Have your soil tested for nutrient content and add organic matter if needed. Good soil absorbs and retains water better.
- Minimize turf areas and use native grasses.
- Use native plants in your landscape—they require less care and water than ornamental varieties.
- Add compost or peat moss to soil to improve its water-holding capacity.

Maintaining:

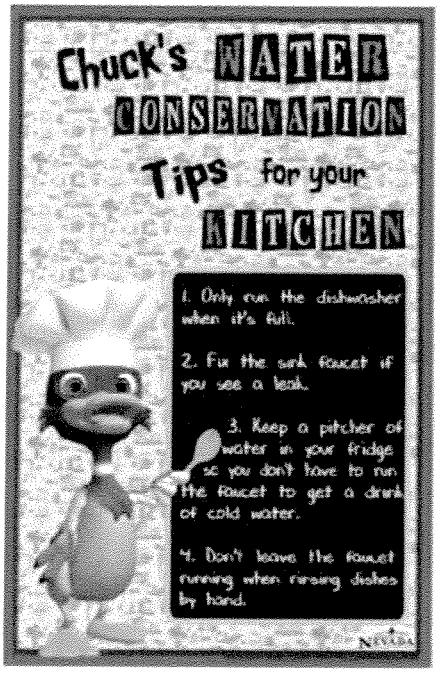
- Use mulch around shrubs and garden plants to reduce evaporation from the soil surface and cut down on weed growth.
- Remove thatch and aerate turf to encourage movement of water to the root zone.
- Raise your lawn mower cutting height to cut grass no shorter than three inches—longer grass blades encourages deeper roots, help shade soil, cut down on evaporation, and inhibit weed growth.
- Minimize or eliminate fertilizing which requires additional watering, and promotes new growth which will also need additional watering.

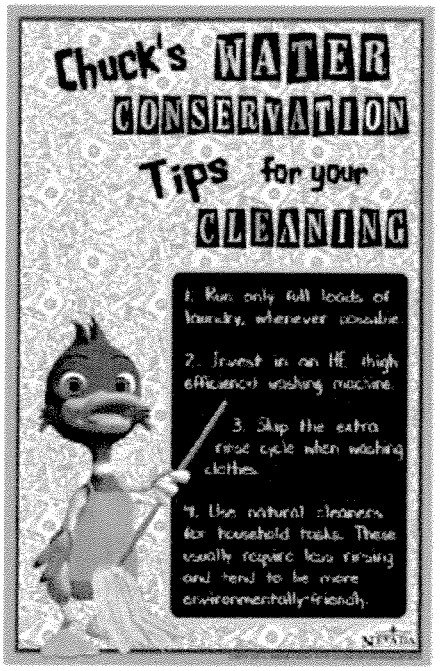
Ornamental Water Features:

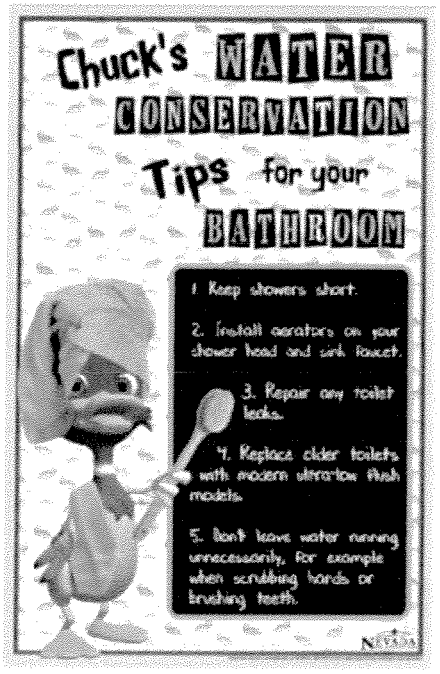
- Do not install or use ornamental water features unless they recycle the water. Use signs to indicate that water is recycled. Do not operate during a drought.

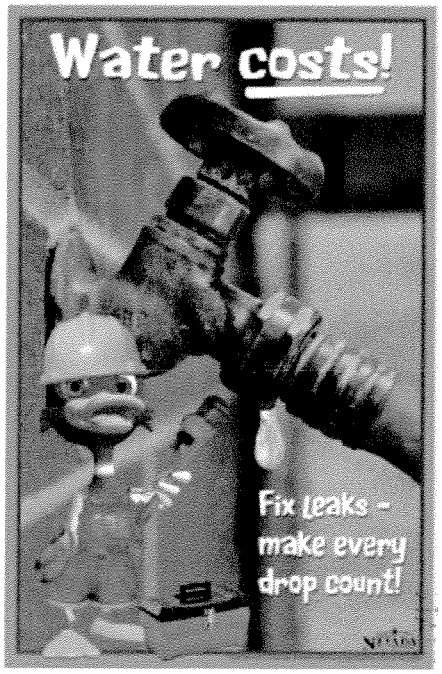
Outreach Materials:

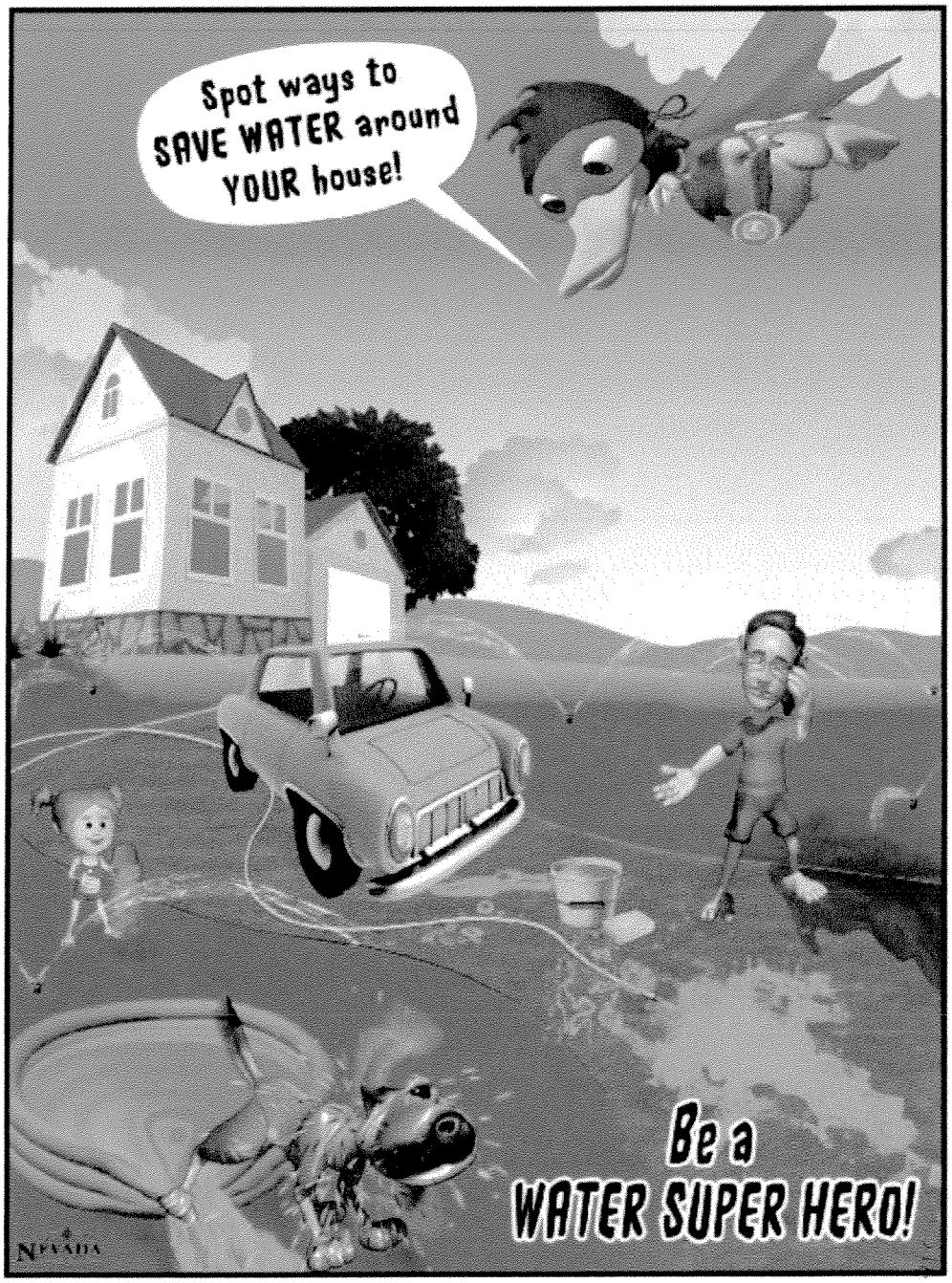
- Posters provided by the Nevada Rural Water Association to inform the public about water conservation are provided herein.

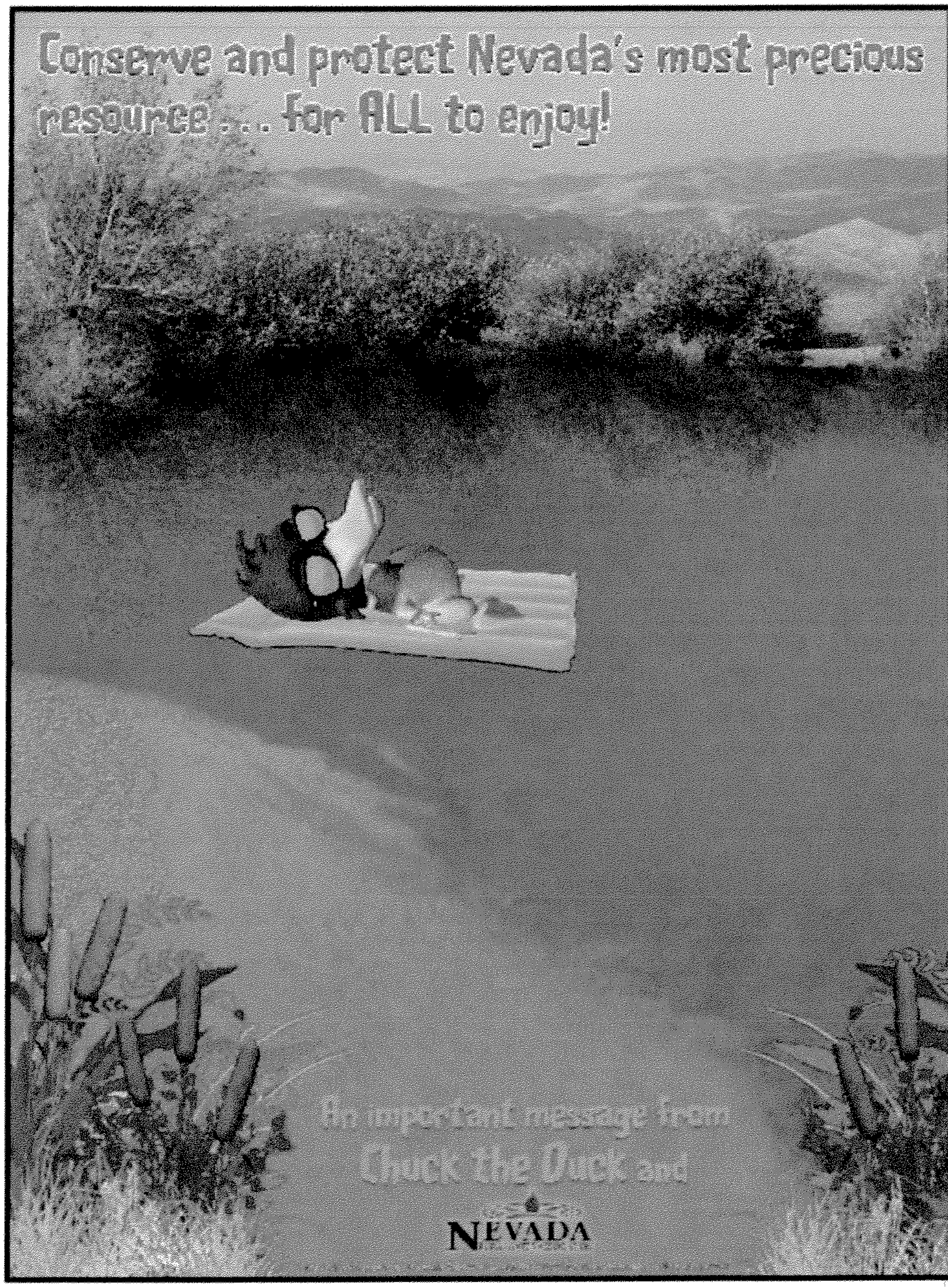


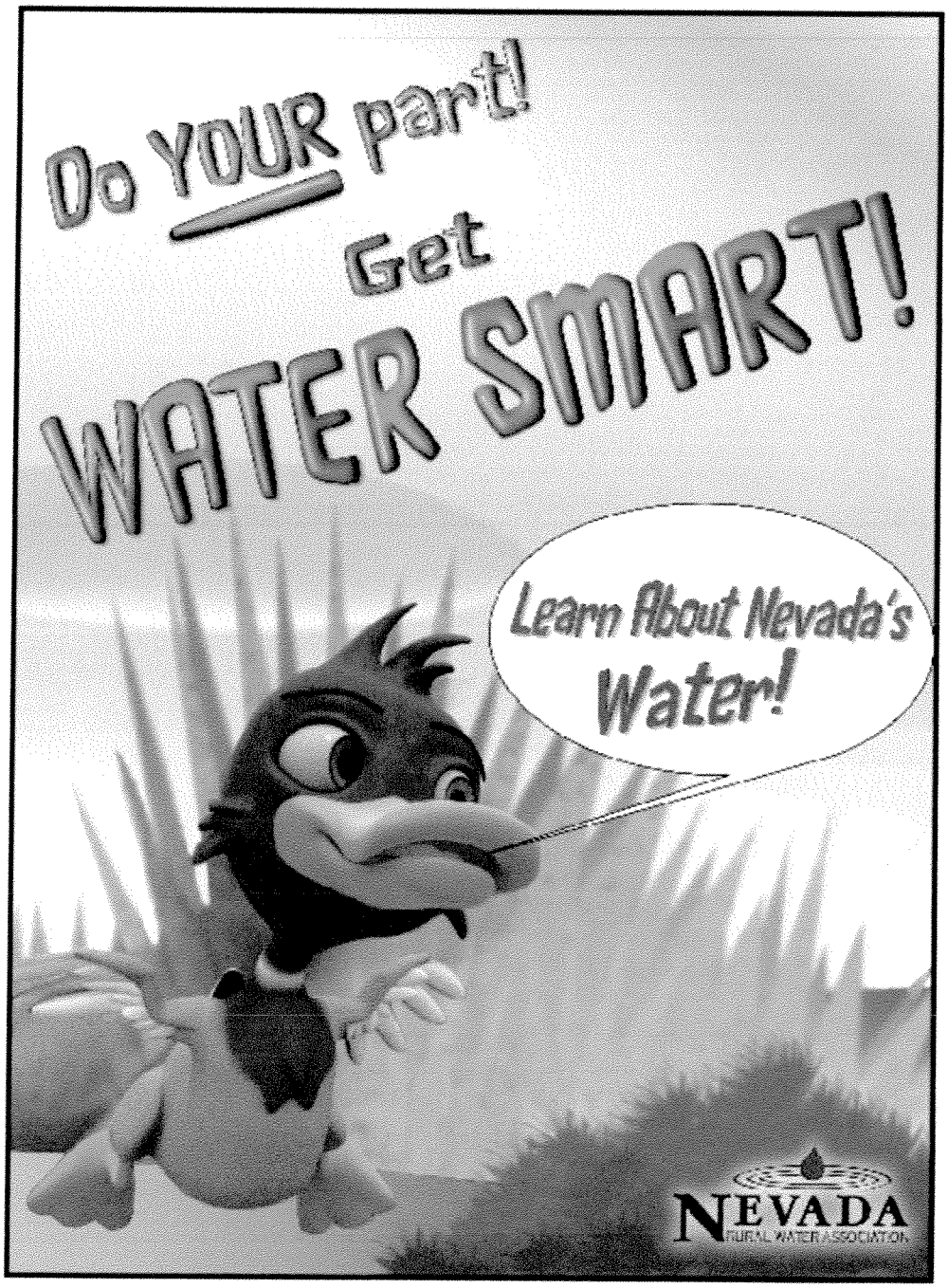












End of Appendix B

APPENDIX C
END-USER WATER SAVINGS

Here are just a few of the end-user water savings that could be realized:

Leaky Faucets

Issue: Leaky faucets that drip at the rate of one drip per second can waste more than 3,000 gallons of water each year.

Fix: If you're unsure whether you have a leak, read your water meter before and after a two-hour period when no water is being used. If the meter does not read exactly the same, you probably have a leak.

Leaky Toilets

Issue: A leaky toilet can waste about 200 gallons of water every day.

Fix: To tell if your toilet has a leak, place a drop of food coloring in the tank; if the color shows in the bowl without flushing, you have a leak.

Showering

Issue: A full bath tub requires about 70 gallons of water, while taking a five-minute shower uses 10 to 25 gallons.

Fix: If you take a bath, stopper the drain immediately and adjust the temperature as you fill the tub.

Estimated water savings from EPA Water Conservation Guidelines 1998 (Appendix B, Table B-1):

Type	Estimated Usage (gpcpd)	Conservation Usage (gpcpd)	Savings (gpcpd)	Savings (%)
Toilet	18.3	10.4	7.9	43 %
Clothes Washers	14.9	10.5	4.4	30 %
Showers	12.2	10.0	2.2	18 %
Faucets	10.3	10.0	.3	3 %
Leaks	6.6	1.5	5.1	77 %

End of Appendix C