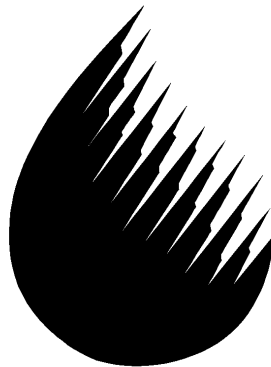


**RECOMMENDATIONS FROM THE
SOUTHERN NEVADA WATER AUTHORITY
YOUTH ADVISORY COUNCIL
TO THE
SOUTHERN NEVADA WATER AUTHORITY
BOARD OF DIRECTORS**

January 2001



**SOUTHERN NEVADA
WATER AUTHORITY**

INTRODUCTION

About the SNWA Youth Advisory Council

The inaugural Southern Nevada Water Authority (SNWA) Youth Advisory Council was formed in January 1999 upon the request of the SNWA Board of Directors. The initial group of students reported to the Board in January 2000. The Youth Advisory Council is now in its second year, which began in February 2000. The authority has a strong history of commitment to public participation through citizen advisory committees and other venues. The youth of Southern Nevada truly represent the future and the Board felt it was essential that they be included in making decisions that will affect them in years to come.

The goal in developing the Youth Advisory Council was to provide a forum in which the SNWA could receive structured and unstructured input from the youth of Clark County on issues of importance to the SNWA, and on water issues that the youth see as pertinent to this community. The objectives were to: expand the SNWA stakeholder base to include Southern Nevada youth; gather ideas from a youthful perspective; receive input on current SNWA programs; strengthen the SNWA's relationship with the Clark County School District; and offer learning activities and leadership experience for Southern Nevada youth. The Youth Advisory Council was slated to report and bring recommendations to the SNWA Board of Directors annually.

To this end, the principals of every public and private high school in Southern Nevada were asked to appoint a representative to sit on the Youth Advisory Council for one year. Twenty-four schools participated in this second year. The list of 2000-2001 Youth Advisory Council members and their home high schools follows. These students represent some of the best and brightest youth in Southern Nevada. They were selected by their school principals, based on involvement and leadership qualities, as well as an interest in water or environmental issues.

While the primary purpose in forming the Youth Advisory Council was to receive input from local youth, there was also a desire and need to provide some background information and education about water issues so that the input from the youth would be of the highest quality possible. Therefore, the students began their yearlong tenure on the Youth Advisory Council with a 20-hour educational course on local water issues. Through this process, students learned about water conservation, water resources, water quality, the history of water in Southern Nevada and the Las Vegas Wash. They also toured applicable sites, including the Desert Demonstration Gardens, Big Springs (now known as the Las Vegas Springs Preserve), the Alfred Merritt Smith Water Treatment Facility and the Las Vegas Wash.

After successfully "graduating" from their water courses, the students were equipped with knowledge about our local water situation and the challenges that our arid desert community faces in providing high-quality water for its ever-expanding

population. Following this experience, the students were ready to think about the issues and challenges associated with water and determine how they could offer valuable advice and input from their unique perspective. This year's group was asked to address the topics of water quality as it relates to the Las Vegas Wash and water taste. Meeting approximately twice a month from April to December 2000, the students analyzed these two issues. (The meeting summaries are attached as Appendix Six.) They studied, researched and developed the following recommendations for the SNWA Board of Directors. They took their assigned task very seriously and sincerely hope that their unique perspective will be of value as the Board of Directors determines policy direction for the future of our community.

2000-2001 SNWA Youth Advisory Council Member List

<i>NAME</i>	<i>HIGH SCHOOL</i>
Jill Martinez	A-Tech
Jarrold Deangelis	Basic
Teryn Mendenhall	Bonanza
Jack Hardy	Boulder City
Jadah Whigham	Community College- East
Steven Klaassen	Community College- South
Trish Wirig	Centennial
Amanda Morrissey	Chaparral
Jim Carhee	Cheyenne
Janine Peacock	Cimarron-Memorial
Lundyne Sloan	Clark
Cresen Salazar	Durango
Casey Hawk	Foothill
Paula Maffey	Gorman
Chris Young	Green Valley
Ian Narciso	Las Vegas
Sabrina Mills	Las Vegas Academy
Neta Labouz	Meadows
Celestial King	Moapa Valley
William Ma	Palo Verde
Sara Leonard	Silverado
Lenny Endsley	Valley
Andrew Novero	VoTech
Jacob Hicks	Western

RECOMMENDATIONS

Urban Runoff

Environmental issues surrounding the Las Vegas Wash have recently been identified as critical in Southern Nevada. Water quality in the wash, and the quality of the water exiting the wash into Lake Mead, are of concern to the Southern Nevada Water Authority. As a Youth Advisory Council, we were asked to study these issues and develop recommendations to help address water quality concerns as they pertain to the Las Vegas Wash.

We visited the Las Vegas Wash and learned of its role as the only outlet of runoff water for our valley. We learned of the changes and erosion that have taken place in recent years due to increasing wash flows. We learned of the formation of the Las Vegas Wash Coordination Committee to address such concerns and of the efforts they are making to stabilize the wash and re-vegetate wetlands. We know that wetlands can serve to enhance water quality by polishing the flow as it travels through the vegetation. We support the Las Vegas Wash Coordination Committee in their actions to protect and stabilize the wash and wetlands.

In studying these issues surrounding the Las Vegas Wash, we learned of the four flow components that enter the wash. We found that the coordination committee was already taking significant steps to address three of them. The fourth flow component, urban runoff, is very difficult to combat because it does not originate from a single source. In fact, it originates from more than a million sources. It is caused by the everyday actions of residents in our community when they release pollutants in streets and storm drains. These pollutants enter our waterways and create water quality concerns.

Because SNWA has the responsibility to maintain the quality of our drinking water, they also have a vested interest in keeping pollution out of our water sources. We recognize that pollution prevention is being addressed by other agencies; in fact, the Clark County Regional Flood Control District, Stormdrain Plaque Attack Campaign representatives and Clark County Comprehensive Planning helped educate us on this topic. We appreciate and support their efforts. Nevertheless, we feel that SNWA can and should play a role in these efforts as they pertain to reducing the amount of pollution that enters the Las Vegas Wash and Lake Mead. Consequently, we chose to make recommendations to the SNWA Board of Directors that focus on reducing urban runoff.

We as a Youth Advisory Council defined the parameters of our recommendations for urban runoff, as it relates to pollutants in the Las Vegas Wash, with the following problem statement:

How can we develop cost-effective and convenient methods to reduce contamination from urban runoff and encourage the community to use them, in order to protect and enhance water quality in the Las Vegas Wash and preserve wetlands?

Urban runoff is only one of four flow components in the Las Vegas Wash. However, the pollutants that are carried by urban runoff into the Las Vegas Wash and then Lake Mead have the potential for impacting the ecosystem and our water supply. Urban runoff is a non-point flow source resulting from over-watering of landscapes and from surface street runoff. Urban contaminants such as oil, grease, pet waste, household chemicals, fertilizers and pesticides are picked up and carried by this runoff water to the wash, which then empties into Las Vegas Bay and into Lake Mead, our drinking water supply.

This issue is ripe for being addressed. As the population in our community has grown, so have the urban contaminants carried from neighborhoods to the wash. The amount of water in Lake Mead, however, has not increased. Hence, if pollutants in urban runoff are left unchecked, the concentration of pollutants in the water may increase over time, potentially affecting the Las Vegas Wash and Lake Mead.

The Las Vegas Wash is home to a variety of plant and wildlife species. Degrading the water quality in the wash can also degrade the habitats needed for such species. We, as a community, have a responsibility to protect wildlife and maintain the necessary habitat for its existence. To do so, contaminants entering the wash through urban runoff must be reduced.

Animals and birds are not the only creatures that can be affected by urban runoff. Pollutants that enter the wash also enter Lake Mead, the primary source of drinking water for the nearly 1.4 million residents of the Las Vegas Valley. Although the wash water that enters Lake Mead accounts for less than 2 percent of the lake's total volume, any contaminants that enter Lake Mead are of concern and could be detrimental to our own community and millions of users downstream. Our drinking water will always be treated to meet federal standards by the Southern Nevada Water System, but treatment costs often increase along with the concentration of any pollutants. Furthermore, if our community does not voluntarily begin to take actions against the pollutants carried by urban runoff, federal fines and mandates could be imposed on us for clean up.

It is our generation that will have to pay these higher treatment costs and face the consequences of any federal mandates. As a Youth Advisory Council, we don't want this issue to escalate to that level. That is why our recommendations focus on reducing urban runoff at its source: neighborhoods in every part of our valley. We want the community to take actions now in order to protect the Las Vegas Wash and Lake Mead from urban runoff contaminants. We want to encourage residents to change their everyday behaviors and help eliminate the introduction of potential contaminants in our water. The following four recommendations demonstrate our best efforts to accomplish this goal. The first three seek to provide residents with simple and convenient ways to take action, while the fourth is designed to encourage residents, through public outreach efforts, to act responsibly.

Urban Runoff Recommendation #1: Establish Used Paint Recycling Centers

Paint products are one pollutant frequently found in urban runoff. They present a danger to plant and animal life as they reach the Las Vegas Wash and Lake Mead, yet they could easily be kept out of those waters. Residents often buy more paint than they need, then improperly dispose of the remainder in storm drains, gutters or on the ground. We believe that residents do not know how to properly dispose of unwanted paint; if residents were advised of a convenient alternative to dumping it down the drain or on the ground, we believe they would take advantage of that alternative.

We recommend that SNWA partner with local businesses, disposal firms and other government entities (such as the Clark County Regional Flood Control District and the local municipalities) to develop free, convenient opportunities for residents to dispose of extra or unwanted paint. This could be accomplished by instituting paint recycling stations at local hardware, home improvement or other stores that sell paint. Upon purchasing paint, buyers would be given printed information telling them about the pollutants carried by urban runoff and encouraging them to return any unused paint to a recycling station. The station locations would be listed in the printed information and the paint would be picked up periodically from the stations. The paint could then be disposed of properly or perhaps all the remaining paint could be combined and used. The mixture could be donated to a non-profit organization for their use, or it could be used to paint over graffiti throughout the valley.

When given a free, convenient alternative to polluting waterways with paint, we believe residents will use it. We contacted some hardware stores to gauge their reaction to hosting a paint recycling station. The stores were receptive to the idea so long as the paint would be picked up; they do not want to worry about disposing of it themselves. We believe stores could be given additional incentives to participate by using mediums such as bill inserts and other publications to list retail locations participating in the recycling program. (A similar method of publicizing retail locations that accept water bill payments is used by the Las Vegas Valley Water District- see Appendix One.) With this free exposure, we think stores would be willing to host paint recycling stations. A program such as this could significantly reduce the amount of paint products entering the Las Vegas Wash. Thus, the Youth Advisory Council respectfully recommends that the Southern Nevada Water Authority support the establishment and publicizing of paint recycling stations throughout the valley.

Urban Runoff Recommendation #2: Establish a Drop-Off or Pick-Up Program for Used Oil and Antifreeze

Other urban runoff pollutants of great concern are motor oil and antifreeze. As with paint, many residents dispose of used oil and antifreeze in the streets, gutters or storm drains. These contaminants can cause severe environmental damage and threaten wildlife in the Las Vegas Wash. Some locations and methods for proper oil and antifreeze disposal do exist in the valley, but many residents are unaware of the locations and the locations are too few and far between. We believe that if there were convenient, free locations for residents to dispose of these chemicals, or if they could be picked up at homes along with other recyclables, many residents would discontinue the practice of depositing oil and antifreeze in the streets. This would be of great benefit to the wildlife in the Las Vegas Wash and to our water in Lake Mead.

If action is not taken soon to significantly reduce the amount of motor oil and antifreeze reaching the wash, more drastic measures may become necessary. These could include expensive filtration devices in the storm drain systems. We do not want our generation to face such costly requirements.

We recommend that SNWA work with local recycling companies, auto parts stores and car repair shops to establish more locations for free drop-off of used oil and antifreeze. Then SNWA and other agencies could assist in publicizing the drop-off program, notifying residents that such locations exist, and where they are. As with the paint recycling stations, locations participating in the drop-off program could be listed in public information materials. Perhaps incentives could be given for proper disposal of used oil and antifreeze. Since these wastes can be sold for profit by the receiving drop-off location, residents who drop off the chemicals could be given a voucher for discounts on gas or merchandise.

Another proper disposal method for used oil and antifreeze is to capture the wastes in plastic containers (with lids) and leave them for pick up on regularly scheduled recycling days. This program already exists, but few residents are aware of it. If appropriate agencies publicized the opportunity to recycle used oil and antifreeze along with other curbside recyclables, we think many residents would take advantage of this service. Perhaps such pick-up service could be expanded to include paint and other household hazardous wastes. We think another residential recycling bin for such materials (in addition to the existing three for paper, plastic and glass), would significantly increase the visibility (and therefore use) of a recycling/disposal program for household hazardous wastes. We understand that in their other responsibilities as city and county commissioners, the SNWA Board members are involved in franchise agreements with Silver State Disposal Service, Inc., the local recycling company. We encourage the Board members to include our recommendations as they update and renew their contracts with Silver State.

We believe that establishing either more drop-off points for oil and antifreeze, or having them picked up along with other household recyclables, would significantly reduce the amount of motor oil and antifreeze carried in urban runoff. This would in turn protect the Las Vegas Wash and our water supply in Lake Mead. Therefore, the Youth Advisory Council respectfully recommends that the Southern Nevada Water Authority support and encourage the implementation of a more extensive and convenient used oil and antifreeze drop-off or pick-up program.

Urban Runoff Recommendation #3: Encourage Residents to Use Environmentally Friendly Car-Washing Methods

Many residents who wash their vehicles at home also contribute to the pollutants in urban runoff. Solvents and cleaners run into the street and become part of urban runoff. Grease and oil that are washed off also run down the street and contribute to the problem. The water used to wash and rinse the vehicle carries the cleaners, oil and grease, and eventually makes its way into the Las Vegas Wash. On its way to the wash, the water picks up other pollutants from the streets or storm sewers and carries them along as well. To prevent these contaminants from contributing to urban runoff, residents should be encouraged to use proper methods when washing cars at home or to use commercial car-washing businesses.

When washing vehicles at home, certain methods and products can be used to minimize the amount and type of contaminants running in the street and contributing to urban runoff. Residents should be advised of these steps so they can make informed decisions. Using biodegradable soaps and cleaning agents is helpful, as is using a bucket filled with water (or a hose with a shut-off nozzle) instead of leaving the hose running. This not only conserves water, but it also decreases the volume of urban runoff. Additionally, parking vehicles on the grass (rather than on the driveway or street) to wash them can make a big difference. The water and potential contaminants run freely over hard, smooth surfaces, but grass can absorb the water and chemicals, holding most of them in the soil and keeping them from contributing to urban runoff. Guidelines such as these, publicized in outreach materials (see recommendation #4, below), could help residents make decisions that will decrease urban runoff. These guidelines are found in certain publications; we recommend their distribution be increased or the information be included in other publications that have a more extensive distribution. We learned that the Stormwater Committee is developing a manual of best management practices for mobile car washes, including car washes sponsored by school and service clubs. We support and encourage the development, dissemination and use of this manual.

Commercial car washes, as required by law, pipe their used water into the wastewater treatment system rather than having it run down the streets or into the stormdrain system. This means that all of the water and chemicals used at their facilities is sent through the wastewater treatment plants, which remove harmful contaminants before the water reaches the Las Vegas Wash. Additionally, many commercial car washes recycle their water, conserving through reuse. (Mobile car washes, on the other hand, are significant contributors to urban runoff; their water and chemicals are dumped directly onto neighborhood streets.) The amount of runoff would be reduced if more residents used commercial car washes, but they must be given an incentive to do so. First, most residents are not even aware of their contribution to urban runoff through car washing. They need to be told the results of their actions. This can be accomplished through outreach (see urban runoff recommendation #4, below). Second, they need to be told that commercial car washes are linked to the wastewater treatment system (and many recycle their water), thus eliminating the associated urban runoff concerns. Third, they need an incentive to use commercial car washes.

For some, simply knowing the consequences of their actions and how to avoid them will be enough incentive. Information could be printed in public information materials (possibly including water purveyor bill inserts) describing the harmful effects of improperly washing cars at home and listing the locations of commercial car washes that recycle water (see Appendix One). For others, however, a financial incentive may be necessary. Perhaps in exchange for being recognized in a bill insert for recycling water, car washes could provide coupons for free or discounted services. Presumably, as relationships are forged between SNWA and car washes that recycle water, the car washes will receive enough benefits that they will be willing to provide coupons or other incentives to customers.

If residents discontinue incorrect practices in washing their cars at home, harmful pollutants in urban runoff will decrease. But residents must know that there is an environmentally friendly alternative and have an incentive to use it. The Youth Advisory Council thus respectfully recommends that the Southern Nevada Water Authority

encourage residents to use environmentally friendly car washing methods, either by using a commercial car wash or by using improved techniques at home.

Urban Runoff Recommendation #4: Develop a Public Outreach Program to Address Urban Runoff

In this desert community, water is a critical resource. Many residents have come to understand this fact through the extensive SNWA Water Efficiency Campaign launched each year to help achieve water conservation goals. While much of the community has come to realize the need for water conservation, the same is not true of the need to maintain the quality of our water supplies. We feel that residents have little understanding of urban runoff and its effect on the Las Vegas Wash and the potential to affect our drinking water in Lake Mead. We believe that further outreach is necessary to accomplish the three recommendations outlined above and to change the community ethic in terms of urban runoff. If residents are never advised of the effects their everyday actions can have on the wash and Lake Mead, they will continue to unknowingly pollute, threatening wildlife and our drinking water quality. Protecting the quality of our water needs to become as ingrained in the minds of residents as conservation. To do that, money will have to be spent for an outreach program and advertising campaign.

We advocate several methods of outreach to educate the community about urban runoff and encourage residents to take actions to prevent it. We feel it should be made very clear to residents that their behaviors impact urban runoff. As a Youth Advisory Council, we have developed examples of some outreach methods. They are attached as noted.

Outreach example #1: Distribute information about safe disposal methods upon the purchase of potentially hazardous materials.

This method of outreach targets a very specific audience. People who purchase paint, oil, antifreeze and other hazardous chemicals often do not know how to properly dispose of these items. If people were given that information in the form of a flyer or brochure upon purchase of the product, it would be fresh in their minds and we believe most residents would then use proper disposal methods.

SNWA could develop a brochure or flyer that describes the safe disposal methods for all common household/residential chemicals. (The Nevada Cooperative Extension Service has produced a very informative and user-friendly document of this kind, but the distribution is highly limited- only upon call-in request. See Appendix Two.) SNWA could then partner with home improvement centers, auto parts stores and other appropriate retail outlets and have these entities distribute the information with specific purchases. If the flyer or brochure were provided free of charge to stores, we are certain they would cooperate in distributing it. We believe this specific, targeted outreach would be very effective in reducing several pollutants that contribute to urban runoff.

Outreach example #2: Air commercials about urban runoff, featuring local celebrities.

Urban runoff and water quality should become the topics of a new advertising campaign. We think television advertising should be used to educate the public about urban pollution and encourage residents to do their part in preventing it. Television commercials can be a particularly visual and graphic way to show residents how they

contribute to urban runoff. We feel that using local celebrities (such as Andre Agassi) as spokespeople will make the ads more effective.

With this concept in mind, we developed some ad concepts for television. They could be used with or without a famous spokesperson, although we believe they would be more effective if SNWA was able to secure a famous face. A description of one of our ideas follows.

Visual	Audio
<ul style="list-style-type: none"> • Bob wakes up (show feet with slippers) 	Yawning
<ul style="list-style-type: none"> • Walks in the kitchen (Show hand getting a glass and going for the water) 	Shuffling feet
<ul style="list-style-type: none"> • Water comes out dirty 	Water sound from faucet
<ul style="list-style-type: none"> • Rewind: water travels back into the pipe, through the water system, up to the street gutter 	Rushing water sound as it rewinds
<ul style="list-style-type: none"> • Paint travels from the gutter back into the bucket from which Bob dumped it 	Voiceover and on-screen: “You can’t rewind in real life.”

We realize that the above ad showing dirty water coming out of the tap could be misinterpreted. Yet we think this sends a stronger and more effective message than showing pollutants in Lake Mead. We also discussed trying to reach residents by emphasizing that treatment costs will increase as pollutants do, but we came to the conclusion that our transient population would not be affected by a strategy that focuses on long-term consequences.

To make the above ad “air-able,” perhaps it could be shown as a dream sequence or nightmare. Or, the “Ghost of Water Future” could be taking Bob on a journey to see the future consequences of his polluting actions. Another possibility would be to show clean water coming out of the tap, but have Bob get “sucked” into the pipe and watch him travel through the water treatment process, Lake Mead, the Las Vegas Wash and back into the neighborhood where he dumped paint in the street.

Another ad we developed reflects the “Brady Bunch” split screen idea. The message is that many different types of pollutants, caused by many human activities, end up in Lake Mead, which is our source of drinking water. This ad concept could perhaps be used in both print and television formats; a print version is attached as Appendix Three. If used on television, we suggest the following audio be added: “Pollutants from your neighborhood flow to the Las Vegas Wash and Lake Mead. Lake Mead provides 87% of the water for the Las Vegas Valley. DON’T POLLUTE!”

We also think a short “infomercial” (similar to “The More You Know” segments on NBC) could be effective. A celebrity or YAC student could describe a household pollutant that contributes to urban runoff and give directions for proper disposal. A series format could be used to highlight several different pollutants.

Our last television commercial idea is a bit strange, but we think viewers of all ages would stop and watch. In a spoof on *The Blair Witch Project*, a shaky handheld camera would show Deputy Drip being chased by a hand holding a can of oil or other

pollutant. The message would advise viewers to keep all of our water drops clean by not polluting.

Outreach example #3: Advertise in local movie theaters.

In addition to television commercials, we think local movie theaters would provide a very effective venue for advertising about urban runoff and water quality. Unlike television, in which viewers flip through the channels during commercials, residents sitting in a movie theater are a captive audience. Waiting for the movie to start, they sit and watch the advertisements in front of them. The specific audience would vary depending on the movie, but a good mix of ages and socioeconomic status could be reached in this manner.

We did some research and learned that time can be bought for local movie theaters, through several different theater chains. Such ads typically stay on the screen for a set amount of time. We created some concepts for print ads that could be used in movie theaters or other venues. The message we want to convey is essentially “What goes around, comes around.” We want residents to understand that when they pollute our waterways, they are potentially affecting themselves as well as millions of Colorado River water users downstream. Our print ad concepts are attached as Appendix Four.

Outreach example #4: Educate the public about urban runoff through water bill inserts.

Including information about urban runoff and proper disposal methods in water bill inserts would be an effective way to reach a large number of residents at fairly low cost. Because inserts are included already by most local water purveyors, periodically adding urban runoff information would be relatively simple and inexpensive. We recommend that a short article about the harmful effects of urban runoff and how to prevent it be included in water bill inserts three or four times each year. The articles could be rotated for variety. Additionally, a message about urban runoff could be printed right on the bill itself periodically. This would reach those people who may not read the bill inserts, but who look at the bill when they pay it.

Because this method of outreach already exists, we recommend that SNWA encourage local water purveyors to begin including urban runoff information in their bill inserts without delay. With little effort, hundreds of thousands of residents could learn about urban runoff, most of them for the first time. As they are educated, they will become motivated to change their behaviors to protect the Las Vegas Wash and Lake Mead.

Outreach example #5: Establish a water pollution information hotline.

After seeing advertisements about urban runoff and being motivated to protect water quality, residents then need to have a simple way to act on their newfound knowledge. We believe a way to fill this need is through a water pollution hotline for residents to call for more information. The SNWA Conservation Helpline has been very successful in fulfilling this need for water conservation, but we need the same type of service for water pollution. We understand that the Stormwater Committee, Clark County Regional Flood Control District and Clark County Comprehensive Planning have expressed interest in a hotline. We learned of a national hotline, 1-800-CLEANUP, which provides local recycling and disposal information free of charge. Rather than

allocating resources to a new hotline, we recommend utilizing the 1-800-CLEANUP hotline. We feel that publicizing this number with advertisements and public information materials, thereby advising residents of a venue for more information, could be very effective in reducing urban runoff pollution.

Outreach example #6: Inform high school students about water issues and motivate them to protect our environment.

Preventing a behavior before it ever starts is easier and more effective than trying to change ingrained behavior. This is why SNWA has extended such efforts to educate the youth of Southern Nevada about stewardship of water resources (see Appendix Five). We believe these youth education efforts should continue.

Additionally, we recommend that SNWA sponsor a high school environmental activity for students. The activity could take several forms, including an environmental club and/or a “water challenge” or contest each year. Students that join the SNWA-sponsored environmental club would learn about local water and environmental issues and participate in related community service projects. A contest would generate momentum through competition among the high schools. While the competition could take various forms, one idea is to have each school develop a television commercial to educate the public about a water issue. The winning school’s commercial would air on television, bringing recognition to the students and their school.

More students should have the opportunity to learn, as we have, about our local environment and resources. As students learn, they naturally will grow to respect, and thus have a desire to protect, those resources. Providing a venue for such learning, through a school club or contest, would be well worth the benefits received through increased awareness and new advocates. The young people can set the example and become champions for the cause of protecting our water quality and wildlife in the Las Vegas Wash and Lake Mead.

As a Youth Advisory Council, we are concerned about the lack of community knowledge, and therefore involvement, on the issue of urban runoff. We believe that if residents have the proper information, most will act appropriately. It is more efficient and cost-effective to prevent the problems that could be caused by urban runoff rather than clean them up after they have occurred. To make a difference, it is necessary to target the community as a whole. The community ethic about residential water pollution must change. Residents must be informed and understand the consequences of their actions. To do this, a full outreach program is necessary. It has proven effective with water conservation, contributing to a 17 percent reduction in water use over the last several years. It can have the same impact on this issue. As a Youth Advisory Council, we respectfully recommend that the Southern Nevada Water Authority partner with appropriate agencies to develop further outreach to combat urban runoff. We feel this is imperative for a large-scale change in attitude and behavior; outreach is necessary to achieve a reduction in the contaminants carried by urban runoff. Outreach is critical to protecting wildlife and water quality in the Las Vegas Wash and Lake Mead.

Urban Runoff Recommendations Conclusion

Our urban runoff recommendations reflect solutions to the two obstacles that, in our opinion, stand in the way of overcoming this non-point source pollution. The first obstacle is that people do not know about urban runoff and the consequences of their actions. The second obstacle is the need for easy and convenient ways for residents to make behavior changes once they are informed on the issue. For widespread behavioral change, both of these obstacles need to be addressed. Through outreach, the public must be informed and educated about urban runoff. They should understand the choices they have and the resulting consequences. Once residents have this information, they then need to be given a motivation or incentive to act on their new knowledge. We believe this can be accomplished by providing convenient and easy proper disposal methods for hazardous materials. If both information and motivation for the issue of urban runoff are provided to residents of the Las Vegas Valley, the Youth Advisory Council believes success will be achieved in reducing urban runoff pollution.

Water Taste

In 1999, the Las Vegas Valley Water District conducted a customer survey. One of the survey questions sought to gauge customers' attitudes about the taste of their tap water. When presented with the statement "I am satisfied with the taste of my water," 37 percent of residential customers agreed and 38 percent of commercial customers agreed. This statistic, coupled with various customer reports of dissatisfaction with water taste, brought the issue of water taste to the attention of the Southern Nevada Water Authority.

Additionally, a high percentage of Las Vegas residents drink bottled water. The use of bottled water may be linked to reasons other than taste, but flavor is certainly one factor. A related challenge is that many customers associate taste with quality, believing that if they don't like the taste, the water must not be safe to drink. This is another reason many residents choose to drink bottled water.

These concerns about customers' lack of satisfaction with water taste prompted the Southern Nevada Water Authority to ask us as a Youth Advisory Council to study and address this issue. To do so, we explored the following question:

How can we improve the public's satisfaction with the taste of our water here in Southern Nevada?

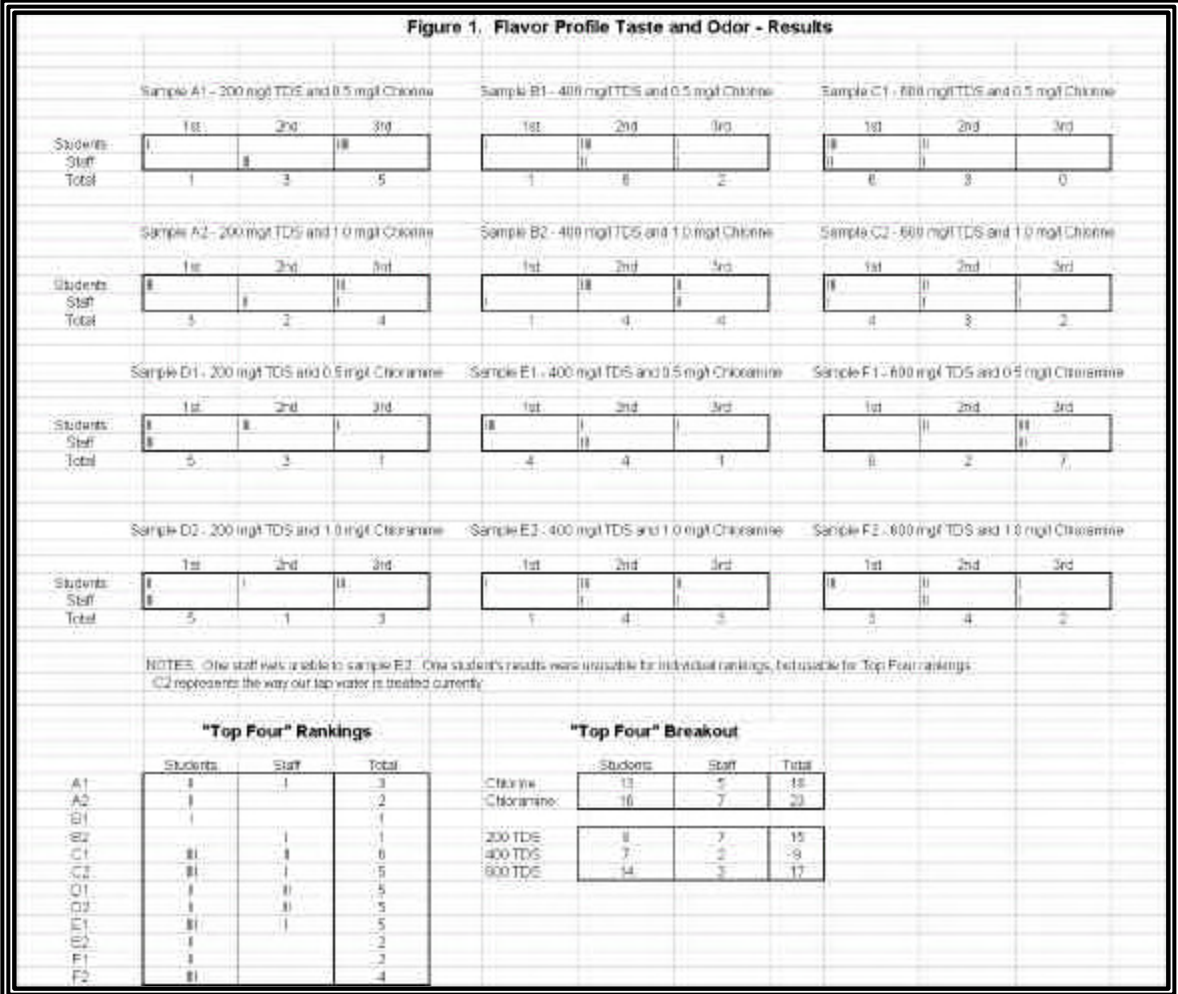
Our original intent was to study different treatment options that would alter the taste of our finished tap water, and then recommend one or more of those treatment options with the goal of improving taste. To move in this direction, we participated in a Flavor Profile Taste and Odor Test as part of a regular Youth Advisory Council meeting on September 7, 2000. Figure 1 provides a summary of the results from this test.

Seven students, two SNWA staff and the Youth Advisory Council facilitator undertook the test. In summarizing the test results, we have cited the two staff and facilitator as "staff" in Figure 1. The test was coordinated and monitored by technical staff from the Southern Nevada Water System (John Fronk and Rebecca Colgate).

The test required each individual to smell and taste 12 separate water samples. Samples were organized on the basis of their chlorine or chloramine concentration, as well as their level of total dissolved solids (TDS). Concentrations of 0.5 and 1.0 milligrams per liter were used for both chlorine and chloramine. For TDS, three levels of solids were used – 200, 400, and 600 milligrams per liter. The resulting samples were organized for the test into four groups, as follows:

Sample Code	Content	Capital Cost	Customer Monthly Cost (% increase)
A1	0.5 mg/l chlorine 200 mg/l TDS	\$680,000,000	21.1%
B1	0.5 mg/l chlorine 400 mg/l TDS	\$680,000,000	20.8%
C1	0.5 mg/l chlorine 600 mg/l TDS	none	none
A2	1.0 mg/l chlorine 200 mg/l TDS	\$680,000,000	21.1%
B2	1.0 mg/l chlorine 400 mg/l TDS	\$680,000,000	20.8%
C2	1.0 mg/l chlorine 600 mg/l TDS	none	none
D1	0.5 mg/l chloramine 200 mg/l TDS	\$682,000,000	21.35%
E1	0.5 mg/l chloramine 400 mg/l TDS	\$682,000,000	21.05%
F1	0.5 mg/l chloramine 600 mg/l TDS	\$2,000,000	.25%
D2	1.0 mg/l chloramine 200 mg/l TDS	\$682,000,000	21.38%
E2	1.0 mg/l chloramine 400 mg/l TDS	\$682,000,000	21.08%
F2	1.0 mg/l chloramine 600 mg/l TDS	\$2,000,000	.28%

Each sample group of water was sniffed and tasted “blind” – that is, the individual taking the test was not aware of the contents in the sample. Everyone tested their respective four groups of three samples this way before any discussion took place, or the contents and treatment cost were revealed by technical staff. The test participants were asked to indicate their order of preference for the samples in each group – “1” for first choice, “2” for second choice, and “3” for last choice. After all four groups had been tested, the participants were then asked to identify their top four “favorite” samples (in order of preference) from all 12. To ensure the integrity of each taste and smell test, technical staff provided the participants with salt-free crackers and a glass of plain water (the “blank”) to help rinse the palate after each sample was tested.



Given the small sampling size (7 students and 3 staff), the test results are not statistically meaningful. However, the results do have qualitative value and are useful as a basis for discussion of the larger issues relative to taste and odor in the water supply. Our observations and recommendations are based on the above results (which are interpreted below) and our subsequent discussion.

We began this process with the assumption that we could “improve” water taste. These results, however, seem to indicate that it is not possible to improve taste- just alter it. We thought there would be a clear preference for one type of water, but according to this test, few individuals have the same water preferences, and where preferences were identified, they were polar opposites (e.g., just as many people preferred high TDS water as low TDS water). This conclusion led us to observations and recommendations that we had not originally anticipated, but that we believe provide valuable insight and direction.

Interpretation of Results in Figure 1

- Overall, the students preferred two types of water. The first is water with a high TDS level and chlorine (samples C1 and C2 had a combined score of 10 first place hits in the testing). The second is water with a low TDS level and chloramine (samples D1 and D2 also had a combined score of 10 first place hits in the testing). In both instances, it also appears that a smaller concentration of chlorine or chloramine is somewhat preferred. This is deduced by combining and comparing the 1st and 2nd place scores of C1 and C2, respectively, and of D1 and D2, respectively. The results show that a 0.5 mg/l concentration of chlorine is favored over a 1.0 mg/l concentration by a vote of 9 to 7. Similarly, a 0.5 mg/l concentration of chloramine is favored over a 1.0 mg/l concentration by a vote of 8 to 6.
- The least favored water samples were F1 and F2, A1 and A2, and B1 and B2. The highest overall negative ranking was for F1, a sample with high TDS and low chloramine. This was closely followed by samples with chlorine and low to moderate TDS. We deduce this by comparing the 3rd place scores, and by combining and comparing 2nd and 3rd place scores.
- Aggregating the “top four” selections produces some interesting patterns. In general, the moderate TDS samples are less favored than the low and high TDS samples, which are favored almost equally. The students clearly preferred samples with high TDS (14 “top four” selections fell into the 600 mg/l range, compared to 7 and 8 for the 400 and 200 mg/l ranges, respectively). Conversely, staff favored samples with lower TDS by almost 2 to 1 over samples with high TDS. Most importantly, the distribution of “top four” samples – both from the students and staff – was essentially equal between chlorine and chloramine samples (13 to 16 for students, 5 to 7 for staff). In other words, chloramine was numerically favored, but not by much.

Water Taste Recommendation #1: Conduct a Statistically Valid Taste Survey

First, we acknowledge that the test data were insufficient. We recommend that SNWA, through its technical staff at SNWS, initiate a statistically valid taste survey within the Las Vegas Valley, to ascertain more accurately how the public feels about the various options potentially available to our local treatment facilities. The survey would provide more data relative to chlorine/chloramine/TDS concentrations, and should provide a firmer basis for conclusions about potential treatment techniques.

Having said that, however, we believe the costs associated with chloramine treatment are extremely high. Given our experience in the flavor profile analysis and the relative similarities we found between chlorinated water and chloraminated water, we question the utility of spending millions of dollars for chloramine treatment, only to impact marginally the taste and odor question. Furthermore, our data indicate that the form of disinfection may be less relevant to the taste issue than the particular mix of disinfectant and level of TDS in the water. In terms of balancing costs and benefits, it may be more advantageous to study how to balance the mix of chlorine and TDS more effectively, than to consider an entirely new treatment process based on chloramines. (Of course, this begs the question of long-term regulatory requirements for trihalomethanes – a factor that, admittedly, should be considered as part of the overall cost/benefit matrix.)

Water Taste Observation: Satisfaction with Water Taste is Linked to Length of Residency

Based on our flavor profile test and subsequent discussion, we believe the taste of local water is influenced by how long the consumer has lived in the Las Vegas Valley. In other words, long-time residents generally view the taste and odor as tolerable, if not preferable. Conversely, people who have recently moved to the valley typically view the water's taste and odor as unacceptable, particularly if the TDS/chlorine content is different than the water they drank at their former home.

If our observation is accepted, it is reasonable to conclude that, given the tremendous population growth in Southern Nevada during the last 10 years, many of these new residents will not like the water. It is also reasonable to assume that these people may acclimate to the water over time, particularly if they are constantly informed and reassured that the water is safe and potable. If population growth ever slows down, the ratio of new to existing residents will be altered and eventually water taste may no longer be a concern. Additionally, the new Millennium Scholarship is now providing incentives for young people to stay in the area.

This observation (if it holds true with a larger, statistically valid sample), puts water taste in a new perspective. It suggests that water taste is not necessarily an issue or problem, simply a matter of acclimation that will solve itself in time.

Water Taste Recommendation #2: Educate Consumers about Water Taste and Quality

Rather than spending money on enhanced water treatment (which is not likely to produce a net increase in satisfaction with tap water), we recommend the continued spending of funds to rehabilitate tap water's image. Consumers need to receive the real facts about tap water, and they should have a basic understanding of the factors affecting local water taste (including the natural minerals that cause hardness and chlorine used in treatment).

We acknowledge that the Southern Nevada Water Authority and its member agencies currently make efforts to educate customers through annual water quality reports and other outreach materials relating to water quality and taste. We support their efforts and encourage them to continue. Perhaps an upcoming focus could be to promote the existence and accessibility of such informational materials. Each customer receives a water quality report in the mail every year, but we believe few of them read it. SNWA's member agencies have made the necessary information available; now the challenge is to have it used by customers. If customers will take that step, they will then have complete

and accurate information about water taste and quality, rather than the sensationalized rumors occasionally spread by the media.

We believe that consumers should have the opportunity to receive and understand complete and accurate information. This would require SNWA to continue to make a concerted effort to educate local residents on the issues of water taste and quality. Several strategies could be used to further educate consumers; a few of our suggestions follow.

Education example #1: Publicize “consumer tips” for drinking tap water.

As members of the Youth Advisory Council, we learned some interesting tips that can improve the taste of tap water after it has reached customers’ homes. For example, refrigerating water in an open glass container can reduce the taste and odor associated with chlorine. Chilled water tastes better to most people and the chlorine gas dissipates when water is stored in an open container. If shared with (and used by) consumers, drinking water tips like these could be successful in improving tap water’s image. More people may drink tap water if they try these tips and find them helpful.

Education example #2: Give consumers the facts about bottled water vs. tap water.

Most Las Vegas residents drink bottled water. That is their choice, but we believe that choice should be based on facts. We were surprised to learn that bottled water is less regulated than tap water. Bottled water is not necessarily “safer” or “healthier” than tap water, but most people think it is. Las Vegas residents (and tap water’s image) could benefit from a widespread dissemination of facts that compare bottled water to tap water.

Education example #3: Air “water taste challenge” commercials.

After conducting blind taste tests throughout the community (as recommended above), we suggest the results be shared with residents. This could be done through a “water taste challenge” commercial, using the Pepsi Challenge idea that has aired recently. This would be a good way to make the community aware that water taste may be primarily about perception. It might also motivate them to seek out the true facts about their tap water.

Education example #4: Bottle tap water.

Many preconceived notions exist about tap water. Regardless of any taste, odor or appearance, some customers may dislike tap water simply because it comes out of a faucet. A possible method to combat this would be to bottle tap water and distribute it at special events or other appropriate occasions. Consumers will receive a bottle of water, and then see on the label that it is simply local tap water contained in a bottle. They may find that it tastes fine when drunk out of a bottle, thus destroying their preconceived negative notions about tap water.

Water Taste Conclusion

Water taste is an issue of perception and expectation. Tap water clearly has an image problem. One Youth Advisory Council student provided a great case study of this image problem. His family has a cabin in the mountains and they think the tap water there is excellent, but they won’t drink tap water at their home in the Las Vegas Valley. As a

Youth Advisory Council, we speculated that they liked the cabin water because of the mountain atmosphere, not because of any real taste preference. So, the student gave his family a blind taste test consisting of local tap water, their cabin tap water and water from a reverse osmosis home treatment system. Without knowing what the samples were, and not being influenced by “atmosphere,” the family members could not detect a difference between the three water samples. Clearly, perception plays a significant role in the public’s satisfaction with water taste.

We believe more taste tests should be done and (assuming those tests concur with our smaller sample) the issue should be addressed at the perception level, through education, rather than at the treatment level. As discussed above, our taste test and analysis indicate that any change in treatment will make water better tasting for some people while making it taste worse for others. For still others, treatment won’t make any difference because it will still have the stigma of being tap water.

We believe local tap water’s image problem will diminish in time as population growth slows and more residents have spent significant time in the Las Vegas Valley. However, this may not hold true if residents continuously drink bottled water. If they don’t drink tap water, they will never acclimate to it. Bottling tap water could be a good way to break this cycle. In the meantime, consumers' concerns and false beliefs about tap water can be addressed through public education efforts. Residents should have the information they need to make fact-based decisions about their drinking water.

APPENDICES

LVVWD example of publicizing the location of services (Appendix 1)

Disposal of Household Hazardous Waste- NV Cooperative Extension fact sheet (Appendix 2)

Urban runoff television ad concept (Appendix 3)

Urban runoff print ad ideas (Appendix 4)

H₂O University (SNWA youth education program) brochure (Appendix 5)

2000-2001 YAC meeting summaries (Appendix 6)