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Taming the waters that taketh from the devil's playground: A history of flood control in Clark County, Nevada, 1955-2010

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TAMING THE WATERS THAT TAKETH FROM THE DEVIL'S PLAYGROUND:

A HISTORY OF FLOOD CONTROL IN

CLARK COUNTY, NEVADA,

1955-2010

by

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A thesis submittal in partial fulfillment of
the requirements for the

Master of Arts in History
Department of History
College of Liberal Arts

Graduate College
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THE GRADUATE COLLEGE

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Jarvis Marlow

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May 2011

ABSTRACT

**Taming the Waters that Taketh from the Devil's Playground:
A History of Flood Control in
Clark County, Nevada,
1955-2010**

by

Jarvis Marlow

Dr. Eugene Moehring, Examination Committee Chair
Professor of History
University of Nevada, Las Vegas

The Las Vegas valley is the driest metropolis in the United States, with an annual rainfall of less than five inches. A large majority of the annual precipitation occurs between May and September in the form of high intensity thunderstorms. Since the founding of Las Vegas in 1905 until the formation of the Clark County Regional Flood Control District in 1986, the five jurisdictions that make up the Las Vegas valley: Las Vegas, North Las Vegas, Henderson, Boulder City, and Clark County, struggled to manage stormwater. The principal defect was that they reflected the particular whims of each government entity, largely ignoring the nagging geologic characteristics that made the valley so susceptible to flooding. Often, dikes and flood channels built in one city were not integrated with those in the adjoining city. After devastating floods in 1983 and 1984 exploited the gaps in the “patch-work” flood control system, a group of progressive minded politicians, engineers, and citizens aggressively campaigned for the formation of a regional flood control district. In 1986 Clark County residents approved a one-quarter of one-percent sales tax increase for the funding for the flood control district. Over the past quarter-century, the Clark County Regional Flood Control District funded a network

of detention basins and flood channels throughout Clark County, which helped manage the massive physical expansion of the Las Vegas valley in the 1990s and early 2000s.

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ACKNOWLEDGMENTS

I made my way to Las Vegas in 1994 on an athletic scholarship to swim for the UNLV Men's Swim Team. After my athletic eligibility was completed in the spring of 1998, I had one semester to complete my Finance degree. The scholarship required that I enroll in a full class load, which gave me the opportunity to take a few optional courses. One of those classes was Dr. Eugene Moehring's History 102. He always commented on me being a swimmer and constantly worried that my skill set was not made for a degree in History. For the first time in my college career something did not come easy. I was hooked! After graduating in the fall of 1998, I continued to enroll in Dr. Moehring's courses, and he continued to question me on my decision to pursue a History degree. Fortunately for Dr. Moehring, my professional life and new family forced my continuing education to take an indefinite hiatus. Then in 2004, a former swim teammate, then working for the Liberal Arts academic advising department called with great news; UNLV was expanding its distance education program. This meant I could continue my love for history and not jeopardize my professional career. In 2005, I completed a second undergraduate degree in History.

Then in the fall of 2006 I began the slow process of taking graduate courses. I am thankful for Dr. Andy Kirk, Dr. Andy Fry and Dr. Elizabeth Fraterrigo for their encouragement during my early semesters. Also, I am grateful to Dr. Barbara Brents from the Sociology Department for her assistance with unrelated research endeavors during my graduate program, and especially for being my Graduate Faculty Representative.

With two young children, a wife that has transitioned to a stay-at-home-mother, multiple church responsibilities and a full-time career, I have never been a traditional

graduate student, a fact Dr. Moehring continued to point out over the years as potential road blocks for my success. In addition, he made sure I knew how much weight I had gained since 1998. Nevertheless, I am very grateful to Dr. Moehring, he is an honest mentor, who has continued to challenge my writing and research skills.

As I began researching topics for a seminar paper in late 2008, Dr. Moehring and I discussed various themes around western United States infrastructure. My professional and personal commitments required that I stay in Southern Nevada. Subsequently, Bruce Woodbury, a long time Clark County Commissioner and known as “The Father of Flood Control” was in the news during this period; he had reached his term limit after nearly thirty-years in the county commission. After meeting with Mr. Woodbury in early 2009, I knew the history of flooding and flood control in the Las Vegas valley could provide enough information for a seminar paper. Dr. Moehring and I discussed my research over this period and he encouraged me to explore flood control as a potential thesis topic. I appreciate Dr. Moehring’s recommendations and assistance in filling in the gaps about Las Vegas history that provided extra depth to the flood control story.

Outside of UNLV, I would like to thank the staff of the Clark County Regional Flood Control District, especially Gale Frazier, the district’s general manager, for answering emails and walking me through the processes of funding and executing a construction master plan that will take over sixty years to complete. Also, special thanks goes to Kevin Eubanks, the assistant general manager, and Tim Sutko, the senior hydrologist, for helping me to understand the changing technology in flood forecasting, flood insurance standards, and the communities early warning system. I especially appreciate Betty Holister and KerriAnne Mukhopadhyay, from the district’s public

relations department. They provided me with countless images and marketing material. It was also a wonderful gesture on their part to interview me about the history of flooding in Clark County for the district's public service television program entitled "The Flood Channel."

I want to thank all the individuals who allowed me to come into their homes and businesses to discuss their role in flood control: Bruce Woodbury, M.J. Harvey, James "Jim" McGaughey, Virginia Valentine, Jay Bingham, Judie Brailsford, Paul Christensen, Sen. Richard Bryan, Danny Thompson, Mike Mansfield, Brent Leavitt, Irene Porter, Norma Cox, Peter Jackson and Robert Lewis. For the two vital members of the flood control campaign that passed away prior to this project; I would like to express my appreciation to Ann Zorn and Manuel "Manny" Cortez.

My mother and father were great inspirations in this matter and provided words of encouragement and support during this process. Finally, this thesis would not have been possible without my best friend and eternal partner's dedication to our family. My beautiful wife has supported me during the many hours of research, transcribing interviews, and writing the final body of work. To my children, Novalee and Van, I am grateful to them as well, especially for allowing dad to type and not draw on his "important papers."

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CHAPTER I

INTRODUCTION

“Noah didn’t fool around when God gave him news that it was going to rain, he had better build an ark. Unfortunately, Clark County gets no warning when it’s going to flood.”¹



Figure 1. July 3, 1975 Caesars Palace Flood
(image courtesy of CCRFCD)

¹ Laura Wigard, reporter, *Las Vegas Review Journal*. August 24, 1986.

February 9, 2009 was a cold damp Monday morning in Las Vegas. So when Gale Frazier heard from his public relations manager Betty Hollister that not one local media outlet called for his opinion nor was one complaint received from a private resident, he was ecstatic. Frazier, the General Manager of the Clark County Regional Flood Control District (CCRFCD), expected a full morning covering calls about the previous weekend's heavy rainfall. During his twenty-one years working on flood control in Clark County, it was the first time no one had questioned the effectiveness of the county's flood control plan.

The CCRFCD is twenty years into completing the flood control master plan, with another thirty-years required to build out the current system of detention basins and channels. But already Las Vegas is experiencing far fewer flood problems than in previous decades. In fact, 2003 was the last deadly flood event not contained by the regional flood control system -- "a success," Frazier noted in a 2009 interview, "that all Southern Nevadans should celebrate." This is a far cry from the early 1990s when residents mocked the District's master plan for being, "just a day late and dollar short." As far back as 1959, when the first regional flood control measures were proposed for Clark County, residents continued to suffer because of the mismanagement of funds, lack of cooperation between the towns in the county and lax building code enforcement.²

It can be difficult for new residents to see flood control's benefits, given that the last major storm to cripple the region came in 2003. The region experienced a massive thunderstorm in August 2007 that produced the same intense runoff as the 2003 storm,

² Gale Frazier, Clark County Regional Flood Control District - General Manager, interview by author, tape recorded, Las Vegas, NV., February 13, 2009. Quoting Marian Timmerman, Las Vegas resident whose in 1990 friend was swept into a flood channel at the intersection of Topaz Street and Russell Road. "Flood projects chase decades of neglect Projects OK'd along washes." *Las Vegas Review Journal*, August 11, 1991. 1A

but was subsequently contained by the region's flood control system. In addition, Las Vegas is the driest metropolitan area in the nation, with the lowest annual precipitation rate of four inches. Not surprisingly, over Las Vegas' one-hundred-year history there have been residents, developers and even city planners who actually scoffed at the notion that it could flood in Southern Nevada.

This thesis traces the history of flooding in the Las Vegas valley and the vital role comprehensive regional flood control planning has played since the creation of the CCRFCD in 1986. More specifically, this work looks at the District's management, construction, and community involvement since 1987 and what is planned for the coming decades to protect current and future residents. It will also explore the ramifications of CCRFCD's fiscal and managerial success, which made it one of the preeminent land-use agencies in the West and one that prompted other cities like Denver, Phoenix, Riverside, and Albuquerque to adopt many of the District's best practices. At the federal level, the Federal Emergency Management Agency (FEMA) itself has been relying increasingly on the modeling and engineering from Clark County to support its own flood plain mapping. FEMA currently borrows or recruits CCRFCD and local flood control staff to assist other communities, especially in the South, to adopt regional building standards and stormwater conveyance systems to manage 100-year flood events, while preparing the citizens for the possibility of 200 and 500-year flooding events. This paper's final section will discuss the expanding role of CCRFCD to support the various environmental and sustainability agencies in Southern Nevada.³

³ The term "100-year flood (event)" will be defined further in the piece; however, it is important for the reader to understand the phrase is a statistical benchmark for a given region's probability of receiving a major flooding event in a given year. Peter Jackson, Senior Engineering Associate, City of Las Vegas Flood Control. Interview by author, March 25, 2009.

Successful flood control is not measured by stopping stormwater from entering an urban community; it comes from managing the water flow once it enters the network. Whether it is rivers and streams, pipes and culverts, or channels and detention basins – management of rain water in urban networks can be complicated by developers and city planners adopting standards without answering two vital questions: why does it flood, and where does it flood? For eighty-years, prior to the formation of the CCRFCD, Las Vegas developers and planners largely failed to address these questions.

Records of flooding in Southern Nevada date back to the late 1800s, with the first official accounts coming shortly after the city’s birth in 1905. But it was not until a series of deadly floods in the mid-1950s that local officials and urban planners began to realize that earlier flood control measures, which relied on lessons learned from river flooding in the East, failed to protect property and lives, as Las Vegas began to leapfrog washes that once lay beyond the city limits. As the town grew into a vibrant metropolis with a dense commercial corridor and radial residential growth patterns, the community developed separate work-life environments that straddled natural flood plains. The creation of the CCRFCD in 1986 facilitated the rapid physical expansion of the community’s network in the 1990s up through present day by controlling and isolating flood waters in a regional system of detention basins and conveyance channels, allowing for growth to occur in expansive floodplains once designated as uninhabitable. Thanks to funds generated from one-quarter of one percent of the sales tax collected in Clark County since 1987 the CCRFCD manages flooding hazards through land-use controls, floodplain management, and revising the system’s construction “Master Plan” every five years, which allows for refocusing efforts per current development needs.

This thesis traces the evolution of the community's flood control practices following the massive 1955 flood, first, with the passing of the Nevada Revised Statute 543 (NRS 543) in 1959 which established flood control policies at the state level. This law mandated that Nevada cooperate with the federal government to prevent loss of life and property, disruption of commerce, interruption of transportation and communication and waste of water resulting from floods. In that same year the United States Army Corps of Engineer released its *Report on Survey for Flood Control: Las Vegas Wash and Tributaries*, which depicted a community paralyzed by a reliance on federal funding. In 1962 local leaders proposed funding the Corps' master flood plan, but voters rejected that bond issue, resulting in three decades of reactive flood control measures. This work will show that the failure to adopt the Corps' plan in the early 1960s allowed the CCRFDC in 1987 to implement a different and more effective plan that promoted the compact and uniform physical expansion of the Las Vegas metropolitan area during the late 1980s, 1990s, and early 2000s. Emphasis will be placed on the small group of politicians, planners, private citizens, and businessmen who brought the community together in 1986 to approve a sustainable funding mechanism for regional flood control. Finally, the work will explore the success of the District's fiscal policies, mission for the future, and its cooperative efforts with FEMA, Southern Nevada Water Authority, and other environmental agencies to protect people, property, and most importantly, the region's water supply.⁴

⁴ Gale Frazier, Clark County Regional Flood Control District - General Manager, interview by author, tape recorded, Las Vegas, NV., February 13, 2009. "Flood Hazard Analyses – Las Vegas Wash and Tributaries: Special Report – History of Flooding, Clark County, Nevada 1905-1975," provided by CCRFDC (document available on CCRFDC website), 1. NRS 543.020 Declaration of Policy found on the world wide web at <http://www.leg.state.nv.us/nrs/NRS-543.html>.

The Las Vegas Valley

In the past four decades the Las Vegas valley has experienced hyper-growth in its population, economy, and physical layout. From 1986 to 2006 Las Vegas consistently ranked as the fastest-growing metropolitan area in the United States. In the late 1990s, Henderson and North Las Vegas were among the top five fastest growing cities in the nation. Estimated to now host over 2 million inhabitants, Clark County's population doubled every decade after Las Vegas's founding in 1905. Embodying western expansion through urban-suburban sprawl, the Las Vegas metro area consists of the cities of Las Vegas, Henderson, North Las Vegas, Boulder City, and unincorporated county lands that include the world famous Las Vegas Strip and its suburbs. The metro area covers 600 square miles of the Mojave Desert and claims nearly every open piece of land from the Spring Mountains in the west, to the Sheep Mountain range in the north, Lake Mead to the east, and the growing area heading southward along Interstate 15 toward the California state-line. Most of this land hosts single family neighborhoods and small to medium commercial complexes.

Unfortunately for urban planners, Las Vegas is the most geographically isolated metropolis in the continental United States, unlike earlier growth patterns seen in Los Angeles, Seattle, and San Francisco that resembled spokes on a wheel. With outer communities connected by transportation and freight lines, Las Vegas developers designed an urban network that grew by layers. Infrastructure costs tied to drilling through the desert's hard *caliche* soil virtually prohibited the development of large home tracts miles beyond the existing network that were typical of other western metropolitan areas. Even today, prime real estate in the valley sits on the ever expanding edge of the

urban network. Consequently, the region's growth pattern since the 1950s has primarily remained radial.⁵

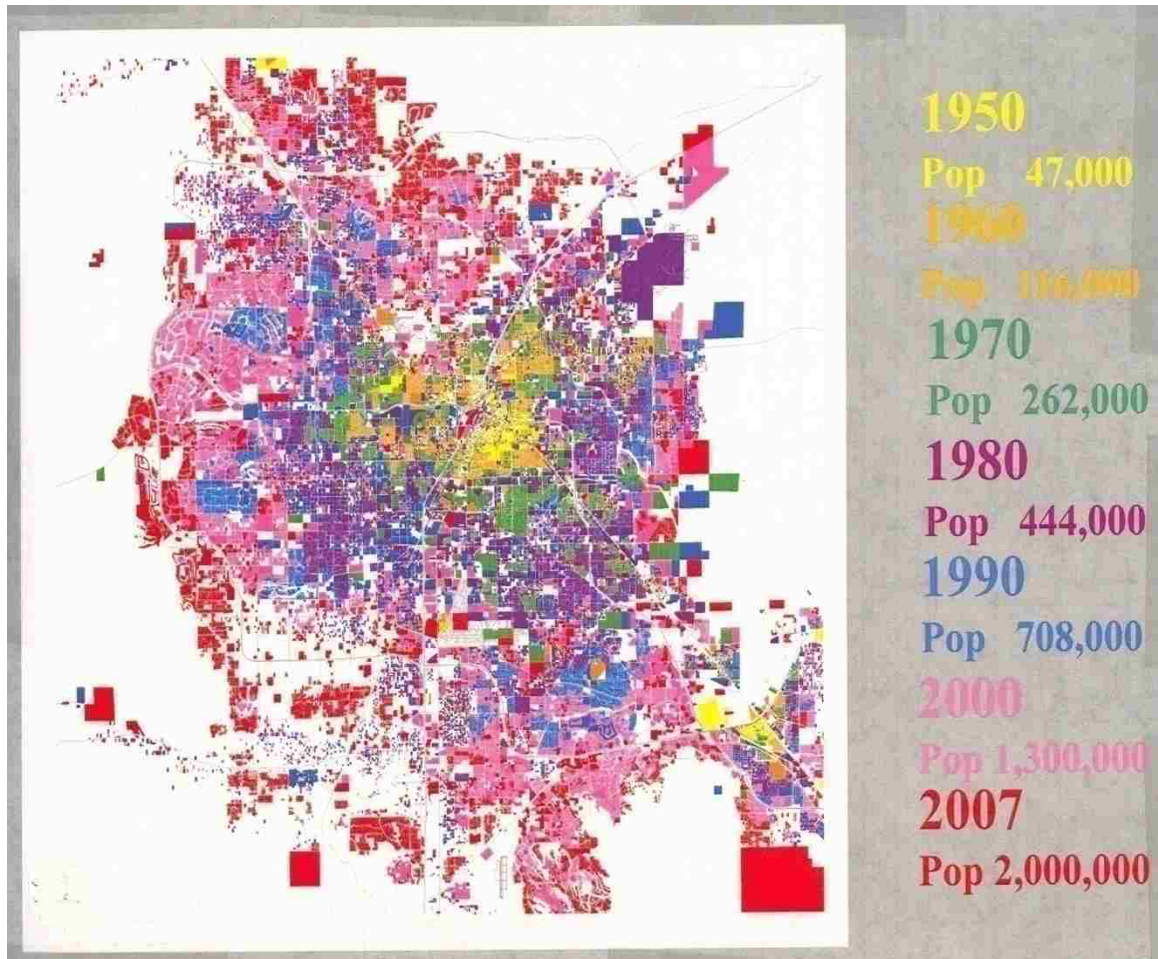


Figure 2. Color representation of population growth in Las Vegas valley
(Courtesy of Clark County Regional Flood Control District)

With no local commercial hubs, the community has fanned out from the central resort corridor into suburbs (fig 2). As land in the core began selling for higher prices in

⁵ Kay Bandlely, 50 year Las Vegas resident and residential home builder from the 1950s through the 1990s. Interviewed by author, transcript, Las Vegas NV., April 12, 2009. Gale Frazier, Clark County Regional Flood Control District - General Manager, interview by author, tape recorded, Las Vegas, NV., February 13, 2009.

the 1950s and 1960s, commercial and residential developers expanded outward to the virgin desert – a process that has continued until this present day. Early development off Fremont Street in downtown Las Vegas headed eastward along Charleston Boulevard to Sunrise Mountain, and along the Boulder Highway as well as westward up to and beyond Decatur Boulevard and later Summerlin master planned community. Thanks to the Strip's growing influence, residential and commercial growth east of the great resorts traveled southward along Maryland Parkway, Eastern Avenue, and other thoroughfares until the late 1980s when the development of Green Valley finally linked Las Vegas and Henderson population clusters. By the 1990s the valley's southern rim experienced massive expansion with Summerlin in the west and Anthem and Seven Hills in the east, Southern Highlands, Mountains Edge, Rhodes Ranch, in the south. More recently, North Las Vegas has enjoyed growth along the northern beltway, which connects the communities of Centennial in the northwest and the master planned community at Aliante in the far north, to Interstate 15 and U.S. 95.

The Land

Flood hazards in the arid Southwest are created when the land is altered by surface paving, homes, and developers changing the land's natural elevation. If the land has been desert for thousands of years, and suddenly driveways and streets are introduced where rain waters once flowed, the water will find new places to travel, not respecting property or jurisdiction boundaries. Less than an inch of rain on the desert floor can be

deadly if it comes in the form of a high-intensity, isolated thunderstorms, which are commonly called micro-bursts or micro-cells.⁶

The topography of the Las Vegas metropolitan area is such that it is situated in a natural depression, which is commonly referred to as “a bowl turned on its side.” When stormwater, irrigation, commercial water run-off, and the nature stream systems enter the valley it becomes part of the region’s watershed. Clark County has ten watersheds, the Las Vegas valley watershed covers the greatest area.⁷ This thesis will primarily focus on the Las Vegas valley watershed (fig 3), which ranges in elevation from 12,000 feet at the peak of Mt. Charleston to 1,500 feet above sea-level at Lake Mead. To the west, the valley is bordered by the Spring Mountains, which are 3,000 to 12,000 feet tall, and to the north by the Ground Gunnery Range, whose peaks rise above 7,000 feet. The Black Mountains comprise the valley’s southern rim while Sunrise Mountain serves as the eastern boarder.

The Las Vegas valley watershed area is approximately 1,520 square miles; its washes and stormwater channels drain through the urban core into the Las Vegas Wash southeast of metro area. All the washes are fed by urban runoff, shallow groundwater, reclaimed water and stormwater. The Las Vegas Wash, which is classified as an urban river, includes a wetlands area that historically has been the “kidneys” of the local environment -- cleansing the water that flows through it, filtering out harmful residues from fertilizers, oils, and other contaminants. The Las Vegas Wash is twelve miles long

⁶ “Cooperation Urged to Curb Drainage Woes” *Las Vegas Review Journal*, October 14, 1986. Gale Frazier, Clark County Regional Flood Control District - General Manager, interview by author, tape recorded, Las Vegas, NV., February 13, 2009.

⁷ Lake Mead, Grand Wash, Lower Virgin, Muddy, Meadow Valley Wash, Las Vegas Wash, Havasu-Mohave Lakes, Piute Wash, Sand Spring-Tikaboo Valleys, Ivanpah-Pahrump Valleys. http://cfpub.epa.gov/surf/county.cfm?fips_code=32003

and empties into Lake Mead. In the metro area there are eight major washes that feed into the Las Vegas Wash; Central, Lower Wash, Duck Creek, North Basin, Range Wash, Gowan, Pittman Wash, and the two largest, the Flamingo and Tropicana Wash (fig 4).⁸

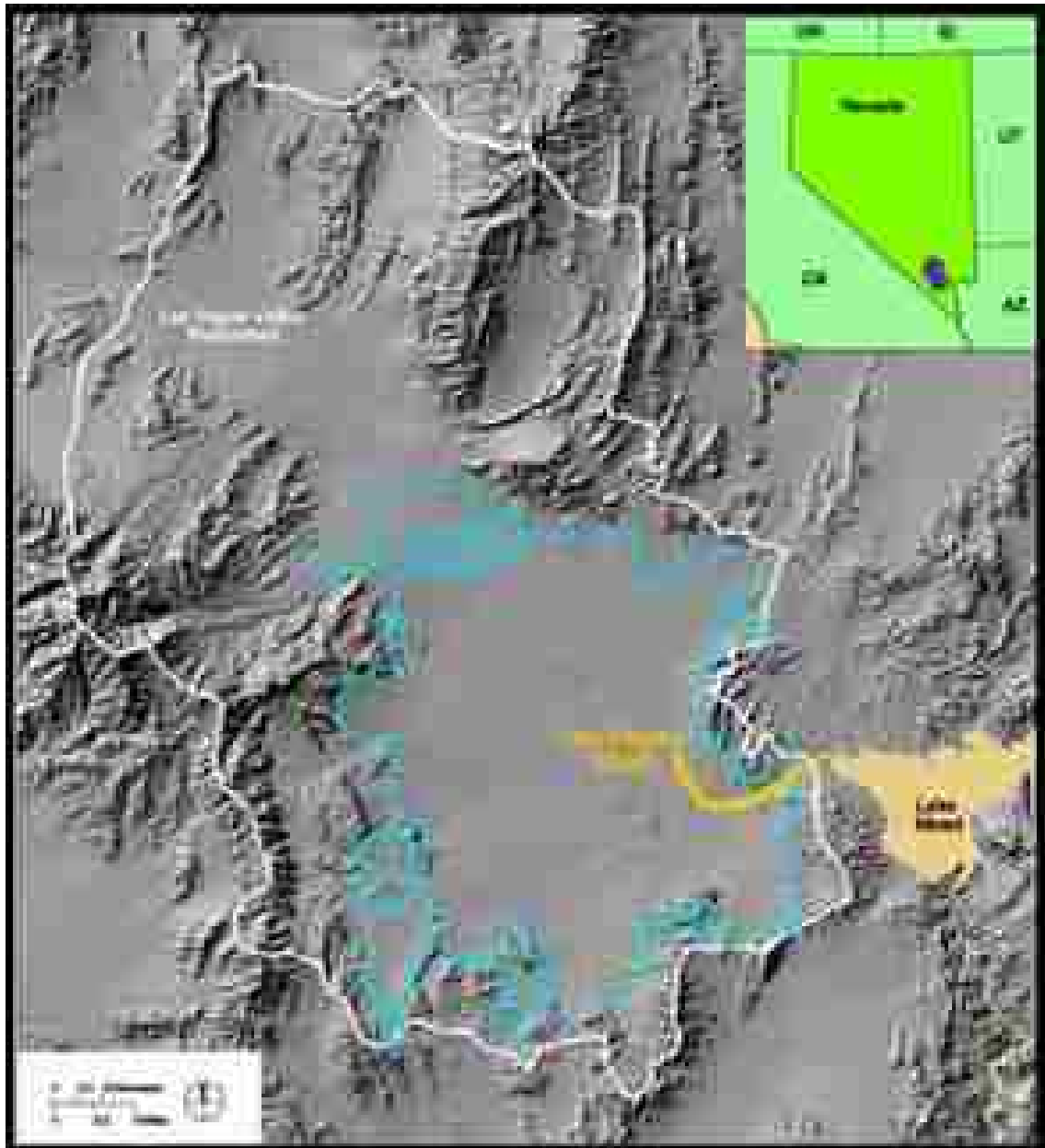


Figure 3. Out line (white) of the Las Vegas Valley Watershed.⁹

⁸ Las Vegas Wash Coordination Committee http://www.lvwash.org/html/what_chrono.html

⁹ Retrieved from the world wide web <http://ufdp.dri.edu/projects/lvwash.htm>



Figure 4. An overview of the Las Vegas Valley Watershed, sub-watershed boundaries, natural channels and the proximity to Lake Mead.¹⁰

Most of the valley’s natural washes are found at the end of alluvial fans. Alluvial fans are areas at the base of a mountain range or at the downstream section of a canyon.

¹⁰ “GIS and the Development of a Source Water Assessment Program” authors Marcelo Reginato and Thomas Piechota, University of Nevada Las Vegas. Retrieved from the world wide web <http://proceedings.esri.com/library/userconf/proc02/pap0439/p0439.htm> .

Peter Jackson, of the City of Las Vegas Flood Control Department described alluvial material as “decomposed mountains.” Over thousands of years, the deposits on the canyon’s outflow creates a scattered mass resembling a hand-fan. Because there is little or no vegetation on arid mountains to prevent erosion, when the stormwater or snow melt flows down the steep slopes, large amounts of debris are transferred through canyons and deposited on the outflow point at the mountain’s pass (fig 5). The fan is composed of soil, rocks, small vegetation and boulders -- the debris causes the majority of the damage during floods in the arid Southwest.¹¹

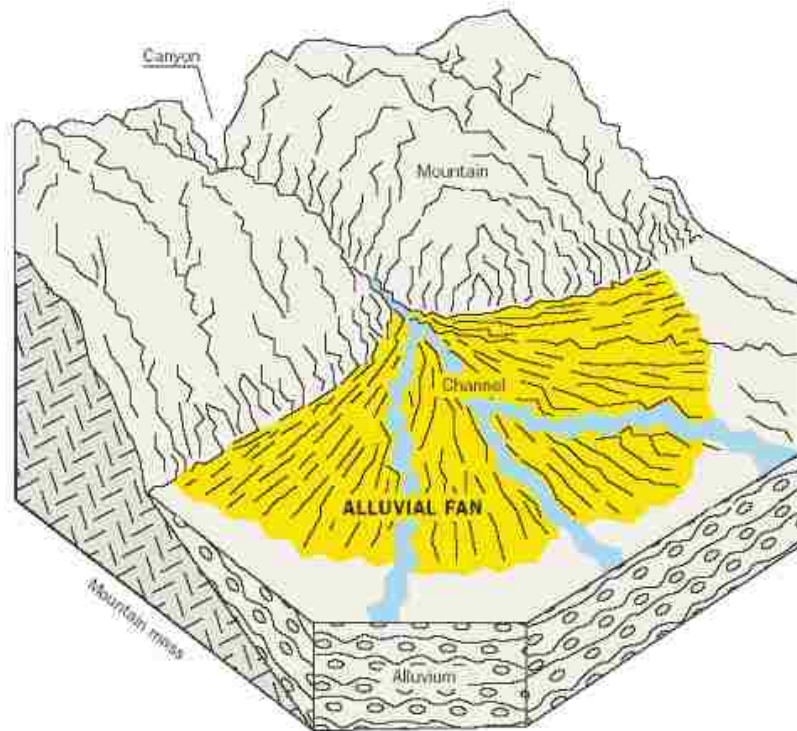


Figure 5. Illustrates the debris deposit that forms the alluvial fan.¹²

¹¹ Peter Jackson, Senior Engineering Associate; City of Las Vegas Flood Control, interview by author, tape recording, Las Vegas, NV., March 25, 2009.

¹² Image retrieved from the world wide web
<http://lang.sbsun.com/projects/fireflood/graphics/alluvialfan.gif>

As the alluvial fan extends out from the mountain's base, floods combined with the decomposed material, act like a natural plow cutting out numerous washes in the loosely compacted soil. Without the constant presence of water, the washes deteriorate by erosion, become overgrown with vegetation, or destroyed by man-made development. All these factors lessen the probability of future watersheds traveling thru the same wash. The random flow patterns are very hazardous for communities that develop near an alluvial fan. Virginia Valentine, the first CCRFCD General Manager and a former Clark County Manager, noted in a 2010 interview that the problem with alluvial fans is there are no channels: "It's like pouring a glass of water on a table top, it goes every where." As the Las Vegas metropolitan area expanded in the early 1950s, more developers built homes on the edge of alluvial fans, which unavoidably disturbed the natural washes and exposed countless properties to major flood hazards. It was not until the mid-1960s that local officials and engineers began studying the region's hydrology, which involved the interaction of water with natural and manmade landscapes.

Urban-hydrology is defined as the study of a region's hydrological processes affected by urbanization. Ever since humans have congregated together in towns and cities they have attempted to change their immediate surroundings. Stormwater drainage has always been a challenge for urban developers who are continually seeking a rapid and efficient means to eliminate standing water from the built-up area. Achieving this objective obviously depends primarily upon knowledge of the characteristics of heavy rainfalls within a specific region. In 1956, *Soil Conservation Service* magazine published a study of urban flooding. The article reported that since the 1930s, urbanizations had increased the frequency of flooding by replacing the natural cover with smooth

impervious surfaces. Following the more widespread use of digital computers in the 1960s, scientists were able to compile relationships between rainfall and stormwater runoff in a city's network of streets and developed land.

Prior to the 1960s Las Vegas engineers, builders, and officials did not consider the natural flow of stormwater that channeled run-offs southeastward toward Lake Mead. With large stretches of desert between neighborhoods, engineers in the 1940s and 1950s designed the early flood control measures to protect homes from the rainfall that fell within a neighborhood's boundaries. Contractors built channels and pipes to convey upstream stormwater away from their homes, with no regard for the down-stream properties. Little thought was given to connecting flood control structures across the growing metro network, which instead became a patch-work system of channels, ditches, and drainage pipes. Each jurisdiction in Clark County had its own priorities and did not coordinate with one another to address regional flood hazards – a state of affairs that continued until the formation of the CCRFCD in 1986.¹³

The Flood Waters

Thunderstorms in the Southwest occur during periods of hot weather between May and September. Heavy rains fall on steep mountains, which in Las Vegas are located west of town in the Spring Mountains and in the Sheep Mountains north of the metro area. Rainwater then rapidly runs off the hard desert soils, which one expert calls “the desert varnish,” through a system of smaller natural channels and washes, collecting in one of the eight regional washes, and then concentrating in urbanized areas at lower elevations. The lack of agriculture, along with *caliche* clay under the surface soil, inhibits

¹³ M.J. Hall. *Urban Hydrology*, (New York: Elsevier Applied Science Publishers 1984), 6, 20, 39, 111. Adam Rome, *The Bulldozer in the Countryside: Suburban Sprawl and the Rise of American Environmentalism* (New York: Cambridge University Press, 2001), 191.

water absorption. Over time, flood waters move large amounts of debris out of the mountains and along the valley's floor forming large "dry river beds." During massive storms these soil deposits and boulders are forced through the washes, potentially causing more damage to property than floods near river systems, which are called riverine floods.

Both riverine and alluvial fan flooding occur in Nevada. The former begins when a river rises and discharges large volumes through low-lying lands. Typically the river rises over a period of hours or days before flooding adjacent lands. Commonly experienced in the Midwestern states, flood waters overrun river banks or breach levees. In Nevada, riverine flooding has occurred in the south along the Virgin River and in the north along the Truckee River. Downtown Reno and the low-lying areas near the river often experience riverine flooding during heavy rains and spring snow melt runoff. The Truckee, a normally quiet stream that meanders gently through Reno and Washoe County has had a history of periodic rampages since 1861. Significant floods over the past half-century have occurred in 1950, 1955, 1963, 1983, 1997, and 2005 – resulting in millions of dollars in damage to downtown and to communities along the river. Flood waters rise in the wake of early snow pack melting during unseasonably high heat fronts or intense winter rain storms. Unlike flash floods that surprise Southern Nevadans, residents and officials along the Truckee River have significant time to sandbag and evacuate low-lying areas as the river rises.¹⁴

Waters levels through the Truckee River system are normally around six-feet deep. In 1950 and then again in 1955, the river crested at twenty-six feet. Truckee floods created so much damage over the past half-century that area governments worked

¹⁴ Reno Evening Gazette, December 23, 1955. Senator Richard Bryan, interview by author, tape recorded, Las Vegas, NV., March 10, 2010.

together with California and federal officials to build upstream dams. Even with a number of reservoirs west of Reno built to handle upriver flooding including Stampede, Boca and Prosser, nothing stopped the deluge making its way down hill in 1997 and 2005. Every building in downtown Reno within three hundred yards north of the river and one-hundred yards south of the river had been flooded at least once during this six year period. The New Year's Flood of 1997 created such devastation in the eastern part of the valley, entire businesses were lost and Harrah's Hotel and Casino as well as nearly every casino along the river had to be closed until the waters receded. One of the major reasons for downtown flooding is the bridge spanning the river from Booth Street and East Second Street was built with aesthetics in mind, any large trees coming down the river in a flood would get lodged and the river would pool behind the bridge as more and more debris clogged the area.¹⁵

The alluvial fan flooding that affects Southern Nevada occurs when thunderstorms drop large amounts of water in the mountains and higher elevations. The flow quickly exits the canyons at a high velocity across the desert floor, collecting in the Las Vegas Wash and then dumping into Lake Mead. Flash floods are more common in the Southwest and have caused millions of dollars in property damage throughout the Las Vegas metro area. Thunderstorms in Southern Nevada are not unique compared to the rest of the arid Southwest; they usually occur in summer and are typically short lived and very intense. Nonetheless, local flood control officials jokingly refer to thunderstorms in this region as "popcorn" -- exploding with no warning. For example, on August 19, 2003, three-inches of rain fell in ninety minutes northwest of downtown Las Vegas. Water

¹⁵ "Along a River's Edge" VisitReno.com, April 2005, found on the world wide web at www.renolocals.com/evanoff/april-05.php

meters in the affected area measured 3,000 cubic feet of water per second flowing down Gowan Road. One cubic foot of water is 7.5-gallons or approximately the size of a basketball in a box; there are roughly 3,000 cubic feet of water in a residential swimming pool. The storm's rapid release of rain in a forty-square mile area displaced air around the rain-burst, knocking over trees along the outer edge of the storm's ring. Less than fifteen miles away at the National Weather Service's McCarran International Airport rain gauges reported no precipitation.¹⁶

Since the major washes are dry most of the year in Southern Nevada and major events such as the August 2003 storm do not occur each summer season, flood control officials worry that newer residents are unaware of the flood potential beyond the established system. The natural element of floods aside, Gale Frazier, the CCRFCD's general manager, believes the influx of people over the past fifty years from "wetter climates" has played a major role in the human cost associated with floods. In a 2009 interview Frazier speculated that newer residents come from parts of the nation that experience riverine flooding and underestimate the potential of flooding because they live miles from the Colorado River and Lake Mead. In addition, Frazier believes that people accustomed to riverine flooding react casually to flash floods as if they heard a radio alert or viewed a television warning of a specific area that might experience rising water. But unlike other America regions where rainfall is more frequent, storms in the Southwest hit

¹⁶ Nevada Division of Water Planning – Flood Management in Nevada, <http://water.nv.gov/WaterPlanning/wat-plan/PDFs/pt3-4a.pdf> 1. Gale Frazier, Clark County Regional Flood Control District - General Manager, interview by author, tape recorded, Las Vegas, NV., February 13, 2009. The flood control system in Las Vegas can handle flow rates around 13000 cubic feet per second. Apples to Oranges: Comparing Storms in 2003 to 2007. Video supplement, 2007-2008 CCRFCD annual report. "Flood-control facilities worked well, officials say: [Final Edition]." *Las Vegas Review Journal*, September 12, 2003, <http://www.proquest.com/> (accessed April 8, 2009).

very fast; they can also be extremely intense and it is virtually impossible to forecast where the rain will fall.¹⁷

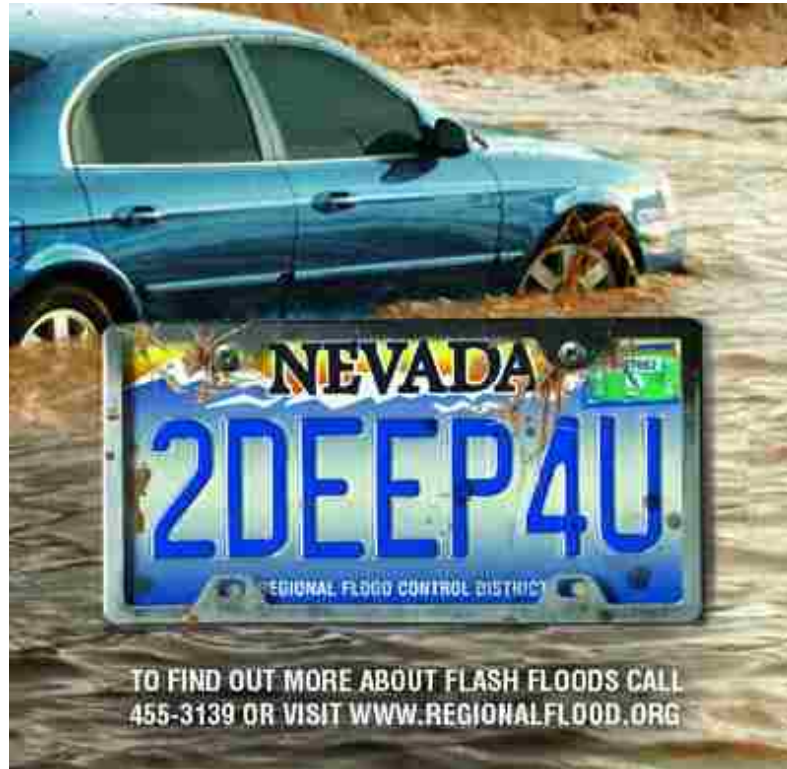


Figure 6. CCRFCD public service advertisement

The public relations department at the CCRFCD produces community outreach programs on the City of Las Vegas and Clark County public access television stations in a format entitled “The Flood Channel.” This program is used to warn the public that most storm damage and death occur beyond the storm event area and that standing water is potentially deadly (fig 6). Betty Hollister, public relations manager for the CCRFCD, notes that most emergency rescues during flood events typically happen with blue sky, sunshine, and almost always down-stream from the storm event. During the August 2003

¹⁷ Gale Frazier, Clark County Regional Flood Control District – General Manager, interview by author, tape recorded, Las Vegas, NV., February 13, 2009

flood, for instance, Juliette Lopez who stopped at the traffic light at Rainbow Boulevard and Gowan Road, recalled water flowing near her tires' rims. Lopez had to crawl onto her roof and be rescued by a helicopter because by the time the light turned green the water was up to the car's windows.¹⁸



Figure 7. Juliette Lopez near the intersection of Rainbow and Gowan, August 19, 2003
(Photo credit given to John Locher, *Las Vegas Review Journal*)

Classifying Floods and the Types of Mitigation

Hydrologists measure the size of a flood in terms of recurrence intervals. Mistakenly called “100-year floods,” storms are measured independently of one another - based on the statistical probability of rainfall and water flow in a specific region, not on the number of years between floods. For example, a 100-year flood has a one-percent chance of being equaled or exceeded in any given year. The National Oceanic and

¹⁸ Betty Hollister, Clark County Regional Flood Control District - Public Relations Manager, interview by author, tape recorded, Las Vegas, NV., February 13, 2009.

Atmospheric Administration (NOAA) collects rain gauge data; in Clark County the gauges are at McCarran International Airport. NOAA submits that information to the National Weather Service to calculate the statistical flood probability of a 100-year event. In Las Vegas, forty years of data have been collected. According to the National Weather Service, the area's 100-year standard is 2.77 inches of rain within a six-hour period. Local engineers and flood control officials have classified eleven major events dating back to 1960 as 100-year floods. Each event has caused more than a million dollars in property damage. Prior to the CCRFCD, Frazier notes, many residents believed the community was safe for 10, 15, 50 and even 100 years after a major storm event occurred because weathermen and the media mistakenly claimed the probability of future floods. To ensure increased levels of flood protection for residents, businesses and tourists from the hazards of flooding in Clark County, the CCRFCD's master construction plan since 1987 has designed all flood control facilities to handle Southern Nevada's statistical 100-year flood.¹⁹

¹⁹ US Geological Survey website, <http://pubs.usgs.gov/fs/FS-229-96/> . CCRFCD "Public Information" website, http://acequia.ccrfcd.org/pdf_arch1/Public%20Information/Flood%20Definitions%20-%20December%202009.pdf . "Flood control measures avert worse damage." *Las Vegas Review Journal*, July 11, 1999, 1A. Gale Frazier, interviewed by author, tape recording , Las Vegas, NV., February 13, 2009.



Figure 8. Lower Las Vegas Wash Detention Basin
(image courtesy of CCRFCD)

The structures that are used in Southern Nevada are common across the Southwest: detention basins, earthen levees, and concrete-lined channels to control the flow of water through an urban corridor. In 1985, engineers from James M. Montgomery Consulting in Salt Lake City began looking at ways to manage the valley's stormwater flowing off an alluvial fan. They discovered that levees three or four feet in height constructed along the edge of the fan corralled the water to a central point near the apex of the fan. By building a detention basin at the apex to capture the water the levee system blocked, the random flow patterns coming off the fan are illuminated. The basins also served to capture massive amounts of potentially dangerous debris. Unlike dams, the engineers design the system's basins to release the flood water as it reaches an outflow point at the downstream end of the basin. Without basins to capture the violent waters originating in the higher elevations and slowing down the flow rates (fig 10), channels would have to be deeper and wider, like the Los Angeles River. However, the Los Angeles River, which was a natural flowing waterway through the city, was built in the bed of an

actual river (fig 9). The channels that snake through the metro area of the Las Vegas valley have to be much smaller to fit into existing flood control structures or installed under road-ways. Most importantly the community can not afford to have channels occupying scarce and very valuable land in the valley's urban core (fig 11).²⁰

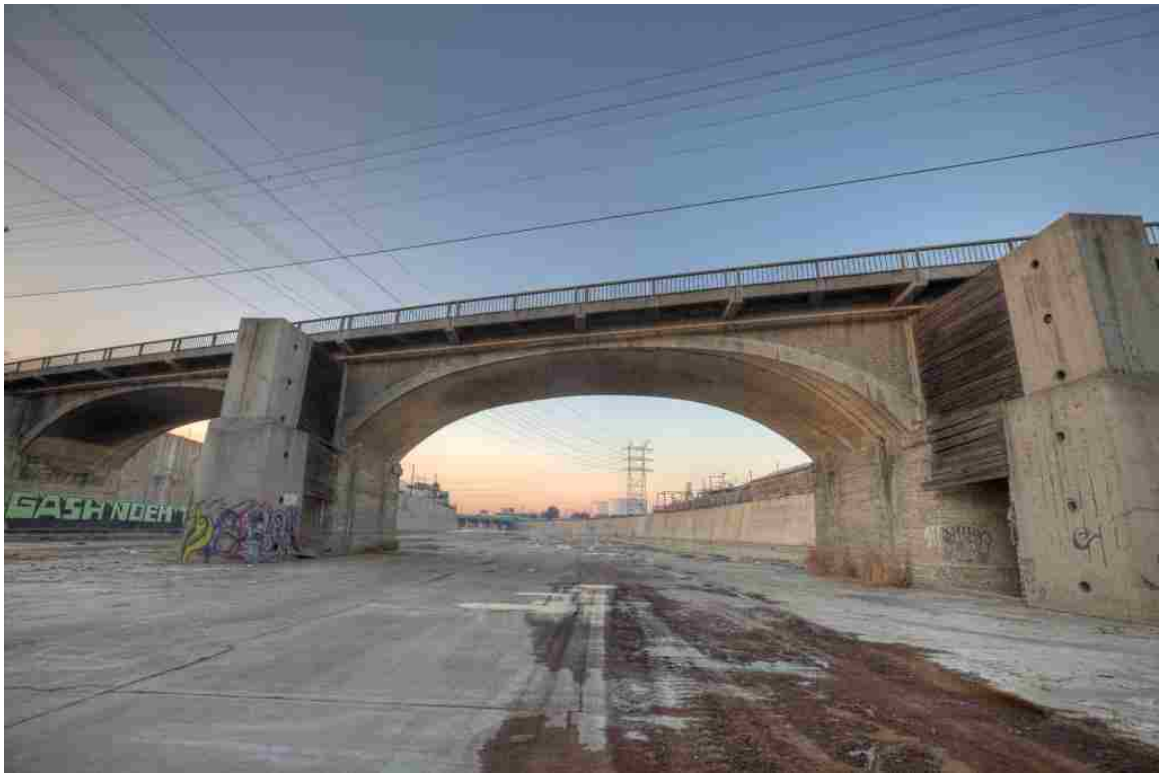


Figure 9. The Los Angeles River

²⁰ Friends of the Los Angeles River, found on the world wide web at http://folar.org/?page_id=16. Gale Frazier, general manager of CCRFCD, interviewed by author, tape recorded, Las Vegas, NV., February 13, 2009.



Figure 10. Ann Road Detention Basin, northeast of Las Vegas.
(image courtesy of CCRFCD)



Figure 11. Workers building an underground storm drain in Northwest Las Vegas.
(image courtesy of CCRFCD)

Many proponents of stormwater harvesting argue that Clark County is losing an opportunity to use the flood waters collected in the basins for irrigating public lands. Friends of the Desert Wetlands Parks, a local group formed by Norma Cox in the mid-1990s, claims that stormwater flowing through the system of basins and concrete channels enters the Las Vegas Wash with no filtering system to separate non-point pollutants such as motor oil, fertilizer, and commercial chemicals. The wash's natural ecosystem is unable to properly clean the stormwater during heavy or sustained rain storms. Nonetheless, the basins are designed to take the fast-flowing flood waters and disperse their violent energy over its large floor. As the water's velocity is drastically reduced by pooling on the basin's floor, it slowly rises toward the outflow point, spilling into a system of conveyance channels that safely transport the water through the urban core toward Lake Mead.²¹

The CCRFCD relies on accurate rainfall and stream gauge data. Presently, the district manages 170 real time gauges in Clark County that cover 8,000 square miles of mountains, desert, dry river beds and Lake Mead shoreline. Prior to 1989, the region only had 3 gauges at McCarran International Airport. Las Vegas did not start collecting rain gauge data until the Army Corps of Engineers presented its findings in the wake of the June 1955 flood. When the hydrologists and engineers attempted to design the regional system in the late 1980s they had little historical data, which forced them to fill in the gaps of missing data with assumptions and rainfall modeling from other arid regions. Once the CCRFCD began connecting the region's existing structures in the early 1990s, these earlier assumptions were proven wrong, causing some of the first flood control

²¹ Norma Cox, concerned Las Vegas resident and member of the League of Women Voters, interviewed by author, tape recorded, Las Vegas, NV., June 1, 2010.

measures to fail during heavy rains. For nearly a decade after the district was formed the various public works departments had to play catch-up in order to correct all the poorly designed flood control systems.²²

In 1995 FEMA issued Clark County one flood plain map, which allowed all local jurisdictions to work under one set of data points for the area. Prior to 2002, with the advent of the computer-based Geographic Information Systems (GIS), flood data was kept on paper maps. Even with one flood plan map engineers pieced together hydrologic studies conducted over hundreds of square miles, which did not take into account specific topographic features or soil conditions, which affect the hydrology of a region. In addition, the maps were designed based on different levels of technology over the decades. After 2002, GIS gave flood control engineers across the nation a repository of digitally formatted flood maps that could be pieced together to create detailed regional maps or very specific maps at the neighborhood level. As a result, present-day flood control engineers can calculate the flow of water once it hits a watershed, allowing them to better predict the probability of flooding.

By 2002, the CCRFCD had done such an excellent job in advancing Clark County's flood control system that FEMA awarded the region the nation's first digital map modernization program (DFIRM), which coincides with the National Flood Insurance Program (NFIP). By being the first community to work with the DFIRM system, CCRFCD had the best tools for predicting flood hazards and advising residents in newly identified flood zones that flood insurance would be required. On the other hand, more land and existing homes could be removed from flood zones as a result of the high-

²² Virginia Valentine, former CCRFCD General Manager, interview by author, tape recorded, Las Vegas, NV, February 24, 2010. Tim Sutko, CCRFCD Senior Hydrologist and Environmental Mitigation Manger, interview by author, tape recorded, Las Vegas, NV, March 18, 2010.

powered computer programs that accurately predict flooding hazards. In less than twenty-five years, with a comprehensive regional flood control plan, Clark County has become one of the nation's premier communities in the battle to mitigate flood hazards. However, this is a far cry from the first eighty years of Las Vegas history. The community experienced decades of piecemeal flood control measures, jurisdictions not cooperating, poor oversight of building codes, and near criminal construction practices. The first efforts to regionalize flood control came in the wake of the June 13, 1955, flood, but the story of flooding in Southern Nevada goes back to the founding of Las Vegas in 1905.²³

The First 50 years of Las Vegas

In 1974, the Nevada Division of Water Resources and several city and county entities in Clark County requested that a flood hazard analysis study be prepared covering Las Vegas Wash and tributaries in the Las Vegas valley. In 1975, under the direction of the United States Department of Agriculture, the Soil Conservation Service began a study of the region's flood history. It based its research upon an assembly of newspaper accounts starting shortly after Las Vegas's founding in 1905 - routine climatological accounts were omitted, and only those articles describing some type of flooding or resource damage were reviewed and assembled.²⁴

The 1977 report became the de facto resource for flood control officials in the early 1980s, because there was no data kept on flood events until 1960. The report also assisted flood control officials in establishing a list of flood-prone areas. Plaintiffs and

²³ Kevin Eubanks, Assistant General Manager CCRFCD, interview by author, tape recorded, Las Vegas, NV., March 5, 2010. FEMA website http://www.fema.gov/plan/prevent/fhm/mm_why.shtm

²⁴ *Flood Hazard Analyses: Las Vegas Wash and Tributaries, Clark County, Nevada. Special Report, History of Flooding, Clark County, Nevada, 1905-1975*, (Reno, Nevada : United States Department of Agriculture, Soil Conservation Service, 1977), 1. CCRFCD estimates 11 floods since 1960, found on the world wide web <http://www.ccrfcd.org/03-history.htm>.

defense lawyers routinely used the report in the late 1980s and early 1990s to determine liability on the part of developers and public works departments or to prove that flood hazards existed in a specific area of the valley prior to the city's formation. Most importantly, it revealed that the Las Vegas area had consistently experienced flooding since 1905; indeed, prior to the great flood of 1955 the valley had been hit by seventy-eight floods. Most of the stormwater flowed through the outlying desert, periodically washing out a road or a small section of railroad track. Research has revealed that in 1906 and 1910 Meadow Valley, northeast of Clark County near Pioche, experienced the two largest floods to ever hit Southern Nevada.²⁵

In late March 1906, a large section of desert in Southern Utah near St. George down through the Virgin River Gorge and into present day Mesquite, Nevada, was hit by the heaviest rains seen in the region. The *Salt Lake Tribune* received reports from railroad engineers, farmers, and local residents that nearly all the low lands were laid waste by torrents of rain-water and snow melt. The water destroyed crops, killed live stock, knocked out telegraph service between Salt Lake City and Los Angeles for days, and damaged or destroyed over one-hundred miles of railroad track from Acoma to Moapa. The lack of adequate drainage pipes along tracks in the Meadow Valley forced massive amounts of flood waters along the raised railroad grade. Reports from early survey teams noted trees, boulders and debris damaged all the bridges in the valley. Union Pacific officials estimated the repairs would take over a month to complete, forcing the railroad

²⁵ *Flood Hazard Analyses: Las Vegas Wash and Tributaries, Clark County, Nevada. Special Report, History of Flooding, Clark County, Nevada, 1905-1975*, (Reno, Nevada : United States Department of Agriculture, Soil Conservation Service, 1977), 2.

traffic through Las Vegas to be diverted north to Goldfield and then across the southern Sierra Nevada Mountains and down through the Imperial Valley.²⁶

Unlike later floods in the Meadow Valley and Virgin River, in 1906 the population in the Las Vegas valley was less than one-thousand residents. It can be speculated that the damage to the railroads negatively impacted the local economy, but during the early years of the town, the economy was still in its infancy. The city was so small it could not accommodate the passengers from the north bound trains out of Los Angeles, forcing many trains to immediately turn back after pulling into the Las Vegas station to replenish their boiler's water tanks. The Union Pacific hired 350 men from the valley to assist nearly a thousand others dispatched from Salt Lake City. The economic impact of the reconstruction work was offset by the severing of a vital supply line that brought in the mail, fresh produce, and most importantly Utah cattle. It took repairs crews until late April 1906 to repair the track.²⁷

Then on January 3, 1910, the largest flood in Southern Nevada history rushed through the Meadow Valley and down the Virgin River, inundating the communities of Moapa, Bunkerville and the farm lands situated near present-day Mesquite. One-hundred miles of Union Pacific railroad track was destroyed between Caliente in southern Lincoln County, Nevada, to just outside of Moapa. Reports out of Caliente painted a picture of massive devastation – deposits of mud and silt one-foot deep in nearly every house in the area. The water and debris flowing out of the high grounds destroyed many farms. With a

²⁶ *Salt Lake City Tribune*, March 26, 1906. *Las Vegas Age*, March 31, 1906.

²⁷ *Las Vegas Age*, March 31, 1906 and April 7, 1906.

drainage basin as large as the state of Pennsylvania, the narrow Meadow Valley was unable to carry the relentless floods in the usual channels.²⁸

Robert Graham, editor for the *Caliente Prospector*, had to secure a local quarter-horse to escape the torrent of rushing water. After many attempts to cross the bloated Virgin River his horse was swept away in the swirling waters; he escaped with his life, but had to strike out on foot for nearly sixteen miles to Panaca. During his trek through the Meadow Valley, he recalled places along the flood's path where two-feet of water stood over the tracks for miles, one spot he observed four-feet of ice over the tracks that had frozen during the frigid high-desert nights. Farther down the valley a train of thirty rail-cars was completely overrun by the rampaging waters; the crew narrowly escaped to high ground. For two days they hiked through the hills until they finally reached the small community of Guelph nearly fifty miles away.²⁹

It took repair crews from Salt Lake City, Las Vegas, and Los Angeles over three weeks to repair or replace thousands of railroad ties and track on the main line. Residents were displaced for months. From the time the Meadow Valley line opened in 1905 floods washed out the tracks three separate times. The 1910 flood forced the Union Pacific to either rebuild or invest millions in relocating the track to higher ground. In the end, company officials decided to invest millions of dollars to cut out portions of the adjacent mountains to raise the tracks out of the Meadow Valley.

The 1910 flood knocked out railroad service between Salt Lake and Las Vegas, diverting the entire railroad traffic bound for Southern California through Goldfield. Even though the Union Pacific reassured local government officials that the rebuilding efforts

²⁸ *Las Vegas Age*, January 8, 1910 and January 15, 1910

²⁹ *Las Vegas Age*, January 8, 1910. Ibid, "Rushing Torrents"

for the southern portion of the damaged tracks would be staged in Las Vegas, the town's business class became convinced that floods had to be controlled. Business in Las Vegas grew in the days after the flood, as men and capital flowed into the small community. There had been a local depression of sorts affecting Las Vegas since the town's founding in 1905, but the railroad made Las Vegas the headquarters for the work on the south side of the 100-mile gap, with all the material staged and the workers housed in the community. The company pumped thousands of dollars into the local economy every week.³⁰

Prior to the June 13, 1955, flood, the 1923 storm over downtown caused the worst damage to the city. Unlike the 1955 event, the damage in 1923 was caused by high winds, lightning and poorly constructed buildings. During the city's first fifty years, the flooding continued to washout railroad tracks, damage communities on the Virgin River and wash out sections of road on the valley's periphery that were built to accommodate the urban expansion. Most flooding in the valley was isolated, affecting only a few homes or a small section of road, and typically lasted only a short period of time. For example, the 1938 flood in the southeast part of the valley during intense rainstorms between February 22 and March 3, virtually cut off Boulder City and Las Vegas. The stormwater washed out large sections of road and railroad track across the desert. But repairs were made quickly and little attention was given to the damage in local newspapers. Most of the water that rushed through the valley during the 1930s and 1940s spared the larger metropolitan area. For the most part, until the early 1950s downtown Las Vegas and its suburbs between Charleston Boulevard to the south and Washington Avenue to the north were protected from massive stormwaters rushing out of the surrounding mountains

³⁰ Las Vegas Age, January 22, 1910

because they were situated on high ground and the waters were corralled by the natural washes. In addition, the outlying washes had not been affected by the sporadic developments west of downtown and the Union Pacific Railroad tracks. Lastly, roads in urban core, especially those along the eastern section of the town near the Huntridge community, were able to withstand the stormwater run-off from storms that occurred over the city. But the 1955 flood forced Las Vegas to face the consequences of developing lands in flood-prone areas and assess the benefit of growth and the hazards of flooding.³¹



Figure 12. Boulder Highway, March 3, 1938, flood.
Courtesy of UNLV Special Collections

³¹ *Las Vegas Evening Review Journal*, March 3, 1938.

CHAPTER II

1955-1962

“Homes are built in areas that were historic waterways for previous flashfloods. In the old days no desert-wise prospector or cattle-raiser would dream of camping in a dry-wash, especially with the prospect of a flash-flood.”³²



Figure 13. Youth diving from a street lamp into the Charleston Boulevard Underpass.
(photo credit to Bill Rogers)

³² “A Futile Warning” *Las Vegas Sun*, June 16, 1955.

The Flood of 1955

A tidal wave of water from the Spring Mountains west swept down on Las Vegas during the afternoon hours of June 13, 1955. Towering storm cells over Red Rock Canyon and Mt. Charleston produced an inch of rain in less than 45 minutes. The force of the flood waters created 10-foot deep gulleys on the outskirts of town and knocked out power to many areas of the community; 70 percent of the residents did not have telephone service throughout the night and next day.³³ The emergency within the city required that all auxiliary police and off-duty officers be called up for 24-hour service. Patrolmen abandoned squad cars to direct traffic, stacking fruit crates and boxes to get above the rushing water. Mercy Ambulance that day managed to get a single ambulance across the Union Pacific tracks to the west side of the city. Patients in all emergency calls on that side of the tracks were taken to Southern Nevada Memorial Hospital, while calls on the east side went to Las Vegas Hospital. The floods divided Las Vegas in half at the railroad tracks because the Charleston and Bonanza underpasses flooded. Built in the 1940s to serve the expanding suburbs southwest of downtown, the Charleston Boulevard and Bonanza Road underpasses were the city's primary east-west passageways. Shortly after the flood waters began rushing through town on June 13, both underpasses filled to the bottom of the train trestles.³⁴

³³ Clark County's population in 1955 was estimated at 80,000 people.

³⁴ *Las Vegas Sun*, June 14, 1955. *Las Vegas Review Journal*, June 14, 1955.



Figure 14. Corner of Main Street and Charleston Boulevard, June 13, 1955.
(image courtesy of UNLV Special Collections)



Figure 15. Corner of Fremont Street and Charleston Boulevard, June 13, 1955.
(image courtesy of UNLV Special Collections)



Figure 16. Rescue crews in a boat at the Charleston underpass, June 13, 1955.
(image courtesy of UNLV Special Collections)

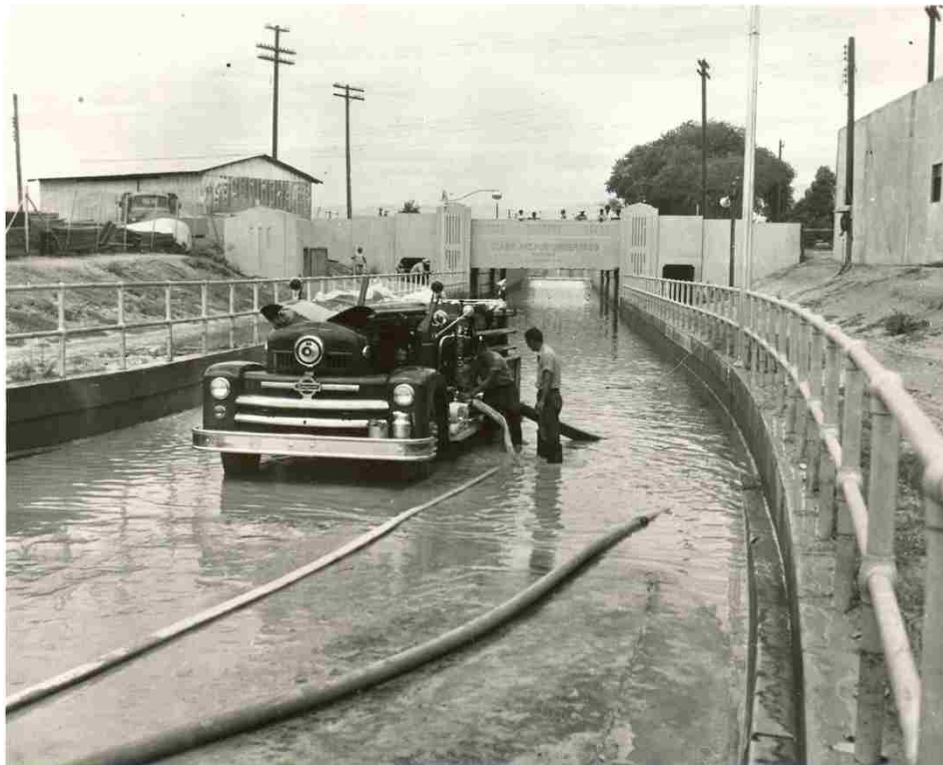


Figure 17. A fire-engine crew pumping water out of the Bonanza underpass, date unknown. (image courtesy of UNLV Special Collections)

Roads resembled rivers and the high water stranded cars. A common sight across Las Vegas and North Las Vegas during the evening commute on June 13 was motorists abandoning their cars and striking out on foot. Even though people tried to drive or walk, many residents were virtually isolated as water backed into yards and homes. Newer sections of the city suffered complete isolation. For example, residents of the Twin Lakes area west of downtown faced three to four feet of water runoff. Police would not allow residents in one northwest neighborhood to return home after work, forcing many to sleep at the home of a friend or relative. The *Review-Journal's* managing editor, John Cahlan, cut off from his office, relayed damage reports on the west side of town to the newsroom. Senator Richard Bryan, then a senior in high school, remembered enjoying a summer date before the intense rain ended the evening. After dropping off his date at her parent's Hyde Park home near Valley View Boulevard and Charleston Boulevard, he spent most of the night driving north and south along the railroad tracks attempting to cross. "I had to sleep in my car," Bryan recalled in 2010, "there was no way to cross the tracks anywhere in the desert and the underpasses were closed."³⁵

From the time Las Vegas was founded in 1905, residents considered flooding a nuisance – roads would be damaged, people stranded at work or home, and utilities affected for hours. Usually, the recorded major storm-events occurred in sparsely populated rural areas of the Las Vegas valley, the northeast region of Clark County near Moapa Valley, Bunkerville, or along the Virgin River. Local officials and "old-timers" considered the June 13, 1955, storm to be the worst in Las Vegas since 1923. The 1923 storm primarily produced lightening and hail damage, while high winds overturned

³⁵ *Las Vegas Sun*, June 14, 1955. *Las Vegas Review Journal*, June 14, 1955. Senator Richard Bryan, interview by author, tape recorded, Las Vegas, NV., March 10, 2010.

poorly constructed buildings. On the other hand, the 1955 damage came from massive flood waters ripping through properties situated on historic waterways. The flood damage in the city of Las Vegas surpassed \$3 million, one-third of the damages were to private residents.³⁶

Days after the flooding, the local media began pointing the finger at land developers and home builders. “In the old days,” observed one *Las Vegas Sun* writer, “no desert-wise prospector or cattle-raiser would dream of camping in a dry-wash, especially with the prospect of a flash-flood.”³⁷ During the city’s expansion in the late 1940s and 1950s, land sub-dividers developed a habit of ignoring nature to build in areas that were dry arroyos, and city and county commissioners let them. Urban hydrology would not begin to influence planning in Las Vegas until the late 1960s, but in the arid Southwest, the land was visibly scarred by previous washes. After the 1955 flood, Las Vegas officials began emphasizing drainage standards for new developments. Major C.D. Baker, himself a civil engineer, called for the Las Vegas building permit office to require that adequate drainage plans be included in subdivision engineering prior to final approval. Las Vegas planners put a stop to dead-end streets in areas where they identified drainage issues. Homes on several dead-end streets saw the greatest amount of damage as flood waters became dammed behind the cul-de-sac’s blocked walls. Even with the city hall outcry, little came from the demands for better drainage and building inspection. Over the next three decades, as building codes were refined and the valley’s city and county governments increasingly formalized planning procedures, developers presented engineered drainage systems for approval. However, once the concrete was dry and the

³⁶ \$25 million in 2010 dollars. *Las Vegas Age*, July 28, 1923. *Las Vegas Review Journal*, June 15, 1955.

³⁷ “A Futile Warning” *Las Vegas Sun*, June 16, 1955.

homes were built, hardly any neighborhood was inspected to ensure compliance. No doubt plenty of money changed hands during the process. Evidence of poor compliance with building codes and lax adherence to engineered drainage systems surfaced after future floods, creating major life-safety concerns in the valley.³⁸

Once the community dried out in late June 1955, officials reported that no lives had been lost in the flood waters. Unfortunately, the real tragedy came after the waters receded and officials began assessing the damage. Six thousand homes, or nearly half the residents in the Las Vegas valley experienced flood damage. Las Vegas-based insurance agents estimated that less than \$1,000 worth of flood insurance existed in the entire metro area. Few people living in the arid Southwest during this time cared to pay \$250 for a three-year policy for flood insurance. National flood insurance was not available until the United States Congress created the National Flood Insurance Program (NFIP) in 1968, and mandatory flood insurance was not required until 1974.³⁹

Prior to the NFIP, massive flood damage relief for affected residents, business and municipal services came first from local disaster funds and then from federal emergency declarations. Immediately following the damage reports from the flood, Nevada U.S. Senator Alan Bible asked a federal emergency team to survey the area for possible federal assistance. He informed Las Vegas City Manager A.H. Kennedy that a formal request for emergency disaster relief would be sent to Governor Charles Russell, who under Public Law 875 would then request President Dwight Eisenhower to declare Las Vegas an emergency area. This event began thirty years of local and state officials

³⁸ *Las Vegas Sun*, June 15, 1955 and June 16, 1955. *Las Vegas Review Journal*, August 18, 1991.

³⁹ \$250 in 1955 is equivalent to \$2000 in 2010 dollars. "Little Flood Insurance in Las Vegas", *Las Vegas Sun*, June 15, 1955

reaching-out for federal assistance for rehabilitation and construction of flood control mitigation projects.

Until the passage of the quarter-cent sales tax increase in Clark County for flood control in 1986, Southern Nevada experienced a roller-coaster ride in the pursuit of federal monies for flood control and disaster relief, especially in 1959 when local and state officials requested funding for Army Corps of Engineers' studies and construction projects. The 1970s and early 1980s were fiscally lean years for the Corps, as the Jimmy Carter and Ronald Reagan administrations redirected flood mitigation funds to pay for projects with greater political capital, such as the Clean Water Act of 1977 and growing defense appropriations. Even though in 1986 Clark County voters approved a funding measure for flood mitigation and prevention through an increase of the county's sales tax, 1962 was the first time Clark County officials requested the community to vote on funding a regional flood control system. Voters overwhelmingly rejected the bond request, which officials and the media both agreed hurt the area during subsequent floods in the 1970s and 1980s. However, research indicates that the flood control system designed by the US Corps of Engineers in 1959 would have had disastrous consequences for the future of the Las Vegas valley, because it would have restricted growth, not allowing for storms originating in different parts of the valley. Also, it would have lacked the ability to protect property outside of the system, and would have been expensive to build and maintain.⁴⁰

⁴⁰ *Las Vegas Review Journal*, June 15, 1955. FEMA (2000), the intent of the NFIP is "to reduce future damage and provide property owners with protection from financial losses through an insurance mechanism that allows a premium to be paid for protection by those most in need of protection." "Market Failure in Information: The National Flood Insurance Program," authors James Chivers and Nicholas E. Flores. *Land Economics*. November 2002, p.515 (source: fema.gov/nfip). Sec 4012a. Flood insurance purchase and compliance requirements escrow accounts, Office of the General Counsel 1997, www.fema.gov/pdf/fhm/frm_acts.pdf. *Las Vegas Review Journal*, June 16, 1955.

In 1955, shortly after Governor Russell requested federal emergency funds for the Las Vegas area, federal officials dispatched members of the Small Business Administration (SBA) and Federal Civil Defense Administration (FCDA) to set up temporary offices in Las Vegas to assist the community. The FCDA, eventually covered \$400,000 in public property damage claims under the federal disaster relief fund approved by President Eisenhower. Unfortunately for the community, the relief fund did little for the 6,000 affected homes. Federal officials advised property owners to seek bank loans first and told claimants that if their loan applications were rejected, they would be accepted at the SBA office. Residents, however, had little optimism that support would come from the SBA, and local officials expressed frustration at the lack of federal assistance for the \$3 million in damages. The *Las Vegas Review Journal* saw irony in the Las Vegas flood, portraying it as a replay of the disastrous flood Henderson had experienced in 1954. Shortly after that event, Henderson Mayor James B. French had requested federal aid to build flood control projects, conduct engineer studies, and receive financial support to rebuild. His effort failed, because the Eisenhower administration was trying to cut domestic spending and reduce the national debt in the wake of World War II and the growing threat of the Cold War.⁴¹

The Great Levee That Nearly Was

After the 1955 flood, Senator Bible demanded that the Army Corps of Engineers dispatch an emergency response team to Las Vegas to devise a solution to the problem. Local officials cautioned residents not to view the Corps' survey as an immediate solution that would protect their homes, roads, and utilities. Funding the project required congressional approval, plus flood control studies often took years to complete, due in

⁴¹ *Las Vegas Review Journal*, June 19, 1955

part to manual analysis of rain gauge information and the time-consuming process of drawing by hand topographic maps by hand. The Corps' engineering team estimated that it might take five years before a thorough assessment could be submitted to Las Vegas and Clark County officials. Hank Greenspun, the owner of the *Las Vegas Sun*, provided great insight into the funding crisis Southern Nevada would experience over the next three decades.⁴² As he noted,

The Army Corps of Engineers which can't talk back to a senator usually bears the brunt of these "demands" yet, their budget for such projects as flood control is slashed unmercifully. This is an ideal subject for making political hay. There aren't very many damaging floods. The senator can "demand" until Hell freezes over, and he knows there isn't going to be any flood control by the Army Corps of Engineers until funds are appropriated for it.⁴³

Nearly all Corps projects required that a percentage of the cost be matched by the local or state government. In 1962, Southern Nevada residents were given the opportunity to vote on a bond issue to raise \$6 million, which would guarantee \$25 million in federal monies that Congress had set aside to fund the projects identified by the Corps to ease Southern Nevada's flooding problems. On April 6, 1962, voters rejected the bond by a 2-to-1 margin.

The failure of the bond vote is traced back to the late 1950s; residents had become more frustrated by bureaucratic red-tape stretching the repairs to the city's damaged system over years rather than months. Local officials had little recourse; Southern Nevada depended on federal funds to solve the flooding problem. Fortunately, the community did not experience another major flood in the urban core for the remainder of the 1950s, which gave the Army Corps of Engineers enough time to complete an extensive survey of the Las Vegas Wash and tributaries.

⁴² *Las Vegas Review Journal*, June 17, 1955

⁴³ *Las Vegas Sun*, June 15, 1955

In 1959, Colonel C.T. Newton presented the Corps' recommendations to the Clark County Commissioners. The plan called for a series of man-made levees and massive detention basins to surround Las Vegas, North Las Vegas, and Henderson. The largest levee, located on the valley's west side, would have ranged in height from 4 to 20 feet above natural ground surface. It would have been located seven miles west of Las Vegas, following the same lines as Rainbow Boulevard and parts of Jones Boulevard today. Originating northwest of town, at what is now the Craig Road and U.S. 95 interchange, the levee system would head south, directing flood waters to a massive 10-square-mile detention basin in the area of Jones and Flamingo Road down to Russell Road. The western levee would protect the city from the floods emanating from alluvial fans below the Spring Mountains. The Corps' fifty-year projection of the valley's population in 2000 was a conservative 150,000.⁴⁴ Fortunately, the agency's plan was never implemented because the Las Vegas area's 2007 population surpassed 2 million people, and the Corps' 1959 recommendation would have restricted Las Vegas growth beyond Rainbow Boulevard.

Figure 18 illustrates one of the two recommendations the Corps presented to local officials. The plan had numerous shortcomings, such as, the city of Henderson would have been walled off in three directions, much like a Dutch city waiting for the next storm to threaten its dykes. The master planned community of Green Valley would have been difficult to build because there were no control measures planned for the massive Duck Creek and Pitman washes south of the Las Vegas levee, which presently flow through Green Valley, Whitney Ranch, and the communities north of downtown

⁴⁴ CCRFCD estimated Clark County's population in 2000 at 1,300,000 and Quickfacts.census.gov estimated the population of Clark County in 2007 being 1,836,000.

Henderson. Under the Corps' proposed system the city of North Las Vegas had no protection. It can be assumed that the engineers in the 1950s did not understand or simply ignored the hazards of the Upper Las Vegas Wash and the various alluvial fans coming off the Frenchman Mountain and the Ground Gunnery Ranges north of the metro area. Ironically, the deadliest storms in the 1970s and early 1980s hit North Las Vegas.

Potentially the worst consequence of the expansive Las Vegas levee would have been the restriction of growth for the suburbs west of downtown and the communities planned west of the burgeoning Strip. Looking back, local flood control officials and developers speculate if homes could have been built west of the levee they would have only been constructed on high ground above the numerous washes and tributaries. The vast amount of uninhabitable desert between the homes would have made it nearly impossible to justify the cost of running utilities and road improvements to these outlying structures. Home owners would have had difficulty obtaining home insurance -- their property, the rural road system, and nearby utilities would have been subject to constant flood damage. No one could have foreseen that Howard Hughes's purchase of 25,000 acres of land on the western edge of the city in 1952 would someday become the Summerlin master planned community. But it could not have been built if the Corp's levee system had been installed, because it would not have protected the community. In fact, the Summerlin area was later one of the first priorities the CCRFCD addressed in the late 1980s. Fortunately, the Red Rock Detention Basin was the first facility built in the 1990s under the CCRFCD's master plan; it captures the deadly stormwaters that threaten Summerlin and Spring Valley.⁴⁵

⁴⁵ *Las Vegas Sun*, August 8, 2008. found on the world wide web
<http://www.lasvegassun.com/news/2008/aug/18/summerlin-past-and-present/>

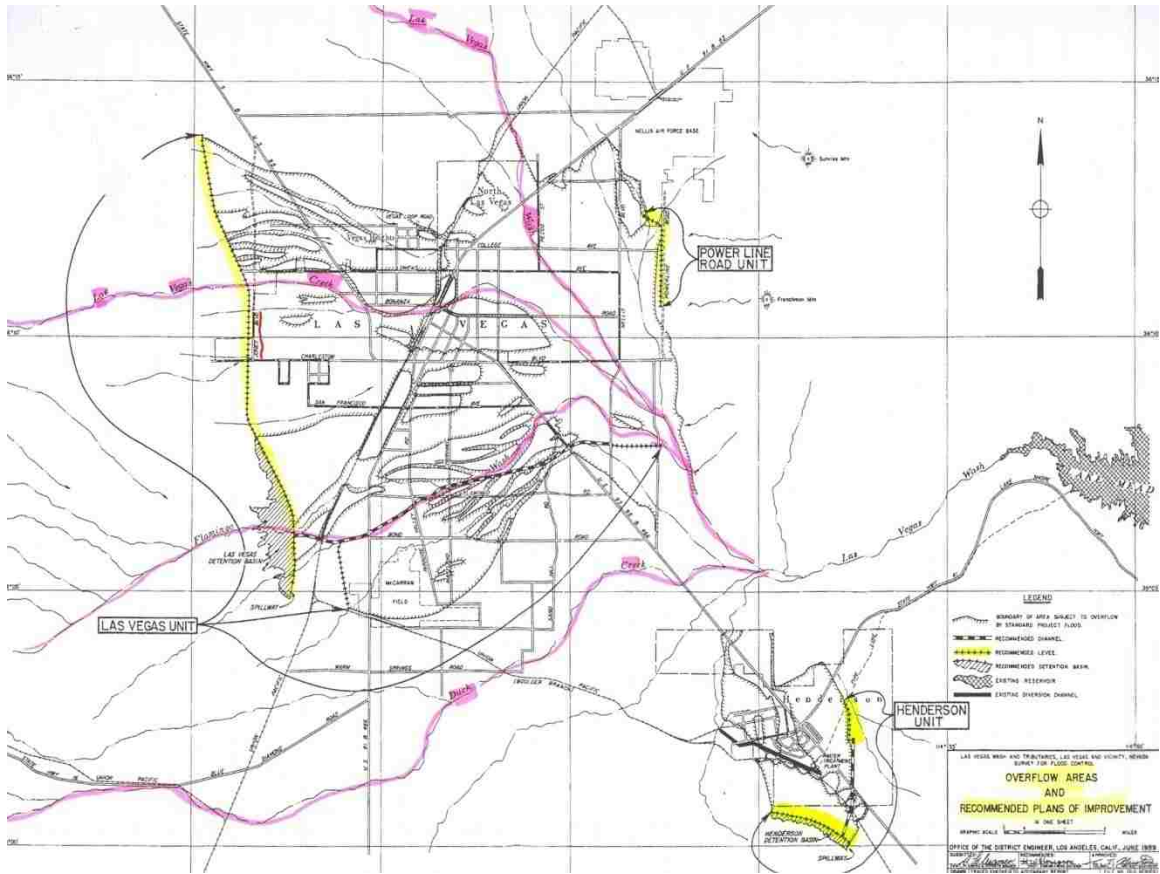


Figure 18. US Army Corps of Engineers recommendations for a flood control system in the Las Vegas valley. Areas in yellow are the proposed levees, areas in pink are the natural washes⁴⁶

In addition to the Corps' 1959 recommendations, that same year state lawmakers passed Nevada Revised Statute 543 (NRS 543), which outlined the state's flood control policies. Primarily due to budgetary constraints, Las Vegas and Clark County officials did not act on the Corps' proposed system until May 1961, when the county commission established the Clark County Flood Control District for the purpose of conducting hydrologic studies, acquiring land rights-of-ways, developing flood conveyance, and assisting in planning and zoning of the entire county. Prior to the creation of the first regional flood control board in 1985, the county commission did not include the other

⁴⁶ "Report on Survey for Flood Control – Las Vegas Wash and Tributaries, Las Vegas and Vicinity, Nevada." Prepared by C.T. Newton, Colonel, Corps of Engineers, September 30, 1959, 22.

jurisdictions on the flood control district's managing board. In the 1960s and 1970s there was a common power struggle between the City of Las Vegas and county commission. After 1985, officials from the entire valley's jurisdiction comprised the district's board, and the CCRFCD was independently managed.

Failed Funding for the First Flood Control District

During the summer of 1961 county officials were considering the proposed flood control system and a funding mechanism when another series of storms hit in August and September, flooding streets, damaging homes, and triggering power outages. Finally, after six years of public outcries, Las Vegas and Clark County officials moved toward definite action. Generating funds for the projects represented the biggest hurdle to overcome for the county commission and the newly formed flood district.⁴⁷

Even though the county commission created the flood control district as a government agency under NRS 543, the commissioners could not agree on the best funding source for the future construction projects. In the end, officials proposed to sell bonds. The Corps' 1959 report estimate the total federal cost of the overall project at \$13.5 million, which would be roughly \$64 million in 2010 dollars. The jurisdictions in the valley would have to contribute nearly \$5 million for the first phase of construction, with an estimated \$800,000 in annual new construction and maintenance. In 1962 the federal government promised to cover \$26 million if Clark County could raise \$6 million.

⁴⁷ "Nevada Revised Statutes (NRS) Chapter 543 was originally enacted in 1959. See Chapter 143, *Statutes of Nevada 1959*, 164, for the enacting language. The measure, sponsored by legislators from Washoe County, provided for a flood control project on the Truckee River in northern Nevada. NRS 543 was amended in 1960. See Chapter 51, *Statutes of Nevada 1960*, 55, for the amendatory language. The measure, sponsored by the Clark County Delegation, provided for loans from the flood control revolving fund to political subdivisions for preliminary costs of flood control and other projects relating to water." Information provided to the author by Jan Wolfley, Assistant Librarian, Nevada Legislative Council, email, April 26, 2009. "Bureau Flash Floods threat to Vegas since 1955." *Las Vegas Review Journal*. July 4, 1975.

There was little choice. Indeed, Colonel C.T. Newton of the Corps predicted that the metropolitan area would incur nearly \$1 million in annual flood damages through the 1960s and 1970s without a concerted flood control effort.⁴⁸

The major flaw in the Corps' flood control plan came from their engineers' modeling of the area's potential flood magnitudes. The system they designed used a hypothetical flood with stormwaters equal to a 400-year flood event; a storm of this magnitude would generate 7.5 inches of rain in less than six hours over the entire 176 square miles of the 1960s urban area. That was nearly twice the annual rainfall ever recorded. With volumes of water that great, 70 percent of the developed land in the Las Vegas valley would be under standing water. It can be argued the Corps' engineers modeling would have drastically altered the physical layout of North Las Vegas, Henderson, and the foothill communities of Summerlin and Spring Valley to the west, Aliante in the north, and Anthem Seven Hills in Henderson if the Corps' system had been built.

Research confirms that growth would not have been totally stopped by a massive levee system, but Irene Porter, Executive Director for Southern Nevada Home Builders Association, and former Assistant City Planner for North Las Vegas and a Southern Nevada resident since 1954, recently noted that the quality of life for those residents living outside of the protective walls would have been drastically different. Without a system to slow the flow of water coming off the mountains, the devastation would be magnified with every new development diverting flood waters through the desert.

Virginia Valentine, former General Manager for the CCRFCD, envisioned that a vast

⁴⁸ "Report on Survey for Flood Control – Las Vegas Wash and Tributaries, Las Vegas and Vicinity, Nevada." Prepared by C.T. Newton, Colonel, Corps of Engineers, September 30, 1959, 22.

area outside of the levee system with neighborhoods dotting the landscape at highpoints, and barren land subject to flooding would have had extremely high flood insurance requirements. Prior to the bond vote in April 1962, a small group of Las Vegas engineers questioned the Corps' aggressive model⁴⁹

On April 6, 1962, a local group of seven independent practicing consultant engineers issued a public statement in the *Las Vegas Sun* opposing the Corps' flood control plan. The group argued that the huge cost of building and maintaining the facilities would more than offset the project's meager benefits to the community. They calculated that the hypothetical storm the Corps' engineers used to model the system produced twice as much rainfall and stormwater as the Las Vegas valley had ever experienced. The local group also exposed the inherent flaw of using levee systems as a flood control method in the desert. Levees worked best, they argued when holding back rising rivers over temporary dams. The group noted that if a high-intensity storm occurred inside the Las Vegas metropolitan area, the results could be catastrophic. Ironically, the group concluded that the Henderson phase of the flood control project that walled off the small town with three massive levees was the best method for protecting for the residents. They also urged that steps should taken to establish an area-wide flood control management program that brought together all the jurisdictions in Clark County. With great foresight they recommended building catchment basins in the foothills of the

⁴⁹ Irene Porter, Executive Director for Southern Nevada Home Builders Association, interviewed by the author, tape recorded, Las Vegas, NV, April 1, 2010. Virginia Valentine, former General Manager for CCRFCD, interviewed by the author, tape recorded, Las Vegas, NV, February, 24, 2010.

mountains, and operating the district as a regional group made up of qualified representatives from all Clark County communities.⁵⁰

If the \$6 million bond sale had passed in 1962, the flood control district would have gained access to \$26 million from the federal government to build and maintain a flood control system. The *Las Vegas Sun* and *Las Vegas Review Journal* ran stories during the days leading up to the April 10th vote claiming county officials were confident voters would approve the bond issue by a substantial majority. Officials waived registration requirements for the election; anyone who owned property could vote, the argument being the bond money would be generated through an increase in property tax. Labor leaders supported the bond because it meant sustainable construction jobs for decades to come. The Las Vegas Strip hotels and the Chamber of Commerce backed flood control to protect the growing tourist industry. A large advertising campaign involving all news media reinforced the idea that the vote would be the last chance valley residents would have to receive matching federal funds for flood control projects. Print ads supporting the bond peppered both local papers with images of the 1955 flood; the ad banners read, “Don’t Let This Happen Again!” and “April 10, 1962, is one of the most important days in the history of Southern Nevada.” The day before the vote, Hank Greenspun editorialized that “The bond election is the first real effort of the community to help itself.” Unfortunately for the bond supporters, voters rejected the bond issue by nearly a 2-1 margin resulting in a quarter-century of “patch-work” flood control projects,

⁵⁰ *Las Vegas Sun*, April 6, 1962 ~ Ewalt Anderson, Ralph Kreamer, Clyde Keegle, Jay Rassler, O.J. Scherrer, Thomas A. Turner and George Von Tobel.

which never protected the valley from millions of dollars in flood damages throughout the 1970s and 1980s.⁵¹

Voters ignored the warnings of the Army Corps. The *Review Journal* speculated the lack of specific voting information made available to the general public leading up to the vote caused its defeat. In addition, it soon became clear that a lot of people simply did not know if they were eligible to vote. The “property owners only” specification confused too many people. According to the 1960 census, 127, 016 people were living in Clark County, but one observer characterized the voter turn-out as “lighter than H₂O molecule to be exact.” The total number of votes cast was 4,677, 1,705 in favor and 2,972 opposed. One editor applauded the result, claiming voters recognized the extreme burden local officials had been putting on property owners with road, water, school and airport bonds. Indeed the *Review Journal* cited the looming \$6 million bond for the Las Vegas Valley Water District in November as a factor for a flood control bond going down to defeat. It demonstrated, the newspaper argued, that Nevadans in 1962 viewed federal matching funds as “handouts” that in the long run would come from the taxpayers. Clearly, the conservative tendency of local voters combined with the high-cost of Las Vegas’ growth defeated the bonds in 1962 and discouraged further flood control initiatives for another quarter century. Ironically, the bond failure proved beneficial. As this thesis will argue, the bond’s failure to fund the massive levee and channel system ensured that the rapid physical expansion of the Las Vegas valley through the 80s, 90s, and the early 2000s would not be hampered. The Corps’ projects would have drastically affected the area’s ability to expand, primarily because the Corps’ large levee system designed to protect Las

⁵¹ *Las Vegas Sun* and *Las Vegas Review Journal*, June 6-10. *Las Vegas City Magazine*, August-September 1987 issue, 13.

Vegas, North Las Vegas, and Henderson in the 1960s would have cut off hundreds of square miles from being developed properly, as well as not protecting the cities from future floods that would occur when massive storms soaked the communities inside the levee system.⁵²

In 1975, one local reporter cynically described the 1962 vote as being affected by the blue skies on that Election Day, suggesting the shortsighted view the community generally approached flood control with lacked consideration for their neighbors' wellbeing. It would be twenty-four years before Clark County residents would have another opportunity to approve comprehensive funding for a flood control plan. In the interim, the separate entities: Clark County, Las Vegas, North Las Vegas, Henderson, Boulder City, and the outlying areas of the community each had to fend for themselves. Each did its best to provide flood protection for its constituents, but political friction between the fractured entities made even the simplest of solution problematic. Through the late 1960s and 1970s county engineers planned and recommended county-wide mitigation projects, but with no regulatory power, the local entities did not approve or enforce many of the measures. As the valley grew, the majority of the time the flood control district planned around an entity's specific needs or scrapped the plans entirely. In addition, local projects lacked reliable, steady sources of funding to plan and construct sufficient control structures. Many of the problems the Clark County Regional Flood Control District would encounter in the 1990s came from the 1960s and 1970s "patch work" projects and the internecine warfare between the various city and county public works agencies. Improvements were made usually after each major deluge, an approach

⁵² *Las Vegas Review Journal*, June 12, 1962. *Las Vegas City Magazine*, August-September 1987 issue, 13. *Las Vegas Review Journal*, July 4, 1975.

local urban planners characterized as, “rain-flood-fix-improve-wait for next storm.” This scenario would repeat itself until 1986, when voters finally approved an equitable and sustainable funding method to build a flood control system through an increase in county sales tax. After more than three decades, voters finally realized that flooding threatened Las Vegas’ national image and therefore its continued growth. At the same time, city and county leaders also recognized the need for a *metropolitan* solution to the flood threat.

CHAPTER III

1962-1980

*“Rain, which is beneficial everywhere else, is harmful in Southern Nevada.
It comes seldom but when it does, look out.
It never rains but that it floods.
Swirling, cascading waters ravage a landscape as effectively as drought.”⁵³*



Figure 19. Flooded cars in the Caesars Palace parking lot.
The Flamingo Hilton in the background, July 3, 1975.
(Courtesy of ClassicLasVegas.com)

⁵³ “Where I Stand” by Hank Greenspun, the owner and editor of the *Las Vegas Sun* on the eve of the failed 1962 flood control bond election. *Las Vegas Sun* April 9, 1962.

Failure at the Polls

Even before the last votes had been counted on April 10, 1962, city and county officials knew the voters had rejected the bond request. As Dick Sauser, Las Vegas Public Works Director, stated in an April 12, 1962, interview, “The issue failed, but a provision still must be provided.” He suggested digging a protective moat at Rainbow Boulevard along the Army Corps of Engineers proposed levee system. “The protection,” Sauser asserted, “must come from our western area.” During that same time, Nevada’s U.S. Senator Howard Cannon requested that the federal matching funds be advanced to Clark County without local participation. Unfortunately, by the end of 1962, both requests failed – Sauser’s recommendation to build the moat lost momentum because neighborhoods had been under construction west of the Corps’ proposed levee system even prior to the April vote, plus the community did not experience another flood until 1967. Colonel Boyd Yaden, the consulting engineer for the Army Corps of Engineers, considered Senator Cannon’s request but inevitably Washington D.C. did not bend on its requirement that matching local funds had to be secured before any money from the Corps could be spent.⁵⁴

Over the next decade, the local flood control offices operated with different priorities: the City of Las Vegas worried about its expanding border to the west, while Clark County focused on protecting growth on the Strip. Flood control was typically under the public works department and always operated with a limited budget provided by city and county commissioners in response to flood damage. The 1972-1973 budgets for the county flood control district allotted a scant \$35,441. Throughout the 1960s and

⁵⁴ *Las Vegas Sun*, April 12, 1962. Eugene Moehring, *Resort City in the Sunbelt: Las Vegas, 1930-2000*. (Reno: University of Nevada Press, 2000), 251.

1970s flood control was left to developers; local governments loosely regulated the “patch-work” system. Clearly, there was no public oversight to prevent construction in flood-prone areas because in 1966, despite warnings from geologist and the Army Corps of Engineers, Jay Sarno opened Caesars Palace on the edge of the Flamingo Wash. The construction contractors paved a portion of the wash that ran through the property to expand its north parking lot. This would prove to be a costly mistake when a massive flood on July 3, 1975, ripped down the Flamingo Wash destroying nearly 300 automobiles in the resort’s parking lot. The flood prompted promoters and local officials to begin worrying about flooding’s impact on Las Vegas’ national image. Also threatened were newly constructed homes and apartments lining the banks of the Flamingo and Tropicana Washes east behind today’s Imperial Palace and west of the Strip.

By the mid-1960s the resort economy flourished, pricing downtown residential lots out of existence and forcing many homeowners to sell to commercial developers. Families were attracted to the newly emerging suburbs south and east of the city. During this time the valley saw the first substantial efforts by city and county planning agencies to bring order to the central city as well as the growing edges of the metro area along Decatur Road, Tropicana Avenue, Smoke Ranch Road, and east of Boulder Highway. The water and sanitation districts implemented a bold construction program during the 1960s. In less than a decade, water and sanitation master plans brought a coordinated and orderly infrastructure to the community’s periphery. These utility connections opened large areas of land for developers to build in the desert, which allowed isolated neighborhoods to tie into the growing water and sewage system. But ominously, Clark County officials did not regard comprehensive flood control as vital to the expanding

network. Local building and planning departments were merely concerned with flood control on a neighborhood and property level, approving a developer's channel and pipes installation even if it stopped at the end of the property-line and possibly increased the flooding risks to down-stream communities.

Urban expansion was promoted by the construction of large auto corridors crossing the entire valley – Tropicana Avenue, Flamingo Road, Desert Inn Road, Charleston Boulevard and Vegas Drive running east-west. The major north-south routes were Rainbow Boulevard, Decatur Road, Las Vegas Boulevard (the Strip), Eastern Boulevard, Lamb/Sandhill Road, and Nellis Boulevard. Local public works departments kept road construction costs down by designing roads to run over the natural terrain. In a 2010 interview, Paul Christensen, a former Las Vegas City and Clark County Commissioner, recalled approving Press Lamb, who was the County Supervisor in the 1970s and the main road builder in Southern Nevada, to pave existing dirt roads over the desert's natural "hills and dales." Lamb did a great job of paving roads very quickly in the valley. Christensen recalled nicknaming new roads "Press Lamb Specials." This type of road construction worked well when the town was small; paving over the existing dirt road and not having to raise it over the natural washes meant the community could open up large chunks of desert without spending a large amount of local tax dollars. Unfortunately by the 1980s, this policy of not building bridges or installing drainage pipes in the larger washes in the periphery made it impossible to travel across town and almost always caused major road damage during even minor storms. Through the late 1990s, 2000s and into present day, it is a common site during heavy rainfalls to see

automobiles backed upon either side of a flooded section of road in less populated areas of the valley that had not been raised over washes (fig 20).⁵⁵



Figure 20. State Route 159 near Red Rock Conservation Area, December 22, 2010. (photo credit to *Las Vegas Sun*)

Into the 1960s, local public works officials had not recognized how stormwater was affected by urbanization. Finally in 1968, the American Society of Civil Engineers (ASCE) conducted a national survey of major studies on urban stormwater runoff. The ASCE concluded that engineers and urban planners should consider the possibility of modifying land-development and drainage practices to reduce peak flow rates. As the United States expanded its road network, suburbs mushroomed on the periphery of all

⁵⁵ *Las Vegas Review Journal*, July 4, 1975. Eugene Moehring, *Resort City in the Sunbelt: Las Vegas, 1932-2000*, 252-256. Paul Christensen, former Las Vegas City Commissioner and Clark County Commissioner, interviewed by author, tape recorded, Las Vegas, NV March 1, 2010.

major metropolitan areas. As more people moved into the arid Southwest, road construction drastically affected natural stormwater drainage systems. Communities located in areas of the Sunbelt that experienced intense rain storms such as Riverside, California, Phoenix, Albuquerque, and Las Vegas had to develop systems for controlling upstream waters exiting onto a community and potentially impacting downstream places.

During the late 1960s, survey hydrologist Luana Leopold wrote a guide to hydrology for urban planning. Leopold's suggestions became the basis for a new concept, "blue-green development." In the 1970s the Federal Housing Administration (FHA) coined this phrase. The basic idea was to combine stormwater storage and open space. Rather than constructing large artificial drainage channels in urbanized areas to divert water around existing structures, the developer would create natural catchment basins and ponds in each neighborhood to store it. This practice is also called "stormwater harvesting." By the early 1970s, the idea had shaped the development of a number of projects, from a low-cost subdivision in El Paso to the celebrated "new town" of Woodland, Texas.⁵⁶

By the mid-1970s the U.S. Department of Agriculture had forty-two research facilities across the nation working on stormwater harvesting. The department had two labs in Arizona, one in Phoenix and another in Tucson. The Phoenix lab designed systems for individual buildings to capture and bank stormwater, which could be used for irrigation or waste water conveyance. Today, stormwater banking has become a vital component for developers pursuing the highest Leadership in Energy and Environmental Design (LEED) Platinum rating; to be considered, the structure must have a water

⁵⁶ Adam Rome, *The Bulldozer in the Countryside: Suburban Sprawl and the Rise of American Environmentalism* (New York: Cambridge University Press, 2001), 199.

collection system in place. The Tucson lab worked on stormwater harvesting, which is the practice of capturing water on each development in ponds or artificial lakes. Then in 1972 Congress passed the Clean Water Act, which set targets for pollutants, which increased the importance of capturing stormwater, as well as commercial and residential runoff, before it enters natural waterways. Environmental officials argued that the country's water system would be permanently affected by man-made pollutants like oil, grease and pesticides if something was not done. Proponents such as Luna Leopold stressed that stormwater harvesting in catchment ponds would absorb the pollutants. However, it is important to understand that harvesting is only successful in areas that have enough rainfall to recharge the ponds. In the arid Southwest where the basin would be empty for months on end, it would require communities to recharge the basins with valuable water. Typically, land values are too high to remove large portions of a new development for harvesting. By having catchment ponds in Las Vegas the shallow salty aquifer would also be recharged, causing the water to resurface through the areas natural springs, and after making its way downstream, negatively affecting the fragile ecosystem of the Las Vegas Wetlands – an ecosystem that is vital to the natural treatment of waste water coming out of the valley before entering Lake Mead.⁵⁷

Another major change to flood water policy came in 1968 when Congress established the National Flood Insurance Program (NFIP) under the Nation Flood Insurance Act of 1968. The NFIP is a federal program enabling property owners in participating communities to purchase insurance subsidized by the government. This was

⁵⁷ Norma Cox, retired Department of Agriculture researcher and concerned Las Vegas citizen, interviewed by author, tape recorded, Las Vegas, NV, June 1, 1920. Kevin Eubanks, Assistant General Manager of Clark County Regional Flood Control District, interviewed by author, tape recorded, Las Vegas, NV, March 30, 2010.

a watershed piece of legislation, for areas struggling with flooding. For Las Vegas, it was difficult to enact appropriate building codes, agree on engineering designs for flood control systems, punish developers who did not comply with established codes, and most importantly, provide affordable flood insurance. Until 1968 federal actions related to flooding were primarily responses to significant events. Local and federal officials used structural measures to control flooding, such as dams, levees, and channels. Generally, the only available financial resource to help flood victims was federal disaster assistance that was hard to get declared and government officials forced communities to navigate a maze of bureaucratic paperwork.

Despite funding under the Flood Control Act of 1936, which attempted to tackle the growing threat of flooding along America's rivers and coastal areas, billions of dollars were invested in structural flood-control projects in the mid twentieth-century. Unfortunately, as more flood control structures were built, the losses to life and property and the amount of assistance to flood disaster victims continued to increase. As early as the 1950s, federal officials proposed flood insurance, but it was clear that private insurance companies could not profitably provide such coverage at an affordable rate because of the catastrophic nature of flood events and the inability to develop actuarial tables that could reflect the risk of flood-prone areas. In response to the private insurance companies' inability to offer cost effective policies, the federal government took over the insurance program in 1965, first under the Federal Insurance Agency, and then in 1979 the Federal Emergency Management Agency (FEMA) became the permanent managing agency.⁵⁸

⁵⁸ 80-percent of the natural disaster losses in the United States are caused by flooding, found on South Florida Water Management District web site, www.sfwmd.gov.

The NFIP required communities to follow strict national floodplain management standards laid out in the National Flood Insurance Act of 1968. For example, commercial and residential finished floors had to be 12-inches above an established community's 100-year flood level; structures in areas prone to river or coastal flooding had to be constructed with flood-resistant materials, and property dividing-walls had to contain openings that would permit the automatic entry and exit of floodwaters. The program also called for the Federal Insurance Agency to map all areas of the country in order to uncover regional flood risk.⁵⁹

In December 1968 Robert C. Weaver, the first Secretary of the Department of Housing and Urban Development, delegated authority for administering the NFIP to the Federal Insurance Agency (FIA). That same month the Flood Insurance Rate Study and Map (FIRM) program began. It required that every community in America be mapped and rated to create a flood hazard probability. The U.S. Geological Survey (USGS) agreed to assist FIA in outlining individual floodplain boundaries, using existing topographic maps and aerial surveys of specific regions. In the same year the Army Corps of Engineers completed a six-year study that identified 5,000 flood-prone communities across the nation. There was an immediate recognition that scientific mapping of the major floodways could not be done within the time frame specified by the 1968 legislation, so the act was amended in December 1969 to authorize an "Emergency Program," which allowed for the creation of Flood Hazard Boundary Maps (FHNM) or "Flat Maps" (fig 21).

⁵⁹ Kevin Eubanks, emailed to author 12/21/2010. National Flood Insurance Program web site: [http://www.nfipiservice.com/nfc_presentations/W5_HistoryoftheNationalFloodInsuranceProgram\(GJNrevised\).2.ppt#276,8,Program Structure](http://www.nfipiservice.com/nfc_presentations/W5_HistoryoftheNationalFloodInsuranceProgram(GJNrevised).2.ppt#276,8,Program Structure).

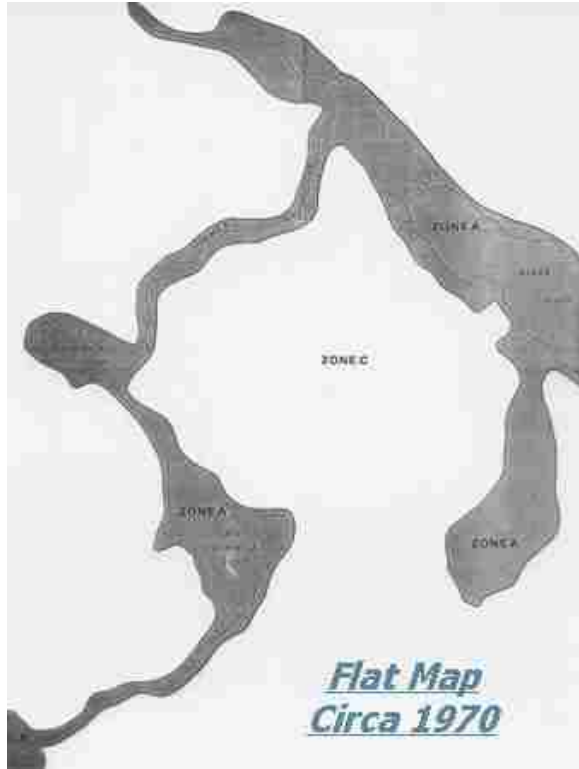


Figure 21. Flat map from Maine.

These maps displayed no topographical features and had little useful information on them, so it was difficult to determine whether a specific property was within a floodplain. Through the early 1970s, the federal government offered limited amounts of insurance to participating communities who were waiting on USGS and FIA to complete the mapping. By the end of 1973, the FIA estimated there were 13,000 flood-prone communities.

In 1973 Congress passed the Flood Disaster Protection Act mandating purchase of flood insurance for all structures within a flood-zone. Congress also prohibited federal agencies from providing financial assistance in the wake of a flood disaster to any community that did not participate in NFIP by July 1, 1975. Drastic changes in federal

regulations forced city and county officials, local builders, and urban planners to reevaluate their land development policies.⁶⁰

Another important piece of legislation came in 1973. The NFIP established floodplain management regulations for Special Flood Hazard Area (SFHAs), which is land lying within the floodplain of a community. The SFHAs are subject to a 1 percent or greater chance of flooding in any given year, which is the community's 100-year flood equivalent. It was virtually impossible for the USGS team to survey every mile of flood-prone land or complete the appropriate studies to determine if a specific area within a region qualified as a SFHA. Consequently, the original maps provided a broad-based view of each community's topographical features and did a poor job of accurately identifying homes or undeveloped land that sat in a flood-zone, causing a great deal of confusion for participating communities and their code enforcement departments. Then in April 1979 the Department of Housing and Urban Development transferred the NFIP over to the newly created Federal Emergency Management Agency. Shortly after taking over the program, FEMA spent millions of dollars to ensure that the appropriate lands were under SFHA and remove the ones that lay outside of floodplains.

During this same period local officials and builders were still taking major risks by continuing the nearly criminal practice of straddling flood plains with little regard to risk of life and property. It should be noted that the cities of Las Vegas, North Las Vegas and Henderson were able to participate in the NFIP by 1980. In fact, shortly after the NFIP applications were given out to communities in 1974, the City of North Las Vegas

⁶⁰ "National Flood Insurance Program: Program Description" Federal Emergency Management Agency, Federal Insurance and Mitigation Administration, 6-9.

completed the appropriate paperwork and flew Irene Porter, its Assistant Planning Director, to San Francisco to submit the first application from Southern Nevada.⁶¹

It took Clark County until the 1990s to qualify for participation in the NFIP. Present-day CCRFCD officials speculate the delay in the county's participation was due in part to FEMA prioritizing mapping for communities with a higher risk of flooding and with larger population centers; up through the early 1980s the county was still sparsely populated. Research suggests that the decades of mismanagement and patch-work construction of flood control came back to haunt county officials. It took the county's public works department and flood control officials nearly fifteen years to improve the system in order to participate in the program. It can also be concluded that the strict NFIP building codes, which Clark County officials began enforcing in the early 1980s, allowed for compact, sustained and rapid growth in the metropolitan area through out the 1990s and early 2000s.⁶²

By the twenty-first century, CCRFCD's success in mitigating floods had propelled Clark County into the forefront of FEMA's effort to modernize floodplain mapping in the digital age. In 2002, Clark County was the first community to receive a Digital Flood Insurance Rate Map (D-FIRM), which provides information for evaluating flood hazards through computerized modeling as a community's development evolves and changes natural floodplains with streets, walls and bulldozes surfaces. This paper concludes that the pressure of the NFIP and FEMA did not force the cities and county to reform seventy years of short-sighted flood control, but in fact it can be traced back to the

⁶¹ Irene Porter, Executive Director of Southern Nevada Home Builders Association, interviewed by author, tape recorded, Las Vegas, NV., April 1, 2010.

⁶² Kevin Eubanks, Assistant General Manager of Clark County Regional Flood Control District, interviewed by author, tape recorded, Las Vegas, NV, March 30, 2010.

community's response to the massive July 3, 1975, Caesars Palace flood and a 1980 liability lawsuit filed by a local resident, Albert Powers.⁶³

The Caesars Palace Flood

In 1966 Caesars Palace opened with great fanfare and excitement. It was one of the largest resorts in the world at the time with its Roman-themed interior and majestic fountains. The property, which is still situated on the northwest corner of Flamingo Road and the Strip, was built adjacent to the Flamingo Wash. Portions of the north parking lot dipped through the wash and were used as a flood control channel to divert stormwater around the property (fig 22). During the resort's early years when stormwater poured in from the west, floods covered that part of the lot in the wash, as water flowed under the Strip and the Flamingo Capri (where the Imperial Palace is presently located), past the Flamingo Hilton, on its way toward Lake Mead. Caesars' management posted signs on light poles warning patrons that the area was subject to flash flooding. Over the years the maintenance staff painted a yellow line on each side of the wash, running the length of the property to show the high-water mark. By the mid-1970s the popularity of Caesars Palace had grown, and more visitors came each year to experience its themed atmosphere. Many out-of-state tourists as well as local residents parked in the wash, ignoring the posted warnings of potential flood hazards. Periodically a flash flood would sweep away a vehicle parked in the wash (fig 23), but for the first ten years of the property's operation, patrons avoided parking in the wash.

⁶³ "A Chronology of Major Events Affecting the National Flood Insurance Program" October 2002, 7-15. NFIP history found on Maine.gov website, <http://www.state.me.us/spo/flood/maps/index.htm>. "National Flood Insurance Program: Program Description" Federal Emergency Management Agency, Federal Insurance and Mitigation Administration. 2,4. Flood Control Act of 1936, Center for Columbia River History website <http://www.ccrh.org/comm/cottage/primary/1936.htm>.



Figure 22. Top right of the image shows the north lot and the wash, March 3, 1975.
(Image courtesy of the Las Vegas News Bureau.)



Figure 23. September 12, 1969 west side of the Strip at the Flamingo Wash
(Image courtesy of the Las Vegas News Bureau)

For a while the lack of floods through the Flamingo Wash created a false sense of safety. Even the Caesars Palace security staff stopped enforcing the property's "No Parking" rule in the wash – so, on July 3, 1975, hundreds of patrons' cars were parked there.

Local officials and casino owners were gearing up for a busy Fourth of July weekend. All the hotels along the Strip and downtown were completely booked. Many eager visitors arrived in town mid-week to enjoy the entertainment and relax before the weekend's big crowds arrived. On Thursday, July 3 there were dark thunder clouds over the western Spring Mountains, but on the Strip it was sunny and hot. As the storm clouds grew darker, Caesars Palace security kept in close contact with the metro police, whose helicopter was surveying the rainfall in the mountains. Shortly before 4 p.m., a Caesars Palace security guard radioed dispatch with a frantic message that a two to three foot wall of water was rushing under I-15 toward the property. The brown, debris filled water slammed into hundreds of cars parked in the restricted area of Caesars Palace's north lot. Along the way, this torrent of water had collected trees, brush, man-made garbage that had been dumped in the desert, as well as large amounts of soil and rocks.

The force of the rampaging water lifted cars off the ground, literally creating hundreds of boats. Seconds after the river of stormwater invaded the lot, cars and debris lodged up against the drainage culvert under the Strip. The combination of cars, debris and the angled culvert supports, caused the water to pond and eventually to overflow onto the Strip. Fortunately for Caesars Palace, The Flamingo Hilton and the Holiday Inn (which is now the Harrah's Las Vegas), the flood waters crested just inches from each resort's front entrance. It should also be noted that the Imperial Palace, which would have sat directly in the floods path, had not yet been built.⁶⁴

⁶⁴ Mike Mansfield, Las Vegas defense attorney, who represented Clark County and CCRFCD since 1978, interviewed by author, tape recorded, September 8, 2010.



Figure 24. July 3, 1975 Clark County Public Works situated a crane on the Strip to remove cars.

(Image courtesy of the Las Vegas News Bureau)

Shortly after the stormwater subsided, emergency crews mobilized and worked with Clark County public works staff to bring in a large crane that removed cars stuck in the drainage culvert. Crews worked through the night and into the Fourth of July lifting more than 200 cars out of the wash and Caesars' parking lot. Numerous insurance firms

set up temporary offices in Caesars to process claims over the weekend. Ironically, the clean up on the Strip was hampered by hundreds of tourist and curious sightseers who swarmed into the area to watch the cleanup efforts, taking pictures and wading through the muddy sidewalks. Extra police had to be called in to control the crowds.



Figure 25. July 4, 1975, view from Caesars Palace of the massive clean up effort.
Image courtesy of the CCRFCD

This was the first major Las Vegas flood to make national news. Indeed, as former Chairman of the Las Vegas Convention and Visitors Authority and former Clark County Commissioner, Jay Bingham recalled in a 2010 interview, the Caesars Palace flood was the first time a Southern Nevada natural disaster had ever made national news. Also in 2010, Senator Richard Bryan remembered receiving calls from all over the country from friends and family fearing for his family's safety. "They must be crazy," he thought that day; "It had not rained a drop near my downtown office." People in other parts of the United States saw images of the Caesar Palace parking lot flooding and assumed the entire city was underwater, when in fact the storm that produced the flood waters was more than five miles west of the Strip.⁶⁵

For people living outside of the arid Southwest, flooding typically occurs when a swollen river crests its banks or a levee breaches. As discussed in chapter one, riverine flooding, most commonly resulted from long sustained rainfall or when large amounts of snow melt enter an area's watershed system, or from massive hurricanes. For decades, images have peppered newspapers or been captured on the national evening news programs of residents working to create man-made levees of sandbags along a swollen river in an effort to protect homes and businesses from flooding, or coastal residents fleeing days or maybe hours before a hurricane made land-fall. The common thread between all these types of floods is time. Riverine flooding is typically slow, sometimes taking days or weeks to reach flood status.

⁶⁵ *Las Vegas Review Journal*, July 5, 1975. Mike Mansfield, Las Vegas defense attorney, who represented Clark County and CCRFCD since 1978, interviewed by author, tape recorded, Las Vegas, NV., September 8, 2010. Jay Bingham, former Clark County and Las Vegas Commissioner and current Las Vegas developer, interviewed by author, tape recorded, North Las Vegas, NV., April 21, 2010. Senator Richard Bryan, former Nevada Governor and United States Senator (Nevada), interviewed by author, tape recorded, Las Vegas, NV., March 10, 2010.

Unlike riverine flooding, the rain storms that cause flooding in the arid Southwest are very intense, short, isolated thunderstorms. After the 1975 Caesars Palace flood, it became apparent to the local leaders that a localized flood event could be taken out of context and magnified by the national media to the long-term detriment of Las Vegas's tourist industry. The rest of the nation lacked experience with these types of storms. People did not understand that a flood could be raging in one part of the valley, while less than a mile away, the land could be completely dry and its residents oblivious to the destruction going on. By the late 1970s, local officials, casino owners, and city promoters become more aware of the nation's negative perception of Las Vegas during rain storms. It became apparent by the early 1980s that tourism was being threatened and even hurt especially in summer by the community's lack of flood control. Cancellation of room reservations spiked in the wake of every major flood event in the Las Vegas valley. Resort owners like Ralph Engelstad of the Imperial Palace and Jay Sarno at Caesars Palace pressured the Clark County Commissioners to address the flooding problem to the west of the Strip. The Caesars Palace flood also marked a turning point in the way Southern Nevadans viewed human interaction with flood waters.⁶⁶

The deaths of two North Las Vegas traffic engineers only reinforced the community's resolve to fix the flood problem. Shortly after the stormwater entered the Caesars Palace parking lot, North Las Vegas officials dispatched road workers ahead of the storm. Crews were attempting to barricade low lying roads and wash crossings to keep people out of danger. Mike Williams and Richard Hunkins were working two miles west of I-15, near the intersection of Craig Road and Losee Road, putting up road blocks

⁶⁶ Jay Bingham, former Clark County and Las Vegas Commissioner and current Las Vegas developer, interviewed by author, tape recorded, April 21, 2010.

at the Upper Las Vegas Wash crossing. By the time the storm reached North Las Vegas, Irene Porter and Dewayne Sudwick, the city's Public Works Director, were in a helicopter surveying the rainfall over the French Mountains north of the city. Porter recalled in 2010, observing a large sheet flood, which was "a couple of feet deep and very wide," flowing from the mountains at a high velocity. "Dewayne and I got on the radio," she remembered, "advising all city employees to get out of the area near the Upper Las Vegas Wash." Porter received the all-clear signal over her 2-way radio just prior to the flood waters channeling into the natural washes and existing flood channels. It was later discovered that Williams and Hunkins crossed back over the wash at Craig and Lossee to retrieve road barriers they feared would be swept away. When they attempted to return, the rising waters had enough force to sweep their truck down the wash. Observers reported seeing one of the men climb out of a side-window and scramble onto the truck's roof. The water's force combined with the buoyancy of the tires rolled the truck over. The next day members of the Clark County Coroner's office located both men's bodies a few miles downstream from where they were last seen.⁶⁷

The deaths of Williams and Hunkins and the hundreds of wrecked cars illegally parked in the wash at Caesars Palace raised major questions about personal accountability when it came to human interaction with flood waters. Research shows that poor human judgment caused the sixty-seven flood-related deaths recorded from 1960 to 2007 and the countless swift water rescues conducted during Las Vegas's history. Clearly, the loss of life was a result of flooding is troubling, but people driving into waters, parking cars in posted flash flood zones, or playing in washes raised the question in the minds of some

⁶⁷ Irene Porter, Executive Director of Southern Nevada Home Builders Association, interviewed by author, tape recorded, April 1, 2010. *Las Vegas Review Journal*, July 5, 1975.

about whether these people could be called “flood victims.” By the 1990s local officials began to consider those who entered flood waters as foolish and irresponsible. Some officials even threatened to fine people who willingly entered flooded areas and required emergency services. Since 1986, the CCRFCD has spent thousands of dollars on educational out-reach and public service campaigns in the hopes that people will think twice before entering flood waters.

But in 1975 it was the governments in the metropolitan area that most people considered foolish and irresponsible for their lack of flood control planning. It was shortly after the 1975 flood when Albert Powers, a private home owner in the southeast part of Las Vegas, filed a lawsuit in the Clark County District Court that would become the watershed case for establishing flood damage liability. The prosecution claimed Clark County officials had not taken reasonable care to avoid flooding of existing homes in the southeast part of the valley. The lawsuit also claimed the county was guilty of approving new private developments at the cost of existing property owners. This case went all the way to the Nevada Supreme Court in 1980. For the first time in the valley’s eighty-year history, government entities were held liable for flooding caused by development. The impact of the Supreme Court’s decision hastened the local governments’ efforts to develop a comprehensive flood control solution, because flood waters do not respect political boundaries. In the 1980s and 1990s, more than 1,000 lawsuits were filed; claiming developers, engineers and local public works departments did not design or build adequate facilities to protect existing properties.⁶⁸

⁶⁸ Brent Leavitt, retired Las Vegas attorney, interviewed by author, tape recorded, phone interview, August 30, 2010. Mike Mansfield, Las Vegas defense attorney who represented Clark County and CCRFCD during the 1980s and 1990s, interviewed by author, tape recorded, Las Vegas, NV., September 8, 2010.

County of Clark v. Powers

During the late 1950s and early 1960s Powers had purchased various properties in Clark County and developed those properties for residential use. One parcel of land was near the present-day corner of Desert Inn Road and Eastern Avenue, just east of the Las Vegas International Golf Course and the country club community on the course. The development was integrated into the County's master drainage plan for the southeast part of the valley. In 1980 the District Court found Clark County guilty, by its own planning, designing, engineering, and construction activities, as well as its adoption of the plans of private developers that altered the natural washes and streams west of the Powers' property. The County filled, leveled, graded, compacted, and paved many areas near the intersection of Desert Inn and Topaz Road, northeast of the Powers and Lawrence Lowe Properties to accommodate new homes and commercial buildings along Desert Inn. Prior to these reconstruction efforts, the curb and gutter system along Desert Inn was designed specifically to divert and channel stormwater and direct its flow east toward the Flamingo Wash, which crossed Desert Inn a mile and a half east of the Topaz intersection.⁶⁹

Once the redesign of the Desert Inn and Topaz intersection was completed in late 1967, the land and road were four feet above the Powers and Lowe's property lines. The county installed rock-lined culverts to divert water from a newly constructed grocery store north of the two properties. The water was channeled to a county maintained drainage pipe that collected water in various culverts and discharged it onto Powers and Lowe's parcels. To make matters worse, the county entered both properties, without permission, and built a concrete and rock berm to keep stormwaters from exiting their

⁶⁹ County of Clark v. Powers, Supreme Court of Nevada, No. 10879. Copy of opinion provided to author by Reference Desk of Supreme Court, web link <http://lawlibrary.nevadajudiciary.us/>, 4-5.

properties. The cumulative effort of the County's construction activities increased and accelerated the flow of water through the natural stream located near their homes. The water that was previously draining down Desert Inn to the Flamingo Wash had now been diverted by county engineers into the small stream system.⁷⁰

During the 1975 Caesars Palace flood and continuing through the early part of 1976, the parcels were deluged by constant flowing water. Subsequently in 1976, the county installed a large drainpipe west of the properties, which increased flooding of homes around Powers. In 1977, attorney Brent Leavitt of Las Vegas filed a lawsuit in District Court on behalf of Albert Powers, Lawrence Lowe, Rufus Wallace, George Rodrigues and Joseph Rodrigues. The suit was based on the theory of inverse condemnation, which is defined as an action brought by a property owner for compensation from a government entity that has taken the owner's property without bringing formal condemnation proceedings.⁷¹ Leavitt argued the county should have provided just compensation through the law of eminent domain if it had desired to incorporate his land into its flood control system. After twelve days of testimony, District Court Judge Howard W. Babcock found that the county had taken Powers and the other plaintiff's parcels in their entirety. In effect, Babcock ruled that the properties no longer had a practical use other than as a flood channel. The county appealed, claiming it had always been immune from liability for damages caused by urbanization. But in a landmark 1980 decision, the Nevada Supreme Court found that the government entities,

⁷⁰ Ibid, 5.

⁷¹ *Black's Law Dictionary*, Ninth edition, 332.

developers, and engineers had to take into account the full cost of development to the entire community prior to construction.⁷²

The District Court and Supreme Court agreed that Clark County, as well as the other local governments, had to take careful consideration of each of the public and private land users. As Supreme Court Chief Justice John Mowbray stated, “Growth and urbanization are not unduly restricted, but merely tempered with elements of order, planning and reasonableness.”⁷³ His opinion on the tempering of growth with order and planning would become the key principle guiding Las Vegas metropolitan’s rapid expansion from the late 1980s to today. *County of Clark v. Powers* also forced local planning agencies to reassess the flood control system in the Las Vegas valley or face the possibility of future lawsuits in the wake of flooding. Gone were the days of simply approving drainage plans for individual homes and neighborhoods on good-faith agreements between developers and local building permit departments. After 1980, planning personnel had to ensure that the existing community would not be adversely affected by future growth. Without a comprehensive flood control plan to correct decades of mistakes, local governments ran the risk of carrying the liability for the poor decision of previous public works employees and elected officials. Research shows that the Las Vegas valley was only able to grow in an orderly manner, because after 1980 officials started correcting existing flood control problems and held developers to a higher standard for new construction.

For the Las Vegas valley to become one of the fastest-growing communities in the United States during the last two decades of the twentieth century there had to be a

⁷² *County of Clark v. Powers*, Supreme Court of Nevada, No. 10879, 5.

⁷³ *Ibid*, 4.

comprehensive flood control plan approved by the metropolitan area's five government entities. History proved that with each entity working independent of the others, it would have been virtually impossible to complete a regional system to convey water through the valley. There was no framework in place to design a system, prioritize projects, and more importantly, fund the construction of the facilities. Looking back, politicians, developers, casino executives, and long time residents all agree that flooding was the catalyst that helped unify the five local governments. These entities had to come together under a regional umbrella in order to tackle the flood issue. Aside from solving the flood control problem in the region, many considered the creation of the Clark County Regional Flood Control District in 1985 as the first major step toward the City of Las Vegas and Clark County working together to assist the metro area's growth.⁷⁴ In the 1990s the regional approach of the CCRFCD produced a working model for other special service districts such as education, police, libraries, and water. It was the first district to adopt a master plan to address current issues while developing a systematic approach for the future expansion of Clark County's urban networks.⁷⁵ It was also the first district to use a citizen's advisory committee to monitor funding allocations as well as being a community outreach group to promote the vital need for a regional flood control district.⁷⁶

In the summer of 1981 there was no flood district and no clear plan for solving eighty years of mistakes and negligence. Then on August 12, 1981, the communities of

⁷⁴ Bruce Woodbury, Jim McGaughey, Irene Porter, Danny Thompson, Jay Bingham, Paul Christensen, Virginia Valentine, Robert Lewis, Brent Leavitt, Mike Mansfield, M.J. Harvey and Senator Richard Bryan all note in their individual interviews conducted by the author that the CCRFCD was the catalyst for the City of Las Vegas and Clark County to unify in regional issues.

⁷⁵ Las Vegas Valley, Boulder City, City of Mesquite, Overton and Logandale, Moapa and Laughlin.

⁷⁶ Jim McGaughey, former Nevada State Assemblyman and Las Vegas contractor, interviewed by author, tapes on file, April 15, 2010.

Moapa and Overton, northeast of the Las Vegas, were nearly destroyed by a series of storms that produced flood waters equivalent to a 500-year flood event. From 1981 to 1986, central Clark County was hit by massive flooding every summer. Unlike previous floods, no community was spared during this devastating period. Research has traced the support for regional flood control back to the storms of 1981-1985; each summer more people died and the property damages were greater each year. It would take Clark County Commissioner Bruce Woodbury and Nevada State Assemblyman Jim McGaughey to design the CCRFCD in 1985 and then, a concerted effort by a small but highly effective group of dedicated residents, developers, government employees and politicians to convince Clark County voters to approve a funding mechanism for flood control in 1986. The dedication of the group Woodbury and McGaughey assembled in 1985 helped protect lives and property. In addition, their efforts permanently reshaped the physical landscape of the Las Vegas valley over the next two decades.

CHAPTER IV

1981-1985

“United we stand, divide we drown.”⁷⁷



Figure 26. Las Vegas August 11, 1983
(image courtesy of CCRFCD)

⁷⁷ Jim McGaughey speaking to the Assembly Government Affairs during the 1985 Nevada legislature general session. *Las Vegas Review Journal*, March, 5 1985.

The Endless Summers of Storms

The catalyst that finally moved the Las Vegas valley's leaders and voters to unite behind the creation of a valley-wide flood control district were a series of disastrous floods that hammered the area between 1981 and 1986. Following Robert Broadbent's 1981 decision to leave the Clark County Commission and become head of the U.S. Bureau of Reclamation, Republican Governor Robert List appointed fellow Republican lawyer Bruce Woodbury to replace him.

During the summer of 1981, Woodbury's district was hit hard by massive flooding. On August 10, 1981, the communities of Overton and Moapa experienced a flood several times larger than the statistical 100-year flood flow rates for that region of the county. The summer storms caused thousands of dollars in property damage, killed hundreds of cattle, and washed out miles of railroad track along the Lake Mead Branch of the Union Pacific line. Woodbury noted in a 2009 interview that flooding became his primary focus after he surveyed the devastation. Over the next two years he attempted to gain support for flood control in the state assembly, but failed. That summer and into 1984, massive flooding across Southern Nevada finally forced legislators to address the concerns raised by Woodbury and others.⁷⁸

During this time local courts began seeing a growing number of flood-related lawsuits. Even prior to the 1980 Nevada Supreme Court decision in favor of Albert Powers, victims of the 1975 Caesars Palace flood were still in the courts trying to negotiate proper settlements. In 1978 the local insurance defense firm of Crommer, Barker and Michelson, the primary firm representing Clark County, handled more than a

⁷⁸ *Valley Herald and Lake Mead Monitor*, July 26, 1984. Bruce Woodbury, former Clark County Commissioner, interviewed by author, tape recorded, January 28, 2009.

hundred lawsuits following the June 3, 1975, flood. In 1978 the firm hired Michael Mansfield, a young lawyer, to take over the mountain of depositions and evidence collected during the period since the flood. From 1978 through the early 2000s, Mansfield was the de facto flood defense expert in Southern Nevada. He spent much of the first decade across the aisle from Brent Leavitt – the lawyer who won the County of Clark v. Powers case and became known as the “the muddy-water attorney.”⁷⁹

Looking back, both Mansfield and Leavitt in recent interviews agreed that the flood problem that Clark County faced the 1980s was magnified by poor government oversight in the cities and county planning and building permit departments. Even though in 1981 Bruce Woodbury blamed the Union Pacific Railroad’s poor drainage system for the massive damage in Moapa and Overton, and even though the local media, flood control personnel, and officials for years attributed flood damage to poor engineering and developers continually ignoring building codes, this thesis argues that the building standards the cities and county attempted to enforce were ineffective and never addressed the fundamental issues of storm water conveyance and its effect on the surrounding built environment.

After voters rejected the 1962 bonding initiative to fund a regional flood control district, county commissioners established a flood water management division within the public works department. In 1979 the small division had two people reviewing and approving all drainage studies for the entire county. In the mid-1970s Lou Vita retired from the Los Angeles Water District and moved to Las Vegas to escape the growing congestion of Southern California. In 1979, Vita decided to get a part-time job to pass the

⁷⁹ Michael Mansfield, Las Vegas attorney, interviewed by author, tape recorded, September 8, 2010. Brent Leavitt, retired Las Vegas attorney, August 30, 2010.

time, so he applied for a low-level position in public works. His resume quickly caught the attention of the department's director Floyd Lamb. Impressed by Vita's experience Lamb offered him a full-time position to run the flood water management division. Vita was accustomed to large budgets; in the 1970s the Los Angeles Water District was the premier water management agency in the West, and arguably in the entire United States. He began with no staff, so realized that he faced a virtually impossible task of managing the county's flood control problems.⁸⁰

Following the 1981 floods in Moapa, residents near the Cooper Avenue crossing sued Clark County, claiming the bridge and drainage pipes over the dry river bed of the Muddy River were inadequate to handle stormwater and debris. Prior to the bridge's construction, most rain storms would have produced enough water to wash out Cooper Avenue where the road dipped into the Muddy River wash, cutting off half the town. Ironically, in late 1980 Floyd Lamb had sent the newly-hired Vita to evaluate various drainage systems and flood-prone areas his department classified as "hot-spots" that required immediate attention. The Cooper Avenue crossing was one of the most urgent. During the first deposition of the 1981 lawsuits, attorney Mike Mansfield called Vita as an expert witness for the defense. He asked Vita to assess the Cooper Avenue crossing. In a 2010 interview, Mansfield jokingly recalled the horror that he felt when Vita answered: "Oh my (explicative)! How could they have built such a thing?"⁸¹ Later it would be revealed that the county's engineers had designed an all-weather crossing with two large drainage pipes to be installed and then the road built over top. However, the project lost funding, but Lamb knew the road needed improvement. So, county public works crews

⁸⁰ Michael Mansfield, Las Vegas attorney, interviewed by author, tape recorded, Las Vegas, NV., September 8, 2010.

⁸¹ Ibid.

constructed a smaller system that was primarily used when water was constantly present. At the Cooper Avenue crossing, construction crews guessed what the expected flow direction would be and angled the small culverts accordingly. But when later flood waters combined with the massive debris field hit the angled culver it instantly clogged and flooded nearly all the homes in the area.⁸²

Clark County was later found liable for the damages caused in the Cooper Avenue crossing flood. A growing number of lawsuits against the county and other municipalities were being processed in district court as a result of the local public works departments installing less expensive and less adequate flood control facilities to save on cost. Even though many of the lawsuits were settled out of court, the practice of stretching flood control dollars for decades was finally coming back to haunt the entire metro area. With more urgent concerns facing western cities in the 1960s and 1970s, such as traffic, crime, growth and water, skimping on flood control was a common practice. In Clark County, planners and developers continued to use urban streets for channeling stormwater to avoid building concrete lined conveyance channels. With no sustainable funding source, local engineers and officials during this period did their best to control localized flooding. Unfortunately, the solutions they were proposing and approving for construction were inadequate, and in most instances caused even more damage during heavy rain-storms.

By 1981 the flood water management division required developers to prove their projects were safe from flooding by submitting engineering studies and verbally confirming that measures were in place to ensure that downstream properties were safe from exiting stormwater. However, the drainage study that engineers routinely submitted to Vita's office was only a single-page that answered just three questions: "How much

⁸² Ibid.

water comes into the development?”, How much water does the development contribute?” and “How much water leaves the development.” The current CCRFCD drainage design manual is nearly 600-pages.

Prior to the County of Clark v. Powers case the various building permit departments in the metropolitan area would stamp or sign-off that a developer’s engineer had submitted a drainage study, which would protect the government entities from any liability. Even though defense attorneys argued that the Supreme Court’s opinion was vague, Mansfield advised Clark County that merely approving a drainage study or signing off on a retaining wall did not indemnify them. It was later revealed that developers were getting around code enforcement by simply asking Lou Vita to verbally approve revisions to flood control standards. “If the county got sued after a flood,” Mansfield noted in 2010, “the developer would turn on Vita, claiming to the judge that it was what his office told them to do.” Into the early 1980s the cities and county were forced to pay thousands of dollars in damages because their approval policies and oversight did not have checks in place to hold unscrupulous developers accountable.⁸³

Research indicates that the increasing number of flood-related lawsuits in the early 1990s became a major driving force to ramp up flood control measures, because many residents believed that corrective actions were taking too long to implement. In addition, the region was expanding into areas of the desert prone to flooding. However, in Clark County from 1977 to 1984 there is no evidence that the lawsuits against the local governments influenced progressive-minded officials like County Commissioners Bruce Woodbury and Manuel “Manny” Cortez and State Assemblymen Jim McGaughey to aggressively pursue the formation of a regional flood control plan. For these individuals it

⁸³ Ibid.

was about quality of life, a quality of life that was endangered during the summer of 1984.

On August 15, 1984, Urban Livengood, the liaison between Comprehensive Planning and the Public Works Department testified in front of a Clark County Commissioners meeting that the cities and county in the past had been waiving flood control improvements after developers requested financial relief from the strain of rising building costs. The largest complaint from developers during this period was the unfair apportionment of flood control cost. In a 2010 interview, Robert Lewis, local land developer and former home builder, noted that local governments would use “the law of the jungle,” lumping the entire cost of mitigation projects in a specific area on the first few builders. Therefore, it was no surprise that developers would skimp on channels and drainage pipes to keep their costs down, because they felt that flood codes unfairly inflated construction costs and lowered their overall profit margin, which slowed the pace of growth.⁸⁴

Growth in the Las Vegas valley was becoming a problem by the early 1980s. Not only did more people and a larger area have to be protected, but new developments were straining existing flood control facilities. This became apparent to some members in the community after the August 10, 1983, storm, which dropped four inches of rain over the southwest part of the valley, causing \$3 million in damage. Bruce Woodbury attempted to use this flood to convince state lawmakers of the need to create a flood control district. Most long-time residents knew that it periodically flooded in Southern Nevada – the storms hit very hard and very fast, hours later clouds were gone, the sun shined bright,

⁸⁴ *Las Vegas Sun*, August 16, 1984. Robert Lewis, former owner of Lewis Homes, which built over 20,000 homes in Southern Nevada before merging with KB Homes in the early 2000s, interviewed by author, tape recorded, Las Vegas, NV., March 12, 2010.

and the community cleaned up the dirt and debris. Unfortunately, 1984 would be a watershed year in the history of flooding for the Las Vegas area.⁸⁵

From July to September in 1984 seven massive storms hit central Clark County. The public property damage from flooding exceeded \$9 million. During this time the *Las Vegas Review Journal* and *Las Vegas Sun* printed pictures of flooding across the county that documented the damaged homes, flooded commercial districts, and loss of life. One of the most dramatic images captured, was that of Don Collett, editor of the *Las Vegas City Magazine* and parent, carrying a young North Las Vegas student to safety, through knee-high waters, with a school bus on its side in the background (fig 27).



Figure 27. Don Collett carrying a North Las Vegas student to safety
(*Las Vegas Review Journal* August 15, 1984)

⁸⁵ *Las Vegas City Magazine*, August-September 1987 issue, 13. "Flood History" *Las Vegas Review Journal*, August 20, 2003.

President Ronald Reagan declared Clark County a federal disaster area after a series of deadly storms in September. The powerful images captured by the media of the battered metro area convinced even the most fiscally conservative resident in the valley to vote for flood bonds in order to protect local children. During one particular storm on the evening of September 10, 1984, a young family of five drowned in the southwest part of the valley. This tragedy became the tipping point for Republican State Assemblyman Jim McGaughey to pursue a comprehensive flood control solution for Clark County. McGaughey should be given most of the credit for being the architect of the district, removing flood control from county control, making it independent, and creating a Citizens Advisory Committee (CAC) to oversee the politicians and ensure the district's longevity.⁸⁶

During the afternoon of September 10, 1984, Frank Faylor of the National Weather Service in Las Vegas reported a massive storm cell gaining strength over the Mojave Desert. It was 150 miles long, stretching from Needles, California, across the Las Vegas valley and up into Lincoln and Nye County. This storm produced an intense isolated cloud burst; at one point during the day officials observed rain falling on one side of street in a valley neighborhood while the other side was completely dry. The heaviest rains hit the Spring Mountains shortly before nightfall. There were reports of a four-foot deep torrent of stormwater flowing along the Blue Diamond Road just east of today's Mountain's Edge. Around 7:30p.m. Michael Shepard and his wife Carol, who lived in a remote desert community one mile south of Blue Diamond Road and seven-miles west of I-15, loaded their three children: Shanna, 6; Shad 3; and Shiela, 2 weeks old, into the

⁸⁶ *Las Vegas Review Journal*, March 5, 1985, Virginia Valentine, first General Manager of CCRFCD and former City of Las Vegas and Clark County Manager, interviewed by author, tape recorded, Las Vegas, NV., February 24, 2010.

family truck and ventured out across one of the muddy desert roads near their home. Metro police later reported that Shepard attempted to gain access to Blue Diamond Road by driving through the rising flood water, when his truck was swept away. The local Flight for Life helicopter arrived shortly before 8:00, but came back empty as rescue officials pronounced all family members dead at the scene. The shocking news was quickly relayed over the local radio stations. Emergency personnel quickly located four of the bodies – however, 2-week-old Shiela’s body was not immediately found.⁸⁷

As the storm intensified, Assemblyman McGaughey raced from his home south of Blue Diamond Road to assist a group of residents filling sand bags on the banks of the Duck Creek Wash near Blue Diamond and the I-15. As the evening went on, updates of the drowning continued to broadcast. The search for Sheila intensified late into the night. Then around midnight, Ron Flood, who would later become the Clark County Coroner, pulled Sheila’s body out of a large sagebrush. In a 2010 interview, McGaughey said he was haunted for years of the image of her little body lodged in those bushes. “That baby’s drowning was the defining moment,” he proclaimed, “her death gave me the passion to solve this [flooding] problem.” By late fall he began reviewing options for a bill to submit in the 1985 Nevada State Legislative session.⁸⁸

The 1984 floods also captured the attention of Mrs. M.J. Harvey, a local resident living in a neighborhood on the banks of the Duck Creek Wash near the intersection of Pecos and Warm Springs just west of the new Green Valley community. Harvey, a staunch conservative, became involved with flooding after her neighborhood was hit five times during the summer of 1984. “When it would flood,” Harvey noted in 2010, “I

⁸⁷ *Las Vegas Review Journal*, September 11, 1984.

⁸⁸ *Las Vegas Review Journal*, September 11, 1984. Jim McGaughey, former Nevada State Assemblyman (R), interviewed by author, tape recorded, Las Vegas, NV., April 15, 2010.

would call Bruce Woodbury and he would come out and survey the scene.” By early 1985 the Republican Woodbury, had gained much credibility with the largely conservative local population. He was known for being a strict opponent of tax increases, but he recognized that the key to solving the region’s flood threat required hundreds of millions of dollars for new projects to correct decades of inadequate, patch-work measures. Voters had approved flood control bonds in 1981 and early 1984, which yielded \$47 million in funds for mitigation projects. However, two problems arose from the bond issues: bonds do not generate additional revenue for sustaining decades of construction and maintenance and second, developers continued to construct flood control across the county that did not link up to downstream projects and channels. In effect, structures located in one jurisdiction did not match those constructed in a nearby one. In short, effective flood control required coordinated engineering with the channels and diameter of pipes widening as the system approached Boulder Highway, through the Las Vegas Wash and then off to Lake Mead. To complicate matters further, priority was still given to projects based on past disasters, rather than being part of a more comprehensive plan to prevent future flooding.⁸⁹

The Fathers of Flood Control

Unlike Woodbury’s 1983 failure to gain support in Carson City for the formation of a regional flood control district, by 1985 he had enough political capital to pursue regionalizing flood control. While city and county planners were enforcing adequate floodplain ordinances and building codes based on the National Flood Insurance Program (NFIP) standards, local public works departments still did not coordinate with one

⁸⁹ Gale Frazier, Clark County Regional Flood Control District – General Manager, interviewed by author, tape recorded, Las Vegas, NV., February 13, 2009.

another to ensure channel systems connected across the valley. Despite prodding by influential Nevada Resort Association members, local government officials, and private developers, the county still lacked a comprehensive regional approach. Flood control exposed the Las Vegas metropolitan area's core problem: lack of regional government.⁹⁰

On August 6, 1984, the Clark County Commission working through the Regional Transportation Commission (RTC) discussed conducting a valley-wide stormwater drainage inventory to evaluate existing problem areas and develop a short-term needs survey with cost estimates and funding options. Many different funding sources were discussed, but a service charge on home owners had the potential of being flexible to generate sufficient money to establish a viable foundation for the proposed program. The average property owner would be charged \$1.40 per month, which county officials estimated would generate \$25 million in revenue over a ten-year period. In the commissioners' defense, the actual master plan's cost of nearly \$1 billion would not be obvious until late 1985. At this point, Commissioner Manny Cortez and Las Vegas Mayor Ron Lurie questioned if the RTC would require legislative changes to become legally responsible for flood control. There was no language in NRS-543, the state's flood control policy, which prohibited the RTC from managing flood control. However, by mid-fall the board members dropped the idea in support of a new district controlled by the county.⁹¹

⁹⁰ M.J. Harvey, Chairwoman and original member of CCRFCD Citizens Advisory Committee, interviewed by author, tape recorded, Las Vegas, NV., March, 11, 2010. Virginia Valentine, first General Manager of CCRFCD and former City of Las Vegas and Clark County Manager, interviewed by author, tape recorded, Las Vegas, NV., February 24, 2010. Bruce Woodbury, former Clark County Commissioner and first Chairman of CCRFCD, interviewed by author, tape recorded, Las Vegas, NV., January 28, 2009.

⁹¹ Regional Transportation Commission of Clark County, meeting minutes, August 6, 1984. Provided to author by Clark County Clerk. *Las Vegas Sun*, October 26, 1984.

In October members of the RTC unanimously voted to have Clark County ask the state legislature for bill to enable the county to draft a ballot question for approval in the 1986 general election. Many members of the RTC as well as various local authorities believed flood control should be managed by the Clark County Commission. Cortez told local reporters that local and state oversight officials were unnecessarily complicating the procedure which made Clark County the governing head of the proposed flood control district. As in the past, officials could not come to a consensus on a funding source; there were proponents for property tax, special service fees and even a pro-rated utility fee.⁹²

After the summer torrents of 1984, flood control became an election issue, with every candidate jumping on the band-wagon. In November 1984 voters in the valley's eastern section elected Jay Bingham, a strong proponent of flood control, to County Commission District B. Bingham defeated incumbent Paul May Jr., who had been appointed by Governor Richard Bryan in 1983 after Commissioner Jack Petitti was indicted for taking bribes in one of Nevada's biggest public corruption cases.⁹³ Residents were tired of politicians like Petitti and May allowing contractors hired to install flood control measures taking months and even years to complete projects, which threatened major thoroughfares such as Nellis Boulevard. During his campaign Bingham, who was a successful valley land developer, saw contractors working for a few days on the roads or channels before leaving the site to work on the side for a private developer's project. Since there were no time limits for public projects, the contractor could move crews over to the higher-profit private jobs, complete them, and then return to work on flood

⁹² Ibid.

⁹³ The sting was codenamed "Operation Yobo," which took down Senator Floyd Lamb, Jack Petitti and three other local officials for demanding bribes to make a \$15million loan form the Public Employees Retirement System, *Las Vegas Review Journal*, March 2 2008

channels or roads. Bingham is credited with establishing completion dates for all public works projects sent out to bid and for assessing fines and penalties on those missing deadlines.⁹⁴

In late 1984 newly elected State Assemblyman Jim McGaughey seized the opportunity to take a comprehensive flood control bill to Carson City. Over the winter he assembled a team to draft a bill he could sponsor. The group included Las Vegas City Manager Ashley Hall, Irene Porter, who left the City of North Las Vegas's planning department in 1977 to head the Southern Nevada Home Builders Association, and Pat Shalmy, the director of the county's public works department and a future Clark County manager. McGaughey saw the importance of reaching across the deep political divide. Going against the advice of fellow senior Republican assemblymen, he asked Democratic State Assemblyman Danny Thompson, chair of the Government Affairs Committee and the president of the Nevada Steelworkers Union, to be his co-sponsor. McGaughey knew Thomas was a major proponent of flood control for Clark County and was influential in the state's Democratic house minority. It should be noted that the Democrats controlled the state's assembly in 1981 and 1983 regular legislative sessions, and then the Republicans took control in 1985.⁹⁵

McGaughey's team argued that a major differentiating factor of the flood control problem versus other pressing problems, such as the need for more firefighters, police and schools, was that when floods rushed through the valley, the water ignored political boundaries. McGaughey understood that each entity had different flood concerns; and,

⁹⁴ Jay Bingham, former Clark County Commissioner and head of Las Vegas Convention and Visitor Authority, interviewed by author, tape recorded, Las Vegas, NV. April 21, 2010.

⁹⁵ Jim McGaughey, former Nevada State Assemblyman (R), interviewed by author, tape recorded, Las Vegas, NV., April 15, 2010. Danny Thompson, former Nevada State Assemblyman (D) and current Executive Secretary of AFL-CIO, interviewed by author, tape recorded, Henderson, NV., May 11, 2010.

therefore, they never came together to share engineering or funding ideas from the top of Mt. Charleston to the Las Vegas Wash. For example, Thompson expressed his dismay over a 1980 flood on the western edge of the Henderson city limits, which was caused by a county approved flood channel that stopped at the edge of the city's boundary and was pointed directly at a housing subdivision just a few hundred feet downstream.⁹⁶

McGaughey noted in 2010 that leading up to his election to the assembly in 1984 he was shocked by the wasteful spending at both the local and state levels. "They always had the tax payer to fall back on." As a fiscal conservative, he understood the importance of designing a bill with a simple but very specific oversight component. By February 1985 McGaughey was ready to propose a sustainable funding mechanism to influence the metropolitan flood control. It consisted of charging a utility fee whose cost to each property owner would depend on the amount of water runoff's effect on that type of property. McGaughey's bill also had two additional components: first it outlined the governing board's structure and then created two advisory committees to oversee the projects and funding.⁹⁷

To fund the preparation of the region's master construction plan the legislature also approved a two-percent property tax increase in Clark County for one year to raise \$1.5 million. In late March of 1985, the newly formed Clark County Flood Control District selected James M. Montgomery Consulting Engineers, a Salt Lake City-based engineering firm, to design the master plan at a cost of \$988,000. County commissioners recommended that the district begin a search for qualified candidates to fill the position of general manager to oversee the program. However, with no permanent funding source

⁹⁶ Ibid. Thomas campaigned and won his 1981 assembly seat because of this flood.

⁹⁷ Jim McGaughey, former Nevada State Assemblyman (R), interviewed by author, tape recorded, Las Vegas, NV., April 15, 2010.

in place a new general manager would face job insecurity and no budget to hire staff or begin implementing the master plan. The district decided to postpone the search until the passage of the bill, but unbeknown to the rest of the county commission and other entities, McGaughey, Cortez and Woodbury had their eye on a young local engineer named Virginia Bax.⁹⁸

As the legislature continued to explore options for Clark County, Assemblyman Thomas Hickey (D-North Las Vegas) argued that the Clark County Commission should run the flood control district just like the successful Regional Transportation Commission (RTC). The RTC had the structure in place and Hickey, along with Bruce Woodbury, argued that representatives from the various local governments reporting to the county commission could possibly ensure a quicker implementation of the master plan.

McGaughey countered Hickey's suggestion with his own blueprint that would become a defining moment toward the unification of the governments in Clark County.

McGaughey proposed to take flood control out of the hands of the county commissioners and create an independent regional board to run the district. It would consist of two county commissioners, two Las Vegas councilmen, and one official each from Henderson and North Las Vegas, Boulder City and Mesquite who would alternate on the board every two years. This caused a major stir as commissioners resisted yielding control of the district. Commissioners Karen Hayes and Bruce Woodbury believed it was unconstitutional and did not account for "the one man, one vote" ruling of the U.S. Supreme Court. They argued the City of Las Vegas and Clark County would have equal voting power, effectively leaving hundreds of thousands of county residents without elected officials. The county commission represented all residents in Clark County, and

⁹⁸*Las Vegas Review Journal*, April 15, 1985

by limiting the commission to two seats on the district's board Woodbury and Hayes worried that rural residents would be left out. Research shows that the failure to address flood control in Clark County occurred partly because the cities never recognize the county's power. In a February 13, 1985, interview with the *Las Vegas Review Journal*, McGaughey defended his rationale for creating an independent district that was not controlled by one jurisdiction:

My main concern is to make this flood control system operate constructively. We have to have representation from every political entity in the valley. The reality of the matter is, and this is politics, if one entity is in charge of something, the other political entities next door will feel left out and won't give their total support and commitment, and I want to get rid of that problem.⁹⁹

McGaughey's bill created a level playing field, which this thesis argues helped curtail decades of infighting among jurisdictions and, more importantly, curbed fears of one local government subordinating its powers to another.¹⁰⁰

The bill's last component created a two-tier oversight structure. First, McGaughey called for all local public works directors to sit on a Technical Advisory Committee (TAC). Working with the district's engineers, the TAC would be charged with proposing projects. Shortly after first general manager of the flood control district was hired, the TAC members would develop a list of their top projects and prioritize them in an effort to reassure residents that all parts of the metro area would receive equal attention. By creating a technical board, the problem could be solved by treating the metropolitan area as a whole, without concern for jurisdictional boundaries.

⁹⁹ *Las Vegas Review Journal*, February 14, 1985.

¹⁰⁰ *Ibid.*

The second board consisted of private residents from each of the entities in the valley, and they would be appointed to the Citizens Advisory Committee (CAC). The CAC mirrored the flood control district's board. The citizens were charged with monitoring the politicians' actions and use of funds. McGaughey believed citizens should run the government, and he knew from his years in construction, the build out of a massive flood control system would take decades. By having a permanent advisory committee written into law and with members solely dedicated to flood control, there was less likelihood of future government officials shelving the district. The CAC would become important in 1986, when Bruce Woodbury, McGaughey, and other officials began a public relations tour of Clark County to sell the final funding mechanism to residents.¹⁰¹

On June 2, 1985, Governor Richard Bryan signed Assembly Bill 169 (AB 169) into law. It established the RTC as the Board of Directors for the district, which achieved McGaughey's goal of creating an independent district. The bill made substantial technical and policy changes to the 1955 Nevada Revised Statute 543 (NRS 543), which had created a state flood control policy. AB 169 also granted additional powers to the Clark County Flood Control District to hire a staff of engineers and various other flood control specialists to create uniform standards and assist in land use oversight.¹⁰²

AB169 did not specify the funding mechanism that would be used to pay for the estimated \$200 million in flood control needs for Clark County, but it required the new district to have a funding source in place by the fall to ensure the question could be on the

¹⁰¹ Jim McGaughey, former Nevada State Assemblyman (R), interviewed by author, tape recorded, Las Vegas, NV., April 15, 2010.

¹⁰² "Transportation Panel Wants Authority on Flood Controls." *Las Vegas Sun*, July 13, 1984. "Legislative Chronology and other Milestones." Provided by CCRFCD, 2. Clark County Regional Flood Control District Annual Report: 1985-1986, 1986-1987, 1-4,9.

1986 election ballot. So the district’s board moved quickly, holding its first meeting on July 11, 1985, electing Clark County Commissioner Bruce Woodbury as the first chair, a position he held until 1990.¹⁰³ The board immediately approved the funding of a \$380,000 federal study of flood detention measures on the eight major washes in the Las Vegas valley. A national search for a general manager began the following day.¹⁰⁴

AB169’s most important component was that it authorized the district to hire a chief engineer and general manager. Employing a qualified engineer to manage the district was a major contributing factor to the district’s success through the 1990s and into present day. Shortly after the bill was passed, McGaughey and Cortez set out to get a qualified general manager. In 2010 McGaughey recalled hearing about a young woman engineer working for Black & Veatch in Las Vegas. Prior to the creation of the district, Virginia Bax had been working with the Clark County Public Works Department to design a set of detention basins on the edge of the Red Rock Canyon just west of the present-day 215 beltway and Charleston Boulevard, as well as a basin in the canyons feeding the Upper Flamingo wash southwest of Las Vegas. At the time Marty Manning, the county’s public works director was considered a leading candidate for the position. But McGaughey considered Manning a political insider and worried that Manning’s allegiance to one entity or another could be a liability, and his concerns hurt Manning’s chances, but Bax was a woman, and women had not made it through the “glass ceiling” in a lot of corporate and government entities in Southern Nevada. To be sure, many local

¹⁰³ Original board members: Bruce Woodbury (County), Ron Lurie (City of Las Vegas), Al Levy, Vice Chair (City of Las Vegas), Carlton Lawrence (Henderson), Chris Christensen (Boulder City), Bill Lee (Mesquite), Jay Bingham (County), Theron Goynes (North Las Vegas), Bill Buxton, RTC Director – appointed as Board Secretary.

¹⁰⁴ “Transportation panel wants authority on flood controls.” *Las Vegas Sun*, July 13, 1984. (See “Legislative chronology and other Milestones.” Provided by CCRFCD, 2. Clark County Regional Flood Control District Annual Report: 1985-1986, 1986-1987, 1-4,9. *Las Vegas Review Journal*, August 12, 1985

officials wanted a man to manage the district. But Bax was smart and capable and McGaughey prevailed. So, on January 31, 1986, the Clark County Flood Control District board unanimously Bax as the first chief engineer and general manager of the district. With a salary ranging between \$55-\$65,000 per year, she became the highest-paid female government employee in the county's history.¹⁰⁵

Once Bax was hired, the district could focus on holding public hearings and approving a sustainable funding mechanism. In early February board members rejected McGaughey's proposal to fund the district through a property tax. Instead, Woodbury and other members of the board recommended that a one-quarter of a cent sales tax increase be the funding source put on the 1986 general election ballot. As Woodbury explained at a public hearing on January 31, 1986, "The property tax has been overworked. Sales tax is much less of a burden of the overage citizen. We're already paying 6 cents on many dollars spent because the [five and three-quarter] tax is being round off."¹⁰⁶ In 1986, only seven-percent of all property in Clark County was privately owned, but nearly 30 percent of the local sales taxes were paid by tourists. In an effort to show the residents that flood control was moving beyond decades of infighting, on March 3, 1986, board members changed the name of the Clark County Flood Control District to the Clark County Regional Flood Control District. Then on April 24th the CCRFCD officials released a master plan draft that outlined a forty-year construction schedule. At an estimated cost of

¹⁰⁵ Jim McGaughey, former Nevada State Assemblyman (R), interviewed by author, tape recorded, Las Vegas, NV., April 15, 2010. Virginia Bax-Valentine, former general manager of CCRFCD and former Clark County Manager, interviewed by author, tape recorded, Las Vegas, NV., February 24, 2010. *Las Vegas Review Journal*, February 1, 1986. *Las Vegas Sun*, February 1, 1986.

¹⁰⁶ *Las Vegas Review Journal*, February 1, 1986.

\$835 million, the master plan was a ground-breaking program to correct decades of mistakes while ensuring that future development would be protected (fig 37).¹⁰⁷

By late spring of 1986 the stage was set to tackle the most important task in finalizing the comprehensive regional flood control plan: convincing Clark County voters to approve a permanent tax increase for the sole purpose of protecting the metropolitan area from stormwater. Proponents of the sales tax increase feared a repeat of the failed 1962 bond election, so from May 1986 through the primary election on September 2nd a small band of dedicated government officials, concerned citizens, and business people led by Bruce Woodbury, Jim McGaughey and Virginia Bax, convinced residents to vote for a sales tax increase that benefited present and future residents of Clark County. Few people understood at the time that the vote was a “now or never” opportunity to move away from decades of relying on federal handouts and to take local responsibility for funding regional flood control.

¹⁰⁷ Legislative chronology and other Milestones.” Provided by CCRFCD, 2. *Las Vegas Sun*, April 25, 1986.

CHAPTER V

1986-1990

*“Floods don’t stop at a stop-sign or a city-limit; they just rage.
We had that in our favor.”¹⁰⁸*



Figure 28. Martin Luther King Blvd and Pinto Lane, August 18, 1989
(Photo credit to *Las Vegas Sun*)

¹⁰⁸ Judie Brailsford, former campaign manager for Bruce Woodbury and public outreach coordinator for the 1986 flood control funding campaign, interviewed by author, tape recorded, Las Vegas, NV., May 12, 2010.

The Now-or-Never Vote

During the winter of 1985-86, the CCRFCD and Southern Nevada legislators joined forces to map out a campaign strategy to persuade voters in September 1986 to increase Clark County's sales taxes by one-quarter of one-percent. Bruce Woodbury gave Judy Brailsford the responsibility of forming a citizens committee to convince the community about the need for adequate flood control. At the time, Brailsford was running his political campaigns, so in late 1985 she became the public outreach coordinator for the Citizens for Flood Protection (CFP) campaign. It was her job to organize the committee, create a speaker's bureau and get the politicians, flood control officials and the citizens committee in front of as many Clark County as possible before the election.¹⁰⁹

Brailsford modeled the citizens committee after blue ribbon committees, traditionally comprised of outstanding citizens in a community who were brought together to study a complex issue and to publicly endorse a solution. Brailsford believed that if the CCRFCD lacked a convincing argument for safeguarding the community and its children, the tax increase would be doomed to failure. Jim McGaughey recommended Ann Zorn, the district's CAC chair, to also lead the Citizens for Flood Protection and to be part of the speaker's bureau. Zorn headed the Southern Nevada League of Women Voters chapter and her husband, Roman J. Zorn had been UNLV's president from 1969-73. McGaughey considered her a pragmatic, nonpartisan problem-solver who would focus on the issues and not get sidetracked. For his part, the Republican Woodbury called upon M.J. Harvey, who had become an outspoken activist for flood control after the

¹⁰⁹ *Las Vegas Review Journal*, November 19, 1985. Judie Brailsford, former campaign manager for Bruce Woodbury and public outreach coordinator for the 1986 flood control funding campaign, interviewed by author, tape recorded, Las Vegas, NV., May, 12, 2010.

massive floods of 1983 and 1984 nearly destroyed her community. Brailsford and McGaughey believed that Zorn, a Democrat, and Harvey, a Republican, would show the community that flood control transcended politics. “This was an issue,” Brailsford stated in a 2010 interview, “that had no political or geographic borders -- floods don’t stop at stop signs or a city-limit; they just rage.” The group knew it had the community’s universal concern about flooding in its favor.¹¹⁰

Woodbury felt that government officials seeking re-election in 1986 needed to make flood control part of their campaign, so he asked fellow county commissioners Manny Cortez and Thalia Dondero, City of Las Vegas Mayor Ron Lurie, and Las Vegas Commissioner Al Levy to participate in the speaker’s bureau. By August 1986, Woodbury and the CFP had received over fifty endorsements for their campaign from all the major local media outlets, both political parties, every local government commission, and numerous civic and organizations.¹¹¹

Woodbury headed up the grass-roots campaign and Bax covered the design portion, while Harvey and Zorn were vital to giving the presentations a personal touch. Over a period of nine months, Brailsford set up 162 meetings across Clark County. They were so passionate about flood control that they spoke to any meeting of citizens of two or more. In a 2010 interview, Bax (now Virginia Valentine) remembered one presentation at a mobile home park on the valley’s east side where they spoke in front of an audience composed of “one guy in flip-flops.” The presentations were 20-30 minutes long; they began with photo slides dating as far back as the 1906 and 1910 floods in Meadow

¹¹⁰ Jim McGaughey, former Nevada State Assemblyman (R), interviewed by author, tape recorded, Las Vegas, NV., April 15, 2010.

¹¹¹ *Las Vegas Review Journal*, November 19, 1985. Judie Brailsford, former campaign manager for Bruce Woodbury and public outreach coordinator for the 1986 flood control funding campaign, interviewed by author, tape recorded, Las Vegas, NV., May, 12, 2010.

Valley, to show the region's historic vulnerability to flooding. Woodbury would discuss why the community needed comprehensive flood control; Bax then covered the Master Plan; Harvey and Zorn then emphasized how flooding affected every valley resident; and McGaughey closed by urging the audience to please vote for the quarter-cent sales tax.¹¹²

Every time he mentioned the tax increase Woodbury, Brailsford and the other politicians would cringe. McGaughey defended this approach because he believed that presenting the residents with a reasonable flood control plan and how it would be funded would lead to more voter support on Election Day. During this same time, fiscal conservatives across the state were paying close attention to California's Question 13, which, if passed, would have stopped all new tax increases. Woodbury made a simple but effective argument against those pushing a similar proposal in Nevada. He knew that Clark County's sales tax would eventually rise, following the lead of Washoe and Nye County sales tax increases. He believed the extra revenue should go to flood control, which 96 percent of surveyed county residents believed was needed. In his presentation, Woodbury stressed the importance of putting it toward flood control rather than letting some other agency get the dollars. He told reporters that "merchants favor the increase because it's easier to figure out, and people have the perception they're paying 6 percent anyway."¹¹³

To ensure the highest quality media campaign, Woodbury called upon his long time political strategist, Kent Orem, to produce the advertisements. Orem brought much experience to Woodbury's team. He had been running campaigns since the early 1970s, and by the mid-1980s, was considered by many local politicians an expert in building

¹¹² Jim McGaughey, former Republican Nevada State Assemblyman, interviewed by author, tape recorded, Las Vegas, NV., April 15, 2010.

¹¹³ *Las Vegas Sun*, August 4, 1986.

advertising campaigns for tax increase initiatives. During the late 1970s and early 1980s his company, OIZ Advertising conducted numerous local and regional polls which uncovered a disturbing trend about voters in the American Southwest. Its data revealed that the more time passed between events such as the 1984 floods and the 1986 election to combat them, the more likely the tax or bond measure would fail. In Orem's opinion, local voters had to see the flood devastation near Election Day. Recognizing that 1986 might not witness the same intense storms and devastation as 1983 and 1984, he advised Woodbury and Brailsford to constantly remind the community, with pictures and video of the devastation.¹¹⁴

Later in the spring of 1986 Brailsford and Orem's team created a political action committee (PAC) to raise money, which they named after the Citizens for Flood Protection committee. Since Bax and her staff were county employees, Woodbury chaired the PAC. In less than a month, it raised nearly \$100,000 for a late summer media blitz across Clark County. OIZ Advertising designed print ads, recorded radio spots, and produced television commercials complete with images and footage from past floods. Leading up to the September election, local television stations ran several commercials. One in particular featured Woodbury in Overton, knee-deep in mud and water, filling sandbags on the banks of a swelling wash. Another showed long-time local reporter Fred Lewis covering earlier floods across Southern Nevada. Orem even pulled images from the 1975 Caesars Palace flood to remind residents that floods also threatened the vital tourism industry, the lifeblood of the local economy. The flood control funding campaign was so successful that over the next three decades Orem and OIZ Advertising worked

¹¹⁴ Kent Orem, Las Vegas political strategist and owner of OIZ Advertising, interviewed by author, phone interview, Las Vegas, NV., February 22, 2010. Bruce Woodbury, former Clark County Commissioner, interviewed by author, tape recorded, Las Vegas, NV., February 18, 2010.

with other politicians and government agencies to secure funding approval for their local and state-wide initiatives.¹¹⁵

Predictably, the only opposition to the sales tax increase came from Carol Vilardo and Everett Perlberg of the Nevada Taxpayers Association. During the final negotiations for AB169 in 1985, Vilardo and Perlberg raised their concerns about McGaughey's funding mechanism lacking a "sunset" clause. Vilardo argued that residents would not have the opportunity to roll back the tax increase, and Perlberg wanted to know: "How do you get the population to exercise veto rights?" Woodbury responded that a formal date to remove the tax increase might threaten federal matching funds the Army Corps of Engineers had earmarked for Southern Nevada once the sales tax increase passed. After the voters approved the tax increase in September and with great confidence that the federal matching funds would be secured, Woodbury and Brailsford convinced McGaughey to allow Vilardo and Perlberg to push through AB-115, which put language in the flood control legislation to allow a ten-year "sunset" clause. In Woodbury's opinion, by 1995 the master construction plan would be one-third complete, making it virtually impossible to stop the program's positive impact on the community. In 1987, AB115 amended AB169 with the proper wording for a proposed public review and vote in 1995. Nevertheless, during the summer of 1986 some members of the CFP still feared that the funding request would not pass. In 2010, Brailsford recalled worrying that voters would reject the ballot question even with all the endorsements, public support, and the

¹¹⁵ Ibid.

well-funded media campaign, leaving no alternative to solve the problem. Even McGaughey warned Woodbury and the CFP that this was a “now or nothing vote.”¹¹⁶

Although support from the community continued to increase, as the mild spring weather began to show signs of the coming summer heat and the possibility of more floods, proponents of the measure were torn between hoping for heavy rains to soak the valley and fearing that another summer of deadly storms would bring more death and destruction. The year 1985 was the first in a quarter century when no one was killed in a Clark County flood. From a political standpoint there was growing concern that without a major flood in 1986, voters might not consider flooding enough of a threat to justify raising taxes. One *Las Vegas Sun* reporter wrote in June that “everybody talks about the weather, but nobody’s willing to do anything about it.”¹¹⁷ A common joke in the community was that “Southern Nevada only gets seven inches of rain a year, but it gets it all in one day.” Past funding measures had failed because, as Governor Richard Bryan told the *Las Vegas Sun* in 1984, valley residents were always guilty of “sunny day voting” on flood control.¹¹⁸ The 1962 bond election was held in April, two months prior to the region’s flood season. Later research concluded that many local residents viewed the 1955 flood as an anomaly and assumed the valley would never experience stormwater of the magnitude again, because it had not flooded in the metropolitan area since 1955. But this proved to be wishful thinking, a reaction that flood control proponents hoped would not delude voters again.¹¹⁹

¹¹⁶ Jim McGaughey, former Nevada State Assemblyman (R), interviewed by author, tape recorded, Las Vegas, NV., April 15, 2010. *Las Vegas Sun*, March 2, 1987. Judie Brailsford, former campaign manager for Bruce Woodbury and public outreach coordinator for the 1986 flood control funding campaign, interviewed by author, tape recorded, Las Vegas, NV., May, 12, 2010.

¹¹⁷ *Las Vegas Sun*, June 16, 1986

¹¹⁸ *Las Vegas Sun*, August 20, 1984.

¹¹⁹ *Ibid.* *Las Vegas Review Journal*, May 9, 1986. *Las Vegas Review Journal*, July 5, 1986.

McGaughey and Woodbury also understood that phrasing a ballot question was equally important as important as the campaign message. “The attitude of a lot of voters,” McGaughey told a reporter in July 1986, “is when in doubt, vote no.”¹²⁰ Local officials agreed that the wrong wording could make it appear as if the county was creating a new tax, rather than raising the sales tax a quarter-cent. More importantly, Woodbury recognized that some residents had short memories about flooding, so the vote, in McGaughey’s opinion, had to be as close to the flood season as possible. A local survey of valley residents in 1984 asked respondents to rank the major issues facing the community; they listed flooding as the number-one threat. The same survey was conducted in early 1986, but flooding did not make the top-twenty. To make matters worse, Assemblyman Marvin Sedway (Democrat – Las Vegas) warned McGaughey and Woodbury that if floods hit again with no structures in place to lessen the damage, the cities and county needed to understand that the state lacked the funds to bail them out.¹²¹

So McGaughey included unusual language in AB169 that required voter approval of the district’s final funding proposal during the primary election in September 1986. Traditionally, all funding requests were put on the November general election ballot. But McGaughey wanted to ensure that residents voted on the funding measure during the flood season. In addition, he did not want to compete with other funding questions, because there was a concern that voters might see multiple requests for money on the ballot and vote for another proposal, or maybe none at all. “If I’m the Lone Ranger,” he recalled in 2010, “then I’ve got a shot.”¹²²

¹²⁰ *Las Vegas Review Journal*, July 1, 1986.

¹²¹ *Las Vegas City Magazine*, August 1986. *Las Vegas Review Journal*, July 8, 1986.

¹²² Jim McGaughey, former Nevada State Assemblyman (R), interviewed by author, tape recorded, Las Vegas, NV., April 15, 2010.

In what would become a very important component of the later flood control system, the City of North Las Vegas, using funds from the 1981 flood control bond sale, had completed a \$2.9 million detention basin in early 1984. Thanks to the project during the devastating storms of 1984 the areas south of the basin had been protected from the deadly floods, a fact touted by Woodbury and the others during the 1986 campaign. Indeed, the impact of the new detention basin on the quality of life downstream from its protective barrier resonated across the valley and encouraged Woodbury and the CFP to push forward. By late 1985 the CCRFCD had already prioritized ten projects similar to the North Las Vegas basin, and they all were ready to start construction once the tax revenues began to flow in by mid-1987. The North Las Vegas basin became a poster-child for the regional master plan, because the plan represented a major leap forward in the flood control fight. For the first time in eighty years, the community had a pro-active solution to flood threats across all municipal boundaries that would use federal matching funds.¹²³

The Nevada Department of Taxation calculated that the one-quarter of one percent sales tax increase would generate roughly \$1 million per month for the district. Shortly after Montgomery Engineers completed the design of the Master Plan, the CCRFCD announced its estimated construction cost. At the National Association of Counties conference in Las Vegas, Woodbury, Bax and Zorn unveiled the ambitious build-out schedule for flood control channels and detention basins. They told delegates from all over America that the first phase would take 10-20 years to complete at an estimated cost of \$389 million. Once the current “patch work” system was corrected and the developed lands that were prone to flooding had been protected, then Phase Two

¹²³ *Las Vegas Sun*, June 16, 1986.

would begin. Officials estimated that this phase would cost \$447 million and take two decades to complete.¹²⁴

The July meeting of the National Association of Counties was the first time Woodbury's team provided the public with cost estimates and projected time-lines. Prior to Montgomery's recommendations, officials had speculated the first phase would only cost taxpayers \$200 million. Woodbury, Orem and Brailsford knew it would have been political suicide if the real projected cost of the Master Plan was revealed. In a 2010 interview, Brailsford explained that no one in the campaign ever mentioned "billions" during their meetings, because there had never been a public works project in the Southwest with a price tag exceeding a billion dollars.¹²⁵ It can be concluded that officials close to the project knew the cost was going to be in the billions, so they made a conscious decision to lower their public projections. Orem and Brailsford conducted opinion polls prior to the formal announcement of the cost. The overwhelming consensus from respondents was that even with federal matching funds if the plan's estimated cost came in above a billion dollars it would be defeated (as of 2009 the Master Plan was 20 years old, with a price tag of \$1.3 billion and 30 years remaining until phase two would be completed). It is important to note that when the district began building projects in the late 1980s the cost per mile of channel was \$2 million. At the peak of the local building boom in 2007, costs per mile of channel reached \$10 million. In early 2011, the cost per mile dropped to \$7 million.¹²⁶

¹²⁴ *Las Vegas Review Journal*, July 5, 1986.

¹²⁵ Hoover Dam only cost \$49 million, accounting for normal inflation, that would only be \$395 million in 1986.

¹²⁶ *Las Vegas Review Journal*, July 5, 1986. Judie Brailsford, former campaign manager for Bruce Woodbury and public outreach coordinator for the 1986 flood control funding campaign, interviewed by author, tape recorded, Las Vegas, NV., May, 12, 2010. February 2009 CCRFCD briefing information document provided by CCRFCD public relations director, Betty Hollister. Gale Frazier, email

While the Master Plan seemed near perfect on the surface, out-of-state delegates from the National Association of Counties could not comprehend how local officials could persuade residents living uphill from the heavy flood risk areas to vote for the sales tax increase. Woodbury merely responded that “It would take skillful political campaigning.” As Woodbury, Bax, McGaughey, Zorn and Harvey told voters in 1986, flooding affected everyone. When fire trucks, police cars, and ambulances could not enter an area because roads were under several feet of water, it threatened the quality of everyone’s life. Since the 1975 Caesars Palace flood, the Las Vegas tourism industry, Southern Nevada’s primary industry and largest employer, saw a significant number of cancelled hotel reservations following every major rain storm. Zorn felt the primary reason why the measure would pass was that this was a pocketbook issue. The state and federal government would not, and probably could no longer afford to fund flood disaster clean-up in Clark County. Also, without a comprehensive plan and regional board to oversee building code compliance and enforcement of new construction it would have been virtually impossible for the community to qualify for FEMA’s National Flood Insurance Program. This exposed the entire valley to major financial hardship if another season of flooding like 1984 were to occur. So, fearful of losing their homes and businesses, Clark County residents went to the polls on September 2, 1986 and overwhelmingly approved, by a 2-1 margin, the one-quarter of one percent sales tax increase.¹²⁷

correspondence with author over the cost comparison for one mile of channel since 1987, emailed to author, February 14, 2011.

¹²⁷ *Las Vegas Review Journal*, July 5, 1986. 50,319 in favor, 28,907 against, *Las Vegas Sun*, September 3, 1986.

Unification of Clark County

On September 3, 1986, a delighted and obviously relieved Woodbury and Bax-Valentine (she got married during the summer campaign), told local media outlets that their top priorities were to announce the first ten construction projects and request McGaughey and fellow assemblyman, Danny Thompson, to move the tax collection up from March 1, 1987 to January 1, 1987, which would give the CCRFCD and extra \$2 million in funds. Shortly after the vote, local planning departments recognized that the district would have to work with the cities and county to adopt ordinances requiring all developers to follow the same building standards in flood plains. This added responsibility would help guarantee that future building across the valley's open desert would follow uniform standards that conformed to the flood control system's standards. For example, the cities and county each required that builders reserve space for flood control structures within their planned subdivisions. Some of these bisected streets and even ran through blocks and between homes. In all situations, the CCRFCD and its needs became paramount.¹²⁸

By October 1986, McGaughey's plan to eliminate corruption in the building permit departments and tighten enforcement began to unfold. Everett Perlberg of the Nevada Taxpayers Association submitted a recommendation to the Legislative Commission, suggesting that the district's Technical Advisory Committee (TAC), made up of local public works staff and directors, have the final say over whether developers could obtain flood control variances for their projects. Leading up to the September vote, a common resident question of officials was: "Why do permit departments let developers

¹²⁸ *Las Vegas Sun*, September 3, 1986. *Las Vegas Review Journal*, September 12, 1986.

build in the washes?”¹²⁹ By removing the elected officials from the variance process, this virtually illuminated the chance of corruption. Gone were the days of developers greasing the pockets of elected officials or getting verbal approvals to cut corners on flood control. With the TAC board staffed with engineers from each jurisdiction in Clark County, a developer could no longer undermine the process. Woodbury himself objected to the TAC having veto power over the district’s board, which was made up of elected officials. It can only be assumed that Woodbury, who never had any ethics issues in his 28-year career, objected to the TAC having veto rights because by law it was the elected officials’ responsibility to decide if a construction variance would be in the community’s best interest. Over the past twenty-five years, the district has only approved two or three Master Plan variances.

During the same Legislative Commission meeting, Perlberg also requested that a cap be put on how much money could be spent on the district’s administration. The Nevada Taxpayers Association wanted the costs limited to 15 percent. McGaughey had always wanted the district’s staff to remain small in order to keep administrative costs low. This would ensure that more miles of channel and basins could be built. Historically, CCRFCD has kept its annual operations expenses (salaries, engineering studies, etc.) at less than 10 percent of sales tax revenues. The district does not manage the construction of flood control projects; that responsibility falls on developers of new land and the jurisdictions in which the projects are located. CCRFCD prioritizes projects, updates the Master Plan every five years, and allocates funds to the various jurisdictions in Clark County. It has been vital for the district to streamline its overhead to maximize every dollar for construction. Compared to other special service districts such as the Las Vegas

¹²⁹ *Las Vegas Review Journal*, October 10, 1986.

Metropolitan Police Department, Regional Transportation Committee (RTC), Clark County School District, Clark County Library District and the Southern Nevada Water Authority, the administrative cost versus money for projects makes CCRFCD the most efficient special district in Clark County.

In addition to McGaughey's plan to keep the district's administrative costs low, he put specific language into the AB169 mandating that revenue from the one-quarter of one percent sales tax could only be used for flood control. During the negotiation process in 1985, local public works officials wanted language in the bill to allow funding for bridge construction with flood control money -- a debate that has intensified during the current economic crisis. McGaughey defeated their request by defining flood control as building channels and detention basins. The only time a bridge could be funded by CCRFCD was when a flood control project affected an existing bridge or required a bridge to span a new channel. By the late 1990s the district began receiving requests for funding to cover cosmetic improvements around basins. Because McGaughey's language was so specific about funding guidelines, the district was able to refuse requests for "soft issues" like parks, side-walks, lamps or landscaping.¹³⁰

Following the successful passage of AB3 on January 28, 1987, which moved the start date of the tax increase from July 1, 1987 up to March 1, 1987, the CCRFCD cleared its last political hurdle. On February 13, Virginia Bax-Valentine presented the list of projects that the district's staff and elected officials from all Clark County governmental entities had been working on for weeks. For the first time in the valley's history, the area's historically fragmented governments worked together to coordinated flood control.

¹³⁰ February 2009 CCRFCD briefing information document provided by CCRFCD public relations director, Betty Hollister. Jim McGaughey, former Republican State Assemblyman, interviewed by author, tape recorded, Las Vegas, NV., April 15, 2010.

Clark County and the City of Las Vegas governments never liked each other. In *Resort City in the Sunbelt*, Eugene Moehring argued that this fragmentation had resulted from Las Vegas's historic inability to annex its suburbs.¹³¹ In his opinion, casino gambling was the culprit. The great Strip resorts repulsed all city attempts to tax their games and annex their property. The regionalization of flood control, like the need to coordinate highway construction and planning, became a catalyst for all the cities and county to come together. The political composition of the independent board required political foes to sit down at the same table, get acquainted with other officials and build cooperative relationships. Prior to the CCRFCD, except for the Regional Transportation Commission there was no formal mechanism in place for representatives from entities to get together and solve common problems. Bax-Valentine outlined \$135 million in projects that covered each of Clark County's geographic areas: Northern Las Vegas Valley, Central Las Vegas, Southwest Las Vegas and the rural communities of Boulder City, Moapa, Overton and Mesquite. The first eight years of the construction plan was based on which projects would protect the largest number of residents, lives and property. During the winter of 1986-87, turf wars began to diminish and a consensus developed to make the solution to eighty years of flood threats the priority of all.¹³²

Credibility Through Resolve

In less than three years, state, county, and city governments pulled together and passed legislation allowing Clark County to raise money for flood protection and for an education program to inform residents about flood hazards and the district's ambitious eight-year construction schedule. On March 1, 1987, the district began what many flood

¹³¹ Eugene Moehring, *Resort City in the Sunbelt* (Las Vegas, University of Nevada Press, 2000) 140-172.

¹³² *Las Vegas Review Journal*, January 29, 1987. *Las Vegas Sun*, February 14, 1987. Eugene Moehring, *Resort City in the Sunbelt*, 139. *Valley Harold and Lake Mead Monitor*, February 19, 1987.

control officials have estimated to be a fifty-year build out of flood control measures designed to protect all the developed land in Clark County and accommodate future growth. The district began its initial construction projects in those parts of Clark County, Las Vegas, Henderson and North Las Vegas where flood control would protect the lives and property of the greatest number of residents (Appendix I).¹³³ However, the patience of local residents was tested by the amount of time it took local governments and CCRFCD to curb the flood problem after the 1986 vote. Even though the first regional flood control project funded by the sales tax increase was awarded to Las Vegas Paving Corporation in November 1987, early projects in the eight-year plan Bax-Valentine announced were designed to correct decades of mistakes. In addition, projects could only be constructed when sales tax revenues were received. This “pay-as-you-go” program created major problems for the district planning massive basins to be built in the 1990s. In 1990 millions of dollars in flood damage occurred because the two major washes in the south part of the valley were delayed two or three years due to the lengthy preparation of environmental impact studies. These had to be prepared after federal officials designated the desert tortoise as an endangered species. In addition, officials had to revise the Master Plan to allow for the explosive growth that beset the valley at century’s end. Also, some progress was made in fixing prior mistakes. Unfortunately, there was continued loss of life. Despite major advances in flood control mitigation, stormwater destroyed property and took lives in the metropolitan area during the early year’s of the system’s construction.¹³⁴

¹³³ *Las Vegas Review Journal* February 14, 1987.

¹³⁴ *Las Vegas Sun*, November 16, 1987. *Las Vegas Sun*, March 2, 1987.

Woodbury, Bax-Valentine, and McGaughey were the driving force to keep the Master Plan intact in the late 1980s. But it soon became apparent in 1988 and 1989 that constructing the flood control system would be the easiest part for the board, staff and supporters of the CCRFCD. McGaughey's fear about over zealous city public works directors attempting to siphon off district funds was vindicated in early 1988 when Las Vegas public works director Richard Goecke requested \$1 million a mile for road improvements near CCRFCD projects. Woodbury and Bax-Valentine had to seek an attorney general's opinion even though AB 169 and subsequent amendments to the bill clearly identified the types of projects that could be funded by the revenue from the one-quarter of one percent sales tax.¹³⁵

The Environmental Protection Agency (EPA) required the CCRFCD to submit an Environmental Assessment (EA), a mandate for all communities receiving federal funds for projects that could significantly impact the human environment. In an effort to ensure that federal matching funds would not be held up, the district hired Dames & Moore to consult on the ten-year Master Plan's potential impact on residents. Officials expected the firm to complete the review and submit a snap-shot of its findings by late 1988. However, during the preparation of the EA, CCRFCD officials received notification from EPA that the desert tortoise, which had been on the U.S. Fish & Wildlife Service's "Threatened" species list since the early 1980s, was being move to an "Endangered" status. Even though the district had been working on the EA, the escalation of the desert tortoise's status to an "endangered species" required it to submit a full report of the Master Plan's environmental impact. The district assigned Tim Sutko, the senior hydrologist, to write the Environmental Impact Statement (ESI). His team had to address the Fish & Wildlife

¹³⁵ *Las Vegas Sun*, "AG's opinion sought on flood funds for roads" date unknown in 1988.

staff's mitigation concerns to protect the desert tortoise. Fish & Wildlife required the district to install special fences in tortoise habitats, or pay for animal's the relocation. The ESI took almost eighteen months to be approved, which further delayed construction in many areas.¹³⁶

The ESI added to the construction time-line, and by late 1988 the district was ready to begin construction on the Upper Flamingo detention near the present-day intersection of Russell Road and Durango Drive, which would prevent the type of flooding that caused the massive damage at Caesars Palace in 1975. Without the report from the Fish & Wildlife agency, the district could not receive the appropriate right-of-way grants to construct the basin and channels or the \$100 million in federal matching funds. Bax-Valentine, therefore, filed an appeal in early 1989 to the Council of Environmental Quality (CEQ), a federal board made up of members from the Fish & Wildlife Agency, EPA, and Soil and Water Conservation. The district also lobbied Harry Reid and other Nevada Congressmen to push for the CEQ to allow the district to move forward. In the end, the CEQ made a rare exception to the Endangered Species Act and approved the building of basins and channel prior to the final EIS being submitted in the early 1990s.¹³⁷

Once the CEQ gave the district the go-ahead, local officials requested the \$100 million in federal matching funds and land right-of-ways. The last major federal hurdle was overcome in the summer of 1989. Later that year, Woodbury and McGaughey met to

¹³⁶ Tim Sutko, Senior Hydrologist and Environmental Mitigation Manager – CCRFCD, interviewed by author, tape recorded, Las Vegas, NV., March 18, 2010. Final Environmental Impact Statement – Flood Control Master Plan, Clark County Regional Flood Control District, April 1991, prepared for the US Bureau of Land Management, prepared by Dames & Moore. Desert Tortoise information on current status <http://ecos.fws.gov/speciesProfile/profile/speciesProfile.action?spcode=C04L>.

¹³⁷ Tim Sutko, Senior Hydrologist and Environmental Mitigation Manager – CCRFCD, interviewed by author, tape recorded, Las Vegas, NV., March 18, 2010.

discuss the district's progress. Woodbury knew the district could never fund the construction of large detention basins needed on the metropolitan area's periphery. Under AB169, projects had to be built with a "pay-as-you-go" model, which required funds to be in place before construction could begin. The five largest basins and the miles of down-flow channels planned for the first ten-years of Phase One would take decades to fund. Woodbury was also concerned that smaller projects to correct the existing "patch-work" problems would not be built because money would have to be diverted for larger projects. Both men knew this contradicted the district's mission to spread the construction projects fairly across the entire county. With monthly revenues of \$1 million from the sales tax, Woodbury worried that it would take decades to fund the construction of a single detention basin, much less hundreds of miles of conveyance channels needed to connect the future system across the valley.¹³⁸

Woodbury, therefore asked McGaughey to consider sponsoring a bill to allow Clark County to sell bonds on behalf of the CCRFCD. The bonds would pay for the larger construction projects and speed up the time-line. Both men knew that the Army Corps of Engineers' feasibility study and the recommendations for the Tropicana and Flamingo washes would be submitted later that year. Moreover, flood control officials estimated the construction on these two washes alone would cost in excess of \$300 million, of which the CCRFCD would be responsible for nearly \$85 million in matching funds. At first, McGaughey had reservations about Woodbury's bill request. They had campaigned together in 1986 for the "pay-as-you-go" system, promising voters no loans

¹³⁸ *Las Vegas Sun*, June 19, 1990. *Las Vegas Sun*, August 30, 1987. February 2009 CCRFCD briefing information document provided by CCRFCD public relations director, Betty Hollister.

or no interest payment.¹³⁹ McGaughey also feared a large influx of money could potentially corrupt the process and sabotage the entire Master Plan. McGaughey spent the remainder of 1989 evaluating the progress of the tax revenue and reviewed construction cost estimates from contractors. By mid-1990, he agreed with Woodbury that “pay-as-you-go” would take decades to show any return on the community’s flood control investment. Also, he had great faith in Bax-Valentine and the CAC to curtail the potential of abuse, ensuring that the tax revenue would go toward future bond payments. So during the 1991 legislature, McGaughey successfully sponsored AB455, which allowed the CCRFCD to let Clark County sell bonds on the district’s behalf. In October of 1991 the county was able to sell \$81 million in bonds. As a preventive measure, he also wrote a second bill, AB462, to prohibit the district from using flood control money for the construction, operation, maintenance, or repair of streets, highways or bridges. The language McGaughey added allowed flood control officials and elected officials in the 1990s and today to successfully defend against other agencies’ attempts to siphon off flood control general funds for their own projects.¹⁴⁰

From 1986 to 1990, County Commissioner Bruce Woodbury, working with State Assemblyman James McGaughey, designed legislation that established the CCRFCD and funded its fifty-year effort to protect the Las Vegas metropolitan area from flooding. They also secured further legislation giving the district bonding capacity to accelerate its construction program. Still, even in 1990, there was no time for self congratulation over

¹³⁹ “On September 2nd Vote Yes for Pay-As-You-Go Flood Control”, Las Vegas Sun, August 26, 1986.

¹⁴⁰ “Flood Control Legislative Chronology and Other Milestones” provided by CCRFCD. Jim McGaughey, former Republican Nevada State Assemblyman, interviewed by author, tape recorded, Las Vegas, NV., April 15, 2010. February 2009 CCRFCD briefing information document provided by CCRFCD public relations director, Betty Hollister.

their historic achievements. Local floods that year damaged more property and took more lives, making it even more urgent to get the system built as quickly as possible.

CHAPTER VI

1990-2010

*“You can keep the water away from the people,
or keep the people away from the water.”¹⁴¹*



Figure 29 Las Vegas Middle Branch Channel
(image courtesy of CCRFCD)

¹⁴¹ Gale Frazier, CCRFCD General Manager.

Flood of 1990

The summer of 1990 was the worst year for the CCRFCD. First, Bruce Woodbury announced he would not run for re-election as chair of the district and would instead focus on the Regional Transportation Commission (RTC) to work on a plan to curb grid-lock across the valley. From 1991 to 2002, the RTC spent millions to re-design the major freeway interchanges at Interstate 15 and U.S. 95, commonly called the “Spaghetti Bowl.” Woodbury also worked to get the massive Las Vegas beltway (that now bears his name) funded and designed. Besides Woodbury’s departure, the district in 1990 also suffered from delayed construction projects on the Flamingo and Tropicana Washes, as the Army Corps of Engineers awaited approval from Washington D.C. certifying that its Environmental Impact Study (EIS) had been accepted. In June and July, two large storms hit Las Vegas and Henderson. Fortunately, within the Las Vegas city limits, heavy downpours fell over the western section of the city, and the newly constructed Angle Park, Gowan and Meadows detention basins captured the stormwaters, protecting homes in the fledgling Summerlin master planned community. But in the southwest parts of the valley the small number of district facilities already built could not prevent massive flooding. Block walls toppled and 6-inch reinforced concrete buckled as flood waters raged. Three people died during the storms, and private and commercial property owners reported nearly \$2 million in damages. The 1990 floods epitomized a problem the district would face for nearly fifteen years – having projects prioritized and planned, but not constructed when a major storm hit an unprotect section of the valley. During this period,

some flood control officials would simply tell critics: “If you can tell me where it is going to rain, then we will build the next project.”¹⁴²

During the early afternoon of Sunday, June 10, 1990, a large storm front covered the Las Vegas valley. In a matter of a few hours one and a half inches of rain fell. In Henderson, members of The Church of Jesus Christ of Latter Day Saints rushed from their worship service to aid neighbors in the Green Valley Country Club community. Rapidly rising flood water forced people to sandbag around their homes while also trying to keep storm drains from clogging to prevent the water from breaching a retaining wall and flooding hundreds of homes. In the excitement, Raymond Kunts, a 19-year-old member of the church went missing. Rescue officials speculated that he fell into a manhole whose cover had been washed away; the Coroner’s office recovered his body the next day about three blocks from where the group had been working.¹⁴³

As usual, people continued to risk their lives by attempting to cross flooded washes, drive through standing water and disregard the slick road conditions created by the storms. That day, every city and county emergency agency received rescue calls about people trapped in flood channels and storm-related motor vehicle accidents. There were also fatalities. Misty Alexander, a 25-year-old Henderson resident, drowned on her way to work. Needing to get to work in Las Vegas, she could go no further when the flood waters began to run over the road at the intersection of Russell Road and Topaz Street, east of McCarran International Airport. Eyewitnesses told authorities that Alexander drove around other cars stopped and inched into the intersection. As soon as her tires entered the rushing water, Alexander’s car was swept down the road. People on

¹⁴² *Las Vegas Review Journal*, July 10, 1990. *Las Vegas Review Journal*, July 13, 1990.

¹⁴³ *Las Vegas Review Journal*, June 12, 1990. *Las Vegas Sun*, June 12, 1990.

the edge of the water later recalled seeing the terror in her eyes. As the car neared a natural wash, the traumatized Alexander put her hands on the wheel and just calmly placed her head on the steering wheel as if to pray for help. The car tumbled into the wash and lodged against a concrete abutment. Rescue workers were helpless against the pressure caused by the stormwater rushing at a velocity of 40 miles per hour. The water's force held the doors closed sealing Alexander's fate. The Clark County Fire Department pulled her body from the car four minutes later.¹⁴⁴

One month after her death, Rose Lynn Worcester, a 25 year-old mother of two was killed on the evening of Sunday, July 16, 1990. It was Worcester's third day as a coffee shop hostess at Whiskey Pete's Hotel and Casino. It was her turn in the car-pool rotation to drive employees to Whiskey Pete's 45-miles south of Las Vegas (which is now Primm). As her shift ended, a massive thunderstorm producing nearly two and a half inches of rain hit the valley. After dropping off the last co-worker on Tropicana west of the Strip, Worcester headed north on Arville. When she pulled up to the Flamingo Wash in her Honda mini-van the water was running extremely fast and deep. Flood officials later determined that at the time of her death, the wash had seven feet of rushing water. A tow truck driver returning from service calls pulled up behind Worcester, and reported seeing her inching her wheels slowly into the waters. In a matter of seconds the force of the water grabbed her van and sent it down Flamingo Wash, past the Rio Hotel and Casino, towards Caesars Palace and the Strip. The following morning a limousine driver discovered her body in the first floor parking lot of the Imperial Palace.¹⁴⁵

¹⁴⁴ *Las Vegas Review Journal*, June 11 and June 12, 1990. *Las Vegas Review Journal*, June 19, 1990.

¹⁴⁵ Michael Mansfield, Las Vegas attorney, interviewed by author, tape recorded, Las Vegas, NV., September 8, 2010. *Las Vegas Review Journal*, July, 17, 1990.

What made these deaths so tragic was the fact they were preventable. Still, flood control and local officials faced a public backlash over the deaths of Worcester and Alexander. Attorney Mike Mansfield, represented the CCRFCD on the Worcester case, but he decided to settle out of court even though authorities ruled that the though cause of death was negligence on Worchester’s part. He convinced the district to give each of her two sons \$10,000, which was highest amount that could be paid out with no additional finance committee approvals. Mansfield feared that if the district or Clark County took it to trial, they might lose because of public sympathy for the victims. In 1991, various attorneys for Clark County advised officials to settle out of court on twenty-six flood damage claims resulting from the June and July floods of 1990. Clark County, which was self-insured, settled for \$615,873.¹⁴⁶

In the weeks following Alexander’s death, public outcry over the area’s continuing lack of flood protection proved hard for officials to address. Ironically, in the area where Alexander drowned the district planned to install a new underground system in early 1991 to prevent stormwater from flowing over the channels walls. Even though many residents in the affected areas viewed this as a constructive solution, for many it was “just a day late and a dollar short like flood control always was.”¹⁴⁷ During this period, Urban Livengood, Clark County’s deputy director of public works, expressed his concern over people not respecting the posted warnings and driving through flooded streets. Some residents expressed frustration over the slow progress of flood control, and there was a growing perception that past flood control projects were now “man-made

¹⁴⁶ Michael Mansfield, Las Vegas attorney, interviewed by author, tape recorded, Las Vegas, NV., September 8, 2010. *Las Vegas Review Journal*, August 11, 1991.

¹⁴⁷ Marian Timmerman, friend of Misty Alexander, talking with *Las Vegas Review Journal*, August 11, 1991.

death traps.”¹⁴⁸ In a statement by Livengood after Alexander’s death, which would be echoed by flood control officials following every major flood over the next fifteen years, “We’re putting in a storm-drain system that will collect this water.” More importantly, this statement acknowledged how the negative legacy of the 1960s, 1970s and early 1980s substandard mitigation, ignorance and neglect of flood hazards continued to haunt the rapidly expanding metropolitan area.¹⁴⁹

Through the early 1990s, flood control officials, local planning departments and building inspectors faced the difficult task of trying to enforce stricter building codes lined out by the NFIP and adopted by the local municipalities in the late 1970s. In 1991, Virginia Bax-Valentine told the *Las Vegas Review Journal*: “One source of problems we know about is something gets approved and then it is not built the way it was planned.”¹⁵⁰ It became apparent to flood control officials that the building department’s inability to close the permit process’ approval and inspection loop jeopardized the entire regional system. For example, the City of Las Vegas did not employ a full-time inspection staff during this period. Following the 1990 floods a local reporter discovered that the city’s quality control people had been allowing private developers and their engineering firms to hire a quality control firm of their choice to supervise the sub-contractors’ installation of flood control measures, while the city staff only performed spot checks.¹⁵¹

In other instances, bureaucratic inefficiencies caused the problems. During a 1991 government records audit, Richard French, a hydrologist for the Las Vegas-based Desert

¹⁴⁸ *Las Vegas Review Journal*, June 16, 1990.

¹⁴⁹ Michael Mansfield, Las Vegas attorney, interviewed by author, tape recorded, Las Vegas, NV., September 8, 2010. *Las Vegas Review Journal*, June 16, 1990. *Las Vegas Review Journal*, August 11, 1991.

¹⁵⁰ *Las Vegas Review Journal*, August 18, 1991

¹⁵¹ *Las Vegas Review Journal*, August 18, 1991. *Las Vegas Review Journal*, August 11, 1991.

Research Institute, uncovered numerous instances of one department rejecting a project's drainage study while another department, not adequately verifying the "paper trail," issued building permits. Brent Leavitt, an attorney for hundreds of flood victims during the 1980s and 1990s, told reporters in August of 1991 that the valley's rapid growth, coupled with the continued flood damage, caused by new development proved that understaffed planning departments were failing to properly evaluate developers' drainage studies. Fortunately for the local agencies, by the mid-1990s communication between departments had improved, and through better computer systems and increased usage, more accurate records were being kept. Even though it flooded every year in 1990s and eleven people lost their lives, local public works departments made great strides in correcting past "patch-work" mistakes while also completing numerous new projects designed to implement the Master Plan.¹⁵²

Building Out the Master Plan

As construction increased in early 1992, larger projects and longer sections of channels were built, thanks to the \$80 million from the 1991 bond issue. During that fiscal year the district released \$47.6 million in new projects with no additional tax burden levied on the community. In accordance with AB 455, the \$15 million collected from 1992 sales tax revenue went toward bond payments. Also in 1992, Bax-Valentine testified before the Army Corps of Engineers in support of authorizing the \$4 million pre-construction engineering and design of the Tropicana and Flamingo Wash Project. Construction began on the two washes in 1995 and ended in 2009.¹⁵³

¹⁵² Ibid.

¹⁵³ Clark County Regional Flood Control District 1991-1992 Annual Report, p 1.

Another significant advance in flood protection came when the district ramped up its early warning system. By 1992 the district monitored 56 stations in and around the metro area, collecting rainfall data and stream flows. Engineers installed the system after the 1974 Nelson Landing flood, 50 miles south of Las Vegas which killed five people. Prior to this early warning system, local flood control engineers relied on the National Weather Service to predict flooding along Colorado River and the smaller Virgin River. However, across the expansive and sparsely populated Mojave Desert, rain gauges were necessary to capture and alert local and state agencies of the possibility of flooding during high intensity, localized thunderstorms. By 2011 the district's early warning system consisted of 170 gauges throughout Clark County, 80 percent located within the Las Vegas valley.

Also in 1992, flood control officials revisited the possibility of using detention basins for dual purposes. This idea dated back to 1985, prior to the district's formation, when officials from Clark County, Las Vegas and North Las Vegas toured a flood control playground in Scottsdale, Arizona, built as part of the region's flood control system. They were impressed by the use of park-lined floodways rather than concrete ditches to direct stormwater flows. Unfortunately for Clark County, the Phoenix metropolitan area built the Indian Bend Greenbelt Floodway using federal subsidies set aside in the early 1970s for an Army Corps of Engineers' recreation program. The federally-funded programs dried up during President Jimmy Carter's administration. In addition, given the unique nature of the Las Vegas valley, it would have been difficult to incorporate a system of greenbelts on the metro area's periphery and concrete-lined channels in the urban core, because with a sharp drop in elevation from the mountains down to the Las Vegas Wash

the green belts would not have been able to slow flood waters sufficiently before they entered the channels. Also, the potential damage to the parks and greenbelt would have made it cost prohibitive to repair the system after a massive flood event.¹⁵⁴

Later that year, Dundee Jones, the City of Henderson Parks and Recreation director, received the “go-ahead” from the Henderson City Council to draft plans for a 60-acre sports complex, part of which would be in a flood basin in the Pittman Wash. Facility architects designed the mesh backstops with hinges, so they could open them up to let water flow through. The fields were located on the high ground of the basin to ensure people could safely escape if substantial flood waters entered the basin. Funding for the project came from a \$1.5 million 1988 bond issue, earmarked for developing recreation areas, which meant flood control funds would not be used for the complex. This ushered in a dual-use program for hundreds of acres of valuable land that required flood control officials to construct detention basins throughout the metropolitan area. Presently, a large portion of the sports complexes, such as baseball, softball and soccer fields are built in flood control facilities. All recreation projects are funded by the local entity, and no Flood Control District funds are used to build or maintain them.

In December 2001, the district adopted policies for dual-use to address the difference between channels, detention basins and natural washes. By the early 2000s, funding from the Southern Nevada Public Lands Management Act (SNPLMA), which came from a portion of the sale of Bureau of Land Management (BLM) lands across Clark County, gave local entities millions of dollars to design and build parks and greenways across the valley. In addition, the valley’s rapid growth during this period put pressure on builders and local officials to provide residents with sufficient open public

¹⁵⁴ *Las Vegas Review Journal*, June 17, 1991. *Las Vegas Sun*, February 17, 1985.

space. Detention basins make great dual-use facilities; however, the district prohibits recreational facilities in channels or natural washes because in the Las Vegas valley stormwater can raise seven-feet in eight minutes.¹⁵⁵



Figure 30. Lone Mountain Detention Basin
(image courtesy of CCRFCD)

Over time, the CCRFCD lost some of its top leadership. Virginia Bax-Valentine left in August 1993 to return to the private sector. Gale Frazier, the assistant general manager took over as interim general manager before the CCRFCD board appointed him as the district's general manager, a position he still holds today. During his tenure at the district Frazier has been considered by many current and former politicians, developers, and flood control proponents to be the driving force behind the district's success. Irene Porter,

¹⁵⁵ *Las Vegas Sun*, February 17, 1985. *Las Vegas Review Journal*, August 18, 1991. *Las Vegas Review Journal*, June 17, 1991.

the executive director for the Southern Nevada Home Builders Association, noted in a 2010 interview that “Frazier is an engineer set on one thing, which has been doing the best job he can do to provide and build a real flood control system.”¹⁵⁶

The Waiting Game for Land Was Now Over

While the Indian Bend project in Scottsdale was an effort to prevent development in identified floodways, the 1985 CCRFCD Master Plan allowed building in flood plains after detention basins and channels were installed. In the 1960s and 1970s builders could easily avoid areas of the valley prone to flooding because there was plenty of “safe” land to build on. But the housing boom of the late 1980s and 1990s, combined with the ever expanding resort corridor along the Strip, consumed many of the large parcels of undeveloped land in the urban core. Over time, urban and suburban growth forced home builders and developers to begin looking at land traditionally in flood zones. Prior to the regionalization of flood control in 1986, the first builders in flood-prone areas were required to construct not only adequate mitigation structures to protect their parcels, but also to build out a large section of structures for the future homes and businesses. For example, developers stayed away from thousands of acres southwest of Las Vegas because the cost of improvements would have driven their home prices above market rates. By the mid-1990s many large home builders such as Lewis Homes, Pardee Homes and American West Homes began to appreciate the dynamic improvements across the valley that the CCRFCD was responsible for.

During this period, Bruce Woodbury and the Regional Transportation Commission (RTC) also began their ambitious beltway project. Woodbury and other

¹⁵⁶ Irene Porter, executive director for the Southern Nevada Home Builders Association, interviewed by author, Las Vegas, NV., April 1, 2010.

officials knew that when completed, the beltway would circle the valley, open up thousands of acres for development, and hopefully relieve the existing freeway system. By the mid-1990s flood control and RTC projects were built in conjunction with each other to save on costs and prevent major road closures. This practice saved money and increasingly protected developers' investments. Indeed, Robert Lewis, the former owner of Lewis Homes, recalled in 2010 that once the district laid plans for protecting flood-prone lands his company as well as other builders began to ask where the next flood control project would be installed or the next RTC road paved.¹⁵⁷

Residential and commercial builders surveyed the local housing market and observed patterns in the expansion of the valley's infrastructure that prepared it for rapid growth. First, the building of Green Valley in the mid-1980s and then Anthem and Seven Hills in Henderson in the late 1990s, as well as the southern part of the Strip to Southern Highlands and Rhodes Ranch in the early 2000s, and then Mountain's Edge, South Summerlin, Centennial and Aliante in North Las Vegas all put pressure on the flood control district. This land and housing boom continued until the housing bubble burst in late 2006. During these go-go-years, builders forged a close relationship with the CCRFCD to gain valuable information on future flood control projects planned upstream, in hopes that their land acquisition teams could purchase all available private lands around those future projects at the lowest possible cost.¹⁵⁸

Of course, flood control in Clark County has always been about protecting the lives of current residents while planning for future ones. The metro area has grown in a radial pattern because of the high infrastructure expense incurred from drilling through

¹⁵⁷ Robert Lewis, President of Lewis Group and former owner of Lewis Homes, interviewed by author, Las Vegas, NV., March 12, 2010.

¹⁵⁸ Ibid

the desert's hard *caliche* soil, which virtually prohibits the development of large home tracts miles beyond the existing network. The cost to bring sewer, water, power, gas to a new area of the valley determines where communities are built. Frazier noted in 2009 that "if the district's job was to facilitate development, all we would have been doing for the past twenty years was building projects for developers."¹⁵⁹ Those who voted in 1986 for the funding mechanism and supported the district's building program had experienced decades of stormwater damage. Still to this day, many of the original flood control proponents stress that the people who moved to the valley and contributed to its hyper growth in the 1990s and early 2000s, owed much to those residents who came together in 1986 to address the flood threat.

The district they created, while it does not facilitate growth, has helped to safeguard "future" residents. Once a developer disturbs the native desert with buildings and roads, the CCRFCD ensures that the new development does not tax the surrounding flood control system. The district requires builders, at their cost, to construct approved facilities that meet the Master Plan and connect the new facilities to the existing channels. Once the improvements have been properly installed to meet the design criteria, they are integrated into the regional system and maintained with flood control funds. In some cases, if the district identifies a project that can protect a greater number of lives and property, it will fund the construction. For example, the district paid for the Angel Park channel to the Gowan Basin, located northwest of Las Vegas, even though it was part of the Summerlin Master Plan. Officials felt that communities downstream needed to be protected sooner than the timelines set for the private development in the area.

¹⁵⁹ Gale Frazier, general manager of CCRFCD, interviewed by author, Las Vegas, NV., February 13, 2009.

Another reason the CCRFCD avoids building in anticipation of future growth is because it is hard to acquire right-of-way grants for federal lands -- 87 percent of the land in Nevada is owned by the Bureau of Land Management (BLM). Also, the district is precluded from building mitigation structures in national recreation areas, such as the Lake Mead National Recreation Area or in an instant wilderness study area, which contain undeveloped federal land retained in its primeval character. Currently within Clark County, 47,200 acres are designated as wilderness study areas.¹⁶⁰ When land requires flood control facilities on federally managed area, Congress is petitioned to grant rights-of-way, agree to boundary changes or enter into land exchange agreements. All three are timely, and more importantly, very costly endeavors to undertake to protect land not yet developed. The Master Plan allows the district to quickly approve the desired structures the developer must install after the land has been purchased. By having a long range plan in place, land can be graded, roads paved, and homes built, and homebuyers and local business owners can be assured they will be protected from floods.¹⁶¹

The Water is Nearly Controlled

Through the mid-1990s the expanding flood control system captured increased amounts of stormwater rushing through the valley. During the summers of 1995, 1996, and 1997 flood waters spared the metropolitan area from massive property damage and loss of life, in part because of the facilities in the ground. Surprisingly, district officials hoped the Charleston Underpass would continue to fill with stormwater. In their view, the underpass was the poster-child for continued support of the Master Plan. But amazingly, even as the underpass continued to flood and even though less than 20-percent of the

¹⁶⁰ http://www.blm.gov/nv/st/en/prog/blm_special_areas/wsas0.html

¹⁶¹ Gale Frazier, general manager of CCRFCD, interviewed by author, Las Vegas, NV., February 13, 2009.

regional system was completed, during the 1997 legislature assembly speaker Richard Perkins questioned whether the flood control district should still be guaranteed the one-quarter of one percent sales tax. Frazier, fearing the default on the bond payments if the legislature pulled sales tax funding, called upon Jim McGaughey, who had left the assembly in 1993, to assist in the matter. That spring, McGaughey contacted Bob Price, chair of the Nevada Taxation Committee, and other influential state officials to ensure that Perkins' proposal failed. Fortunately for Clark County residents, Perkins' attempt to end the district's funding was merely a tax-cutting ploy to curry favor with his voting constituents. One can only wonder if Perkins ever considered the legal obligation to the pay off the bonds. Nevertheless, the bonding obligations saved the sales tax revenue and possibly the regional system. Without the bond payments, Perkins or any other over zealous state politician could have used the "sunset" clause in AB115 to threaten the district's longevity.¹⁶²

Clearly, the district's expensive work was not over. In April 1999, the CCRFCD Board of Directors took action to earmark \$28 million for the construction of the Freeway Channel and Bypass Facilities from Alta Drive to Sahara Avenue. The district wanted to build channels in conjunction with the RTC's ambitious I-15 and U.S.95 interchange expansion, at the Spaghetti Bowl. These construction projects west of downtown would stop the Charleston Underpass from flooding. Unfortunately, the projects were not finished in time to prevent a massive 1999 flood from devastating homes and property in the central part of the valley. In parts of the Las Vegas Wash, Duck Creek Wash, and the Flamingo Wash, the flood waters exceeded the 100-year flood standard. The thunderstorm

¹⁶² *Las Vegas Review Journal*, June 25, 1997. Jim McGaughey, former Nevada State Assemblyman (R), interviewed by author, tape recorded, Las Vegas, NV., April 15, 2010.

hit fast and required over 200 swift water rescues in and around the metro area. Damage to public and private property exceeded \$40 million, and two people drowned. The county declared a state of emergency, which eventually led to a Presidential Disaster Declaration. Shortly after the flood waters dried up, Tim Sutko, the district's senior hydrologist, told the *Review Journal* that the storm rivaled the 1984 floods. The Oakey Detention basin, built in 1992 to protect the expanding western section of the valley, captured 32 million gallons of stormwater before it could strike a nursing home and the Opportunity Village center. It can be assumed that without the flood control projects built through the 1990s, the 1999 flood could have been the deadliest ever to strike the valley.¹⁶³

¹⁶³ "The Las Vegas Flash Floods of 8 July 1999: A Post-Event Summary," Western Regional Technical Attachment, No. 99-26, November 9, 1999, 2-4. *Las Vegas Review Journal*, July 11, 1999.



Figure 31. Intersection of Flamingo Road and the Strip, July 8, 1999.
(Photo found on the web)



Figure 32. Charleston Boulevard Underpass, July 8, 1999.
(photo credit given to Ethan Miller of the *Las Vegas Sun*)

Ironically, this flood marked one of the last times the iconic Charleston Underpass flooded. The clean-up, combined with construction along I-15 and U.S.95, helped accelerate completion of the protective channels around downtown and the underpass. In a 2009 interview, Gale Frazier reflected on the “media circus” the flooded underpass caused throughout the decades: “It reminded people of the danger of flooding.” Without the visible reminder of the Charleston Underpass, the district relied on its public service campaigns to educate the community about flooding hazards. In 2000, the county commission, with the support of all other entities in the valley, designated July as “Flash Flood Awareness Month.” Dating back to the late 1980s, the district promoted flood awareness with an annual news conference every July 31st (which remains the official start of Las Vegas’ flood season), along with various advertising campaigns and later with the district’s public service television program called “The Flood Channel.” Since 2004, the district has asked residents to submit license plate abbreviations, and in 2007 a Spanish language abbreviation was added to the contest. Every spring the two winning selections are used on billboards (fig 33) and in print ads across Clark County.¹⁶⁴

¹⁶⁴ Gale Frazier, general manager of CCRFCD, interview by author, tape recorded, Las Vegas, NV., February 13, 2009. Betty Hollister, public relations director for CCRFCD, email to author, February 22, 2011.



Figure 33. 2010 CCRFCD billboard winners, English and Spanish
(Image courtesy of CCRFCD)

The last major flood to damage the Las Vegas valley occurred on August 19, 2003 in the northwest. The intense thunderstorm dropped two inches of rain over 49 square miles in less than 90-minutes. Gowan Road near U.S.95 became an instant river, and flood control officials estimated the flow rate down Gowan reached 3,000 cubic feet per second (a private residential pool holds approximately 3,000 cubic feet of water). No deaths occurred, but local emergency crews conducted numerous swift-water and helicopter rescues. Flood waters soaked 60 homes and caused \$2 million in private and public property damage. However, the devastation would have been much worse if not for the fact that local flood control facilities were completed and in place at the time. The system captured 400-acre feet of runoff, which is comparable to a football field with 400-feet of water on top of it (an acre-foot is 325,851 gallons water). Without those facilities,

the flow rates down Gowan would have exceeded 10,000 cubic feet per second, which would have threatened human lives and destroyed hundreds of homes.¹⁶⁵



Figure 34. City of Las Vegas Fire Engine trapped, August 19, 2003.
(Image found on the internet)

The 2003 flood hit an area that had additional flood control measures' approved and ready for construction, but the event occurred before the projects start dates. Unlike prior decades of reactive flood control measures, the district stuck to the Master Plan's construction priorities and installed the facilities that would have protected the area around Gowan in accordance with the original schedule. Then came the storms of August 2 and 27, 2007, both of which mirrored the intensity and rainfall measurements of the 2003 storm. But little damage was reported from these storms. Officials noted that heavy

¹⁶⁵ "Rainfall Event Report: August 19, 2003." Prepared by CCRFCD, November 4, 2003. "Apples and Oranges," CCRFCD public information video, http://acequia.ccrfcd.org/VideoViewer/VideoViewer.aspx?ReturnName=Public+Information+Videos&ReturnURL=http%3a%2f%2facequia.ccrfcd.org%2fPIVideos%2fPIVideos.aspx&VideoURL=http%3a%2f%2facequia.ccrfcd.org%2fpdf_arch1%2fpublic+information%2fvideos%2fApplesAndOranges.flv.

rains fell over areas in the west of the valley where the entire flood control infrastructure was built and in the ground. The network of detention basins and channels in place worked as designed, capturing massive amounts of stormwater and diverting it around neighborhoods. Between the two storms nearly 700 acre feet of water rushed into the detention basins, which slowed the water's velocity before safely conveying it to Lake Mead.¹⁶⁶

More recently during the week of December 17-23, 2010, a sustained low pressure system remained stationary off the coast of southern California, producing significant rainfall for much of Clark County and southern Utah. This type of low pressure system is commonly referred to as the "pineapple express," because it pumps moist tropical air from the Pacific Ocean into the continental U.S. During the six days of constant rainfall, gauges across Southern Nevada reported one to two inches of accumulation. But in the valley only a few road closures occurred, mostly in the remote Blue Diamond community and Red Rock National Recreation Area. The flood control infrastructure functioned as designed, collecting 1335 acre feet of stormwater (approximately 435 million gallons of water) and conveying it through the system. But communities beyond the metro area were not so lucky. Indeed, floods ravaged Bunkerville, Moapa, and Mesquite. And, St George, Utah experienced significant flood damage when the Virgin River nearly breached its banks. The river also threatened an earthen dam in Beaver Dam, Arizona, destroying two homes in the small community.¹⁶⁷

¹⁶⁶ Ibid.

¹⁶⁷ *Las Vegas Review Journal*, December 28, 2010. "Rainfall Event Report: December 17-23, 2010," prepared by CCRFCD, January 24, 2011. Betty Hollister, public relations director for CCRFCD, email to author, February 23, 2011.



Figure 35. A home washing into the Virgin River in the Beaver Dam, Arizona.
(photo credit given to Associated Press)

By January 2011, the regional flood control system had 83 basins and 550 miles of channel, 130 of which were natural washes that will remain natural pathways. Currently, Clark County continues to feel the effects of the 2008 recession. With sales tax revenues continuing their decline since 2007, the district projected revenues for fiscal year 2010-2011 stood at \$65.6 million, which is 15 percent less than the prior year. From 2007 to 2010, sales tax revenues shrunk by 72 percent. Consequently, construction costs dropped 70 percent during the same period because contractors, struggling to win bids, significantly lowered their rates. In addition, the current economic climate has caused greater competition among construction contractors. For example, prior to the 2007

downturn, four or five construction companies submitted project bids, but by 2010 the district consistently received bids from fifteen or more companies.¹⁶⁸

Surprisingly, as the recession battered the local construction industry, the 2009 economic stimulus packaged of President Barak Obama and Senate Majority Leader Harry Reid did not include earmarks for flood control construction in Clark County. Even though the regional system in Clark County is a model for public works in the struggling Southwest and a source of valuable construction jobs, the stimulus bill's criteria required that money could only go toward current Army Corps of Engineers projects. The \$239 million in federal funds used to complete the Corps' \$336 million Tropicana and Flamingo Wash projects did not qualify because all the detention basins and channels had been completed prior to the stimulus bill's passage. However, the bill did allow the district to sell \$150 million Build America Bonds (BABS), which Clark County sold in June 2009. The BABS gave the district a 35-percent payback on the interest paid. So, while the annual interest payment is \$9.4 million, which the federal government will reimburse the district \$3.3 million annually for it.¹⁶⁹

¹⁶⁸ Gale Frazier, general manager of CCRFCD, email to author, February 14, 2011.

¹⁶⁹ Gale Frazier, general manager of CCRFCD, email to author, December 20, 2010.

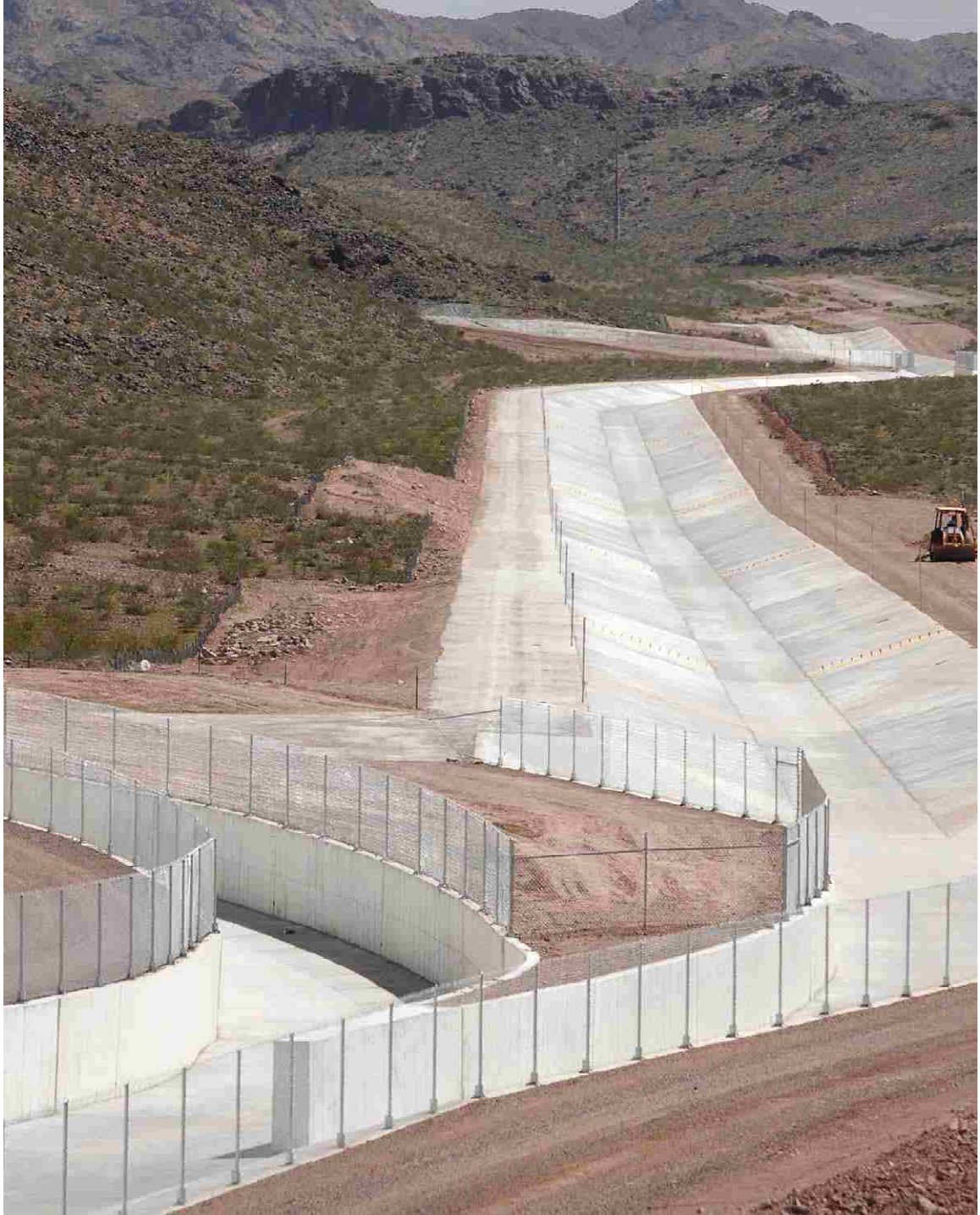


Figure 36. The Northeast C-1 channel and basin.
(image courtesy of CCRFCD)

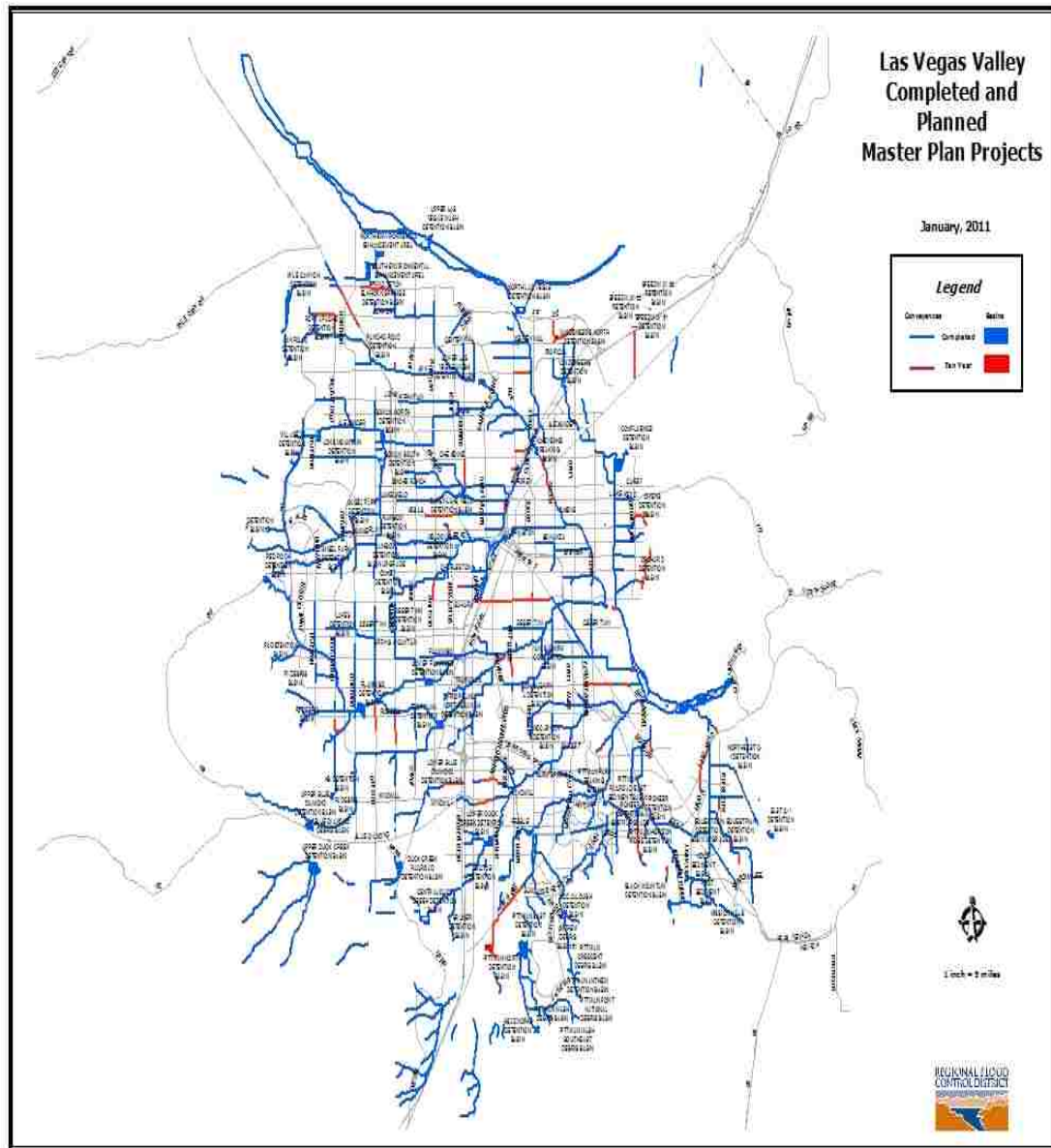


Figure 37. Las Vegas Valley completed Master Plan as of January 2011. Areas in blue are completed; areas in orange are planned for the next ten years.

The Future is Yet Sustainable

It can be argued as the storms of August 2007 and December 2010 demonstrate that the flood control system is accomplishing the Master Plan's goals of safeguarding the valley from rampaging waters. As the local economy continues to struggle and regain its momentum during the Great Recession, the Master Plan is in place to ensure that future growth will be protected.¹⁷⁰ However, the legislation governing the district does not allow funding for projects in anticipation of future growth, preventing valuable taxpayer money from being wasted on facilities that do not help existing residents. Once the valley is protected, the district has procedures in place to inspect and possibly reconstruct facilities built in the early phases of the Master Plan, as well as fund maintenance projects within the system. As the physical threat of stormwater decreases with every new flood control project installed, the struggle over sustainable water resources intensifies.

The Las Vegas metropolitan water area's resource is unique. Many of America's riverfront cities treat waste water and then dump it into the river. Downstream, another community pulls it out, treats it for human consumption, then the wastewater is treated and dumped back into the river, and so on and so forth. In the Las Vegas valley it is a closed cycle – the wastewater is treated and released into the Las Vegas Wash and then into Lake Mead, where the community's drinking water is taken from. A decade-long drought in Southern Nevada and the increased demand for water in the region has

¹⁷⁰ In December 2010 there were 307 new home building permits issued, *Las Vegas Review Journal*, January 17, 2011, compared to 2,733 in October 2007, statistic from Home Builder's Research.

lowered Lake Mead nearly 100 feet. It is no surprise that reliable clean water is a major concern for Southern Nevada's future.¹⁷¹

In addition to stormwater conveyances, stormwater quality has become a major environmental issue in the past two decades. Since the 1990s, environmental groups and clean water advocates have expressed their concern over the untreated stormwater flowing into the Las Vegas Wash and into Lake Mead.¹⁷² Unlike wastewater, stormwater is not treated before it enters Lake Mead. Flood control officials point to the fact that 90 percent of all the water in the Las Vegas Wash is treated water, while stormwater only represents 5-percent of the outflow, which historically comes during rain storms lasting over three to five days. The lake's pollutant levels spike during these intense rain storms, but dissipate quickly. District officials point to the ability of coastal communities to trace sustained pollutant levels back to stormwater because the event frequency is much higher. Clean water advocates, working in conjunction with the Environmental Protection Agency (EPA), require these communities to treat stormwater.

For the past decade, the EPA has required all American land developers to submit a Storm Water Management Plan (SWAMP) for approval. SWAMPs outline the developer's physical barriers to prevent erosion and soil runoff, in addition to the general contractor's own policies and procedures designed to minimize pollutants from exiting the construction site. In Clark County, the curb and gutter system connects to the flood

¹⁷¹ Kevin Eubanks, assistant general manager CCRFCD, interviewed by author, tape recorded, Las Vegas, NV., March 5 and March 30, 2010.

¹⁷² In 1989 the CCRFCD got involved to assist in protecting the region's water resources. EPA instructed local communities and other regulatory agencies to do something about stormwater. Boulder City and Mesquite were exempt because their populations were small enough. In 1990 the Clark County received the its first Municipal Separate Storm Sewer System (MSSSS) permit. At that time none of the entities had funding, so the state looked to the CCRFCD for money. Under NRS543, the district could use funds from the sales tax increase to protect the environment. Kevin Eubanks, assistant general manager CCRFCD, interviewed by author, tape recorded, Las Vegas, NV., March 30, 2010.

control system. In 2004 the CCRFCD adopted a program to inspect construction sites for soil runoff and levy steep fines on any developer who did not comply. Currently, the EPA does not require the CCRFCD to treat the valley's stormwater prior to its entering Lake Mead. However, in 2009, the agency itself began "setting the bar higher" on pollutant levels entering domestic waterways. The district partnered with the Southern Nevada Water Authority (SNWA) to achieve the EPA's expectations of stormwater quality. Presently, the district's major concern is that the EPA is attempting to set blanket national standards. In the Las Vegas valley, the first few minutes of a rain storm washes off large amounts of street pollutants into the flood control system. So, the CCRFCD, in conjunction with SNWA, is educating the public to assist in preventing pollutants from entering the system and contaminating Lake Mead.¹⁷³

As partnerships between the CCRFCD, SNWA and the EPA evolve, their combined focus will be to ensure that Southern Nevada's water resources are protected from man-made pollutants. The current drought affecting Lake Mead water levels, along with increased water demands for the metropolitan area, the district's role in the region's land-use, stormwater quality and flood plain management will inevitably become more important in protecting region's clean water supply.

At the federal level, CCRFCD management practices continue to provide FEMA with valuable mapping and modeling techniques to help other communities manage their flood zones. With a proven funding mechanism in place since 1986, FEMA officials point to the district as a model for other communities considering comprehensive regional

¹⁷³ Ibid. Norma Cox, former chair of Water Resources for League of Women Voters and Las Vegas Wash Development Committee, interviewed by author, tape recorded, Las Vegas, NV., June 1, 2010. Peter Jackson, City of Las Vegas Flood Control Senior Assistant Engineer, interviewed by author, tape recorded, Las Vegas, NV., March 25, 2009.

flood control to evaluate. The higher local regulatory standards adopted in the 1980s for new construction allow FEMA to focus on higher risk areas primarily along the nation's coastal and river systems. In the wake of Hurricane Katrina, it became imperative that communities in flood-prone regions take proactive measures to mitigate flood hazards. FEMA is currently in the process of recertifying all major levees across America.

Even with language written into NRS 543 that could dissolve the district after the balance of flood control projects are completed and despite the fact that the 2008-2010 recession slowed residential and commercial development in the region, periodic storms will continue to pound Clark County. Over the next fifty years as the Master Plan's build out is completed, many of the early channels will require reinforcement or reconstruction. During the foreseeable future the revenues from the one-quarter of one-percent sales tax and the money generated from bond sales will be needed to fund maintenance and upgrades to detention basins, channels and other flood control facilities. The metropolis' future growth patterns will be integrated into the existing regional system because of the long-range planning embedded in the district's Master Plan and because of the uniform building standards and regulations developed over the past quarter-century.

Conclusion

Like other burgeoning desert cities, Las Vegas and its suburbs postponed a systematic approach to street flooding for as long as possible. Even after the municipality and Strip began to expand across numerous washes that once lay beyond the built-up areas, voters were slow to fund the occasional bond issues that usually followed destructive floods. Las Vegans were more concerned with building streets, schools, and other high-priority projects. For most of the twentieth century residents were content to

combat flooding with such band-aid solutions as installing a culvert or spanning a wash with a small road bridge. Even after the great flood of 1955 that caused millions of dollars in damage, residents of Clark County voted down a 1962 bond issue to fund an Army Corps of Engineer-designed flood control project. Even in 1975 when devastating floodwaters at Caesars Palace imperiled Las Vegas' tourist image, the response remained meager.

Indeed, there was no real effort to fund a valley-wide comprehensive solution to flooding until 1985 when Clark County Commissioner Bruce Woodbury and State Assemblyman Jim McGaughey assembled a small group of progressive-minded politicians, engineers, and dedicated private citizens to promote the benefits of developing a regional solution to flooding. Inspiring the group was a series of disastrous floods during the early 1980s, which endangered residents, virtually shutdown the Strip, ravaged old and new communities throughout the area, caused millions of dollars in damages to public and private property, and resulted in loss of life. In particular, the drowning of a two-week old baby girl, along with her entire family in September 1984 helped solidify Jim McGaughey's dedication to push Nevada's legislature to approve an independent flood control district for Clark County. Bruce Woodbury led a year-long political campaign to gain voter approval for the flood control district's funding mechanism. Even though flood-related deaths and massive property damage continued to occur over the next two-decades, 1985 became the watershed for community action. Las Vegas finally took responsibility for protecting life and property in their metropolitan area.

By the mid-1980s, Strip executives, politicians, civic groups and community leaders recognized that something had to be done. In 1986, with more than 500,000 residents, the valley finally had enough tax base to fund the flood control district with an increase in the county's sales tax. With growing support for a regional flood control solution, in September of 1986 county residents overwhelmingly approved a dedicated funding mechanism to build a multi-billion dollar system of basins and channels that many officials estimated could take over a half-century to complete. The creation of the Clark County Regional Flood Control District not only produced a blueprint for change, but also symbolized the growing willingness of the four cities and Clark County to work together for the common good. A handful of visionary local and state politicians molded the flood control district into an independent government agency, making it the first special use district in Clark County not controlled by a specific jurisdiction.

Representatives from all the local entities came together, without the fear of relinquishing their political control to a rival, and finally began making progress on a comprehensive mitigation system. The new legislation appointed a group of committed private citizens to monitor and oversee the funding of projects, while a separate committee of technical advisors, comprised of public works department officials, prioritized projects to ensure that the regional system was not high-jacked or manipulated for political gain. After decades of feuding over tax revenues, sewer districts, fire and police services, and regional planning, the politically fragmented metropolis had matured enough that officials and residents finally came together in a cooperative spirit to solve a problem that threatened them all.

The Las Vegas valley's unique geography and the unpredictable nature of flash floods in the arid southwest will always require proactive stormwater mitigation to protect lives and property. Even during economic downturns, fluctuating environmental policies and threats to the longevity of its dedicated sales tax revenues, the district continues to provide funding for construction of new facilities and the maintenance of the existing system, as it invests to safeguard the community. It is vitally important that future residents recognize the potential for larger and even deadlier storms to strike the valley. As more channels are installed and basins built, the hazards of a 100-year event will continue to decrease, but flood control officials speculate that the region's weather patterns could still produce 200-year and even 500-year floods, potentially over-flowing the metropolitan system. Still, the Clark County Flood Control District has accomplished a lot in its first quarter century of life. It has forever transformed the physical layout of the Las Vegas metropolitan area by correcting decades of mistakes embodied in the old patchwork approach to flooding. In the process it has greatly improved the quality of life for all Las Vegas area residents while also providing a safe blueprint for future growth.

APPENDIX I

Political hurdles cleared on flood control plan

The Regional Flood Control District cleared the last political hurdle on its eight-year, \$136 million priority construction plan, as soon as the quarter-cent tax increase starts rolling in on March 1.

District Manager Virginia Bax-Valentine presented the list of priorities that staff and elected officials from all Southern Nevada governmental entities have worked on for weeks.

The number one priorities of each of the geographical areas were selected on the basis of "fairness" to each of the entities, but also on broader, regional reasons for the flood problems in Southern Nevada. Weight was given to those that would protect the life and property of the largest number, according to District Chairman Bruce Woodbury. The outlying, sparsely populated areas were not forgotten, he said.

Bax-Valentine emphasized that the eight-year priority list will be subject to review and updating every year, and all projects will be subject to availability of funds. The \$136 million list does not take into account any subsequent money the district may receive from federal programs.

Here are the number one priorities in each of the geographical areas chosen by the committee, and approved Thursday by the RTC:

• **Northern Las Vegas Valley:** Improvements to

Lower Las Vegas Wash south of the Union Pacific railroad tracks, consisting of a new channel between the railroad tracks and the freeway, concrete lining of the existing Las Vegas Wash Channel as well as a new bridge structure at Cheyenne Avenue — \$13.6 million.

• **Central Las Vegas Valley:** Conveyance and detention system that intercepts the proposed Charleston Storm Drain and Edna Storm Drain and connects them to the Las Vegas Creek conveyance system, \$4.2 million.

• **Southwest Las Vegas Valley:** Upper Flamingo Detention Basin at Durango and Tropicana, including a spillway and outlet works. \$6.8 million.

• **City of Henderson Basin:** A channel on Pittman Wash from the Union Pacific railroad tracks in the west to Duck Creek on the east, including bridges at Sunset Road, Stephanie Road, Boulder Highway, and Hollywood Boulevard, \$13.7 million.

The number one priorities in the smaller cities were listed. In Henderson, a channel on Pittman Wash from the Union Pacific Railroad tracks in the west to Duck Creek on the east, including bridges at Sunset Road, Stephanie Road, Boulder Highway, and Hollywood Boulevard. In Boulder City, Bootleg Canyon diversion dike at the mouth of the canyon.

Break down of projects for the first eight years of the CCRFCD Master Plan
Las Vegas Review Journal, February 14, 1987.

APPENDEX II

IRB Approval



**Social/Behavioral IRB – Exempt Review
Deemed Exempt**

DATE: August 19, 2010
TO: Dr. Eugene Moehring, History
FROM: Office of Research Integrity – Human Subjects
RE: Notification of review by Ms. Cindy Lee-Tataseo, BS, CIP, CIM
Protocol Title: Taming the Desert's Wash: The History of Flood Control in Southern Nevada; 1955 - 2010
Protocol # 1007-3512M

This memorandum is notification that the project referenced above has been reviewed as indicated in Federal regulatory statutes 45CFR46.

The protocol has been reviewed and deemed exempt from IRB review. It is not in need of further review or approval by the IRB.

Any changes to the exempt protocol may cause this project to require a different level of IRB review. Should any changes need to be made, please submit a **Modification Form**.

If you have questions or require any assistance, please contact the Office of Research Integrity - Human Subjects at IRB@unlv.edu or call 895-2794.

Office of Research Integrity – Human Subjects
4505 Maryland Parkway • Box 451047 • Las Vegas, Nevada 89154-1047
(702) 895-2794 • FAX: (702) 895-0805

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