

Water for Nevada



GUIDE TO
NEVADA STATE WATER PLANNING REPORTS

PROPERTY OF
DIVISION OF WATER RESOURCES
BRANCH OFFICE
LAS VEGAS, NEVADA

GUIDE TO NEVADA STATE WATER PLANNING REPORTS

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Prepared By

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TO THE CITIZENS OF THE STATE OF NEVADA

The Division of Water Resources has produced 29 separate publications, including summaries, since 1971 in support of the ongoing Nevada water planning effort. The "Water for Nevada" series included 22 reports and the "Alternative Plans for Water Resource Use" series included 7 reports. A "Special summary Report" was based upon the previously published reports, and provided general and specific conclusions and recommendations upon:

Water laws and administrative procedures
Regional water and related land resources
considerations
Projected water requirements

"Guide to Nevada State Water Planning Reports" is offered to facilitate in depth use of the immense amount of material published to date in these ongoing series of reports. A brief abstract along with the contents of each report is presented in the order of the date of publication.

Respectfully,


Roland D. Westergard
State Engineer



Photo by R. E. WALSTROM

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29.	<u>Water for Nevada, Special Summary Report, Nevada State Water Plan, State Engineer's Office, Nevada Division of Water Resources, Department of Conservation and Natural Resources, November 1974.</u>	93

INTRODUCTION

Water resource planning has been involved in administrative and management decisions and in the formulation of necessary information and data for a basis of such decisions for many years in the State of Nevada.

However, there has been a general concern about the State's limited water resources and the adequacy of these resources to meet current and future needs. There was also an awareness of other state, regional and national water planning efforts and a recognition of the necessity for the State of Nevada to be prepared to play her proper role in interstate and regional efforts and determinations.

Senate Joint Resolution No. 15 of the 1967 Nevada Legislative Session directed that the Division of Water Resources, of the Department of Conservation and Natural Resources, determine Nevada's future water needs and available water resources. Senate Concurrent Resolution No. 16, of the 1967 Session directed the Legislative Commission to study future Statewide Water Needs. A Legislative Subcommittee was appointed by the Legislative Commission to undertake this study.

The Subcommittee and the State Engineer subsequently recommended the establishment within the Division of Water Resources of a Water Resources Planning Branch and also recommended legislation to assure statutory authority for the planning function (Report to the Legislative Commission on Nevada Statewide Water Needs, January 31, 1969).

Development of a comprehensive water resource plan for Nevada was authorized by the 1969 Legislature under the provisions of Nevada Revised Statutes 532.165.

The 1973 Legislature by an Act, Chapter 554, required the State Engineer to complete the comprehensive water resource plan and submit it to the 1975 session of the legislature.

Development of objectives, principles, assumptions and procedures to be used in the planning process was essential at the outset. It was also considered advisable and necessary to provide for a review by the citizens of the State and their elected local and state officials of these proposed procedures and to seek any direction the public might suggest. Public meetings were held in 1969 and 1970 in all of the sixteen counties and Carson City. Views expressed were incorporated in the planning process.

It was also considered important to report the data and information to the legislators and other interested persons as it was developed. This was intended to serve several purposes including participation in the planning process, a

continuing status report on the efforts and to avoid submitting large volumes of material all at one time just prior to a legislative session.

To accomplish this, two "series" of reports have been presented. One series, "Water for Nevada" addresses Statewide inventory and projection data and information, and certain specific areas or subjects. The other "Alternative Plans for Water Resource Use" addresses the issues by regions of the State.

Reports and the supporting material have been developed by the staff of the Division of Water Resources, other state, local and federal agency personnel, consultants, and representatives of private entities.

This report presents the title and table of contents of all Nevada State Water Planning Reports. It is intended as a guide to facilitate the retrieval of the wide variety of data presented in the entire Water Plan. When it is determined that a certain map, table or other data is contained in a water planning report, that individual report must be consulted for the actual information.

Although some reports are in short supply, or out of print, some are available through the State Engineer's office, Division of Water Resources, Department of Conservation and Natural Resources, Carson City, Nevada. Additionally, these reports are available at most county libraries, the State Library in Carson City and the University of Nevada at both Reno and Las Vegas.

NEVADA STATE WATER PLANNING REPORTS

Water for Nevada, Report No. 1, Guidelines for Nevada Water Planning, State Engineer's Office, Nevada Division of Water Resources, Department of Conservation and Natural Resources, January 1971.

The purpose and scope of the State Water Planning Program are presented. The basic objectives including environmental quality, economic efficiency and area development are described as are the principles and assumptions. The procedures for inventories of available water resources, their present use and projected requirements are included.

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Objectives
Principles and Assumptions
Procedures
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Water for Nevada, Report No. 2, Estimated Water Use in Nevada, State Engineer's Office, Nevada Division of Water Resources, Department of Conservation and Natural Resources, January 1971.

Estimates of water withdrawals and consumption by counties and hydrographic regions provide a basis for making projections of future water requirements in Nevada for different types of uses. Irrigation, public supply, industrial, electric power, and rural uses are presented. Evaporation losses from lakes, streams and reservoirs are shown. Trends and changes in use are described for the period 1950-1969 and a history of water development in each category of use is given.

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Water for Nevada, Special Planning Report Summary, Water Supply for the Future in Southern Nevada, State Engineer's Office, Nevada Division of Water Resources, Department of Conservation and Natural Resources, January 1971.

The report presents a summary of several alternative plans for alleviating a projected water shortage in Southern Nevada near the year 2000. The plans discuss various importing, schemes, reduced water use, and limiting and dispersing population.

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 Alternative Water Supply Plans
 Alleviating Shortage by Reducing Consumption, Redistributing Population or Limiting Population
 Comparison of Alternatives

Water for Nevada, Special Planning Report, Water Supply for the Future in Southern Nevada (Detail), State Engineer's Office, Nevada Division of Water Resources, Department of Conservation and Natural Resources, January 1971.

Early attention has been given to meeting the needs of those areas of the state which are presently experiencing water shortages and those areas which may be water deficient in the near future.

Alternative ways were studied and evaluated to meet the potential water needs in southern Nevada which are expected to be over and above those which can be met with the importation of Nevada's allocation of mainstream water from the Colorado River through the Southern Nevada Water Project.

Much of the material developed could be applied to other areas and situations in the State.

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Water for Nevada, Special Report, Reconnaissance Soil Survey of Railroad Valley, State Engineer's Office, Division of Water Resources, Department of Conservation and Natural Resources, May 1971.

The soils of the Railroad Valley area were identified, mapped, and named according to the U. S. Comprehensive System of Soil Classification, as part of a statewide reconnaissance soil survey. This progressive survey is designed to furnish basic soil data needed to evaluate a variety of potential uses. Soil Hydrologic Groups, Soil Materials Sources, Soil Erosion Potential and Soil Irrigability Classes are among the several interpretive evaluations made in Railroad Valley as a result of the survey.

In addition to being used in the development of the State Water Plan, the progressive reconnaissance soil survey will also contribute to an eventual soil map of Nevada which will be a basic resource data source for state, regional and local land evaluation and development planning. The summaries of the Railroad Valley and Dixie Valley reports are included here as examples of the type and form of material being developed.

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Water for Nevada, Report No. 3, Nevada's Water Resources, State Engineer's Office, Nevada Division of Water Resources, Department of Conservation and Natural Resources, October 1971.

This report constitutes an inventory of the water resources of the State and presents the total ground and surface water supply presently available in Nevada.

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Water for Nevada, Special Report, Hydrologic Atlas, State Engineer's Office, Nevada Division of Water Resources, Department of Conservation and Natural Resources, June 1972 and subsequent.

This atlas includes a series of maps containing hydrologic data and basic information related to the State Water Planning effort.

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Water for Nevada, Report No. 4, Forecasts for the Future - Mining, State Engineer's Office, Nevada Division of Water

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Water for Nevada, Report No. 5, Forecasts for the Future - Population, State Engineer's Office, Nevada Division of Water Resources, Department of Conservation and Natural Resources, February 1973.

Population projections are provided for counties and hydrographic regions in the 1970-2020 planning period. Additionally, open file small area population projections are maintained for over 100 portions of the state, including cities, towns, townships and rural areas. Consistency of projections among these various areas was obtained to gain an insight into when and where and in what amounts future water needs will occur.

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Water for Nevada, Special Report, The Future Role of Desalting in Nevada, State Engineer's Office, Nevada Division of Water Resources, Department of Conservation and Natural Resources, April 1973.

A wide diversity of potential applications for desalting is considered, including possible preservation of Walker Lake's quality at a level better than exists today. The greatest potential for immediate application of desalting in Nevada is for an individual ranch domestic water supply or other small need where good quality water supplies are not available. In addition, Brady's Hot Springs, between Reno and Lovelock, is assessed as a source of geothermal energy to provide both desalted water and electric energy. Costs would probably be applicable to other geothermal areas.

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Water for Nevada, Report No. 6, Forecasts for the Future-Fish and Wildlife, State Engineer's Office, Nevada Division of Water Resources, Department of Conservation and Natural Resources, September 1973.

Estimates of water-based future use of Nevada's fish and wildlife resources are presented for the counties and hydrographic regions. Physical distribution of all game fish and animals are presented along with selected nongame species.

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Water for Nevada, Report No. 6, Forecasts for the Future - Fish and Wildlife, Appendix D, Stream and Lake Inventory, State Engineer's Office, Nevada Division of Water Resources, Department of Conservation and Natural Resources, September 1973.

This appendix, published under separate cover from the main report, contains an inventory of over 1,500 Nevada waters and listed by hydrographic region. A correlation is shown between minimum streamflow and biologic ratings made by the Nevada Department of Fish and Game for over 400 streams.

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Water for Nevada, Report No. 7, Water Related Recreation in
Nevada - Present and Future, State Engineer's Office, Nevada
Division of Water Resources, Department of Conservation and
Natural Resources, December 1973.

Estimates of future water-based recreational
activity and associated water requirements, along
with economic value, are provided for the counties
and hydrographic regions. This information
relates only to city, county, state and federal
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Water for Nevada, Report No. 7, Water Related Recreation in Nevada - Present and Future, Appendices, Water Based Recreation Inventory, State Engineer's Office, Nevada Division of Water Resources, Department of Conservation and Natural Resources, December 1973.

The appendices present inventories of recreational use, location, size and water needs for 1,209 recreation sites and lists them by county and hydrographic region.

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Water for Nevada, Report No. 8, Forecasts for the Future -
Agriculture, State Engineer's Office, Nevada Division of Water
Resources, Department of Conservation and Natural Resources,
January 1974.

Estimates of Production by commodity and
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Water for Nevada, Special Report, Reconnaissance Soil Survey of Dixie Valley, State Engineer's Office, Division of Water Resources, Department of Conservation and Natural Resources, February 1974.

The soils of the Dixie Valley area are identified, mapped, and named according to the Soil Taxonomy of the National Cooperative Soil Survey. For additional description, refer to the previous review of the special report of May 1971 entitled, "Reconnaissance Soil Survey of Railroad Valley."

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Water for Nevada, Report No. 9, Forecasts for the Future - Electric Energy, State Engineer's Office, Nevada Division of Water Resources, Department of Conservation and Natural Resources, August 1974.

Basic planning for Nevada's future water and related land resources options, as related to electric energy, is provided from two viewpoints - Nevada's and that of the eleven Western States along with the nation.

Numerical electric energy projections are provided, for Nevada, California, the eleven Western States and the nation, along with future water requirements for Nevada's electric energy needs.

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Water for Nevada, Report No. 9, Forecasts for the Future - Electric Energy, Appendices, State Engineer's Office, Nevada Division of Water Resources, Department of Conservation and Natural Resources, August 1974.

These appendices describe a tentatively developed rating system, with economic and environmental considerations, for selecting valleys which might efficiently support electric energy generation.

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Water for Nevada, Special Report, Input-Output Economic Models, State Engineer's Office, Nevada Division of Water Resources, Department of Conservation and Natural Resources, September 1974.

Input-output analysis, an economic modeling technique, has been provisionally developed for Nevada. The technique may be used to examine Nevada's future alternatives involving the use of water and related land resources.

Foreseeable major problems are candidates for possible input-output analysis. To demonstrate the capabilities and limitations of the input-output technique, maintaining the level of Walker Lake was examined in terms of reduction in upstream water use and estimating associated reductions in production, employment and income.

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Water for Nevada, Special Report, Water - Legal and Administrative Aspects, State Engineer's Office, Nevada Division of Water Resources, Department of Conservation and Natural Resources, september 1974.

Nevada's system of established surface and ground water rights has been evolving for more than 100 years. During this time, beneficial use has been defined by court decision and statute as the basis, measure and limit of the right to use water. History of water policy and administration, as well as amendments to the water law, are traced to the present.

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Water for Nevada, Special Report, Nevada State Water Plan
References, State Engineer's Office, Division of Water Resources,
Department of Conservation and Natural Resources, June 1976.

This report contains all the references that were utilized in the development of the Nevada State Water Plan. There are about 1,000 references which include interviews, press releases, short excerpts as well as reports, books and professional papers from federal, state, local governments, private individuals and consultants. Included in the report is a map which portrays those references which are limited to a specific geographical point of Nevada.

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Photo by R. E. WALSTROM

"ALTERNATIVE PLANS FOR WATER RESOURCE USE"

Alternative plans for water resource use, Walker River Basin, Area I, State Engineer's Office, Nevada Division of Water Resources, Department of Conservation and Natural Resources, September 1973.

This water planning report, the first in a series of six, considers the range of possible alternative uses in which the water resources of the Walker Basin could be employed. The report basically outlines environmental quality and economic efficiency objectives for use of the available water in the basin. To analyze the impact of either of these objectives, a without plan was developed which would show the expected future trends of the basin's major activities without intentional deviations based upon objectives. The center of attention is directed toward the decline of Walker Lake by 60,000 acre-feet per year, flooding throughout the basin, irrigation requirements, and recreation needs.

There were two environmental alternatives offered. The first would be a plan directed toward the

maintenance of the lake at its present level, while the second emphasized development and use of water upstream without regard to the lake level. Both alternatives noted that fishing was the main recreational activity in the basin.

The economic efficiency alternative discussed possible reservoir sites for recreation, irrigation, flood protection and fishery enhancement. The plan outlines the projected needs with and without the large water requirements projected for the mining industry in the basin. Several possibilities to save Walker Lake were also studied in the economic efficiency plan.

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Alternative Plans for Water Resource Use, Carson-Truckee River Basins, Area II, State Engineer's Office, Nevada Division of Water Resources, Department of Conservation and Natural Resources, December 1973.

This report is centered around the competing water needs on the Truckee and Carson River systems.

Problems in this area are the declining of Pyramid Lake, floods, municipal, industrial, and agricultural water shortages, seasonal erratic flows of small streams, lack of adequate water for wildlife areas, and a need for more water-related recreation. Various schemes for water import, ground water augmentation, snow evaporation suppression, and land management are noted.

Without supplemental sources for existing supplies, the Carson City area is projected to run short of municipal and industrial water in this century. Possible actions for additional water for Carson City are considered. Actions to enhance the Newlands area are briefly mentioned which include lining ditches, eliminating holding ponds, and phreatophyte eradication. Should Pyramid Lake be maintained at its level, the report estimates various upstream impacts in dollars and man years of employment.

Two environmental quality plans were presented. The first maintained the level of Pyramid Lake. The second disregarded the lake level while allowing development to continue within environmental constraints upstream. The economic efficiency alternative identified eight projects with twenty-seven reservoirs for flood protection, irrigation storage, power generation, recreation, fishery, and municipal and industrial uses.

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Alternative Plans for Water Resource Use, Humboldt River Basin, Area III, State Engineer's Office, Division of Water Resources, Nevada Department of Conservation and Natural Resources, February 1974.

This report analyzes the water resources situation for the Humboldt River Drainage, the Black Rock Desert area, and the Northwest Region of the State. The Humboldt River is the largest river which begins and terminates within the State. Problems in Area III are floods, irrigation seasonal flows, sediment (both wind and water) and short growing seasons. The report indicates that the elevations in this planning area range from over 10,000 feet to less than 4,000 feet. Government is the largest employer with services second. The 1970 per capita income was slightly over \$5,000. Of the 18,300,000 acres in this planning area, over three-fourths are used as rangeland. There are no lakes in the planning area, and the stream flows are very erratic.

The environmental plan discussed many components to help preserve the rather untouched environment. These include more wilderness-type areas, and more scenic vistas. One environmental quality alternative stressed keeping streams free flowing without additional structures.

The economic efficiency plan stresses the three upstream storage project dams which provide flood protection, sediment detention, irrigation water storage, recreation, fish and wildlife, and channelization. Agricultural water management was identified for certain areas.

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Alternative Plans for Water Resource Use, Central Region,
Area IV, State Engineer's Office, Nevada Division of Water
Resources, Department of Conservation and Natural Resources,
April 1974.

Area IV, the largest single study area in Nevada, is over 400 miles long and 300 miles wide at the extremes. Three alternatives are presented concerning use of the water supplies in Area IV. The environmental quality plan stresses the protection and preservation of the fragile desert environment by informing the public concerning environmental problems, and spreading development over a large area to minimize severe damage to certain areas. The economic efficiency alternative stresses flood protection reservoirs, especially for Ely, Duckwater, and Beatty. Also, several reservoirs would be constructed for recreation and fishery.

This is the only planning region with an identified "area development" plan. This plan is designed to upgrade depressed economies and alleviate the lack of services, such as doctors, dentists and hospitals. Some of the possibilities in the area development plan include mining and agriculture co-ops, warehousing, small assembly plants, increases in recreation, better transportation and services, hydroponics, and solar generation experimentation.

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Alternative Plans for Water Resource Use, Colorado River Basin, Detail Report, Area V, State Engineer's Office, Nevada Division of Water Resources, Department of Conservation and Natural Resources, April 1974.

This report identifies major issues and alternatives in the most populated planning region in Nevada. Toward the end of this century, existing water supplies for the Las Vegas Valley are expected to be fully used, and supplemental sources will have to be developed. Flooding of urban and agricultural lands, as well as isolated areas are recurrent problems.

The environmental quality plan discusses protection of rare and endangered fish and animals, informing the public, and improvement of streams, lakes, reservoirs, ponds, and springs. Additionally, the preservation and enhancement of Las Vegas Wash was considered.

In the economic efficiency plan, possible alternative solutions are presented for the projected water shortages. Projects are identified to relieve urban and agricultural flood problems, and brief discussion is provided concerning flood insurance and zoning.

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Alternative Plans for Water Resource Use, Colorado River Basin, Summary Report, Area V, State Engineer's Office, Nevada

Essentially, this report presents, in summary,
the same material provided by the foregoing detail
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Alternative Plans for Water Resource Use, Snake River Basin, Area VI, State Engineer's Office, Nevada Division of Water Resources, Department of Conservation and Natural Resources, June 1974.

This report covers the Nevada portion of headwaters of the Columbia-Snake drainage in the Pacific Northwest. It is the least populated of the planning areas with about 1,700 people in 1970. Generally, water is relatively abundant in this region. Wild Horse Reservoir is the largest body of water in the planning region. Fishing is considered excellent in Area VI. Agriculture suffers from short growing seasons.

The environmental quality plan identifies five rare and endangered fauna, and discusses modernizing irrigation facilities.

Floods have been a problem in the past. The economic efficiency plan includes three reservoirs for flood control, irrigation releases and possible recreation. They are located on Goose Creek, Indian Creek and Willow Creek.

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Water for Nevada, Special Summary Report, Nevada State Water Plan, State Engineer's Office, Nevada Division of Water Resources, Department of Conservation and Natural Resources, November 1974.

This special summary report outlines and summarizes the Nevada water planning effort from its inception to 1974. Included are short abstracts of all Water for Nevada and Alternative Plans for Water Resource Use reports. The report also includes conclusions and recommendations formulated during the water planning process. These include matters dealing with present water law, environmental concerns, specific problems in each of Nevada's six water planning areas, and projected water requirements. Additionally the report presents drafts of geothermal legislation, Virgin River legislation, and water for wildlife legislation.

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Report No. 2, Estimated Water Use in Nevada

Special Report, Water Supply for the Future in Southern Nevada

Special Report, Reconnaissance Soil Survey of Railroad Valley

Report No. 3, Nevada's Water Resources

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Report No. 6, Forecasts for the Future - Fish and Wildlife

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