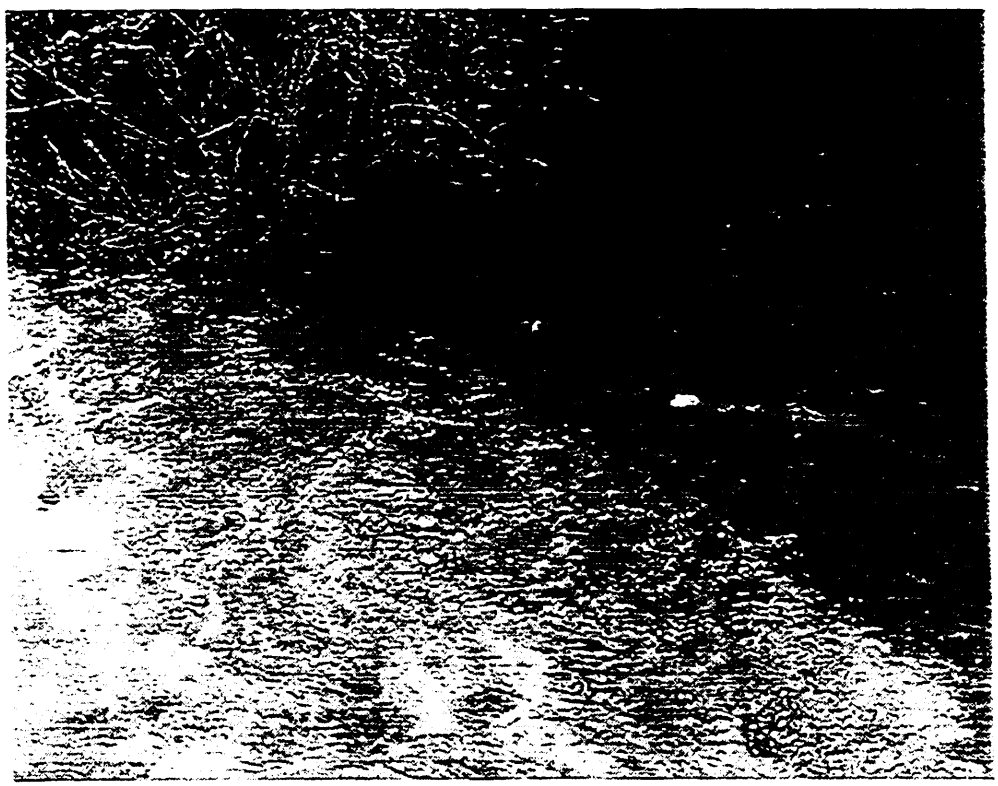
Presented below are water quality standards that are in effect for Clean Water Act purposes.

EPA is posting these standards as a convenience to users and has made a reasonable effort to assure their accuracy. Additionally, EPA has made a reasonable effort to identify parts of the standards that are not approved, disapproved, or are otherwise not in effect for Clean Water Act purposes.

Utah Division of Water Quality

Mixing Zone Implementation Procedure

March 17, 2000



Utah Division of Water Quality
Mixing Zone Implementation Procedure

The Policy

R317-2-5, the State mixing zone policy, states: A mixing zone is a limited portion of a body of water, contiguous to a discharge, where dilution is in progress but has not yet resulted in concentrations which will meet certain standards for all pollutants. At no time, however, shall concentrations within the mixing zone be allowed which are acutely lethal as determined by bioassay or other approved procedure. Mixing zones may be delineated for the purpose of guiding sample collection procedures and to determine permitted effluent limits. The size of the chronic mixing zone in rivers and streams shall not exceed 2,500 feet and the size of an acute mixing zone shall not exceed 50% of stream width nor have a residency time of greater than 15 minutes. The size of the chronic mixing zone in lakes and reservoirs shall not exceed 200 feet and the size of the acute mixing zone shall not exceed 35 feet. Domestic wastewater effluents discharged to mixing zones shall meet effluent requirements specified in R317-1-3.

The following procedures will be used by staff of the Division as guidance in implementation of the mixing zone policy, and specifically in developing effluent limits for UPDES discharge permits for point source dischargers into waters of the State.

1. Definitions.

The Zone of Initial Dilution (ZID) is that part of a receiving water where it is permissible to exceed the magnitude of an acute numeric criterion.

The Critical Low Flow may be the seven day low flow with a ten year return frequency (7Q10) or other scientifically justifiable low flow normally will be used to represent critical flow conditions in streams in streams and rivers. Where data is inadequate to develop these values, a 20% of all available data may be used.

Totally mixed discharges may be assumed where the discharge has a mean daily flow greater than or equal to half the critical low flow (the 7Q10) of the receiving stream.

2. Mixing Zone Size.

Where a discharge is not totally mixed, an appropriate mixing zone for chronic aquatic life and human health criteria shall not exceed 2,500 feet. And the size of an acute mixing zone for aquatic life criteria shall not exceed 50% of stream width nor have a residency time of greater than 15 minutes. For lakes, the size of the chronic mixing zone would normally not exceed 200 feet in radius and the size of the acute mixing zone would normally not exceed 35 feet in radius. Individual mixing zones may be further limited or disallowed in consideration of the following factors in the area affected by the discharge:

(i) Bioaccumulation in fish tissues or wildlife,
(ii) Biologically important areas such as fish spawning/nursery areas or segments with occurrences of federally listed threatened or endangered species,
(iii) Potential human exposure to pollutants resulting from drinking water or recreational activities,
(iv) Attraction of aquatic life to the effluent plume, where toxicity to the aquatic life is occurring.
(v) Toxicity of the substance discharged,
(vi) Zone of passage for migrating fish or other species (including access to tributaries)
(vii) Cumulative effects of multiple discharges and mixing zones.

3. Totally-Mixed Discharges

Totally-mixed discharges will normally receive a dilution allowance equal to the critical low flow where such dilution will protect designated uses. A discharge will be assumed to be totally mixed where an effluent diffuser covers the entire stream/river width (at critical low flow). Further, discharges with a mean daily flow greater than or equal to half the critical low flow (the 7Q10) of the receiving stream also may be considered to be totally mixed. Where the mean daily flow of the discharge is less than half the low stream flow of the receiving water, it will be assumed that the discharge is not totally mixed unless otherwise demonstrated by the permittee. Demonstrations of complete mixing by the permittee should be consistent with a study plan that is developed in cooperation with the Division of Water Quality.

4. Mixing Zone Methods

The mixing zone policy normally will be implemented by the Division utilizing an appropriate mixing model (e.g., Stream DO IV (as modified by Utah DWQ) for streams and a plume jet mixing model for lakes and reservoirs). In addition other appropriate mixing models may be used. Where data are available from a properly designed field study that quantify the actual rate and pattern of mixing at the low flow condition or near the low flow condition, that data may also be used to implement the mixing zone policy. The narrative criteria found at §317-2-7.2 apply within mixing zones except as indicated below:

Determining Acute Permit Limits:

For application of the acute water quality criteria (higher concentration allowed, but of short duration) for individual substances, a plume model will be used to calculate the length of the plume to reach 50% of the stream width at the critical low flow (the 7Q10). A second calculation will be performed to determine the length of the plume corresponding to a 15 minute travel time calculated using an estimate of the average plume velocity. The second calculation is performed to ensure that organisms swimming or drifting through the plume will not be in the zone of initial dilution for longer than 15 minutes, which should minimize the potential for drifting organisms to be exposed to a 1-hour average concentration that exceeds the acute criterion. The more stringent of these two methods will be used to establish the acceptable size of the zone of initial dilution. The portion of the low stream flow that mixes with the effluent within the ZID will be utilized in mass balance calculations to determine permit limits applying the various acute criteria. The result will be at least a 50% zone of passage at all times for migrating fish. This procedure is similar to past and current State practice

Determining Chronic Effluent Limits:

The approved procedure for chronic permit limits allows up to 2,500 feet downstream of a discharge for a chronic mixing zone. Chronic water quality criteria must be met at that distance. Therefore chronic effluent limits for UPDES permits allows up to a 2,500 feet mixing zone where chronic water quality standards must be met. A plume model will be utilized for these calculations.

Model Coefficients

Coefficients for reaeration, dissolved oxygen depletion, and other coefficients used in the modeling process are taken from EPA recommendations, literature values, and actual field data where appropriate.

5. Special Situations

For far-field pollutants (e.g., ammonia, dissolved oxygen) that often exhibit increased toxicity downstream of the mixing zone, limits will be derived to achieve applicable criteria at all points downstream of the discharge. For facilities (e.g., lagoons) that discharge intermittently and not during

low-flow conditions, the stream flow to be used in the mixing zone analysis will be the lowest flow expected to occur during the period of discharge. Where monthly and seasonal permit limits are developed, dilution flow may be determined on a monthly or seasonal basis, as appropriate, provided that the mixing zone size limitations and other requirements of the policy and procedure are satisfied.

6. Utah Mixing Zone/Dilution Procedure for WET Permit Limits

Discharges that are Totally Mixed

Chronic WET Limits: If chronic WET limits are appropriate for totally mixed discharges, such discharges will normally receive a chronic dilution flow equal to the 7Q10, where such dilution will protect designated uses. Where background toxicity in the receiving water is assumed to be zero, chronic WET limits will prohibit chronic effects (as an IC25 or NOEC) at or less than:

(1) % Effluent = 100% x Facility Design Flow / (Facility Design Flow + Chronic Dilution Flow)

Acute WET Limits: If acute WET limits are appropriate for totally mixed discharges, such discharges will normally receive an acute dilution flow equal to half the 7Q10, where such dilution will protect designated uses. The dilution ratio will then be calculated as follows:

(2) Ratio = (Facility Design Flow + Acute Dilution Flow) / Facility Design Flow

If the ratio given by equation (2) is less than or equal to 3.33, and background toxicity in the receiving water is assumed to be zero, acute WET limits will prohibit acute effects (as an LC50) at or less than 100% effluent.

If the ratio given by equation (2) is greater than 3.33, and background toxicity in the receiving water is assumed to be zero, acute WET limits will prohibit acute effects (as an LC50) at or less than:

(3) % Effluent = 100% x Facility Design Flow / 0.3[1] * (Facility Design Flow + Acute Dilution Flow)

Discharges that are Not Totally Mixed

Chronic WET Limits: If chronic WET limits are appropriate for discharges that are not totally mixed, a mixing model or another valid method will be used to determine the mixing achieved within the chronic mixing zone at the 7Q10, and that flow will be used as the chronic dilution flow. Where background toxicity in the receiving water is assumed to be zero, the chronic dilution flow will be applied to determine appropriate chronic WET limits consistent with equation (1).

Acute WET Limits: If acute WET limits are appropriate for discharges that are not totally mixed, a model or another valid method will be used to determine the mixing achieved within the acute mixing zone at the 7Q10, and that flow will be used as the acute dilution flow. Where background toxicity in the receiving water is assumed to be zero, the acute dilution flow will be applied to determine appropriate acute WET limits consistent with equations (2) and (3).

NOTE: An Excel spreadsheet is available from the Division that takes the above equations and logic and calculates the Percent Effluent Percentages as a function of various inputs.

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[1] The Factor of 0.3 is used to convert an LC50 to an LC1 in order to avoid acute toxicity in the receiving water body, as discussed on page 35 of the Technical Support Manual for Water Quality-Based Toxics Control (EPA, 1991)

7. New Information

All mixing zone-dilution assumptions are subject to review and revision as new information on the nature and impacts of the discharge becomes available (e.g., chemical or biological monitoring at the mixing zone boundary). Where justified, such as where there is a downstream drinking water intake, the Division may require the discharger to conduct in-stream monitoring to verify that mixing zone size restrictions are being achieved. Mixing zone and dilution decisions are subject to review and revision along with all other aspects of the discharge permit upon expiration of the permit.

Prepared by: William O. Moellmer, Ph.D.

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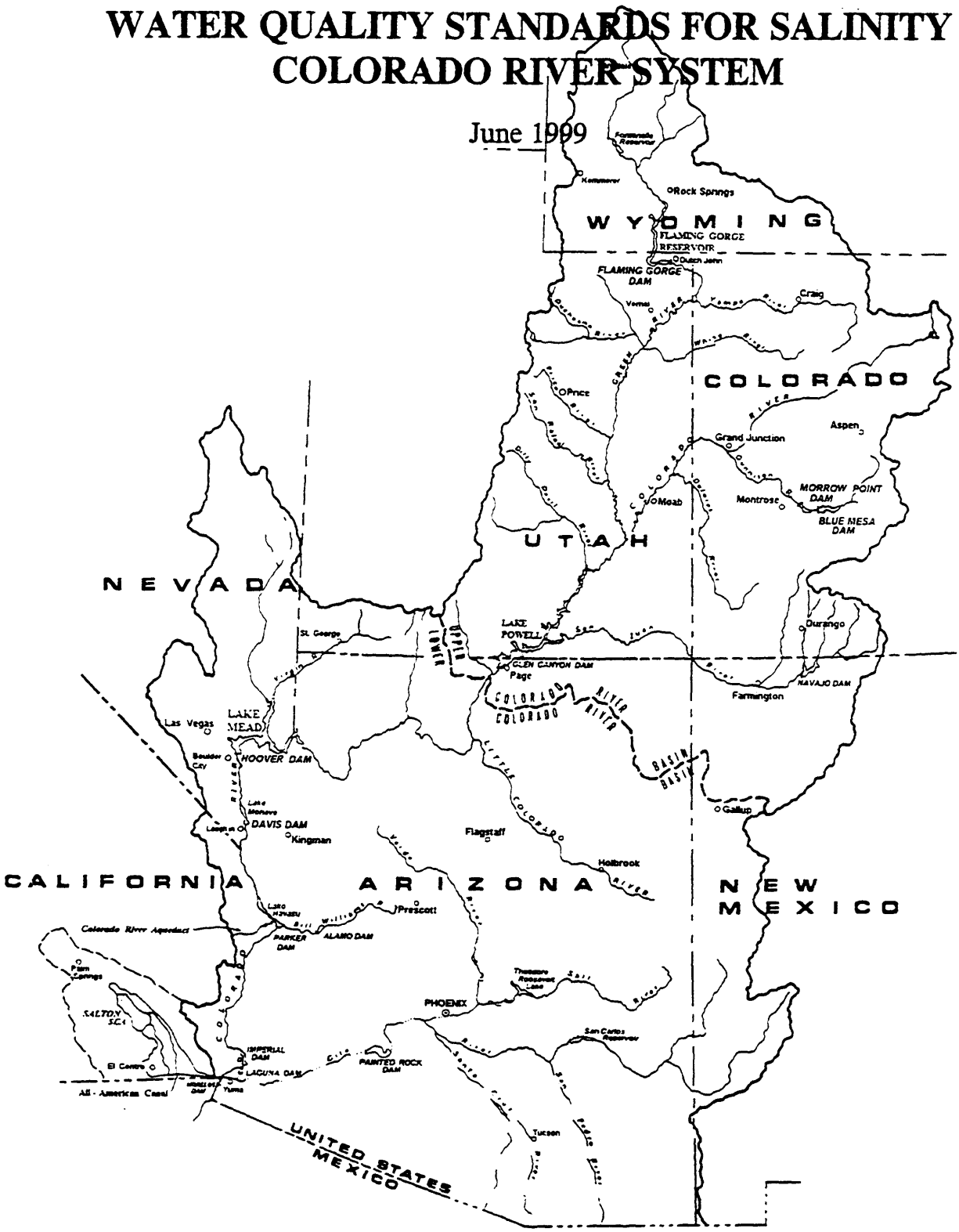
1999 REVIEW

WATER QUALITY STANDARDS FOR SALINITY COLORADO RIVER SYSTEM

June 1999



Colorado River Basin Salinity Control Forum

1999 REVIEW

WATER QUALITY STANDARDS FOR SALINITY
COLORADO RIVER SYSTEM

June 1999

Prepared by
Colorado River Basin Salinity Control Forum

COLORADO RIVER BASIN SALINITY CONTROL FORUM
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Department of Water Resources
Wayne K. Hood III, Environmental Program Manager
Department of Environmental Quality
Larry R. Dozier, Deputy General Manager
Central Arizona Water Conservation District

CALIFORNIA

Gerald R. Zimmerman, Executive Director
Colorado River Board of California
Walter G. Pettit, Executive Director
State Water Resources Control Board
Duane L. Georgeson, Consultant to
The Metropolitan Water District of Southern California

COLORADO

Peter H. Evans, Director
Colorado Water Conservation Board
Department of Natural Resources
J. David Holm, Director
Water Quality Control Division
Department of Public Health and Environment
David W. Robbins, Attorney at Law

NEVADA

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Colorado River Commission of Nevada
Allen Biaggi, Administrator
Division of Environmental Protection
Freeman Johnson, Assistant Director
Department of Conservation and Natural Resources

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Thomas C. Turney, State Engineer
New Mexico State Engineer Office

UTAH

D. Larry Anderson, Director
Division of Water Resources
Department of Natural Resources
Jay B. Pitkin, Assistant Director
Division of Water Quality
Department of Environmental Quality

WYOMING

Gordon W. Fassett, State Engineer
State Engineer's Office
Gary Beach, Administrator
Division of Water Quality
Department of Environmental Quality
Dan S. Budd, Interstate Stream Commissioner

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Colorado River Basin Salinity Control Forum
106 West 500 South, Suite 101
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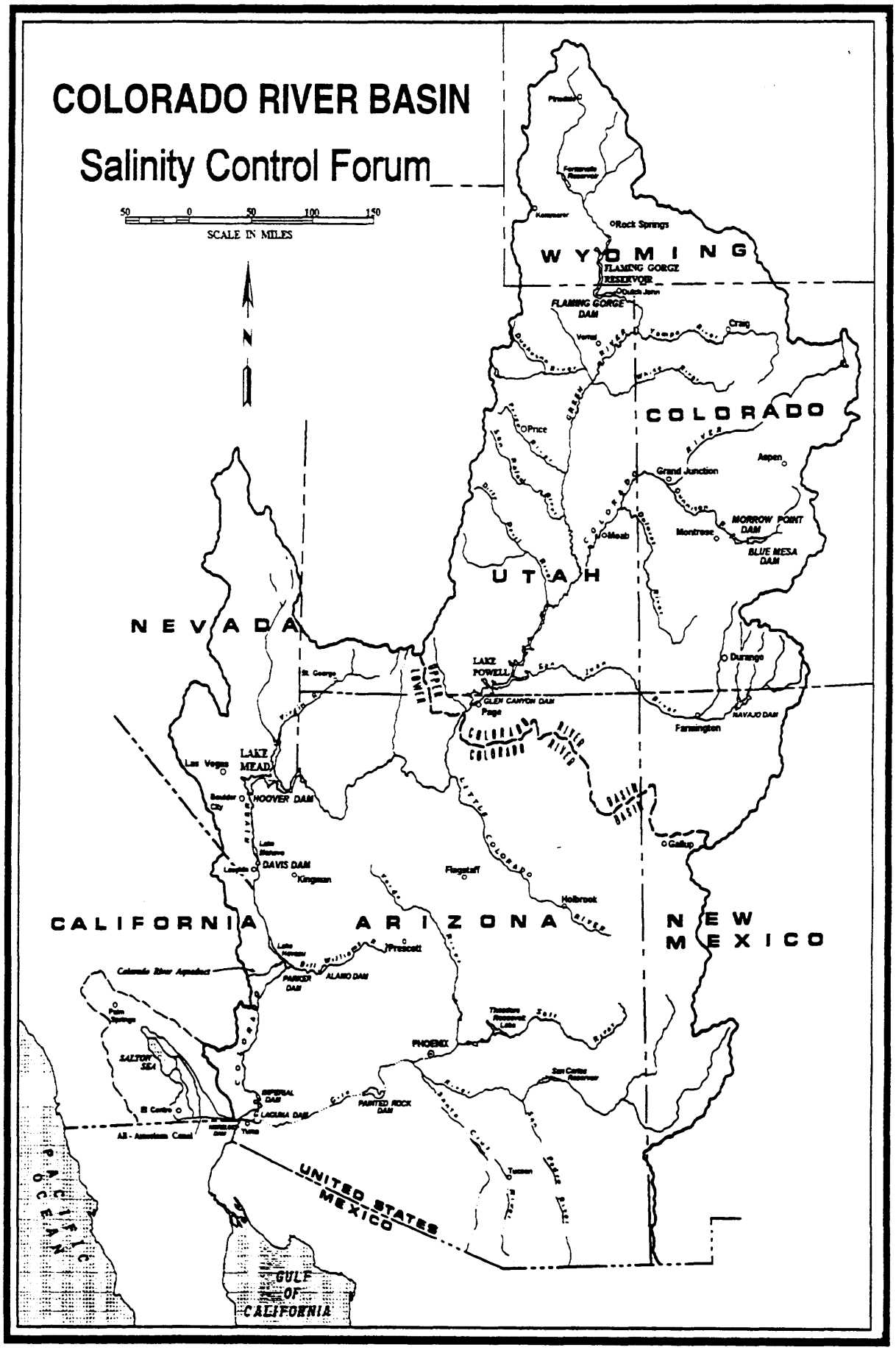
COLORADO RIVER BASIN
Salinity Control Forum
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SCALE IN MILES
N
WYOMING
COLORADO
UTAH
NEVADA
CALIFORNIA
ARIZONA
NEW MEXICO
FLAMING GORGE DAM
FLAMING GORGE RESERVOIR
Rock Springs
Craig
Vernal
Price
Grand Junction
Aspen
Montrose
Moab
MORROW POINT DAM
BLUE MESA DAM
Durango
Farmington
NAVAJO DAM
LAKE POWELL
GLEN CANYON DAM
Page
St. George
LAKE MEAD
HOOVER DAM
Las Vegas
Boulder City
DAVIS DAM
Kingman
Flagstaff
Holbrook
Gallup
Prescott
PARKER DAM
ALAMO DAM
Colorado River Aqueduct
Palm Springs
SALTON SEA
El Centro
IMPERIAL DAM
LAGUNA DAM
PAINTED ROCK DAM
Yuma
PHOENIX
San Carlos Reservoir
Tucson
All-American Canal
UNITED STATES
MEXICO
PACIFIC OCEAN
GULF OF CALIFORNIA

TRANSMITTAL LETTERS

The Federal Water Pollution Control Act requires that at least once every three years the Colorado River Basin states review water quality standards relating to the salinity of the waters of the Colorado River. The states collectively initiated this review under the auspices of the Colorado River Basin Salinity Control Forum, prepared a preliminary report; and after holding public meetings, the Forum prepared a final report.

Upon the Forum's adoption of the final report, it is transmitted by letter to the governors of the individual states for their independent action. The following governors in each of the seven Colorado River Basin states shall receive this report:

Honorable Jane Dee Hull
Governor of Arizona
Statehouse
Phoenix, AZ 85007

Honorable Gray Davis
Governor of California
State Capitol
Sacramento, CA 95814

Honorable Bill F. Owens
Governor of Colorado
State Capitol
Denver, CO 80203

Honorable Kenny Guinn
Governor of Nevada
State Capitol
Carson City, NV 89701

Honorable Gary E. Johnson
Governor of New Mexico
State Capitol
Santa Fe, NM 87503

Honorable Mike Leavitt
Governor of Utah
State Capitol
Salt Lake City, UT 84114

Honorable Jim Geringer
Governor of Wyoming
State Capitol
Cheyenne, WY 82002

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