

Arizona Legislature
Joint Legislative Study Committee
on Water Salinity Issues



Annual Report
December 31, 2011

Committee Members:

Senator Gail Griffin, Vice-Chairman
Senator Jack Jackson Jr.
Barry Aarons
Philip Bashaw
Michael Brewer
Marshall Brown
Henry Darwin
Troy Day
Sandra Fabritz Whitney
Matthew Garlick
Maureen George
Harold "Chip" Howard
Tom Poulson (Ex-Officio)

Representative Karen Fann, Chairman
Representative Lynne Pancrazi
Brandy Kelso
Tim Lawless
Gustavo Lopez
Robert Lotts
Dave Loveday
Doug Oberhamer
Gary Pierce
Dave Richens
Lori Roman
Sandy Sutton

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JOINT LEGISLATIVE STUDY COMMITTEE ON WATER SALINITY ISSUES

Annual Report 2011

Laws 2011, Chapter 201 [Appendix A] established the Joint Legislative Study Committee on Water Salinity Issues to study issues and problems related to water salinity and water softener usage in the United States, other countries and Arizona. In addition, the purpose of the Committee is to meet and consider the following issues: (1) the relationship between water salinity issues and possible effects on water conservation, groundwater quality, and the quality impacts on water reclamation facilities and operations, and nature of water and reclaimed water and its use on golf courses and other uses, other potential effects on tourism as they relate to high usage of water softeners in Arizona; (2) the financial impact and necessity of water and wastewater treatment to address salinity levels and the potential costs for treatment methods and facilities; and (3) an examination of sources of excess salinity caused by high water softener usage and possible responses.

Membership consists of members from the House of Representatives, the Senate, and other persons familiar with water salinity issues in Arizona. Since its establishment, the Committee met three times, on October 27, November 28, and December 19, 2011. At the first meeting, the Committee elected a chairman and vice-chairman, listened to presentations on water treatment and water salinity, and discussed the history and details of the Central Arizona Salinity Study (CASS). At the second meeting, the Committee listened to presentations on issues related to reducing the salt load in aquifers, reducing the amount of water being used and discussed an acceptable balance. In addition, an appropriate definition of soft water was discussed, as well as old technology versus new technology in the industry. At the third meeting, the Committee discussed current water softener ratings and considered extending the Committee or creating a subcommittee to continue studying the issue of water salinity. No formal recommendations were voted on by the Committee.

NOTE: All documents submitted to the Committee are on file in the Chief Clerk's Office of the Arizona House of Representatives and the Secretary of the Senate's Office of the Arizona State Senate.

APPENDIX A:

**Joint Legislative Study Committee on Water Salinity Issues Enabling
Legislation**

House Engrossed

State of Arizona
House of Representatives
Fiftieth Legislature
First Regular Session
2011

HOUSE BILL 2593

AN ACT

ESTABLISHING THE JOINT LEGISLATIVE STUDY COMMITTEE ON WATER SALINITY ISSUES.

(TEXT OF BILL BEGINS ON NEXT PAGE)

1 Be it enacted by the Legislature of the State of Arizona:

2 Section 1. Joint legislative study committee on water salinity
3 issues; membership; report; delayed repeal

4 A. The joint legislative study committee on water salinity issues is
5 established consisting of the following members:

6 1. Two members of the house of representatives who are appointed by
7 the speaker of the house of representatives, one of whom is a member of the
8 majority party and the other of whom is a member of the minority party.

9 2. Two members of the senate who are appointed by the president of the
10 senate, one of whom is a member of the majority party and the other of whom
11 is a member of the minority party.

12 3. One person who is an elected municipal official and who is
13 appointed by the speaker of the house of representatives.

14 4. One person who represents the agricultural industry and who is
15 appointed by the president of the senate.

16 5. One person who represents the golf industry and who is appointed by
17 the speaker of the house of representatives.

18 6. One person who represents the hotel, motel and resort industry and
19 who is appointed by the president of the senate.

20 7. One person who represents the homebuilding industry and who is
21 appointed by the speaker of the house of representatives.

22 8. One person who represents an association of office and industrial
23 properties and who is appointed by the president of the senate.

24 9. One person who represents a city owned wastewater department and
25 who is appointed by the president of the senate.

26 10. One person who represents a city owned water provider and who is
27 appointed by the speaker of the house of representatives.

28 11. One person who is an attorney with experience in water law and who
29 is appointed by the president of the senate.

30 12. One person who represents a public service corporation in the
31 business of electric generation and who is appointed by the speaker of the
32 house of representatives.

33 13. Two persons who represent a regulated public service corporation
34 that provides water, one of whom is appointed by the speaker of the house of
35 representatives and one of whom is appointed by the president of the senate.

36 14. Two persons who represent manufacturers and retail dealers of ion
37 exchange water softeners, one of whom is appointed by the president of the
38 senate and one of whom is appointed by the speaker of the house of
39 representatives.

40 15. One person who represents a nonprofit association that focuses on
41 water and wastewater and who is appointed by the president of the senate.

42 16. One person who represents a nonprofit association that focuses on
43 the salt industry and who is appointed by the president of the senate.

44 17. The director of the department of environmental quality or the
45 director's designee.

1 18. The director of the department of water resources or the director's
2 designee.

3 19. The chairman of the Arizona corporation commission or the
4 chairman's designee.

5 20. The director of the water infrastructure finance authority of
6 Arizona or the director's designee.

7 21. As nonvoting members:

8 (a) One person who represents the United States environmental
9 protection agency.

10 (b) One person who represents the United States bureau of reclamation.

11 B. The committee shall meet and consider the following issues:

12 1. Water salinity issues related to water softener usage in the United
13 States, other countries and this state.

14 2. The relationship between water salinity issues and possible effects
15 on water conservation, groundwater quality, and the quality impacts on water
16 reclamation facilities and operations, and nature of water and reclaimed
17 water and its use on golf courses and other uses, and the potential effects
18 on tourism as they relate to high usage of water softeners in Arizona.

19 3. The financial impact and necessity of water and wastewater
20 treatment to address salinity levels and the potential costs for treatment
21 methods and facilities.

22 4. An examination of sources of excess salinity caused by high water
23 softener usage and possible responses.

24 C. The committee shall elect from among its members a chairperson and
25 vice-chairperson and shall meet as designated by the chairperson. The
26 committee may divide itself into subcommittees to consider issues as
27 determined by the chairperson. Members of the committee are not eligible for
28 compensation or reimbursement of expenses except as otherwise provided by
29 law. The committee shall make a report on its findings, including
30 recommendations on any further action if appropriate and shall submit that
31 report to the governor, the president of the senate and the speaker of the
32 house of representatives no later than December 31, 2011 and shall provide a
33 copy of its report to the secretary of state.

34 D. This section is repealed from and after September 30, 2012.

APPENDIX B:

Meeting Notice & Minutes of Proceedings

REVISED - 10/24/11

REVISED - 10/24/11

REVISED - 10/24/11

Interim agendas can be obtained via the Internet at <http://www.azleg.state.az.us/InterimCommittees.asp>

ARIZONA STATE LEGISLATURE

INTERIM MEETING NOTICE

OPEN TO THE PUBLIC

JOINT LEGISLATIVE STUDY COMMITTEE ON WATER SALINITY ISSUES

Date: Thursday, October 27, 2011

Time: 1:30 P.M.

Place: HHR 1

AGENDA

1. Call to Order
2. Explanation of Committee Charge
3. Election of Committee Chairman and Vice-Chairman
4. Presentation by Doug Oberhamer - Water Treatment 101
5. Presentation by Brandy Kelso and Tom Poulson on
the History and Details of the Central Arizona Salinity Study
6. Public Testimony
7. Set Date for Next Formal Meeting
8. Adjourn

Members:

Senator Gail Griffin
 Senator Jack Jackson Jr.
 Barry Aarons
 Phillip Bashaw
 Michael Brewer
 Marshall Brown
 Henry Darwin
 Troy Day
 Sandra Fabritz Whitney
 Matthew Garlick
 Maureen George
 Harold "Chip" Howard
 Tom Poulson (Ex-Officio)

Representative Karen Fann
 Representative Lynne Pancrazi
 Brandy Kelso
 Tim Lawless
 Gustavo Lopez
 Robert Lotts
 Dave Loveday
 Doug Oberhamer
 The Honorable Gary Pierce
 Dave Richens
 Lori Roman
 Sandy Sutton
 vacant (Ex-Officio)

~~10/19/11~~

10/24/11

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People with disabilities may request reasonable accommodations such as interpreters, alternative formats, or assistance with physical accessibility. If you require accommodations, please contact the Chief Clerk's Office at (602) 926-3032, TDD (602) 926-3241.

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ARIZONA STATE LEGISLATURE

INTERIM MEETING NOTICE OPEN TO THE PUBLIC

JOINT LEGISLATIVE STUDY COMMITTEE ON WATER SALINITY ISSUES

Date: Monday, November 28, 2011

Time: 1:30 P.M.

Place: HHR 1

AGENDA

1. Call to Order
2. Presentation by Paul Hendricks
 - Reducing Salt Load in Aquifers
 - Reducing the Amount of Water Being Used
 - Acceptable Balance
3. Committee Discussion
 - Old Technology versus New Technology
 - Definition of Soft Water
4. Public Testimony
5. Recommendations for Draft Legislation
6. Set Date for Next Formal Meeting
7. Adjourn

Members:

Senator Gail Griffin, Vice-Chairman
 Senator Jack Jackson Jr.
 Barry Aarons
 Philip Bashaw
 Michael Brewer
 Marshall Brown
 Henry Darwin
 Troy Day
 Sandra Fabritz Whitnev
 Matthew Garlick
 Maureen George
 Harold "Chip" Howard
 Tom Poulson (Ex-Officio)

Representative Karen Fann, Chairman
 Representative Lynne Pancrazi
 Brandy Kelso
 Tim Lawless
 Gustavo Lopez
 Robert Lotts
 Dave Loveday
 Doug Oberhamer
 The Honorable Gary Pierce
 Dave Richens
 Lori Roman
 Sandy Sutton
 vacant (Ex-Officio)

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ARIZONA STATE LEGISLATURE

INTERIM MEETING NOTICE OPEN TO THE PUBLIC

JOINT LEGISLATIVE STUDY COMMITTEE ON WATER SALINITY ISSUES

Date: Monday, December 19, 2011

Time: 1:30 P.M.

Place: HHR 1

AGENDA

1. Call to Order
2. Presentation on Water Softener Ratings - Brandy Kelso, Water Services Department, City of Phoenix
3. Current Regulatory Framework
4. Committee Discussion
5. Public Testimony
6. Formal Recommendations
7. Adjourn

Members:

Senator Gail Griffin, Vice-Chairman
 Senator Jack Jackson Jr.
 Barry Aarons
 Philip Bashaw
 Michael Brewer
 Marshall Brown
 Henry Darwin
 Troy Day
 Sandra Fabritz Whitney
 Matthew Garlick
 Maureen George
 Harold "Chip" Howard
 Tom Poulson (Ex-Officio)

Representative Karen Fann, Chairman
 Representative Lynne Pancrazi
 Brandy Kelso
 Tim Lawless
 Gustavo Lopez
 Robert Lotts
 Dave Loveday
 Doug Oberhamer
 The Honorable Gary Pierce
 Dave Richens
 Lori Roman
 Sandy Sutton
 vacant (Ex-Officio)

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ARIZONA STATE LEGISLATURE
Fiftieth Legislature – First Regular Session

JOINT LEGISLATIVE STUDY COMMITTEE ON WATER SALINITY ISSUES

Minutes of Interim Meeting
Thursday, October 27, 2011
House Hearing Room 1 -- 1:30 p.m.

Representative Fann called the meeting to order at 1:40 p.m. and attendance was noted by the secretary.

Members Present

Senator Gail Griffin	Representative Karen Fann
Marshall Brown	Representative Lynne Pancrazi
Linda C. Taunt (for Henry Darwin)	Brandy Kelso
Troy Day	Gustavo Lopez
Michael J. Lacey (for Sandra Fabritz Whitney)	Robert Lotts
Matthew Garlick	Dave Loveday
Maureen George	Doug Oberhamer
Harold "Chip" Howard	Steve Olea (for The Honorable Gary Pierce)
Tom Poulson (Ex-Officio)	Dave Richens

Members Absent

Senator Jack Jackson, Jr.	Tim Lawless
Barry Aarons	Lori Roman
Phillip Bashaw	Sandi Sutton
Michael Brewer	Vacant (Ex-Officio)

EXPLANATION OF COMMITTEE CHARGE:

Gina Kash, Majority Research Analyst, related that the Joint Legislative Study Committee on Water Salinity Issues is charged with considering the following:

- Water salinity issues related to water softener usage in the United States, other countries and this state
- The relationship between water salinity issues and possible effects on water conservation, groundwater quality, and the quality impacts on water reclamation facilities and operations, the nature of water and reclaimed water and its use on golf courses and other uses, and the potential effects on tourism as they relate to high usage of water softeners in Arizona
- The financial impact and necessity of water and wastewater treatment to address salinity levels and the potential costs for treatment methods and facilities
- An examination of sources of excess salinity caused by high water softener usage and possible responses

She advised that the Committee is required to make a report of its findings and recommendations on or before December 31, 2011. Additionally, it must elect a Chairman and Vice-Chairman.

ELECTION OF COMMITTEE CHAIRMAN AND VICE-CHAIRMAN:

**The motion was made and seconded to nominate Representative Karen Fann as Chairman.
The motion carried.**

The motion was made and seconded to nominate Senator Gail Griffin as Vice-Chairman. The motion carried.

Chairman Fann discussed the salinity problems in the state's water. Water softeners are contributing to the problem, including some of the old, outdated systems that are putting a significant amount of salt back into the aquifers and wasting water. She noted that there are additional issues that need to be identified.

PRESENTATIONS:

Presentation on Water Treatment 101:

Doug Oberhamer, representing Arizona Water Quality Association, advised that the Association is a not-for-profit trade association whose members are manufacturers or retail distributors of water treatment equipment and chemicals. He related that water is often called the universal solvent because of its ability to dissolve most compounds either quickly or over time. Calcium and magnesium ions are dissolved by water trickling down over strata of rock and soil. Water containing these minerals is called "hard water." Public water is treated at a central treatment plant and distributed through distribution piping, while water delivered by members of the Association begins at the point of entry (POE) or point of use (POU), only in the quantity that is needed. POE is full-service water at the inlet to an entire building or facility. POU is water treatment at a single outlet or a limited number of outlets in a building. POU is often used to treat water for drinking and cooking only. Products made by members of the Association include water softeners, filters, reverse osmosis systems, distillations, deionizers, ultraviolet and disinfection products. One of the core products is water softeners. Water softening is the reduction or removal of calcium and magnesium ions which are the principal cause of water hardness. Water conditioning equipment or water treatment equipment is defined as the treatment or processing of water by any means to modify, enhance or improve its quality to a need or standard. Soft water is water which contains less than one grain of calcium or magnesium per gallon (GPG); a grain is measured in milligrams per liter or parts per million. Hard water is water which contains dissolved compounds of calcium and magnesium, as well as other metallic elements. Hardness prevents soap from lathering and causes scaling in pipes. Only three technologies are available today to treat hard water to meet the definition of soft water:

- Ion exchange - uses resin to exchange calcium and magnesium ions for sodium or potassium ions
- Reverse osmosis - uses pressure to force water molecules through a membrane
- Distillation - uses cooling, evaporation and condensation

He said that adding chemicals to hard water will counteract its effects; however on a large scale, ion exchange is the only practical way to soften all of the water in a home system.

He explained the two regenerates: sodium chloride, the chemical name for table salt, and potassium chloride, the chemical name for potassium salt. Potassium chloride releases more salt into the sewers and costs three times as much as sodium chloride. The advantage of potassium chloride is that it plays a vital role in plant life: turf irrigation and agriculture.

He advised that homeowners and businesses soften water because of savings in energy. A recent study showed a 22-percent savings in energy in electric water heaters and a 30-percent savings on gas water heaters. The study also noted the following: tankless water heaters fail prematurely on six or more grains of hard water; longer life cycle for water-using appliances and plumbing pipes; use of less detergent and soap; and longer-lasting textiles (clothes).

Representative Pancrazi queried whether the Association is working on newer methods of delivering soft water. She wondered whether the old equipment is still being sold or whether it is being replaced by newer equipment. Mr. Oberhamer related that most of the manufacturers are constantly striving to improve technology that will meet the definition of soft water without using as much water or any salt whatsoever.

Mr. Howard mentioned that the State of California is ahead of Arizona in this. Mr. Oberhamer replied that some areas of California have restricted the use of water softeners. The primary problem being addressed there is the chloride issue. He said he is unaware of any specific chloride issues in Arizona.

Mr. Loveday commented that because of legislation, California has banned clock timers; it also has higher-efficiency water softeners.

In reply to Representative Pancrazi whether the industry is working on large desalination plants for public use, Mr. Oberhamer explained that his industry is limited to small communities (approximately 25,000 people), not the larger communities.

Presentation on the History and Details of the Central Arizona Salinity Study:

Tom Poulson, Civil Engineer, Bureau of Reclamation (USBR), U.S. Department of the Interior, gave a slide presentation on the Central Arizona Salinity Study (CASS) (Attachment 1). The study was initiated in 2001 by the City of Phoenix and the Bureau of Reclamation in partnership with the Cities of Glendale, Mesa, Scottsdale and Tempe. Other participants included the Cities of Goodyear and Tucson, as well as private water companies, industry, agriculture, researchers, consultants and government. The purpose of the study was to evaluate the extent and nature of the salinity problem. He reviewed the report relating to salinity and Phase I of the study. Discussion on salinity included the following:

- General Guidelines: Salt is not regulated by the Environmental Protection Agency but the standard is 500 milligrams per liter (mg/L); however, this area's water contains 700 mg/L; reclaimed water is 1,000 mg/L; brackish water is 1,000-3,000 mg/L; saline water is 30,000-50,000 mg/L; and brine is over 50,000 mg/L
- Sources of Salinity: Natural geological formation (50-80 percent); irrigation/agricultural runoff; residential and urban uses; and industrial uses
- Agriculture: Limited soil use and groundwater impairment
- Problems: Deterioration of appliances and fixtures; taste and odor complaints; on-site treatment required for some industries, accelerates corrosion of infrastructure; and limits reuse options
- Treatment of Salinity: Processes include membranes (using pressure), electro dialysis (using electrical energy to pull the ions through) and thermal processes (evaporating and condensing water). These processes remove 95 percent of the salts but are costly. Water softeners remove only calcium magnesium

He related that CASS Phase 1 relates to study findings: salt balance, salinity in the Phoenix area, economic impact and challenges in Arizona.

It was brought up that some of the challenges of salinity in Arizona that need to be addressed are brine/concentrate management, loss of water resource, regulatory, environmental, cost and energy.

Brandy Kelso, Deputy Planning Director, Water Services, City of Phoenix, discussed Phase 2 of the study. She stated that after the information was collected in Phase 1, technical subcommittees were formed to look further at a planning model, brackish water, wastewater treatment plants, and concentrate management. She reviewed the findings of each subcommittee and brought up some issues found by the subcommittees:

- What is needed to make brackish water the next available water source
- Tracking salt from the Colorado River
- Length of time it takes for salt to end up in groundwater and soils
- Quantify the amount and quality of brackish groundwater in the state
- Kinds of treatment needed to eliminate as much salt as possible
- Problems with the treatment process once the salt content reaches over 2,000 mg/L
- Tracking salt from cooling towers

Representative Pancrazi asked whether these cooling towers are used for refrigeration units for big corporations. Ms. Kelso replied in the affirmative and explained these are on very large buildings.

Ms. Kelso advised that smaller reclamation facilities were looked at to quantify how the different residents and businesses in the area are contributing salt to the system. A questionnaire was sent out by the Bureau of Reclamation to see how people are using water; one of the questions asked was about water softeners. It was found that prior to 1980, there were few water softeners built. After the 1980s, 1990s and 2000s, the numbers started to rise dramatically. She noted that the areas with water softeners built before the 1980s have smaller reclamation plants and will probably be the first to have issues with salinity problems.

Mr. Poulson related that with the completion of Phase 2, the USBR continues to hold meetings, write papers, and conduct research.

In response to Representative Pancrazi's question on whether any good uses for the salt have been found, Mr. Poulson said there are arsenics, seleniums, etc., in the water in addition to sodium chloride. Ms. Kelso revealed that there are some companies that have been trying to do selective removal; however, they have not come up with a good solution for Arizona water.

Mr. Howard raised the issue of removing salt from water. He said that salts are not actually removed but replaced because the end-stream water going back into the sewer has all the original salts in it. He brought up alternative salts to sodium chloride, i.e., potassium and acids, and said that part of the discussion should include the use of alternative salts in water softeners even though it is more costly. Ms. Kelso noted there are only a few sources of potassium worldwide; she agreed that it is expensive.

Mr. Garlick asked about the smaller wastewater treatment plants and the costs associated with processing water over 2,000 mg/L. Ms. Kelso stated that not a lot of treatment plants have hit those high limits, so it has not been a priority. Mr. Poulson said the real issue for water treatment plants is that if the content gets to about 1,000 mg/L, effluent cannot be used for re-use.

Representative Pancrazi asked whether there is any research on less expensive, more modern ways to desalinate. Mr. Poulson stated that is being worked on every day. Everything is improving, so the costs are being driven down. In the Valley, there is a lot of brine but no place to put it, which is a problem that has to be resolved. Ms. Kelso mentioned that brine costs can be equal to or more than the treatment cost.

NO PUBLIC TESTIMONY:

Chairman Fann said that although she has been dealing with water for the past 20 years, she was unaware of the salt problem in Maricopa and Pima Counties. The issue was originally brought to her as a water softener issue, so her intent is to concentrate on water softeners and technology. She asked members if they are comfortable with starting with this issue before tackling more complex issues. Mr. Poulson commented that focusing solely on water softeners will be contentious enough.

SET DATE FOR NEXT FORMAL MEETING:

Chairman Fann asked for comments and whether members would like to have further presentations at the next meeting. She proposed having a draft bill brought forward at the next meeting to keep the process moving.

Mr. Richens suggested that it might be more efficient to establish some basic principles prior to drafting a bill.

Vice-Chairman Griffin stated that she is comfortable with that suggestion. She would like to know the cost of the old versus new systems and a comparison of advantages and disadvantages.

Representative Pancrazi said she would like to see a timeline of when new models will be phased in, cost analyses, regulations or requirements, such as what California has done, etc.

Chairman Fann expressed the need to be cognizant of big box stores and manufacturers that have inventories on hand, and where industry will go in the future.

Vice-Chairman Griffin recommended that everyone submit to staff a list of questions and issues to be discussed at the next meeting, as well as suggestions for legislation. Chairman Fann concurred and asked members to email their list to staff. Ms. Kash advised that Justin Riches will staff the Committee in the future. Chairman Fann advised that staff will organize the information submitted by members to be discussed at the next meeting.

Mr. Richens said he would like to see a presentation on other states' regulations and successes or failures, before the list is composed. He said that will be helpful in determining whether regulation in Arizona will be effective. Mr. Poulson agreed to update members on regulation in other states at the next meeting.

Representative Pancrazi suggested that all issues/comments be sent to staff by November 15, 2011.

Chairman Fann advised that an email will be sent to members informing them of the date of the next meeting. She mentioned November 28, 2011 in the afternoon as a probable date.

Without objection, the meeting adjourned at 3:00 p.m.

Joanne Bell, Committee Secretary
November 9, 2011

(Original minutes, attachments and audio on file in the Chief Clerk's Office; video archives available at <http://www.azleg.gov>)

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JLSC ON WATER SALINITY ISSUES
October 27, 2011

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ARIZONA STATE LEGISLATURE
Fiftieth Legislature – First Regular Session

JOINT LEGISLATIVE STUDY COMMITTEE ON WATER SALINITY ISSUES

Minutes of Interim Meeting
Monday, November 28, 2011
House Hearing Room 1 -- 1:30 p.m.

Chairman Fann called the meeting to order at 1:36 p.m. and attendance was noted by the secretary.

Members Present

Senator Gail Griffin, Vice-Chairman
Senator Jack Jackson Jr.
Barry Aarons
Phillip Bashaw
Michael Brewer
Marshall Brown
Henry Darwin (Linda C. Taunt)
Troy Day
Sandra Fabritz Whitney (Michael J. Lacey)
Maureen George
Harold "Chip" Howard

Representative Karen Fann, Chairman
Representative Lynn Pancrazi
Tom Poulson (ex-officio)
Brandy Kelso
Tim Lawless
Gustavo Lopez
Robert Lotts
Dave Loveday
Doug Oberhamer
The Honorable Gary Pierce (Steve Olea)
Lori Roman

Members Absent

Matthew Garlick
Dave Richens

Sandi Sutton

Presentations

Brandy Kelso, Water Services Department, City of Phoenix, provided a handout, *Overview of Current Water Softener Control Programs* (Attachment 1). She said the water in Arizona is considered very hard because the Salt River contains sodium chlorides and Central Arizona Project (CAP) water contains calcium, in higher quantities than found in other places in the United States. Salt from water softeners amounts to approximately 10 percent of total dissolved solids (TDS) at wastewater treatment plants.

She discussed TDS control programs, noting that approximately half of the states have local controls on water softeners with California being the "hotbed" where 30 plus years have been spent dealing with salinity issues. States that have controls mainly deal with septic tanks and not necessarily discharge to sewer systems; there is much controversy as to whether or not salts from water softeners harm septic tanks, for which studies are underway.

Ms. Kelso reviewed legislative and court actions taken in relation to water softeners in California beginning in the 1960s with a ban in certain areas and adoption of statewide technical standards in the 1970s, both of which were reversed. In the 1980s, efficiency standards were adopted in the health code for the kinds of water softeners that can be used, such as high efficiency, specific ratings, etc. AB1366 was passed in 2009, which allows sewer system owners to ban water softeners if justification is provided.

She related that regulations were imposed in Santa Clarita, California to ban water softeners because the area is under a state mandate to control chloride and the water is reused for agricultural purposes. The ban helped to some extent, but costly water treatment plant controls will still have to be implemented to reach the required levels. In July 2011, the Inland Empire Utilities Agency adopted a regulation stating that anyone in the district can ban new, replacement or expansion of self-generating water softeners. There is some question about how the regulation will align with AB1366.

Ms. Kelso added that Ellman Companies in Arizona included self-imposed bans in the homeowners' association rules and regulations in Fountain Hills and Goodyear, partially because wastewater is reused for golf courses and other purposes.

She provided a handout, *Summary of Salinity Management Programs by State* (Attachment 2), which shows regulations by local jurisdictions in other states in relation to discharge to sewer systems and to septic tanks.

In response to a question, Ms. Kelso elaborated that some current studies regarding discharge from septic tanks focus on whether the natural "bugs" that live in the septic tank are harmed by the amount of salt, and whether water that is not treated in the septic tank that goes into the leach field and soil affects plant growth.

Mr. Loveday related that research is being conducted by Virginia Tech University and the Water Quality Association, which will take about one-and-one-half years to determine the impact water softeners have on septic systems. Many septic controls are at township and county levels. Some jurisdictions completely banned discharge into septic tanks, but many jurisdictions require the use of a trench drain so the discharge goes directly into the ground.

Chairman Fann asked if the amount of land makes a difference because an acre or more would have a vast amount of soil to absorb the discharge, whereas a smaller lot would not.

Mr. Loveday replied that is not being considered; however, there has been some debate within the septic industry about sizing septic systems according to the dimensions of the home and the number of occupants.

Ms. Kelso stated that with regard to wastewater treatment plants, most of the TDS goes right through the treatment plant, but a few controls are used to monitor the healthiness of the treatment system, some of which can be intolerant to elements like chloride. Not only is the healthiness of plants considered, but also how the water will be reused and tolerances or intolerances.

In response to a question, Ms. Kelso elaborated that Ellman Companies was in charge of the wastewater system, so wastewater was collected from the homes and used on the golf course that was built within the community. The developer is attempting to keep the sodium levels low so the grass will grow without more treatment or more water. It is the only prohibition she is aware of in Arizona.

In response to a query about California, Mr. Loveday stated that the Inland Empire Utilities Agency passed an ordinance suggesting that its communities impose a ban, but only one community has done so; the others are debating what to do. He met with two of the municipalities and he has been asked to return and discuss options. That is the only action taken by a community since AB1366 was passed in 2009. Santa Clarita was different and had to be voted on. Ms. Kelso added that Santa Clarita had very specific state-mandated regulations to meet; she is not aware of any other entity in a similar situation.

Mr. Howard stated that newspaper articles in California suggest that equipment manufacturers are trying to cause the bans to be repealed. Mr. Loveday remarked that the Water Quality Association and the Pacific Water Quality Association were neutral on AB1366.

Chairman Fann revealed that she personally will never sponsor or support a bill banning water softeners. If too much salt is beginning to affect wastewater treatment systems, water systems, infrastructure, golf courses and the Palo Verde Power Plant, the Committee will need to decide on an acceptable level and determine how it can be obtained.

Mr. Howard commented that the issue is more serious in Arizona than California because the state has already exceeded salinity limits according to Environmental Protection Agency (EPA) standards in some domestic water and golf courses. For example, the City of Scottsdale utilizes reverse osmosis (RO) treatment to remove salinity from effluent before it will be accepted by golf courses.

Chairman Fann remarked that establishing guidelines for acceptable water softeners is only part of the salinity issue. In the future, RO treatment and other processes may need to be addressed.

Vice-Chairman Griffin pointed out that there is a difference between rural and urban areas. She lives on eight acres of land and she has a water softener in which she can use salt or an alternative. One size does not fit all, which needs to be taken into consideration.

Mr. Howard stated that Ms. Kelso, Mr. Poulson and others have done extensive studies on salinity, which suggest that commercial and residential water softeners are a problem.

Paul Hendricks, representing self, stated that this is a complex issue and there are costs associated with the benefits of conditioned water. What policymakers will be challenged with is who pays the cost, how to encourage people to do the right thing and the fact that various jurisdictions within the state may have differing rules. He reviewed a handout, *Reducing Salinity and Water Waste from Water Softening* (Attachment 3). He discussed the salinity problem in Arizona and water hardness levels in Phoenix. He indicated that 50 percent of the homes built in the Phoenix area use water softeners, and new communities provide water softeners as an incentive or add-on so it is incorporated into the home purchase. There are aesthetic and economic values to soft water.

Mr. Hendricks noted that an undersized self-regenerating water softener can use as much as 912 gallons of water and 169 pounds of salt per month. Many developers are considering building reclamation facilities in communities to gather water for reuse within the local area, which is good sound water management, but the impact of highly concentrated salt loads from new developments is starting to take its toll. In some cases, jurisdictions are making decisions about the use of reclamation facilities based upon the impact to water. Cities like Scottsdale must condition water for turf irrigation that previously did not have to be conditioned.

He said the individual homeowner only pays for a fraction of the privilege of having soft water by purchasing the water softener, salt, water and sewer discharge, whereas the cost of the salt load and waste water that has to be replaced with a new water supply is shifted to the general society. He indicated that alternative technologies are available, some of which are more traditional than others; some are regulated and legitimate, but some are not:

- Commercial RO systems have been used for a long time by industries, hotels and large commercial facilities. The systems have been improved over the years to the point that there is only 15 percent waste water and a brine stream is created, which is one of the largest challenges.
- Some companies offer an exchange system. One company will take the resin chamber from the water softener for testing or regenerating.
- Another company developed an almost zero liquid discharge (ZLD) process in which the brine waste is captured, filtered, conditioned and reused for further regeneration.

Mr. Hendricks discussed technology options and likely results:

- banning time clocks: small reduction in salinity and water waste
- enacting high salt efficiency standards: small reduction in salinity; increase in water waste
- twin tank models: significant reduction in salinity; higher cost to consumer
- whole house RO: no increase in salinity; significant increase in water waste
- distillation: no increase in salinity; high energy usage; high operating cost
- exchange tanks with near ZLD: no increase in salinity; significant water conservation benefits; use waste stream as resource; consumers cannot "own" the system because it is a service contract

In conclusion, Mr. Hendricks recommended that policymakers and industry representatives work with water service providers to determine what steps should be implemented; if it is not done in a broad-based, collaborative manner, people will game the system and nothing will be accomplished.

Mr. Poulson questioned the statistic of 169 pounds of salt use per month by a water softener, noting that a water softener survey cited about 40 pounds per month for the average household. Mr. Hendricks responded that if it is four times less, the annual number of tons of salt per year at the reclamation plant would be one-fourth of 13,182, which is still a significant amount.

Mr. Oberhamer cited the following industry statistics based on the Central Arizona Salinity Study (CASS):

- With an average daily soft water use per home of 300 gallons, assuming 2.7 people are in the home, each person would use 111 gallons per day.
- With a time clock unit, 15,000 gallons of water per year would be needed to regenerate and 1,217 pounds of salt.
- A metered unit or demand-initiated regeneration unit would use approximately 4,258 gallons of water and 973 pounds of salt per year, which is a 60 percent savings in water and 20 percent savings in salt compared to a time clock unit.
- A portable exchange option would use approximately 2,700 gallons of water and 507 pounds of salt per year, an 82 percent savings in water and 58 percent savings in salt compared to a time clock unit.

Mr. Hendricks related that the information he provided is based upon four people in the home and represents an inefficient water softener, not the new water softeners sold today unless the unit is cheap or not properly adjusted or maintained.

In response to a question, Mr. Lotts answered that the flow of TDS is always monitored at the Palo Verde Power Plant. During the 30 years he has been at the plant, the amount of salt has slowly increased. The plant has 650 acres of evaporation pond space, and unless something can be done to decrease the salt load into the system, another pond may have to be built in the future, which is very costly.

Chairman Fann asked what will happen if nothing is done to reduce the amount of salt, the economy improves and another onslaught of homebuilding occurs. Mr. Hendricks speculated that it will be challenging for communities to build reclamation facilities to reuse water in the area because the cost of desalting will become very significant. He recommended that policymakers, industry and utility representatives decide where the state should be in 20 to 50 years and develop a plan for a sustainable growth model that does not hurt anyone in today's economy. Business models, practices and engineering plans can be adjusted to implement the plan in a three-to-five-year time period.

Mr. Brown clarified that the City of Scottsdale constructed a RO facility at a cost of \$60 million to remove sodium from reclaimed water to irrigate turf; some of the water is recharged so there are multiple end uses. If something is not done to minimize the salt load into the system, it is anticipated that another \$60 million facility will be needed to deal with brine, which is accumulating.

In response to a question, Mr. Loveday related that Santa Clarita had a unique situation where the water going into the area was already out of compliance, so an ordinance was passed through a referendum banning water softeners to avoid building a secondary treatment plant. Chlorides decreased somewhat, but the water is still out of compliance and a secondary treatment plant will have to be built anyway.

Mr. Hendricks stated that an item not discussed is the environmental impact of salinity on Whole Effluent Toxicity (WET) testing and the discharge requirements to the Salt and Gila River Watershed based upon water quality standards, which is another set of criteria that may drive this issue sooner. Arizona has not yet been informed by any regulatory agency that it is necessary to reduce constituents, but that is expected.

Chairman Fann asked about the Environmental Protection Agency's (EPA) minimum standard for salt in Arizona. Ms. Taunt stated that in WET testing, when a wastewater treatment plant or water treatment plant discharges to navigable water or surface water, there is not a salinity standard per se; WET testing is done to see how the effluent will affect aquatic life in the stream and items of that nature. The only stream in Arizona with specific TDS numbers is the Colorado River, which is a function of the Colorado River Salinity Control Forum whereby seven states that obtain water from the river worked together to adopt standards. It is up to the community or water system to conduct further study on what is impacting effluent and streams; however, many facilities do not discharge surface water, so then there is the recharge issue and impact to the aquifer.

Public Testimony

Marty Jessen, Rainwater Corporation; President, Pacific Water Quality Association, said Rainwater is a 60-dealership water treatment network with employees in California, including Santa Clarita. Regarding Mr. Poulson's question about the 160 versus 40 pounds of salt use per month, he said the nuance of water softeners is that they can be set for different concentrations of salt in terms of regeneration. There have been discussions about adopting California's high salt efficiency standard, which means 4,000 grains of hardness is removed per pound of salt used, but water waste is increased by twice or more and cannot be decreased unless new technologies are implemented.

He remarked that since AB1366 was passed in California, there has been more innovation in the water softener business than in the previous 30 years because everyone began to realize that the old way might be in jeopardy. New electrochemical deionization technology will be introduced in April 2012 by Pentair, which will reduce TDS and hardness by 80 to 85 percent without using a grain of salt. Also, whole house RO will be improved and become more efficient waterwise. He added that Rainwater is the company with the ZLD project that is a viable alternative.

Mr. Jessen noted that in relation to setting standards for grains of salt per gallon, etc., it is important for the technician to install the water softener correctly based on the volume of water that will be used per day and the number of people in the house.

He pointed out that California enacted high salt efficiency standards 30 years ago when it was using Arizona's Central Arizona Project (CAP) entitlement and water conservation was not so important. It is a little more important to California today, but he does not know if that is what is driving the people trying to ban water softeners in communities.

In response to a question, Mr. Jessen answered that a number of states are considering regulatory frameworks such as Iowa, Wisconsin, Minnesota and Texas, which has a certification program for technicians and installers that would be a good model to use.

Mr. Jessen asked the Members to address consumer protection. He said all kinds of devices to replace water softeners will be marketed when there are only three ways to obtain soft water. Those are ion exchange (either self-regenerating water softeners using salts [potassium or sodium chloride]) or exchange tanks, RO or distillation. Santa Clarita lists 80 plus devices on its website and people are being misled. He added that if the Committee "pushes the bar" to dual tanks, for example, which is where the biggest short-term payoff is obtained, the cost to consumers will increase \$400 to \$500, but as Mr. Hendricks suggested, the cost will be placed on the people who benefit rather than society as a whole.

Senator Jackson requested examples of what a few other states are doing for the next meeting. Mr. Jessen indicated that he will provide information on Texas.

Chairman Fann recalled that there was discussion at the last meeting about consumer protection, and the Attorney General's Office (AG) and the Registrar of Contractors' (ROC) Office were going to be contacted.

Justin Riches, House Majority Research Analyst, said he did call, but he has not heard back.

Committee Discussion/Recommendations for Draft Legislation

Chairman Fann expressed the intent to look ahead 10 to 30 years and develop reasonable requirements that could be phased in during the next 5 to 10 years. After that, depending on technology and input from Salt River Project, CAP and municipalities, a determination can be made whether there is a need to go any further or if the problem is solved. If the consensus of the Committee is that water softeners are causing problems, the Members can decide what to include in legislation, i.e., define soft water, the maximum amount of water and salt that should be used in a month based on how many people live in the house or whatever experts determine, how to reach that goal, phase it in and what to do about old, expired water softeners.

Mr. Day said he is not convinced that a ban in small or large increments will result in a significant reduction or avoid future costs to the public for additional treatment. He pointed out that the Committee has not heard from the farming or mining industries, etc., who have issues with salinity in the aquifer. Chairman Fann reiterated that the Committee is not going to ban water softeners, but noted that the Members are from many different industries.

Discussion followed about replacing water softeners with twin tanks to reduce the salt load.

Mr. Poulson indicated that the slight reduction could be the difference between passing or not passing EPA scrutiny.

Chairman Fann noted that the amount of water that is being wasted is also important and should be reduced. Water in Arizona is not only precious, but it is becoming expensive.

Mr. Hendricks clarified that within the context of his presentation, the definition of waste water is if water is softened by using more water than is necessary.

Mr. Brown stated that water loaded with sodium chloride is very difficult to reuse in most applications, so there is an added cost depending upon what the water is loaded with when it goes to the treatment facility. Sodium is more of a challenge in Arizona than chloride. He argued that the 10 percent is based on a number of assumptions. Some communities are probably closer to 25 percent from sodium and chloride water softening; it depends on the demographics of the community, but 10 percent is probably a good overall representation.

Mr. Aarons asked what the percentage would be if commercial water softeners were included. Ms. Kelso replied that she believes the overall 10 percent includes the total watershed, but she will have to check. Many businesses use water softeners such as restaurants, car washes, hotels, laundromats, municipal swimming pools, etc.

Mr. Aarons submitted that if the Committee applies definitions, phase-outs and requirements for new technology, it is not fair to place the financial burden on commercial users or homeowners; it should be done across the board. Chairman Fann speculated that commercial users will want to use new technology because money will be saved by using less water and less or no salt.

Mr. Aarons said if people are going to be encouraged to use more efficient systems, the long-term cost should be known. It may be more costly today, but money may be saved over the lifetime of the system, which will probably increase as technology improves.

Mr. Loveday related that some water softener systems were upgraded, at minimal cost, at large laundries in California. In one case, over 600,000 pounds of salt per year was saved. He indicated that he will email the examples to the Members.

Mr. Howard stated that the Marriott Desert Ridge Hotel and the Desert Marketplace consume 620,000 pounds of sodium chloride per year. Mr. Brown stated that there is a high cost for removing sodium from the waste stream that could be avoided or approached differently to minimize costs on the back end, but ultimately the consumer will end up paying the cost on the front end or the back end.

Mr. Howard said according to everything he has read, the driving force behind most of the bans, except in Santa Clarita due to its peculiar environmental issue, has been to make waste water suitable for a secondary use on golf courses or agriculture so potable water does not have to be used. In order to mitigate the effects of sodium chloride on the soil, whether it is on golf courses or for agriculture, as much as one ton per acre of gypsum salt must be added, which ultimately could result in several tons of salt added to the system.

Vice-Chairman Griffin requested a breakdown of residential and commercial water softeners. She said the average homeowner does not know what unit to use and makes purchases because of affordability. Perhaps a tax credit for installation of specific systems will be possible, but right now the public needs to be educated about good and bad units, water and salt usage, etc.

Mr. Loveday said manufacturers partnered with the City of Madison, Wisconsin to educate customers about the impact of salts and best practices.

Mr. Hendricks recommended that the Committee work with the Homebuilders Association on the type of water softeners to include in new home purchases when homebuilding picks up.

Mr. Brewer remarked that in today's marketplace, anything that costs additional dollars is a non-starter. There will be another boom and something needs to be done as to what types of water softeners are installed in new homes. If the unit has a clock and someone is not living in the home for six months out of the year, it is probably not a good choice; however, the residents would not be adding salt either, so at some point it would be regenerating, which leads to wasted water. He added that starting the shower, walking off to get a cup of coffee and returning is a bigger waste of water than any water softener.

Vice-Chairman Griffin noted that homes with energy-efficient ratings are being built, so rating water softeners could be advantageous.

In response to a question, Mr. Bashaw remarked that salinity issues in relation to agriculture are different than with wastewater treatment plants and septic systems. Mostly surface water is used in Arizona for agricultural production, so he is mainly present to hear about water softeners and the impact on municipal water treatment facilities, Palo Verde, etc.

Mr. Oberhamer stated that good public policy should address commercial, industrial and residential users. Electronic and chemical deionization will reduce hardness 80 or 85 percent, but RO may still be needed to remove the last 10 or 15 percent because businesses and industry need zero soft water on many applications. Public policy can help homeowners do the right thing. He opined that the Committee should create a standard to reduce the amount of salt and water that is used, but not prohibit new technology.

Chairman Fann asked Mr. Riches to find out where the AG's Office and the ROC stand on defining a water softener and who is qualified to install them because the point was made that if the installer does not know what he is doing, everything the Committee does will be moot. As to setting parameters on the acceptable amount of water, there are some issues. She asked how far Texas has gotten with legislation. Mr. Loveday replied that Texas regulates who can install through licensing, which has been in effect for a few years, and he will obtain information for the Members. Texas has no regulations on salt water softeners.

Chairman Fann asked how the Committee wants to define the parameters of an acceptable level, whether old systems that waste too much water or use too much salt should no longer be acceptable in five or ten years. Ms. Kelso said technology is moving forward so the Committee could start with what California has done and improve on that. Mr. Loveday indicated that he can provide literature on innovations in the industry.

Chairman Fann asked how old water softeners will be phased out. She indicated that consumer protection will be part of the educational process and endorsed the idea of rating water softeners. Mr. Day pointed out that consideration should be given to funding for an educational program.

Mrs. Pancrazi said the Members should know what the ratings are on different water softeners before the next meeting. Mr. Loveday explained that water softeners are certified and tested to American National Standards

Institute (ANSI) certification, of which he will obtain a copy. It is a third-party standard for residential users only.

Discussion followed about the use of potassium in water softeners rather than sodium chloride. Concerns were raised about the potential impact to the agriculture industry, the higher cost of potassium, availability and potential poisoning of the environment, which Mr. Poulson said he will research.

The Members discussed large industrial manufacturers, which Ms. Kelso agreed to research.

Chairman Fann questioned how to determine whether the Committee is doing the right thing and to what extent it should be done. Ms. Kelso stated that some salt models were developed during the CASS study and the water softener study that could be used as a starting point. She agreed to develop a presentation.

Mr. Day asked if the Committee will be making decisions about regulation of other sources that create salinity. Chairman Fann responded that the Committee was established to address problems caused by soft water softeners, but after the first few meetings, she realized it is only a fraction of the bigger problem. The Committee expires at the end of 2011 and may be extended or some of the Members changed, depending on the subject that is broached.

Mr. Brown indicated that the Committee did not discuss enforcement, which he assumes will fall to the more localized entities. Chairman Fann said that is the reason she asked Mr. Riches to contact the AG's Office and the ROC about what is currently done as far as penalties for false marketing.

Set Date for Next Formal Meeting

The Members agreed to meet on Monday, December 19, 2011 at 1:30 p.m. in House Hearing Room 1.

Without objection, the meeting adjourned at 3:57 p.m.

Linda Taylor, Committee Secretary
December 8, 2011

(Original minutes, attachments and audio on file in the Chief Clerk's Office; video archives available at <http://www.azleg.gov>)

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JLSC ON WATER
SALINITY ISSUES

November 28, 2011

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ARIZONA STATE LEGISLATURE
JOINT LEGISLATIVE STUDY COMMITTEE ON WATER SALINITY ISSUES

Minutes of the Meeting
Monday, December 19, 2011
1:30 P.M., House Hearing Room 1

Members Present:

Senator Gail Griffin, Vice-Chairman
Barry Aarons
Michael Brewer
Henry Darwin
Harold "Chip" Howard
Tom Poulson (Ex-Officio)

Representative Karen Fann, Chairman
Representative Lynne Pancrazi
Brandy Kelso
Dave Loveday
Robert Lotts
Doug Oberhamer
Dave Richens

Members Absent:

Senator Jack Jackson Jr.
Philip Bashaw
Marshall Brown
Troy Day
Sandra Fabritz Whitney
Matthew Garlick
Maureen George

Tim Lawless
Gustavo Lopez
The Honorable Gary Pierce
Lori Roman
Sandy Sutton

Staff:

Stephanie Johnson, House Research Analyst
Sharon Langford, Senate Research Analyst

Chairman Fann called the meeting to order at 1.35 p.m. and attendance was noted.

Presentation on Water Softener Ratings

Brandy Kelso, Water Services Department, City of Phoenix, distributed a handout entitled "Residential vs. Commercial Softening – Phoenix Service Area" (Attachment A) and gave an overview of water softeners and salt levels.

David Loveday, Director of Government Affairs & Communications, Water Quality Association, provided information to the Committee on salinity issues.

Marty Jessen, Rayne Water, distributed "Salinity from Water Softeners: How do Softeners Use Salt & Water, Expected Reduction with Different Policy Options & Recommendations" (Attachment B) and answered questions posed by the Committee.

Current Regulatory Framework

Stephanie Johnson, House Assistant Research Analyst, distributed copies of Arizona Revised Statutes 13-2202, 13-2203, 13-2310, 13-2311 and 44-1211 (Attachment C) and gave an overview of the regulatory situation.

Doug Oberhamer, Culligan Water, General Manager, distributed a handout entitled "NSF/ANSI 44 – 2009; Residential Cation Exchange, Water Softeners" (Attachment D), "Recommendations Arizona Water Quality Association" (Attachment E) and "Salinity Management" (Attachment F). He discussed the recommendations of the Water Quality Association and answered questions posed by the Committee.

Committee Discussion

Discussion was held on the current level of information available and the future plans for the Committee.

Formal Recommendations

The Committee agreed that this Committee be continued and subcommittees be appointed.

There being no further business, the meeting was adjourned at 3:02 p.m.

Respectfully submitted,

Shelley Ponce
Committee Secretary

(Audio recordings and attachments are on file in the Secretary of the Senate's Office/Resource Center, Room 115. Audio archives are available at <http://www.azleg.gov>)

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JOINT LEGISLATIVE STUDY
COMMITTEE ON WATER
SALINITY ISSUES
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