



IDA WORLD
CONGRESS

2015

DESALINATION & WATER REUSE
Renewable Water Resources to Meet Global Needs

Seawater Desalination in Texas: Past, Present, and Future

September 2, 2015 by Erika Mancha
Texas Water Development Board

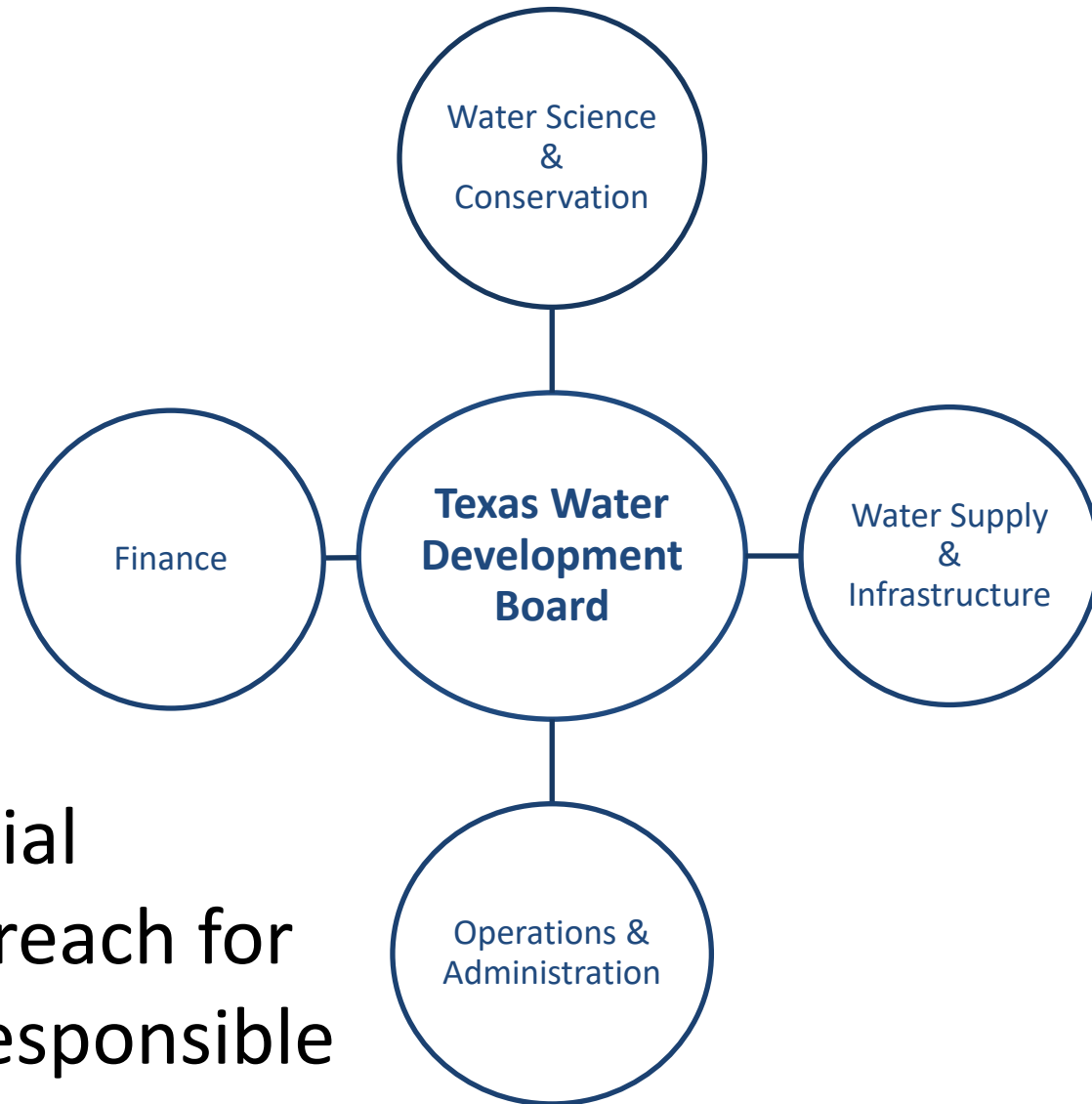
The following presentation is based upon professional research and analysis within the scope of the Texas Water Development Board's statutory responsibilities and priorities but, unless specifically noted, does not necessarily reflect official Board positions or decisions.

Mission

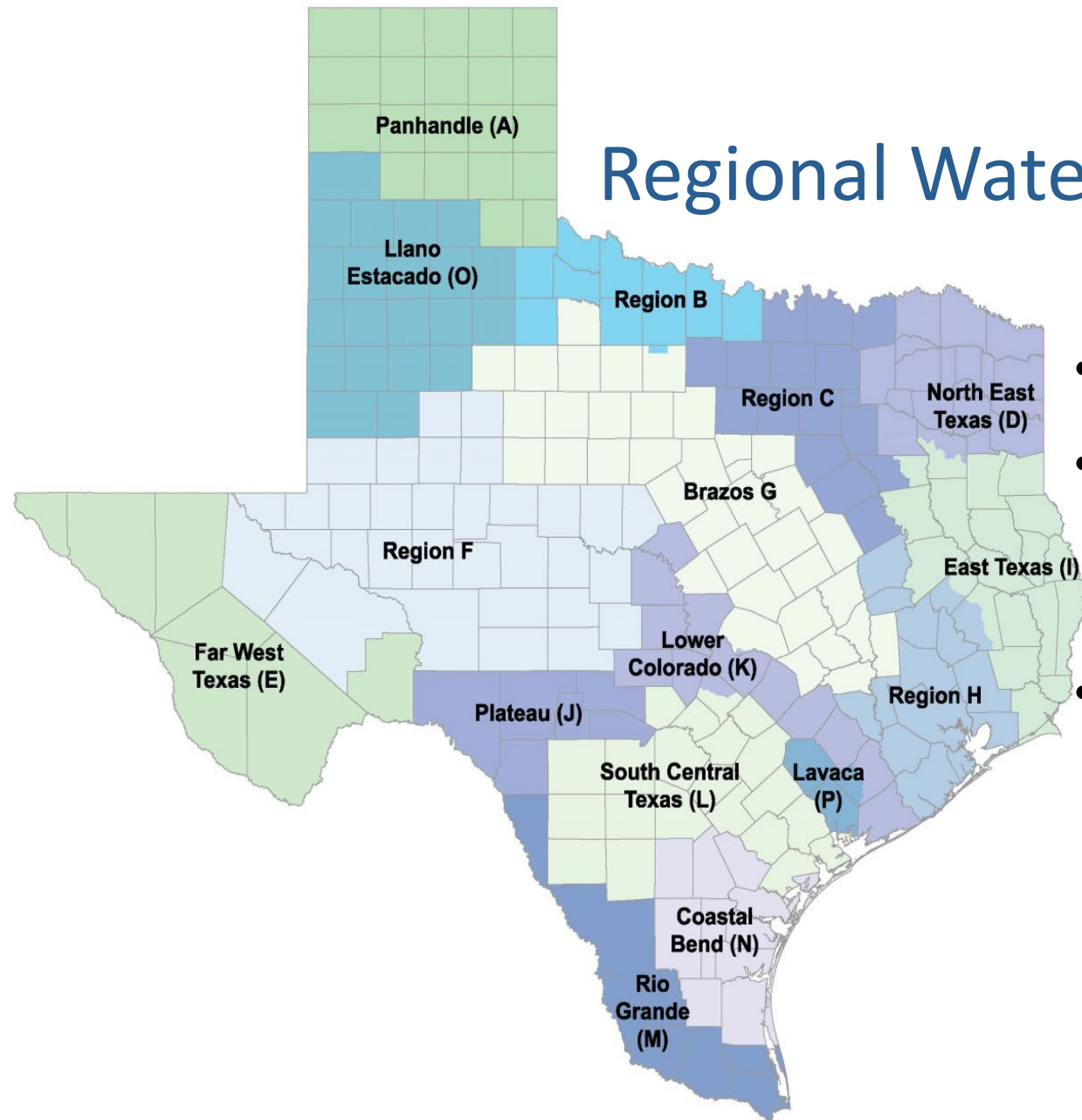
To provide

- Leadership,
- Information,
- Education, and
- Support

for planning, financial assistance, and outreach for conservation and responsible development of water for Texas.

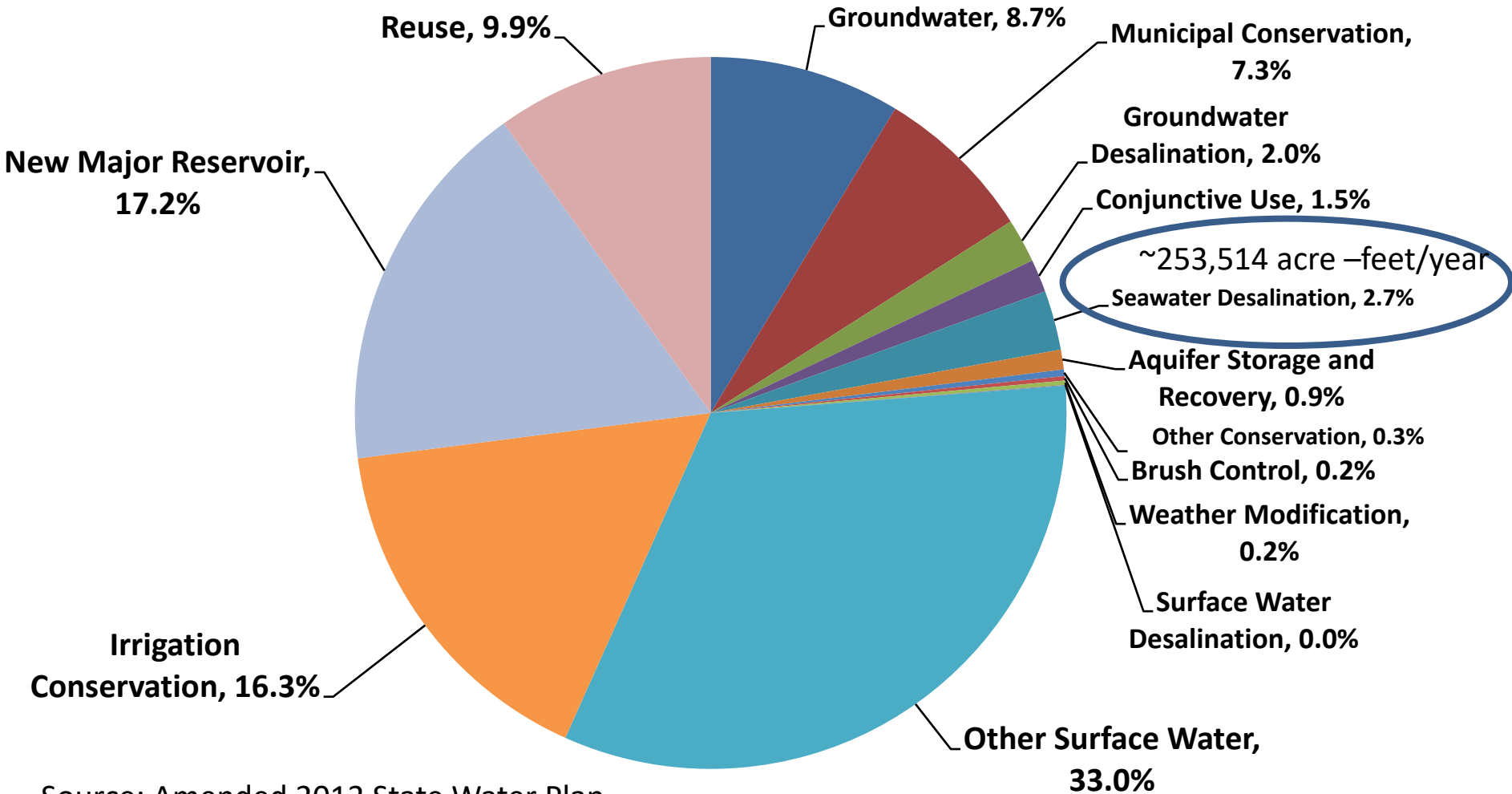


Regional Water Planning Areas

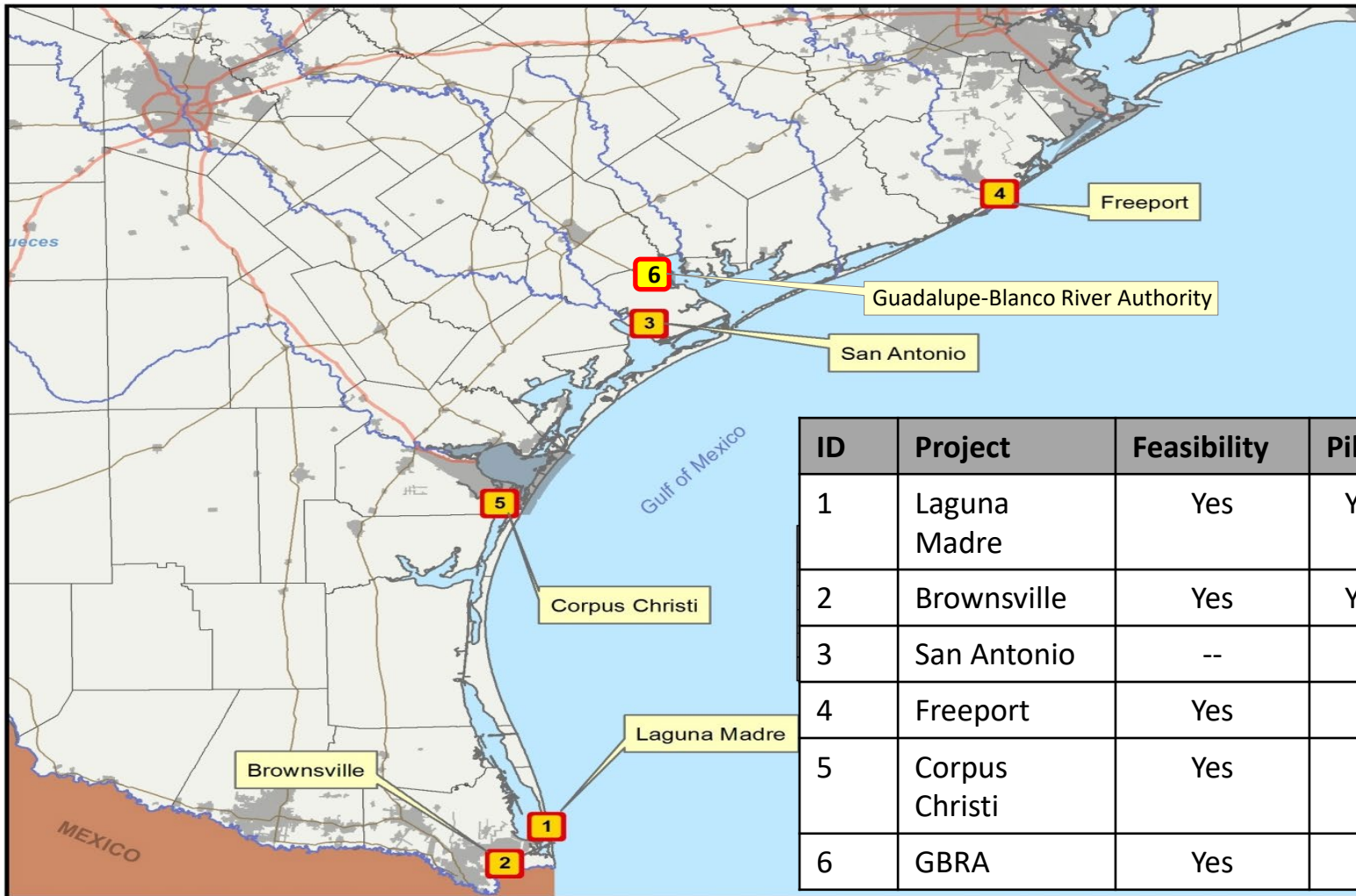


- Bottom-up approach
- State Water Plan is completed every five years
- 2017 State Water Plan is in process

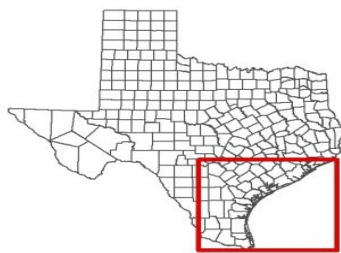
Recommended Water Management Strategies by 2060



Source: Amended 2012 State Water Plan



ID	Project	Feasibility	Pilot
1	Laguna Madre	Yes	Yes
2	Brownsville	Yes	Yes
3	San Antonio	--	--
4	Freeport	Yes	--
5	Corpus Christi	Yes	--
6	GBRA	Yes	--

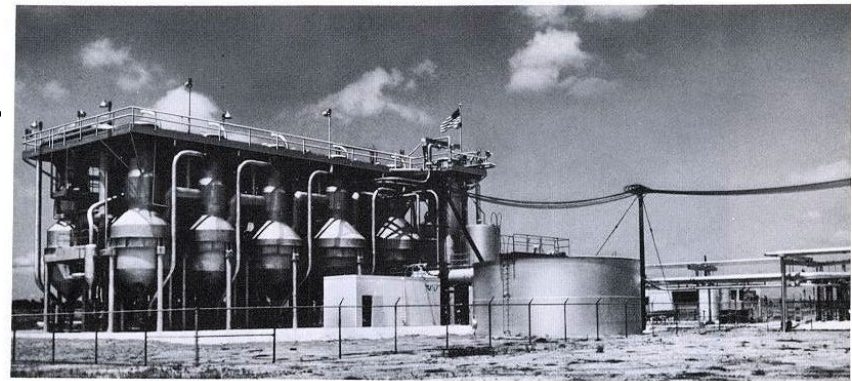


- 3 Recommended and Alternate Desalination Sites
- Major Rivers
- Interstate Highways
- US Highways
- Texas Counties
- City Boundaries (2009)

Freeport Seawater Desalination Demonstration Plant

- Operational June 21, 1961
- Capacity of 1 Million Gallons per Day (MGD)
- Multi-effect vertical tube distillation
- Total Dissolved Solids
 - 35,000 ppm for seawater
 - 140,000 ppm for brine
- Cost of ~\$1.5 million

DEMONSTRATION PLANTS



First Department of the Interior Saline Water Conversion Demonstration Plant.

TEXAS BOARD OF WATER ENGINEERS

Durwood Manford, Chairman
R. M. Dixon, Member
O. F. Dent, Member

A PLAN FOR MEETING THE 1980 WATER
REQUIREMENTS OF TEXAS

Prepared under the direction of
John J. Vandertulip, Chief Engineer

For Submittal to the
Fifty-Seventh Legislature

May 1961

SOUTHWEST RESEARCH INSTITUTE-HOUSTON
3600 SOUTH YOAKUM BOULEVARD
HOUSTON, TEXAS 77006



DEPARTMENT OF APPLIED ECONOMICS

November 1966

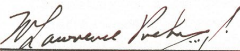
THE POTENTIAL CONTRIBUTION
OF DESALTING TO FUTURE WATER
SUPPLY IN TEXAS

Prepared for:

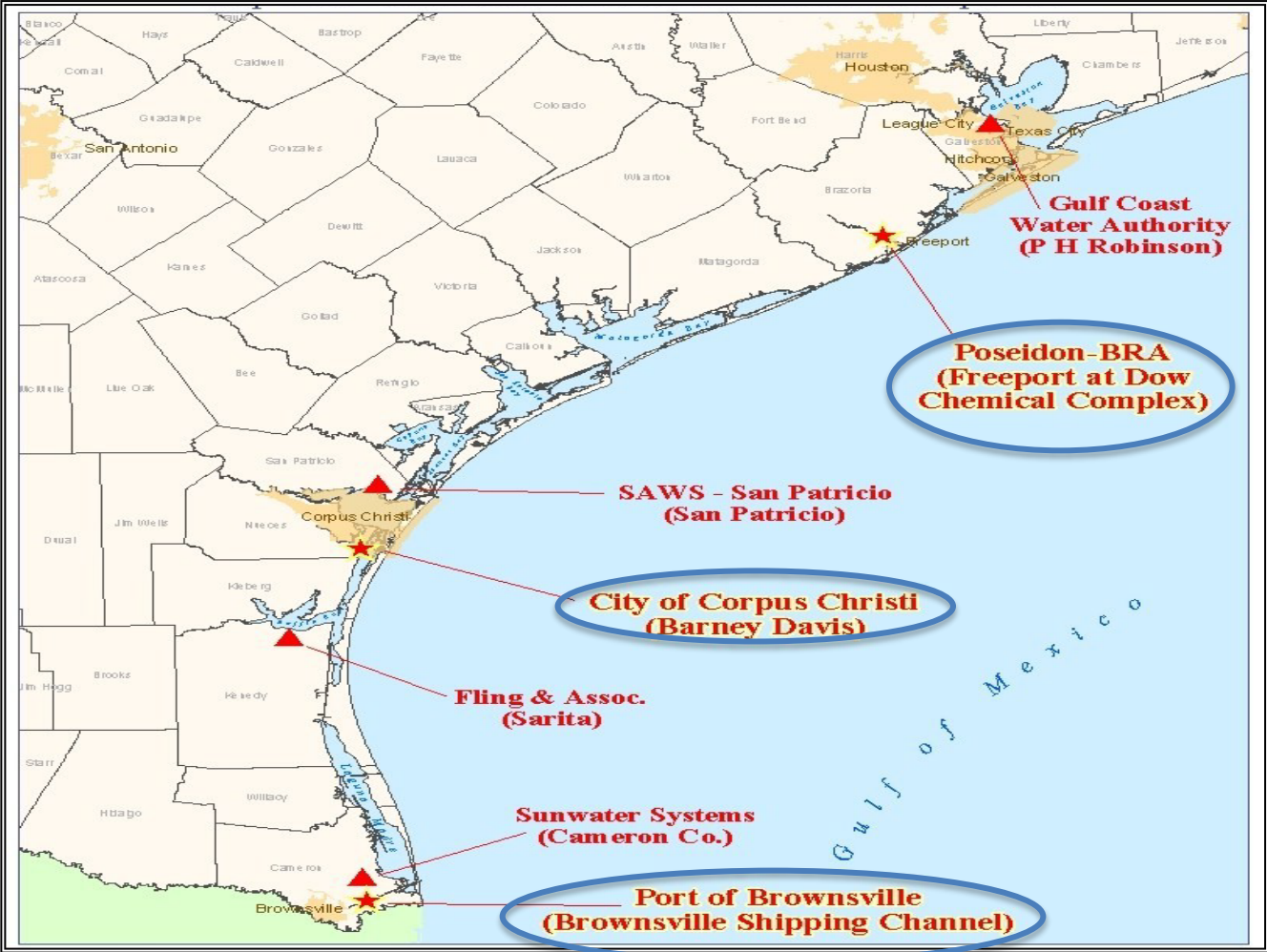
TEXAS WATER DEVELOPMENT BOARD
and
OFFICE OF SALINE WATER;
U.S. DEPARTMENT OF THE INTERIOR

By: W. Lawrence Prehn and Robert A. Sigafos
SwRI Project No. 19-1692

Approved:


W. LAWRENCE PREHN JR., DIRECTOR
DEPARTMENT OF APPLIED ECONOMICS

Proposed Sites and Recommended Proposals

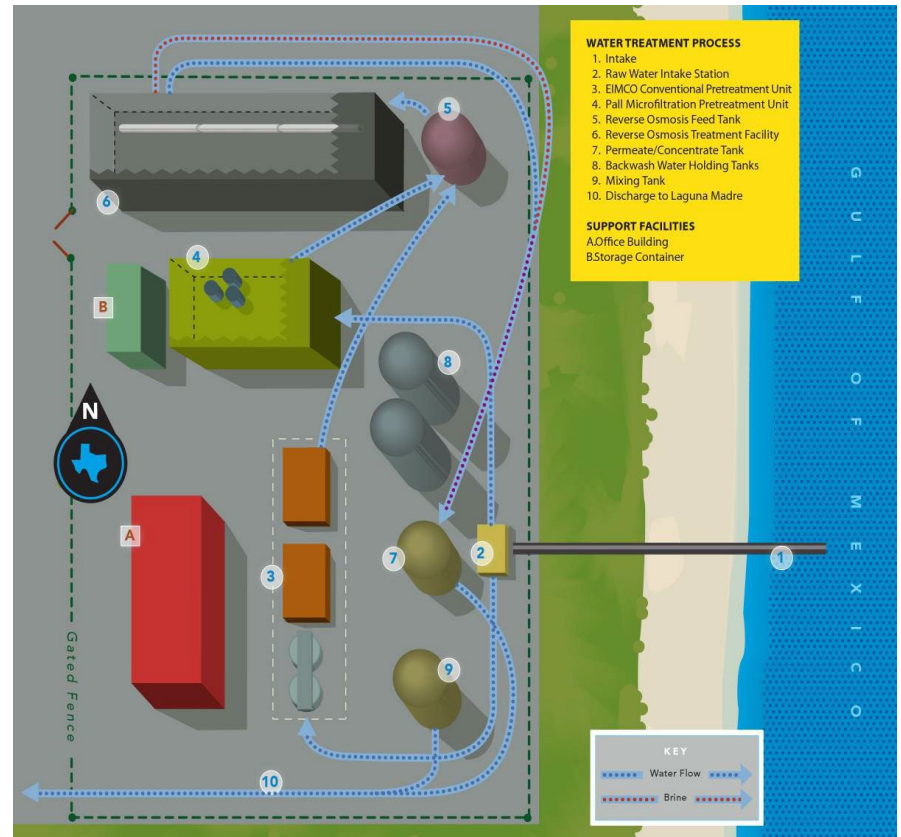


Pilot Studies

Brownsville – Site Layout



Laguna Madre Water District – Site Layout



TWDB-Funded Seawater Desalination Reports

Report title	Study location	Study type
Lower Rio Grande Valley, Brownsville Seawater Desalination Demonstration Project (Brownsville Public Utilities Board, 2004)	City of Brownsville	Feasibility study
Large Scale Demonstration Desalination Feasibility Study (City of Corpus Christi, 2004)	City of Corpus Christi	Feasibility study
Freeport Seawater Desalination Project (Brazos River Authority, 2004)	City of Freeport	Feasibility study
Pilot Study Report, Texas Seawater Desalination Demonstration Project (Brownsville Public Utilities Board, 2008)	City of Brownsville	Pilot-plant study
Feasibility and Pilot Study, South Padre Island Seawater Desalination Project (Laguna Madre Water District, 2010)	South Padre Island	Pilot-plant study
Guidance Manual for Permitting Requirements in Texas for Desalination Facilities Using Reverse Osmosis Processes (R.W. Beck, Inc., 2004)	Not applicable	Guidance document
Lessons Learned from the Brownsville Seawater Pilot Study (Reiss Engineering Inc., 2009)	City of Brownsville	Guidance document
Texas Desal Project (Brownsville Public Utilities Board, 2011)	City of Brownsville	Guidance document

Seawater Desalination Reports

2014

Biennial Report on
Seawater Desalination



The Future of
Desalination in Texas

- Sixth report in series
- 12 years of activities toward advancing seawater desalination
- Provides a status update

M&G Resins – Industrial Seawater Plant



Source: 2014, M&G Chemicals, <http://www.mgcorpuschristi.com/en>

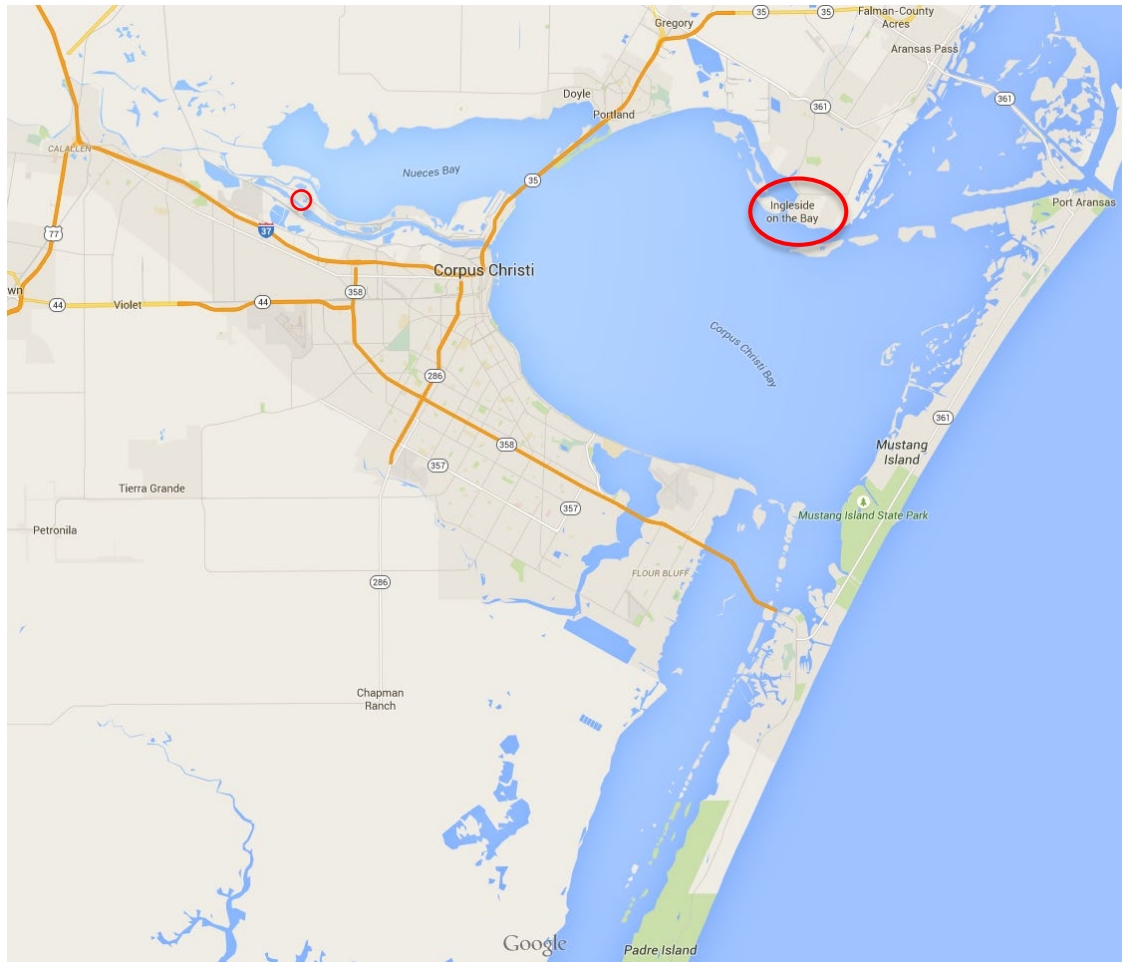
M&G Resins – Industrial Seawater Plant

- Design maximum capacity of 22 MGD
 - 6 MGD of permeate
 - 9 MGD of Brine
- Design includes a
 - 12 ultrafiltration trains, and 7 reverse osmosis trains
- Model predicts total dissolved solids concentration in the water of Viola Channel would increase by 1 %

City of Corpus Christi

- Variable Salinity Desalination Demonstration Project
 - Selected plant site – Ingleside (Phase 2)
 - Develop criteria of pilot study (Phase 3)
 - Conduct 18-month pilot study (Phase 4)
- Industrial Project
 - City and industrial work group
- Texas General Land Office and Seven Seas Water
 - Sell water to industrial customers

City of Corpus Christi



State Water Implementation Fund for Texas (SWIFT)

- Established by voters in 2013 to fund projects in the state water plan, \$2 billion fund
- Integrated Water and Power Plant Project
 - \$8,000,000 to Guadalupe-Blanco River Authority
 - Seawater desalination plant co-located with power plant
 - Perform a feasibility study and evaluate four proposed sites

84th Texas Legislation

- House Bill 2031
 - Authorizes to divert and use seawater without obtaining a permit from the Texas Commission on Environmental Quality (TCEQ) except
 - If point of diversion is located within 3-miles of state's coast
 - If seawater contains a concentration of total dissolved solids less than 20,000 mg/L
- House Bill 2230
 - Authorizes injection of nonhazardous brine from a desalination operation or nonhazardous residuals from drinking water treatment into a Class II injection well
- House Bill 4097
 - Conduct a study to determine if existing transmission and distributions are adequate infrastructure for seawater desalination projects and the potential to participate in existing demand response opportunities



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Thank You!

Innovative Water Technologies

www.twdb.texas.gov/innovativewater/index.asp