Surface-water and Groundwater Monitoring Networks

USGS Surface-Water Network in Louisiana

Site type	LaDOTD	Other agencies
Index-Velocity sites	0	24
Stage-Discharge sites	7	46
Continuous-Stage sites	16	107
Crest-Stage sites	11	120
Flood-Profile sites	7	0
Water-Quality sites	0	44

≋ USGS

USGS Surface-Water
Monitoring Network

EXPLANATION

site_type
- ▲ crest stage
- ▲ discharge
- ▲ flood profile
- ▲ misc. meas.
- ▲ stage
- ▲ water-quality

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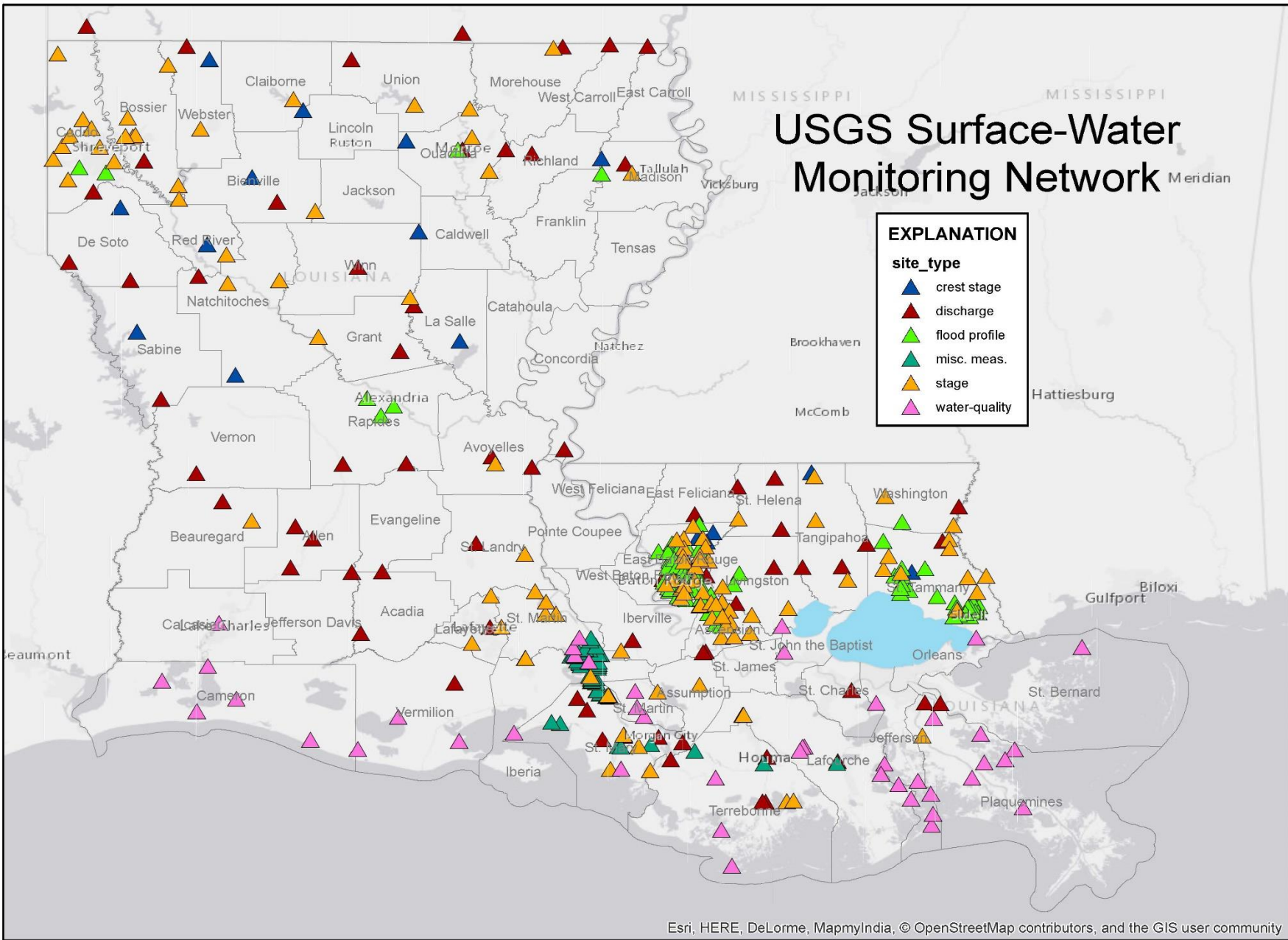
USGS Groundwater Network in Louisiana

Site type	LaDOTD	Other agencies
Water Level sites	318	93
Chloride sites	98	41

Water-level Monitoring
in Louisiana, 2017

EXPLANATION
(a square symbol indicates a
continuous or real-time well)

- USGS-DOTD network (318 wells)
- USGS-Fort Polk network (13 wells)
- USGS-CAGWCC network (77 wells)
- USGS CRN network (3 wells)

Chloride Monitoring
in Louisiana, 2017

EXPLANATION

▲ USGS-DOTD network (98 wells)
▲ CAGWCC network (41 wells)
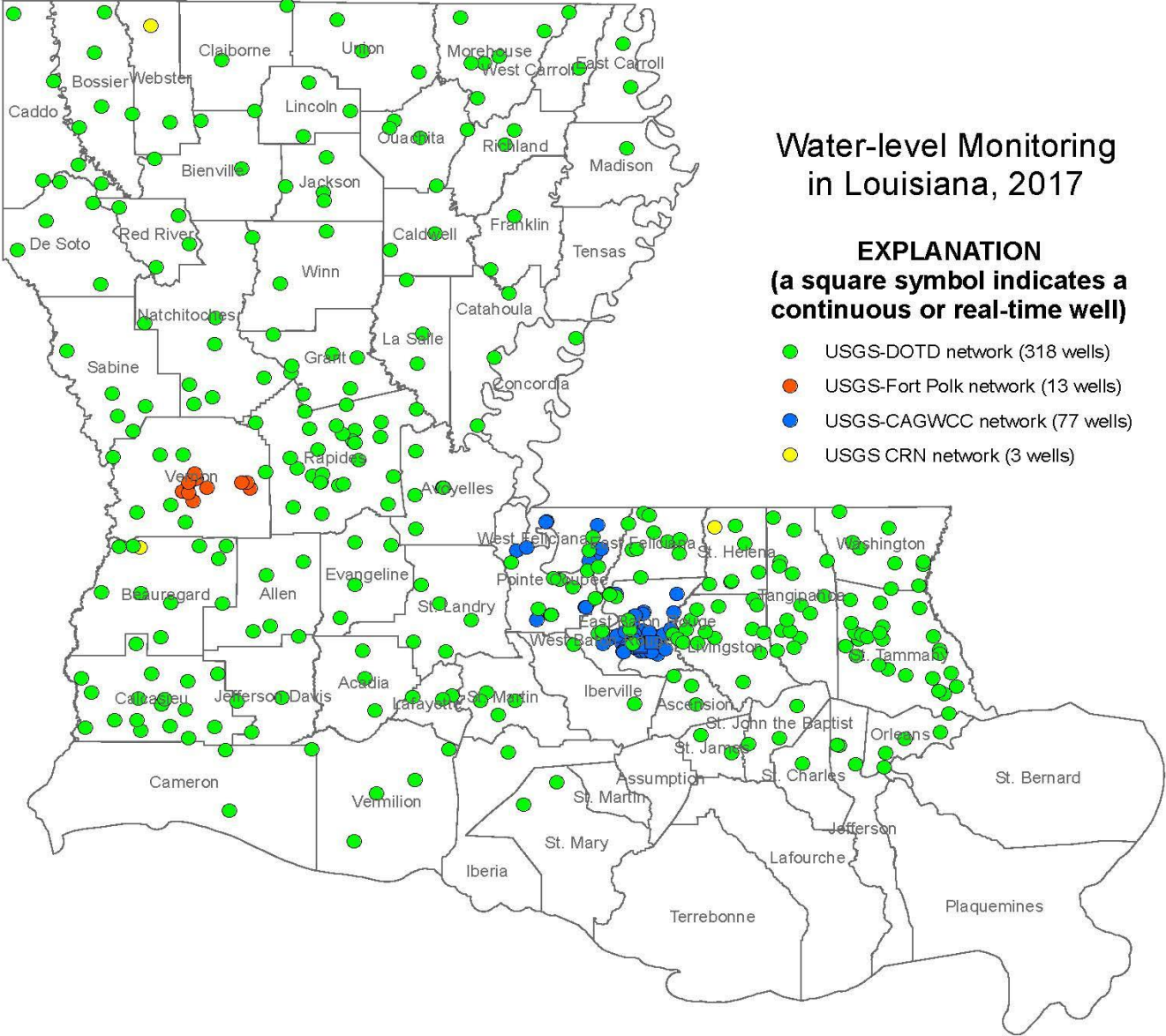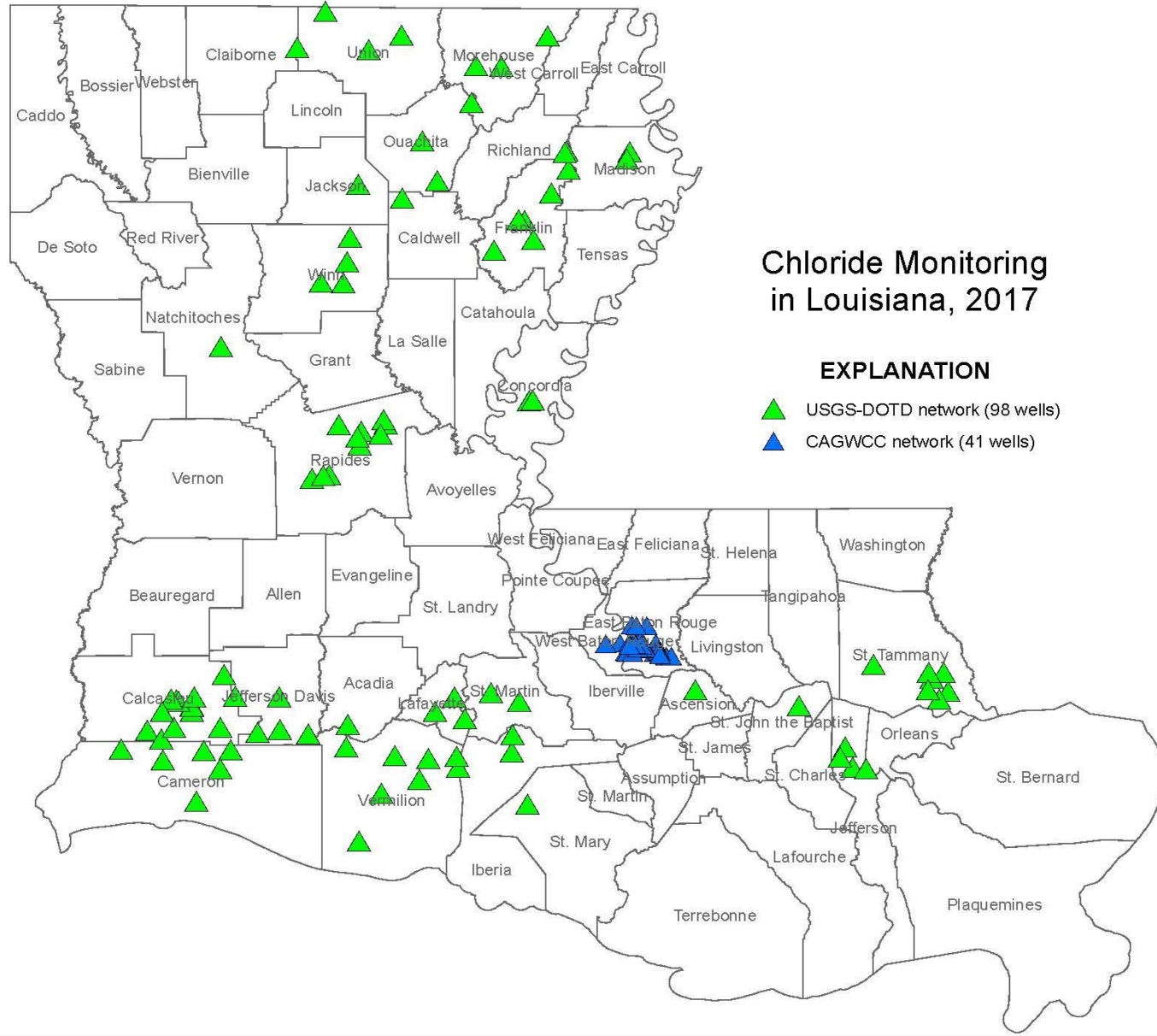
2019-20 Investigations Program

➢ Water use in Louisiana

➢ Water resources of Louisiana Parishes

➢ Baton Rouge Sands Model

➢ Potentiometric Maps of the Mississippi River alluvial aquifer

➢ Saltwater in the Mississippi River alluvial aquifer

➢ Potential corrosivity of groundwater in Louisiana

➢ Potentiometric maps of the Upland Terrace and Cockfield aquifers

➢ Louisiana StreamStats

➢ Water levels, withdrawals, and recharge in the Chicot aquifer system

USGS

DOTD
LOUISIANA DEPARTMENT OF
TRANSPORTATION & DEVELOPMENT

Water Use in Louisiana

Fiscal Year 2020 goals

➢Improved estimation of self-supplied domestic populations

➢Collection and storage of monthly withdrawals by about 175 "major" users in Louisiana

➢Preliminary activities in preparation of the 2020 water-use inventory.

USGS

PURPOSE OF THE STUDY

➤ Knowledge of water withdrawals from ground and surface sources for various uses is needed for proper management and protection of those resources.

➤ Water-use data are necessary to address many state and federal priority water-resources issues such as drinking water availability, water-supply sustainability, the effects of various land uses on water resources, and the effects of population increases on water resources in the coastal zone.

➤ Water-use data also are essential input into water budgets and surface-water and groundwater flow and solute transport models.

Water Use in Louisiana, 2015, by Collier and Sargent (2018), was published last year and is available in print and online here: https://la.water.usgs.gov/publications/pdfs/WaterUse2015.pdf
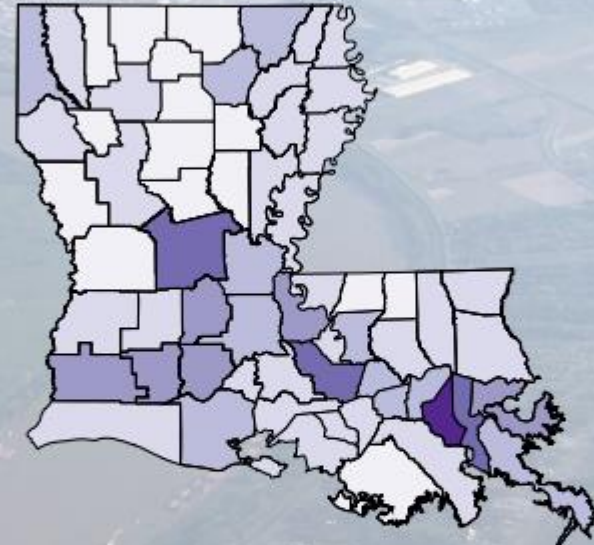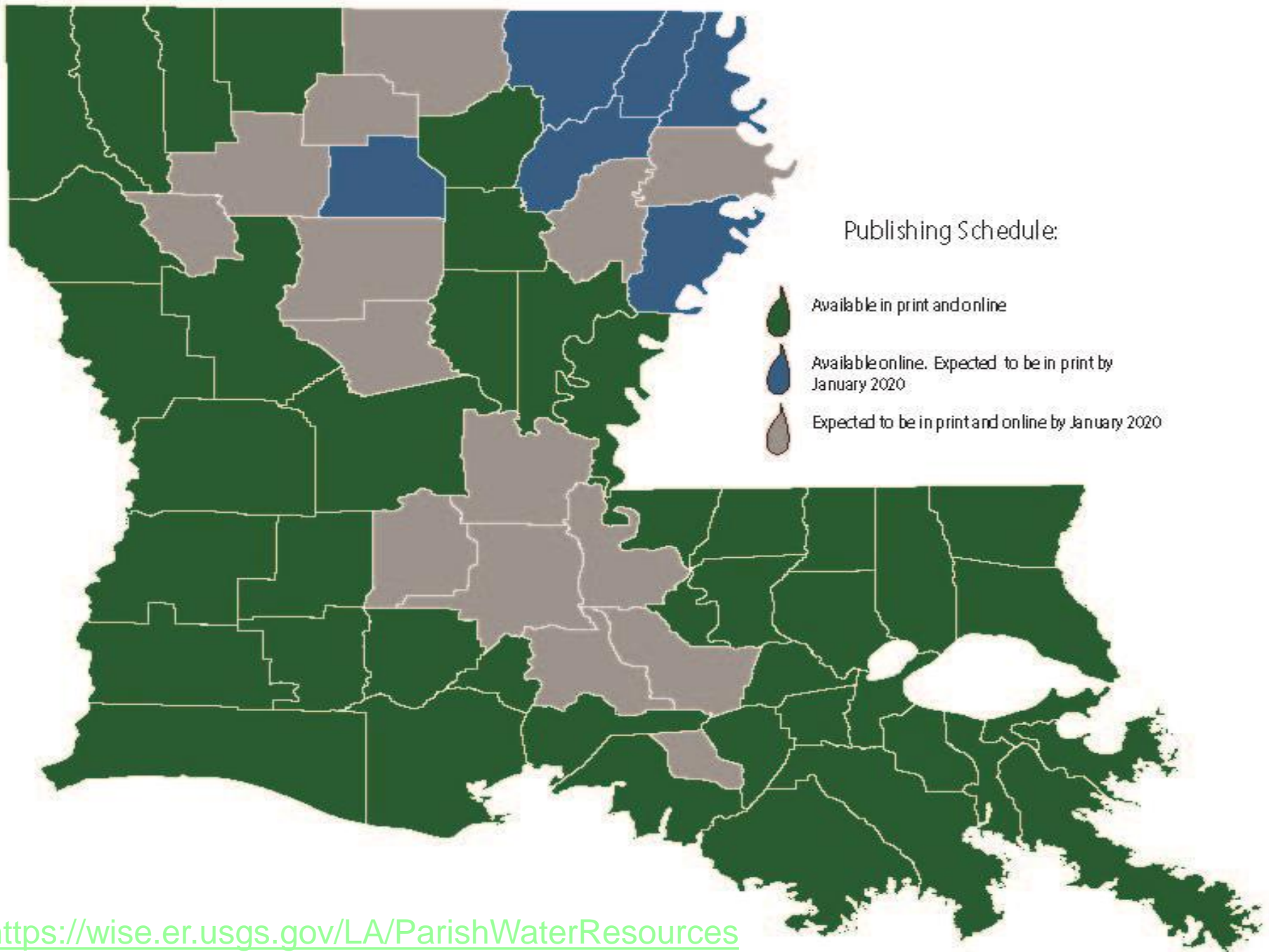
Water Resources of Louisiana Parishes

- Fact sheets describing water resources in 50 of Louisiana's 64 parishes have been published to date.

- Fact sheets for the remaining 14 parishes have been created and are in various stages of review and approval. All are expected to be published online and in print during fiscal year 2020.

PURPOSE OF THE STUDY

➢ Basic information on surface water, ground water, and water quality in a single parish of interest often has to be gleaned from technical reports of varying scope and focus. Such reports often are not easily understandable by the general public.

➢ Brief summaries of water resources in each parish local officials and concerned citizens with information needed to make decisions about current and future water development in their parish.

≋ USGS

Publishing Schedule:

Available in print and online

Available online. Expected to be in print by January 2020

Expected to be in print and online by January 2020

https://wise.er.usgs.gov/LA/ParishWaterResources

DEVELOPMENT AND MAINTENANCE OF A COMPUTER MODEL TO SIMULATE GROUNDWATER FLOW AND SALTWATER ENCROACHMENT IN THE BATON ROUGE SANDS, LOUISIANA

➢ A multiyear effort conducted in cooperation with LaDOTD, the Capital Area Ground Water Conservation Commission, and East Baton Rouge Parish to simulate current and hypothetical future groundwater conditions in the Baton Rouge area.

➢ The computer model simulates groundwater flow and saltwater transport.

≋ USGS

PURPOSE OF THE STUDY

➤ The objective of the proposed work is to develop and maintain a groundwater flow and solute transport model of all 10 Baton Rouge sands that can be used to assess changes in pumping and evaluate possible groundwater management alternatives.

➤ The model provides a tool to evaluate:

- 1) the effectiveness of possible management options.
- 2) impacts of alternative pumping scenarios.
- 3) possible locations for saltwater monitor wells.
- 4) possible locations for scavenger or barrier wells.
- 5) saltwater discharge rates from scavenger wells.

USGS

Fiscal Year 2020 goals

➢ Publish a report documenting simulated current and hypothetical future water levels and saltwater movement in the 1,500-ft, 2,400-ft, and 2,800-ft sands.

➢ Complete simulations of current and hypothetical future water levels and saltwater movement in the 400-ft, 600-ft, 800-ft, and 1,000-ft sands.

➢ Prepare a report documenting model construction and results of simulations and enter the report into review.
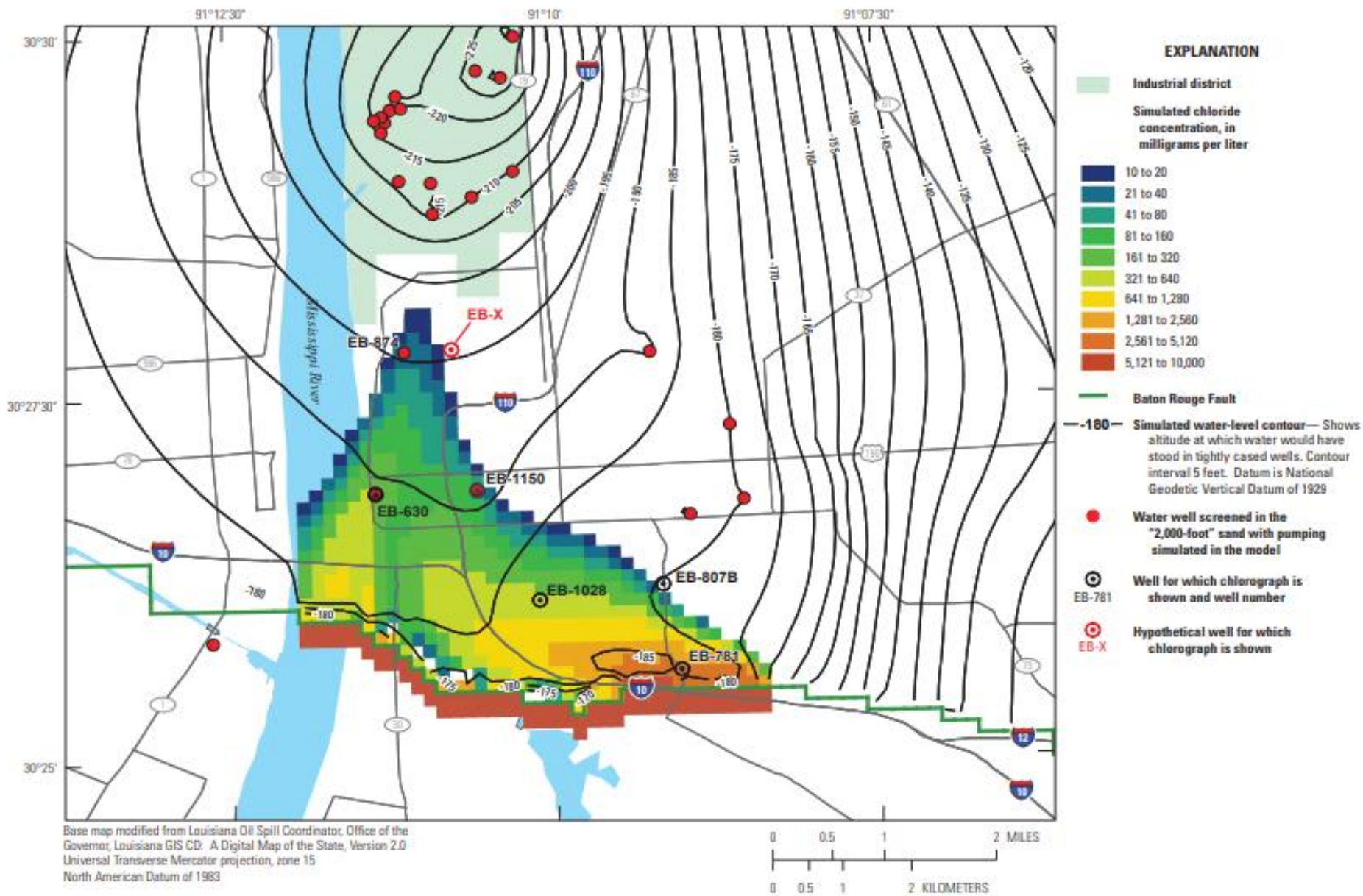
Figure 17. Simulated 2012 water levels and chloride concentrations at the base of the "2,000-foot" sand of the Baton Rouge area in the detailed model area in southeastern Louisiana.

Hydrogeologic Structure of Southwestern Louisiana

Fiscal Year 2020 goals

➢ Complete data analysis and mapping of aquifer surfaces.

➢ Prepare and publish a report documenting methods and results, which will include maps and cross sections.

➢ Prepare and publish resulting geospatial data, which will include aquifer tops and bottoms.

≋ USGS

PURPOSE OF THE STUDY

➤ Hydrogeologic structure maps and cross sections of southwestern Louisiana will be useful to water resources managers and planners, well drillers, land owners, and others interested in groundwater resources of the area.

➤ The maps and digital data developed during the project could be used as a framework for groundwater flow and solute transport models of the area.

➤ This study is a next step towards the development of detailed hydrogeologic structure maps and cross sections for all of Louisiana.

Approximate extent of study area

EXPLANATION

———— APPROXIMATE EXTENT OF STUDY AREA

Map credit: Modified from Official Map of Louisiana, Louisiana Department of Transportation and Development, 1986

Potentiometric Maps of the Mississippi River Alluvial Aquifer in Louisiana

Objective

➢ To document current (2018) water levels, water-level changes due to seasonal pumping, long-term water-level trends, and general directions of ground-water flow in the Mississippi River alluvial aquifer in Louisiana

## Fiscal Year 2020 goals

➢ Prepare and publish a report documenting groundwater levels in the Mississippi River alluvial aquifer during 2018.

➢ Prepare and publish resulting geospatial data, which will include potentiometric contours.

≋USGS

PURPOSE OF THE STUDY

➤ This study will provide State and local water users and managers with information on trends in water levels and the impacts of pumping.

➤ The data and results of this study will be used for calibration of two regional groundwater flow models, including a model of the Mississippi Embayment regional aquifer system (MERAS), which includes the Mississippi River alluvial aquifer in parts of Arkansas, Louisiana, Mississippi and Tennessee, and a model of the Coastal Lowlands aquifer system (CLAS), which includes coastal plain areas of Alabama, Florida, Louisiana, Mississippi, and Texas.

➤ The MERAS model additionally is being used to assess water availability and water budgets in the Mississippi River valley as a major component of the Mississippi Alluvial Plain (MAP) Regional Water Availability Study (https://www2.usgs.gov/water/lowermississippigulf/map/).

≋ USGS

Freshwater extent of the Mississippi River alluvial aquifer in Louisiana and locations of wells on the water-level network.
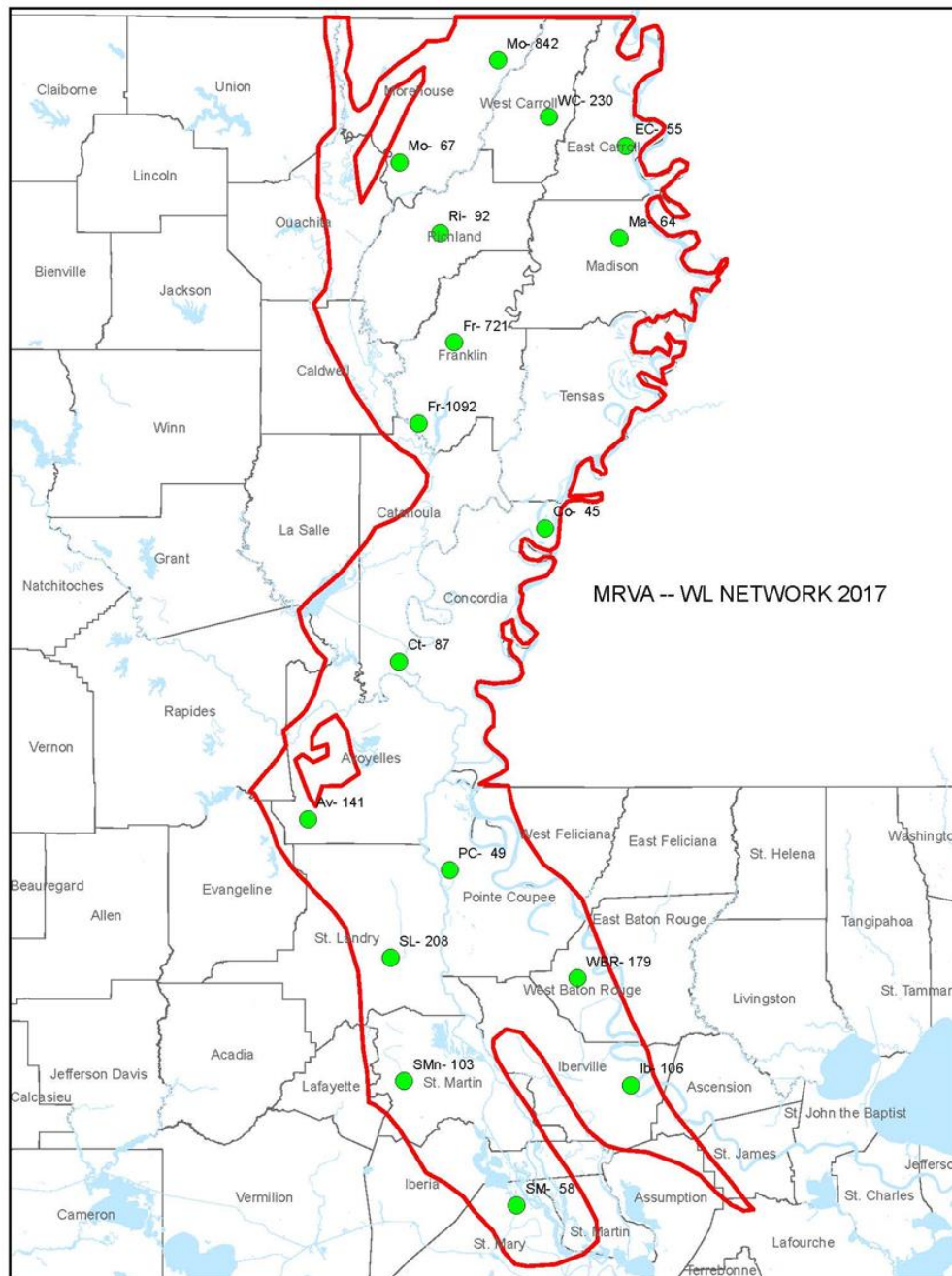
Chloride Concentrations in the Mississippi River Alluvial Aquifer of Northeastern Louisiana

Primary Objectives

➢ Map the most recent chloride concentrations and specific conductance in water from the MRVA

➢ Identify areas where saltwater encroachment has occurred or may be occurring

Fiscal Year 2020 goals

➢ Complete data analysis.

➢ Develop isochlor maps.

➢ Prepare final report.

≋ USGS

PURPOSE OF THE STUDY

➤ Knowledge of current chloride concentrations and specific conductance in the MRVA are critical to understanding the aquifer's suitability and sustainability for uses such as domestic, public supply, industry, and agriculture.

➤ Such knowledge can be used by farmers, residents, and industry in areas overlying the aquifer and could be directly impacted by the presence of saltwater in the aquifer, particularly in areas where the MRVA is the sole source of fresh groundwater.

≋USGS

Freshwater extent of the Mississippi River alluvial aquifer and locations of wells screened in the aquifer in Louisiana.

Extent of freshwater and locations of wells screened in the Missiissippi River alluvial aqufier in Louisiana
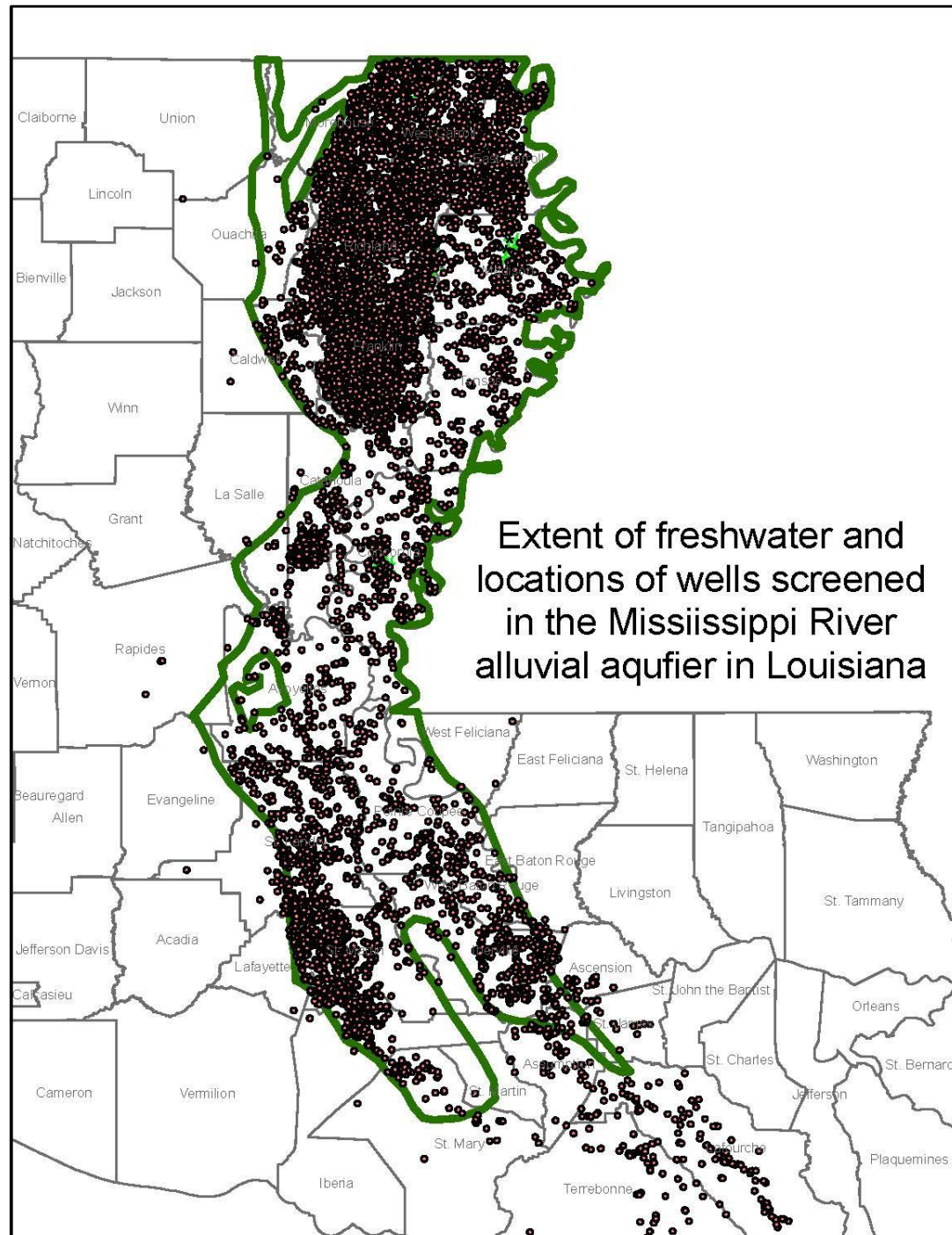
Potential Corrosivity of Untreated Groundwater in Louisiana

Objective

➢ Analyze water-quality characteristics of groundwater in Louisiana and identify areas of moderate to high corrosivity potential in 13 major aquifers and aquifer systems.

Fiscal Year 2020 goals

➢ Complete data analysis.

➢ Prepare final report.

USGS

PURPOSE OF THE STUDY

➢ To provide state and local governments, public water system managers, and private well owners with information needed to manage drinking water supplies and mitigate potential health risks related to leaching of metals from water pipes and fixtures.

➢ The effort may help Louisiana's newly-formed Rural Water Infrastructure Committee identify possible problem systems and prioritize assistance.

≋ USGS

Potentiometric Maps of the Upland Terrace and Cockfield Aquifers of Central and Northern Louisiana

Objective

➢ To document the potentiometric (water-level) surfaces of the Cockfield and Upland Terraces aquifers in central and northern Louisiana.

Fiscal Year 2020 goals

➢ Complete development of potentiometric surfaces
➢ Prepare reports and data releases for publication.

≋USGS

PURPOSE OF THE STUDY

➢ To provide State and local water managers with information about the impacts of pumping on water levels in the Cockfield and Upland Terrace aquifers.

➢ Once constructed, the potentiomentric maps can be compared to previous potentiometric maps to identify areas where water levels may have changed due to changes in withdrawal rates.

➢ The data and resulting maps also will be useful for the development of digital groundwater models of these aquifers.

≋ USGS

Freshwater extent of the Cockfield aquifer in Louisiana

Freshwater extent of the Upland Terrace aquifer in Louisiana

Implementation of the U.S. Geological Survey's StreamStats Application for Louisiana

Objective

➤ To implement a web-based application that estimates streamflow statistics at upgaged sites.

Fiscal Year 2020 goals

➤ Continue to assemble and prepare geospatial data utilized by the application.

➤ Review and update existing descriptive information, streamflow statistics, and basin characteristics in the database for Louisiana data-collection stations.

≋ USGS

PURPOSE OF THE STUDY

➤ Streamflow statistics are used by government agencies, engineers, scientists, water-resources managers, and others, for purposes of water management, permitting, and design.

➤ Examples of streamflow statistics are the 1-percent chance flood, the mean annual flow, and the annual minimum 7-day average streamflow with a 10-year recurrence interval (7Q10).

➤ Implementation of StreamStats in Louisiana will provide planners and managers with an efficient, consistent, and accurate means of obtaining streamflow statistics at streamgages and partial-record stations, and estimated streamflow statistics at ungaged stream sites

≋ USGS

Water Levels, Withdrawals, and Recharge in the Chicot Aquifer System of Southwestern Louisiana

Objectives

➢ Develop a set of historical water levels based on drillers' measurements and other monitoring for use as input to hydrogeologic models of the Chicot aquifer system and Coastal Lowlands regional aquifer system.

➢ Determine the range and extent of seasonal water-level changes in the Chicot aquifer system in southwest Louisiana.

➢ Measure groundwater withdrawals for irrigation at selected sites in southwest Louisiana.

➢ Determine potential recharge rates in southwestern Louisiana using the USGS soil-water balance model.

≋ USGS

Fiscal Year 2020 goals

➢ Evaluate historical water levels in the Chicot aquifer system for accuracy using a computer routine developed by the USGS. The water levels, which are stored in the Louisiana Department of Natural Resources' SONRIS database (http://www.sonris.com/), were measured by drillers when water wells were completed and vary in accuracy.

➢ Measure water levels at a sufficient number of wells to adequately map the potentiometric surface of the Chicot aquifer system for pre-pumping and post-pumping conditions.
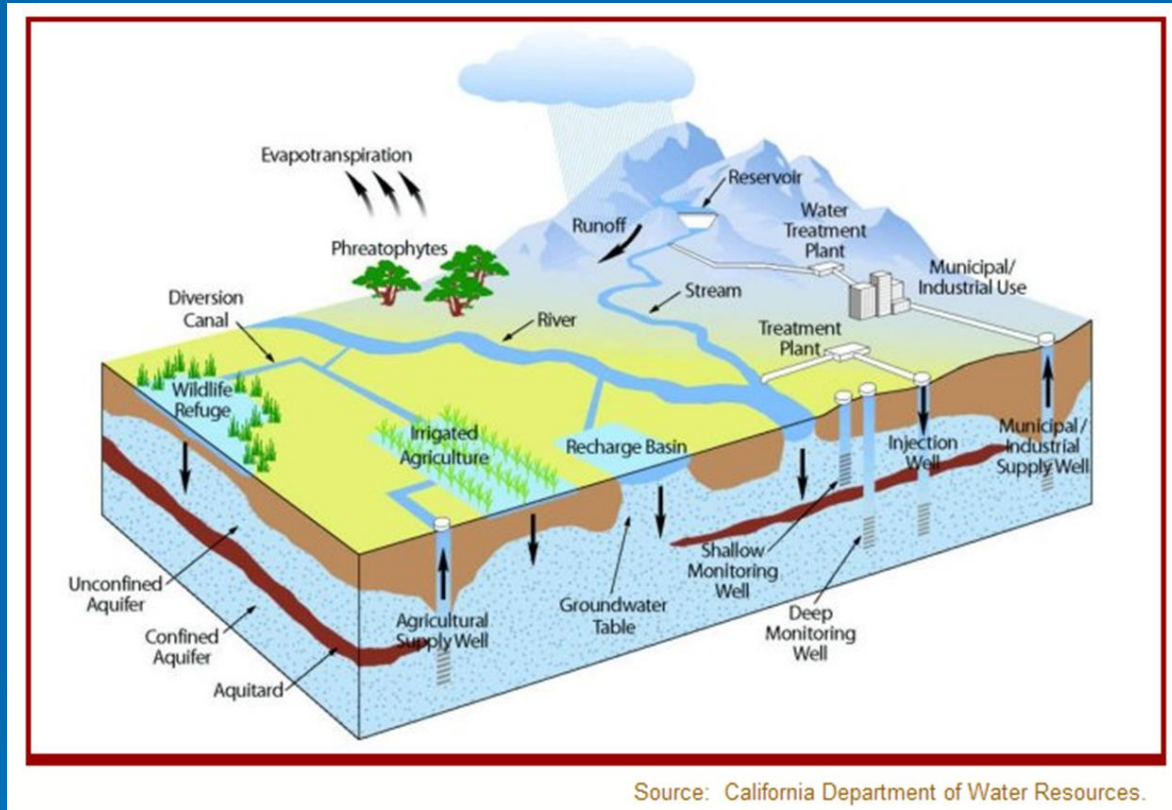
≋ USGS

Fiscal Year 2020 goals

➢ Install transducers in 6 to 8 selected wells to record hourly water levels.

➢ Begin monitoring pumpage at 6 irrigation wells to determine the rates and timing of withdrawals for irrigation and other uses during the year. Other uses could include flooding of fields for crawfish and waterfowl habitat.

➢ Estimate rates of recharge to the Chicot aquifer system using a GIS-based soil-water balance model developed by the USGS.

≋USGS

Freshwater extent of the Chicot aquifer system in Louisiana

QUESTIONS?

Source: California Department of Water Resources.

John Lovelace
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