



HARC

An Overview of Phase One: The Galveston Bay Regional Monitoring Database

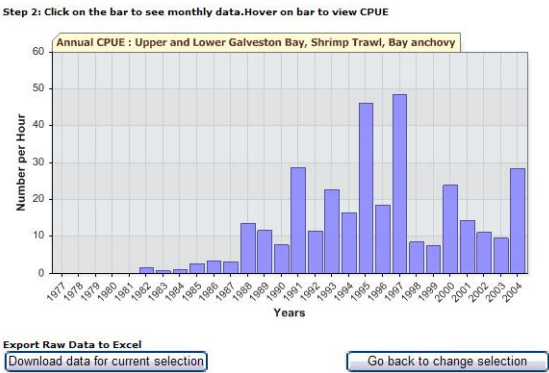
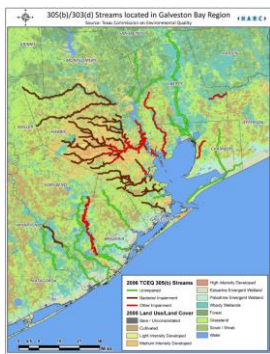
Dr. Ryan Bare, Research Scientist



This project is funded with a grant from the United States Environmental Protection Agency through the Texas Commission on Environmental Quality's Galveston Bay Estuary Program.

Background

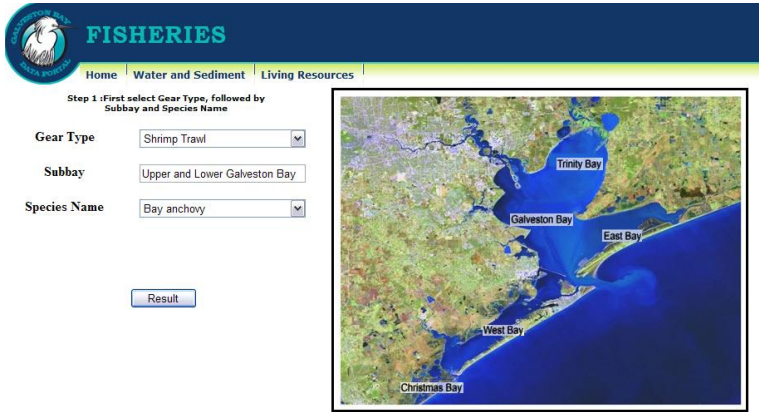
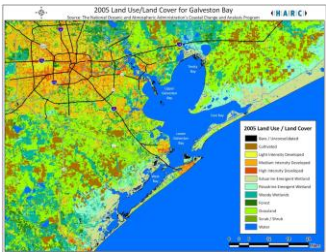
- Initial datasets selected based on previous projects - Galveston Bay Indicators, Status and Trends, State of the Bay, and Coastal Atlas
- GBEP & HARC held stakeholder meeting Aug. 2019
 - Gathered feedback and input to shape RMD
- Reuses www.galvbaydata.org domain



Reset Selection

Year	CPUE	Sample #
1977	*	0
1978	*	0
1979	*	0
1980	*	0
1981	*	0
1982	1.60	110
1983	0.71	96
1984	0.93	107
1985	2.73	120
1986	3.31	105
1987	3.16	112
1988	13.58	118
1989	11.64	118
1990	7.74	100
1991	28.69	110
1992	11.56	110
1993	22.75	101
1994	16.43	103
1995	46.24	119
1996	18.62	116
1997	48.50	109
1998	8.54	123
1999	7.59	102
2000	23.89	105
2001	14.43	106
2002	11.18	102
2003	9.58	99
2004	28.53	106

Indicates CPUE not calculated because of insufficient sample size



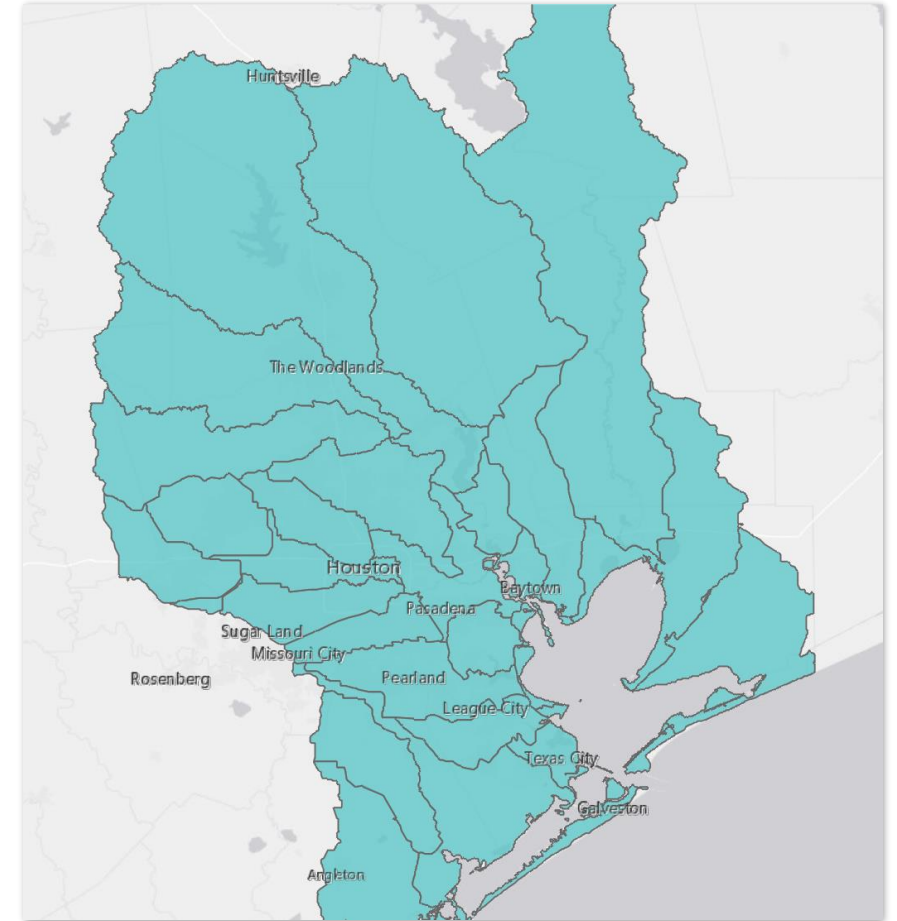
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Galveston Bay Regional Monitoring Database

- Support conservation and management of Galveston Bay system in partnership with GBEP
- Interactive online portal increase data and information access
- Indicators water and sediment quality, fish and wildlife abundance, and habitat, among other key ecosystem categories
- 4 new watersheds!
- 3 distinct phases

Guess the oldest data point: **1877**



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The **Galveston Bay Regional Monitoring Database (RMD)** is an interactive portal that provides quality-assured data related to conservation and management of the Galveston Bay system.



Data Downloads

Directly download spatial and tabular datasets organized into Human Role, Water and Sediment Quality, Bay and Public Health, Freshwater Inflows, Habitat, Fisheries and Wildlife, and Invasive Species categories.

[Open](#)



Data Catalog

Explore and search the inventory of available datasets and supporting information.

[Open](#)



Interactive Tools

Interactive Tool features coming soon.

[Open](#)

Total Datasets

27

Have questions or suggestions?
Provide comments through the
Feedback Submission Tool.

[Feedback](#)

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subscription to be informed
about data updates and
additions.

[Sign Up](#)

[Disclaimer](#)

Phase I - Released
September 2022



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Mechanics

- Data Sources – 13
- Acquisition
 - Email requests, automated, or manual download
- Quality Assurance
- Automated Workflows
 - SAS, SQL, R, ArcGIS
- Not just data - metadata & supporting documents
- Value added
 - Inclusion of spatial information, seasons, and combined fields

Metadata for Water and Sediment Quality Datasets

About: The Galveston Bay Regional Monitoring Database (RMD) is an interactive portal that provides quality assured data related to the conservation and management of Galveston Bay.

Data Descriptions:

Metals Environmental Quality - Reported values for analyzed inorganic metal constituents including parameters collected in sediment, tissue, and water.

Organics Environmental Quality - Reported values for analyzed semivolatile, volatile, and pesticide organic constituents including PAHs, PCBs, and Dioxin parameters collected in sediment, tissue, and water.

Nutrients & Microbiological Water Quality - Reported values for analyzed nutrient constituents and related microbiological indicators collected in water.

Field Water Quality - A multi-source dataset comprising field measured water quality parameter values including salinity, pH, specific conductance, dissolved oxygen, and water temperature.

Suspended Solids Water Quality - A multi-source dataset including reported values for total nonfilterable residue and turbidity collected in water as suspended solids.

Fecal Indicator Bacteria - A multi-source Fecal Indicator Bacteria dataset including reported values for enterococci, *E. coli*, and fecal coliform parameters collected in water.

Sources: Texas Commission on Environmental Quality (TCEQ), Texas Department of State Health Services (TDSHS), Texas General Land Office (TGLO), Texas Parks and Wildlife Department (TPWD)

Notes: This metadata describes fields contained in the Metals Environmental Quality, Organics Environmental Quality, Nutrients & Microbiological Water Quality, Field Water Quality, Suspended Solids Water Quality, and Fecal Indicator Bacteria datasets. Fields denoted with "HARC generated" were developed to aid in processing or create additional attributes from the original source data. The Field Water Quality (from TCEQ, TDSHS, TGLO, and TPWD sources) and Fecal Indicator Bacteria (from TCEQ, TDSHS, and TGLO sources) datasets are comprised of data from multiple source agencies. The Source Note field indicates applicable source agency(ies) for combined datasets. Data sourced from TDSHS only includes dissolved oxygen measurements for collection years before 1988, which is when the agency ceased sampling for this parameter.

E. coli and enterococci are fecal indicator bacteria used to evaluate whether a water body meets water quality standards for recreational use (Texas Administrative Code Title 30, Chapter 307, Texas Surface Water Quality Standards). *E. coli* and enterococci replaced fecal coliform as the fecal indicator bacteria for recreation in Texas. The TDSHS collects fecal coliform data within the Bay for the intended purpose of protecting consumers from illness caused by potentially contaminated oyster waters. The TDSHS fecal coliform data is provided for research purposes and may not be suitable for assessing recreational public health risks.

Data Confidence:

Approved QAPP: Yes (TCEQ and TGLO only)
Established QA/QC Procedures: Yes
Agency Documentation: Yes
Metadata: Created

Field Descriptions:

Fieldname	Field Description	Field Length	Field Type	Source Note
ID	Unique record Identification reference (HARC generated)	20	Text	All sources
RFA	Request for Analysis tag number	10	Text	TCEQ only
Station_Sample_ID	A unique Station or Sample Identification code (combined method, date/time, lat/long) (HARC generated)	100	Text	TCEQ, TDSHS, TGLO (Station ID Code); TPWD (Sample ID Code)
Station_Desc	A short Station Description	254	Text	TCEQ, TDSHS, TGLO
Basin_ID	River Basin Identification where the station is located	10	Text	TCEQ only
WS_Bay	Whether the station is located within a Watershed (WS) or Subbay (Bay) (HARC generated)	10	Text	All sources
WSHED_Subbay_Name	The Watershed or Subbay Name where the station or sample is located (HARC generated)	100	Text	All sources
Segment_ID	Segment Identification for the water body where the station is located	10	Text	TCEQ only
Alt_Stmty	Standardized Alternative Stream Type attribute. Default for TCEQ/HARC generated for other sources.	100	Text	All sources
Par_Code	A unique 5-digit Parameter Code that numerically identifies the monitored parameter	10	Text	TCEQ only
Par_Desc/Alt_Par_Desc	Parameter Description/Alternative Parameter Description for reported values. Default for TCEQ/HARC generated for other sources.	254	Text	All sources
Primary_Group	Higher-level Primary Group classification for parameters (HARC generated)	100	Text	All sources
Secondary_Group	Lower-level Secondary Group classification for parameters (HARC generated)	100	Text	All sources
GTLT	Greater Than/Less Than designation for reported values	3	Text	TCEQ only
Value	Original reported Value	8	Numeric	All sources
Alt_Value	Alternative Value - A simple substitution method is applied to numeric values designated as "<" in the GTLT field. HARC calculated one-half of the reported value. (HARC generated)	8	Numeric	All sources

```
# Add & populate new columns

# Anatomy
anatomy_sub <- tissue %>%
  filter(Par_Code==74995)%>%
  inner_join(select(anatomy,c(Anatomical_Part,Alt_Value)),by="Alt_Value")

tissue <- left_join(tissue,select(anatomy_sub, c(ID,Anatomical_Part)), by="ID")

# Get rid of NAs
tissue <- mutate(tissue, Anatomical_Part = ifelse(is.na(Anatomical_Part), "", Anatomical_Part))

# Species
species_sub <- tissue %>%
  filter(Par_Code==74990)%>%
  inner_join(select(species,c(Common_Name,Scientific_Name,Alt_Value)),by="Alt_Value")

tissue <- left_join(tissue,select(species_sub, c(ID,Common_Name,Scientific_Name)), by="ID")

#Get rid of NAs
tissue <- mutate(tissue, Common_Name = ifelse(is.na(Common_Name), "", Common_Name))
tissue <- mutate(tissue, Scientific_Name = ifelse(is.na(Scientific_Name), "", Scientific_Name))
```

MARINE RESOURCE MONITORING OPERATIONS MANUAL

Updated by:
Fernando Martinez-Andrade, Program Leader
25 April 2018



TEXAS PARKS AND WILDLIFE DEPARTMENT
Coastal Fisheries Division

April 2018

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Data Downloads

Directly download spatial and tabular datasets organized into Human Role, Water and Sediment Quality, Bay and Public Health, Freshwater Inflows, Habitat, Fisheries and Wildlife, and Invasive Species categories.

 Open










GALVESTON BAY REGIONAL MONITORING DATABASE

Galveston Bay Regional Monitoring Database

☐ Select All

Sort By Name ▾ ☰ ☲ ☳

<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
			
Bay and Public Health	Fisheries and Wildlife	Freshwater Inflow	Habitat
1 MB	156 MB	2 MB	31 MB
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
			
Human Role	Invasive Species	Water and Sediment Q...	
241 MB	1 MB	814 MB	

1 Items Selected

Download



- Directly download datasets from 7 categories
- Multifile file formats - .txt & CSV + spatial
- Habitat
 - Landcover dataset - conservation, change in habitat coverages, developed areas environmental impacts



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Data Catalog

Explore and search the inventory of available datasets and supporting information.

 Open

Metals Environmental Quality

 Download



Description:

Reported values for analyzed inorganic metal constituents including parameters collected in sediment, tissue, and water.

ID: 02


Last Uploaded
08/18/2022

Update Frequency
Annual

Category
Water and Sediment Quality

Source(s): Texas Commission on Environmental Quality

Organics Environmental Quality

 Download



Description:

Reported values for analyzed semivolatile, volatile, and pesticide organic constituents including PAHs, PCBs, and Dioxin parameters collected in sediment, tissue, and water.

ID: 03


Last Uploaded
08/18/2022

Update Frequency
Annual

Category
Water and Sediment Quality

Source(s): Texas Commission on Environmental Quality

Fecal Indicator Bacteria

 Download



Description:

A multi-source Fecal Indicator Bacteria dataset including reported values for enterococci, *E. coli*, and fecal coliform parameters collected in water.

ID: 04

Last Uploaded
08/18/2022

Update Frequency
Annual

Category
Water and Sediment Quality


Source(s): Texas Commission on Environmental Quality, Department of State Health Services, Texas General Land Office




Sylvan Beach Park




Show More Filters 

 bacteria

Sort by Upload Date 

1 record found

Fecal Indicator Bacteria

 Download



Description:

A multi-source Fecal Indicator Bacteria dataset including reported values for enterococci, *E. coli*, and fecal coliform parameters collected in water.

ID: 04

Last Uploaded
08/18/2022

Update Frequency
Annual

Category
Water and Sediment Quality

Source(s): Texas Commission on Environmental Quality, Department of State Health Services, Texas General Land Office



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Total Datasets

27

Have questions or suggestions?
Provide comments through the
Feedback Submission Tool.

 Feedback

Sign up for the email newsletter
subscription to be informed
about data updates and
additions.

 Sign Up

 Disclaimer

We want to hear from you!

Phase I - Almost 50 unique folder
views or downloads to date



Interactive Tools

Interactive Tool features coming soon.

 Open

Sneak Peak – Phase II Summer 2023



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Water and Sediment Data Dashboard

Select a Primary Parameter Group

Fecal Indicator Bacteria

No group selected

Fecal Indicator Bacteria

Field Water Quality

Metals

Nutrients & Microbiological

Organics

Suspended Solids

Tissue

Select Data Range

1963 - 2021



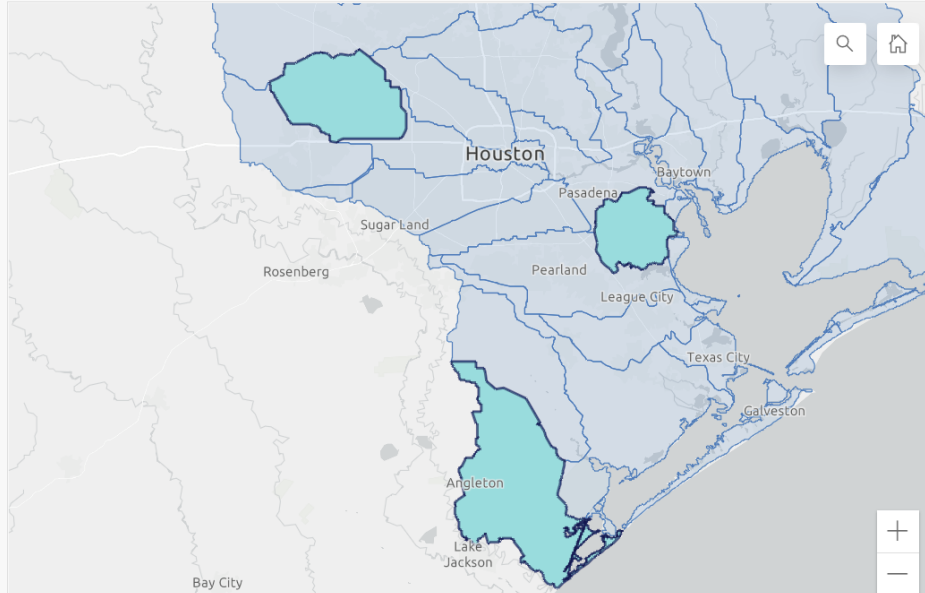
Watersheds or Subbays

Watersheds

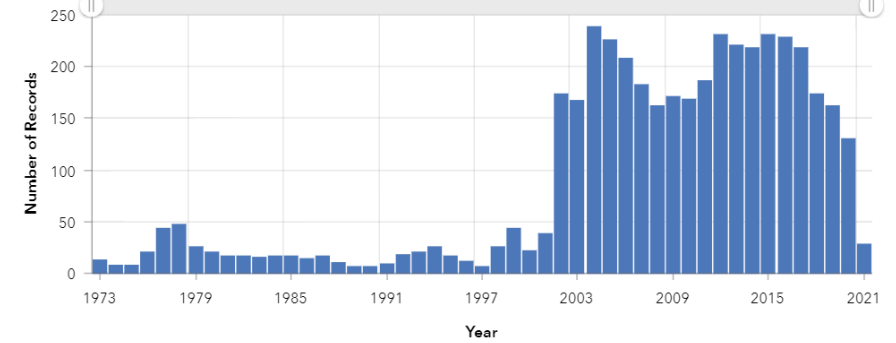
Subbays

Select Watershed(s) or Subbay(s)

Addicks Reservoir, Armand-... 3

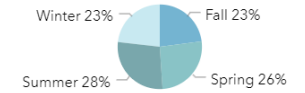


City of Alvin, Texas Parks & Wildlife, CONANP, Esri, HERE, Garmin, Foursquare, SafeGraph, FAO, METI/NAS... Powered by Esri



4.3k Total Records

50 Total Stations or Samples



Seasons

Database Sources

ID	RFA	Station_Sample_ID	Station_Desc	Basin_ID	WS_Bay	WSHED_S
TCEQ_0890365	I600551	20783	BRUSHY BAYOU AT THE INTERSECTION OF BIERI FARM ROAD AND BRAZORIA COUNTY ROAD 210/DANBURY-ANGLETON ROAD	11	WS	Austin-B...
TCEQ_0899308	I600552	20783	BRUSHY BAYOU AT THE INTERSECTION OF BIERI FARM ROAD AND BRAZORIA COUNTY ROAD 210/DANBURY-ANGLETON ROAD	11	WS	Austin-B...
TCEQ_0786158	I045647	20783	BRUSHY BAYOU AT THE INTERSECTION OF BIERI FARM ROAD AND BRAZORIA COUNTY ROAD 210/DANBURY-ANGLETON ROAD	11	WS	Austin-B...
TCEQ_0879818	I600308	20783	BRUSHY BAYOU AT THE INTERSECTION OF BIERI FARM ROAD AND BRAZORIA COUNTY ROAD 210/DANBURY-ANGLETON ROAD	11	WS	Austin-B...
TCEQ_0835445	I048366	20783	BRUSHY BAYOU AT THE INTERSECTION OF BIERI FARM ROAD AND BRAZORIA COUNTY ROAD 210/DANBURY-ANGLETON ROAD	11	WS	Austin-B...

Data (first 2K records)

Tissue Data (first 2K records)



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Groundwater Data Dashboard



Select Data Range

1903 - 2021

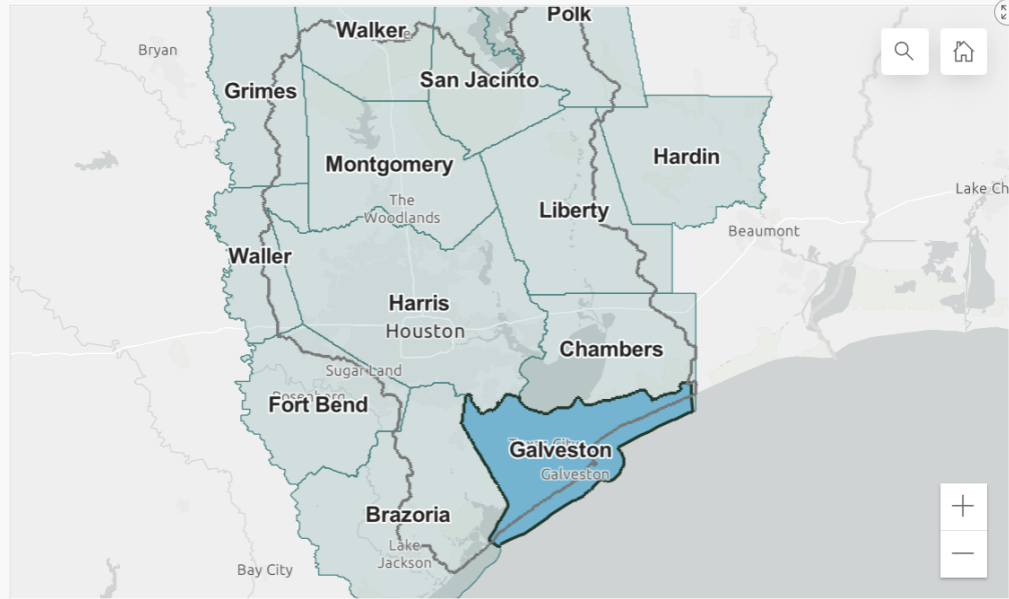


Select County(s)

Galveston

Filter...

- Brazoria
- Chambers
- Fort Bend
- ✓ Galveston
- Grimes
- Hardin
- Harris
- Liberty
- Montgomery

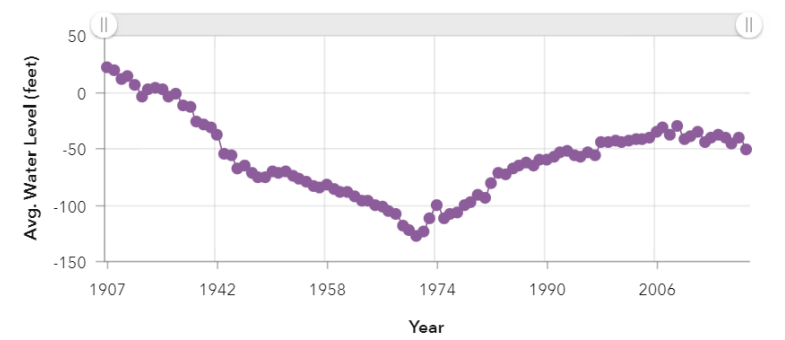


City of Houston, Texas Parks & Wildlife, CONANP, Esri, HERE, Garmin, FAO, NOAA, USGS, EPA, NPS | G... Powered by Esri

State_Well_Num	County	Aquifer	Aquifer_Code	Aquifer_Code_Desc	Sample_Year
6548502	Galveston	Gulf Coast	112CHCTL	Chicot Aquifer, Lower	1963
6556802	Galveston	Gulf Coast	112CHCTL	Chicot Aquifer, Lower	1974
6556804	Galveston	Gulf Coast	112CHCTL	Chicot Aquifer, Lower	1977
6548502	Galveston	Gulf Coast	112CHCTL	Chicot Aquifer, Lower	2006

Water Quality (first 2K records)

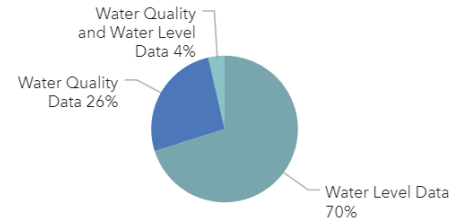
Water Level (first 2K records)



Avg. Water Level

Min Water Level

Max Water Level



Well Count by Records Available

194

Total Groundwater Wells

16.1k

Water Quality Records

12.1k

Water Level Records

190

Water Quality Parameters



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Land Cover & Imperviousness Data Dashboard

Select Dataset(s)

NOAA CCAP Land Cover

USGS NLCD Imperviousness

Select a Data Year

2016

2006

2001

Select Watershed(s)

Brays Bayou, Buffalo Bayou, ... 3

Filter...

Addicks Reservoir

Armand-Taylor Bayou

Austin-Bastrop Bayou

Barker Reservoir

✓ Brays Bayou

✓ Buffalo Bayou

Cedar Bayou

Developed

9%

from 1996 (187.9k acres)

Wetlands

-50%

from 1996 (2.3k acres)

Forests

-52%

from 1996 (12.1k acres)

Imperviousness

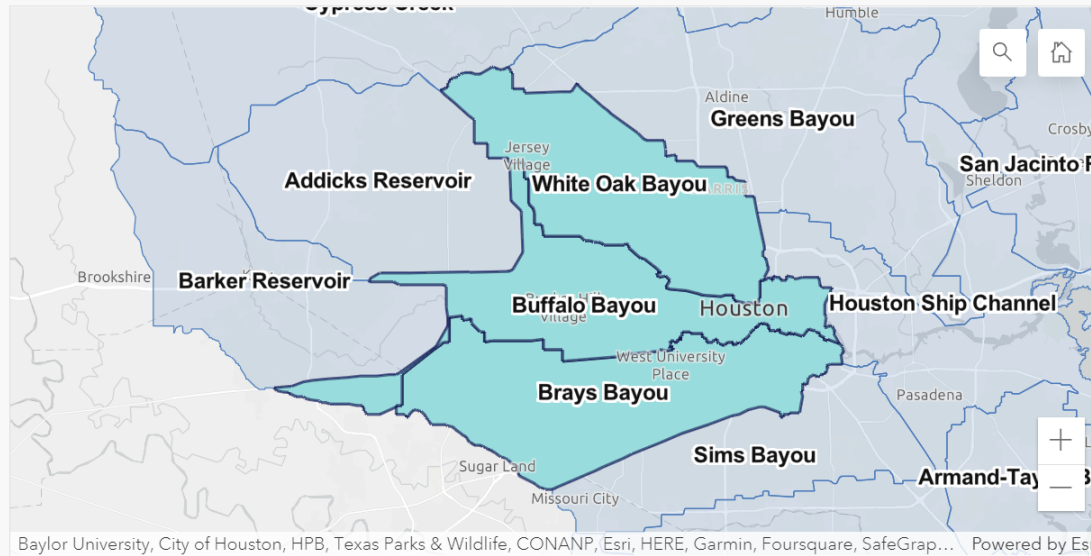
8%

from 2001 (124.7k acres)

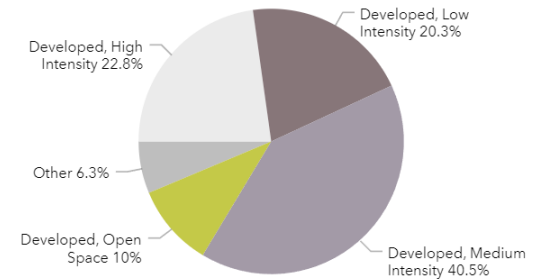
Population

1.9M

in 2021

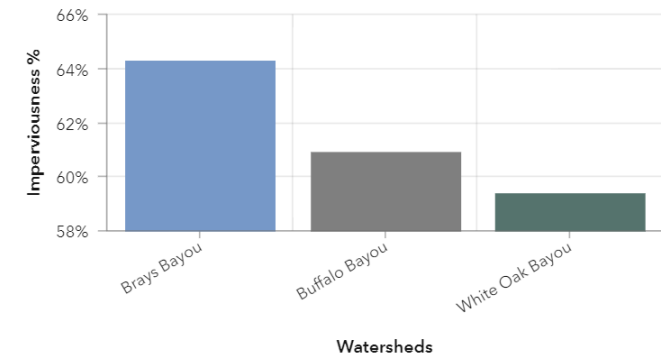


Name	Year	Category	Acres	Acre_Pct	Source
Brays Bayou	2016	Bare Land	297.79	0.36	NOAA CCAP
Brays Bayou	2016	Cultivated Cr...	84.51	0.10	NOAA CCAP
Brays Bayou	2016	Deciduous Fo...	853.33	1.04	NOAA CCAP
Brays Bayou	2016	Developed, H...	19,384.35	23.69	NOAA CCAP



All Land Cover Classes

Top 10 Land Cover Classes



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Ryan Bare, PhD
Research Scientist
rbare@harcresearch.org

Questions?



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