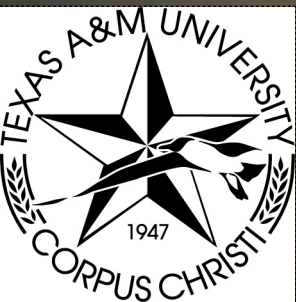


Gulf of Mexico (Texas) Height Modernization

Great Lakes Regional Forum - September 24, 2008



Madison, Wisconsin

Gary Jeffress, Ph.D., RPLS
Texas Spatial Reference Center
Director, Conrad Blucher Institute for Surveying and
Science
Texas A&M University-Corpus Christi



The opportunity.....

Why do we need accurate elevations?



Austin, 2001



Houston, 2001 and 2008

Lives are lost and
\$Billions of property are lost.

Flooding in Austin 2001



- Flooding in Central Texas in 2002 on the Guadalupe River



AP

El Paso, July 2006

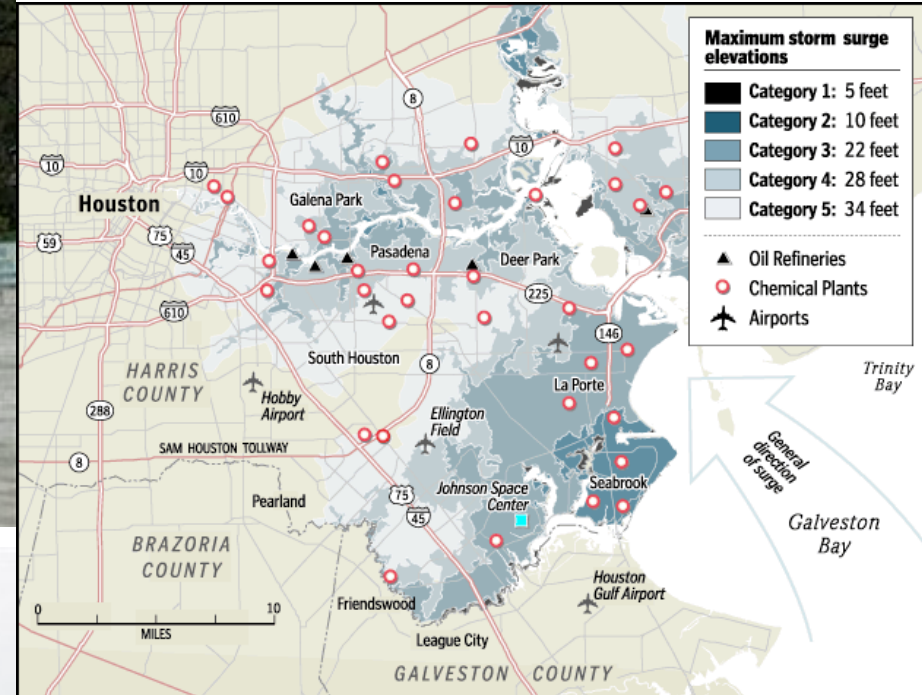


The cost of flooding in Texas

Dates	Dec 18 to 23, <u>1991</u>	<u>Oct 17-18,</u> <u>1998</u>	June 6 to 9, 2001	Nov 15, 2001	June 30- July 7, 2002
Location	Central Texas	South Central Texas	Southeast Texas (Houston)	Central Texas	South Central Texas
Max. Rainfall	15.5 in.	30 in.	36 in.	14 in.	35 in.
Deaths	10	32	22	10	12
Approx. Damage	\$43 Million	\$1.5 Million	\$5 Billion	\$11.4 Million	\$1 Billion

From www.floodsafety.com

Don't forget coastal flooding?



Hurricane Ike 2008

It is about better measurement of heights or elevations in Texas



How high above current Mean Sea Level?

Do I live in a flood zone (elevation certificate)?

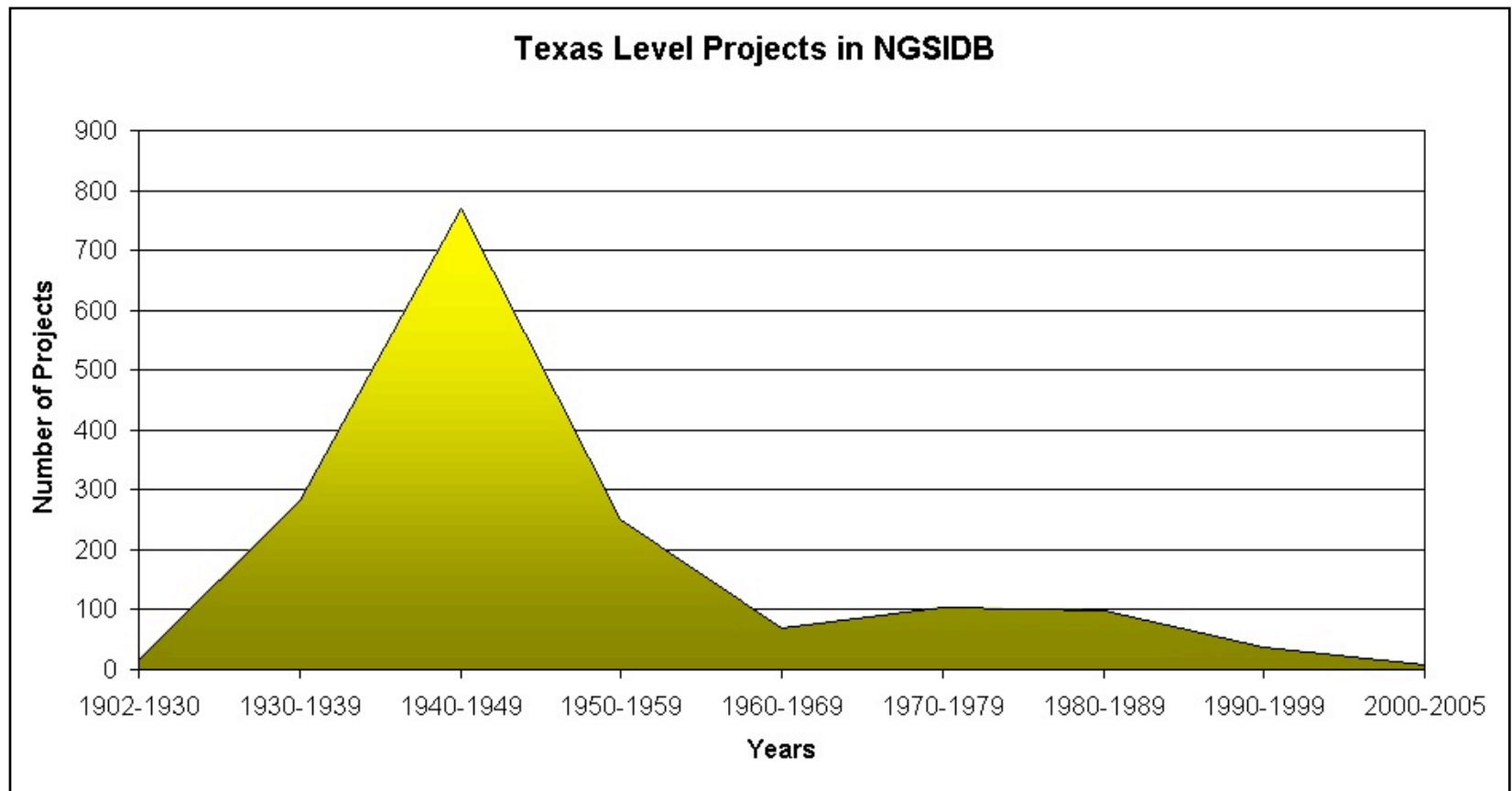
Can I get flood insurance (elevation certificate)?

Can we design drainage systems across local government boundaries?

How do we obtain accurate digital elevation maps that cover an entire river system?

Why are Elevations unknown?

Answer: The data is old and subject to change and destruction.



Estimated 80% of these benchmarks have disappeared¹⁰

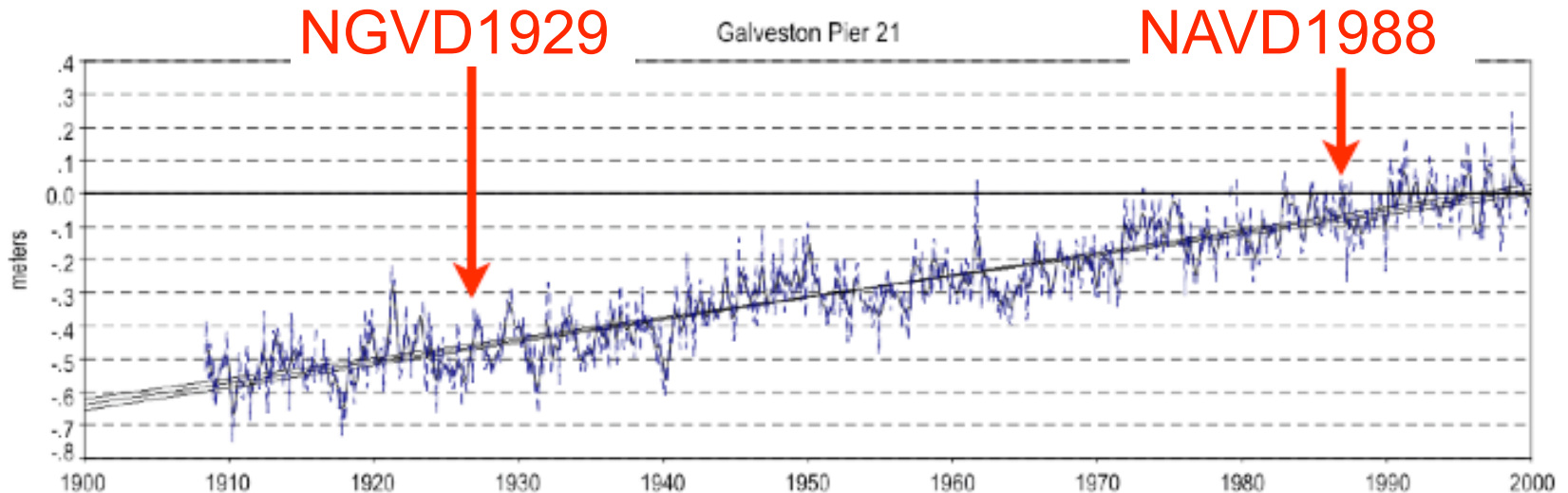
Many benchmarks have been destroyed, or worse, unreliable.



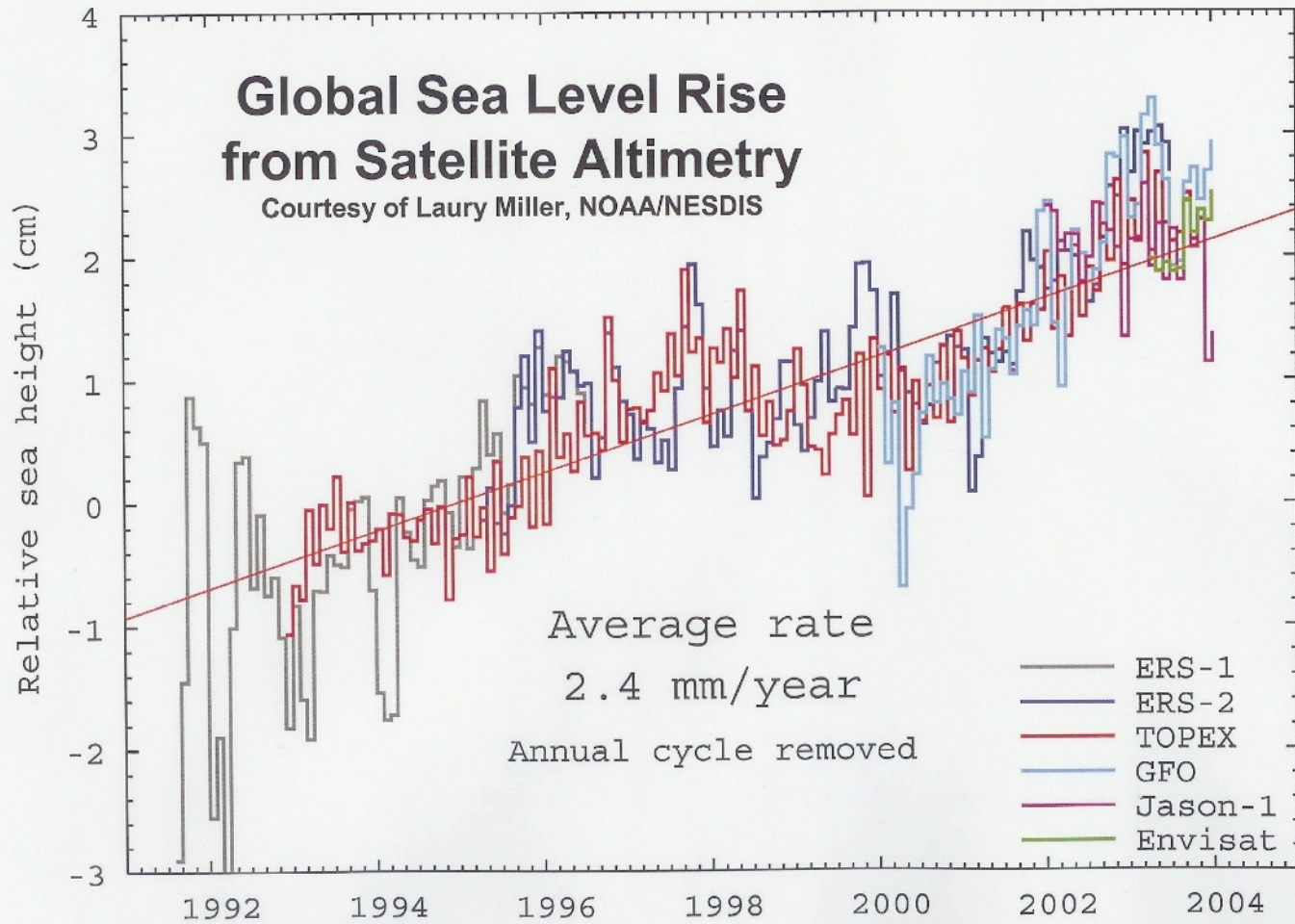
Benchmarks not related to MSL.

Long term sea level data...

From NOAA Co-Ops

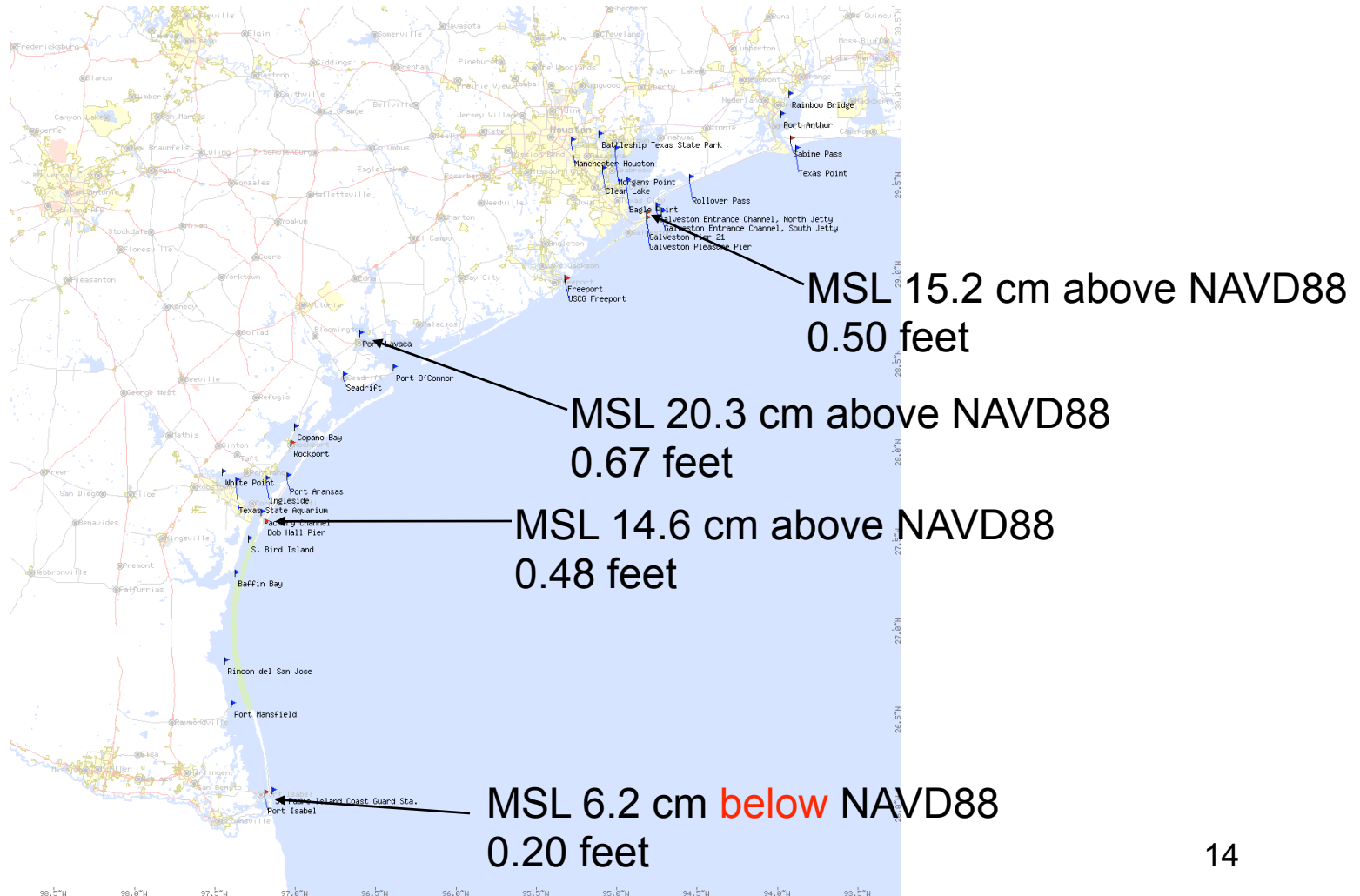


Galveston rate of increase 2.13 ft / 100 years
6.6 mm / year

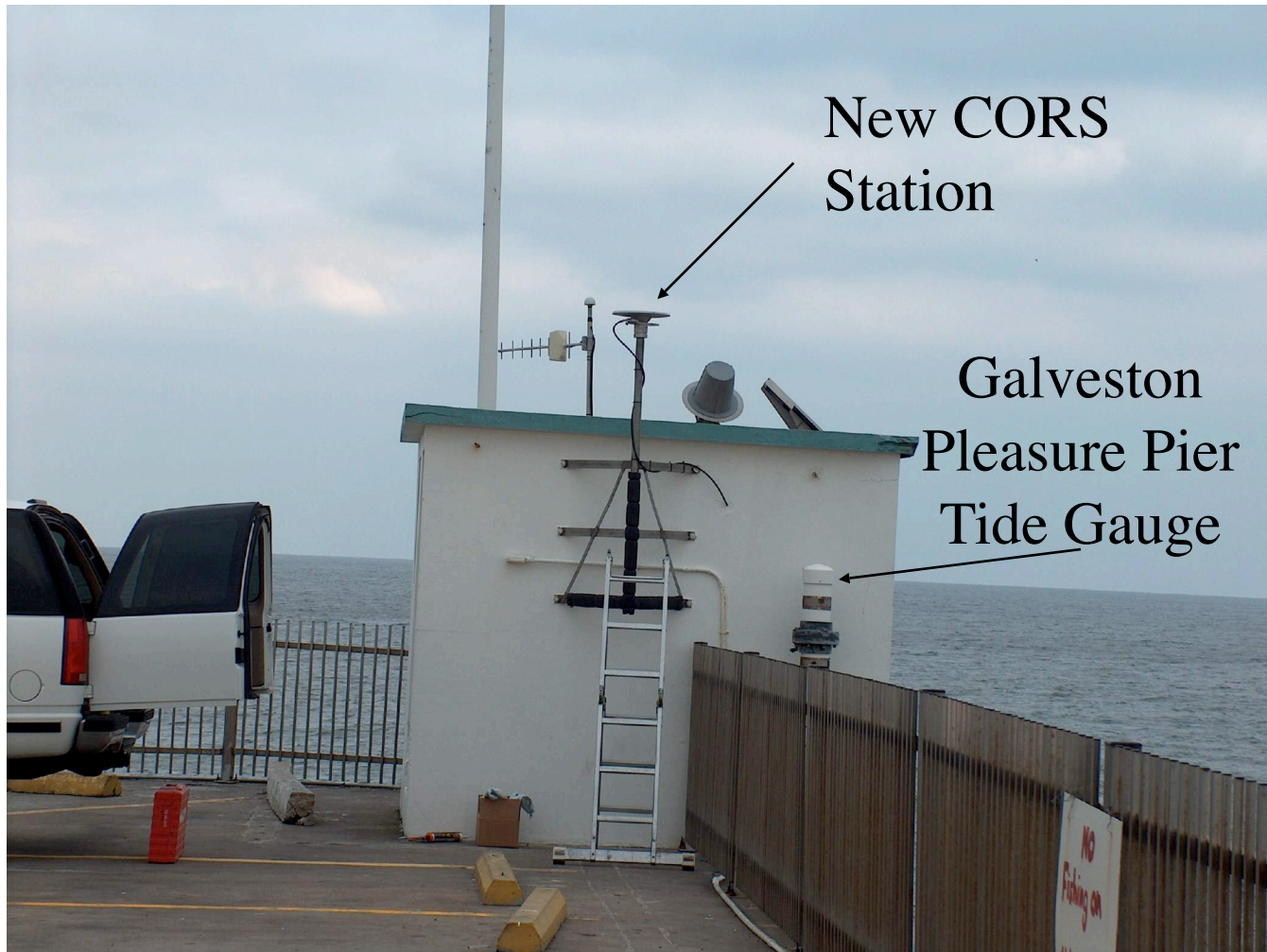


NAVD 88 - Mean Sea Level

Supporting to the need for Height Modernization and V-Datum



Integrating GPS with Tide Gauges



The solution....

Re-establish vertical control
using good science, modern
technology, and to national
standards.

Texas' Objectives

- Act as “Branch Office” of NGS to promote scientifically valid geodetic control for Texas.
 - Texas Spatial Reference Center established 2007 by Texas Legislature as a state entity.
- Assist and encourage State and Federal agencies to adopt federal spatial accuracy standards when establishing control.
 - Working with Texas Natural Resources Information System QC for LIDAR and Aerial Mapping control.
 - Working with US Army Corps of Engineers.
 - NAVD88 on Texas tide gauges
 - Assessing risk in current vertical control practices

Texas' Goals

- Train private sector to undertake NSRS projects.
- Connect vertical datums to modern sea level along the Gulf of Mexico (VDatum).
- Connect Texas CORS to NAVD88.
- Promote regional collaboration (Central Region and Gulf Coast Region).
- Assist NGS develop efficient NSRS software and conduct geodetic research.

What does Texas need from
NGS?

Texas needs...

- Interagency agreement, whereby...
 - NGS to insist on scientifically documented national standards and procedures for NSRC activity and wherever possible.
 - NGS to fund Spatial Reference Center to keep the doors open with funding for qualified staff

In return for...

- Spatial Reference Center to continue to seek state and federal support for priority projects (CORS, digital mapping control, flood mitigation, coastal programs, local height networks, etc.)
- Spatial Reference Center to assist in implementing NGS mission and strategic plan implementation

Texas' Current FY Support

- NGS Height Mod Grant \$270,000
- Texas Natural Resources Information System \$100,000
- US Army Corps of Engineers \$110,000
- Conrad Blucher Institute \$60,000

Texas Experience with NOS Co-Ops/TCOON

Measuring water level, current, water quality, and meteorological data. **ALL TO NATIONAL STANDARDS**

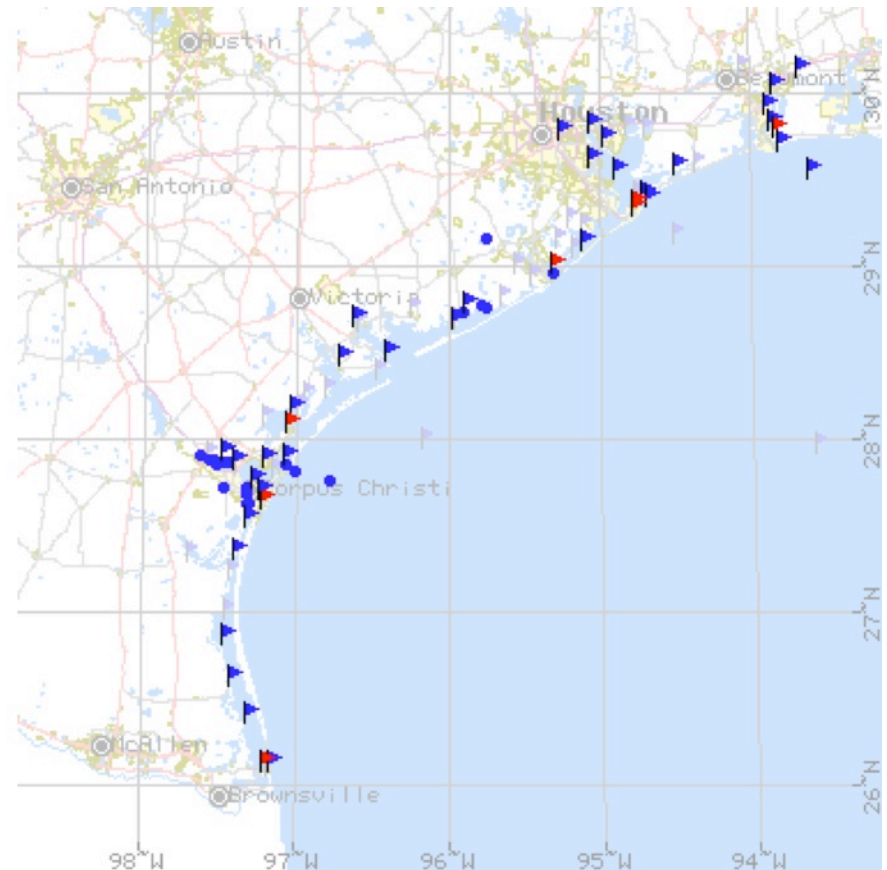
Started 1988

34 active stations

80 historic & active

Primary Sponsors

- TX General Land Office
- TX Water Development Board
- US Army Corps of Engineers
- US National Ocean Service



Conrad Blucher Institute for Surveying and Science

<http://tsrc.tamucc.edu>



