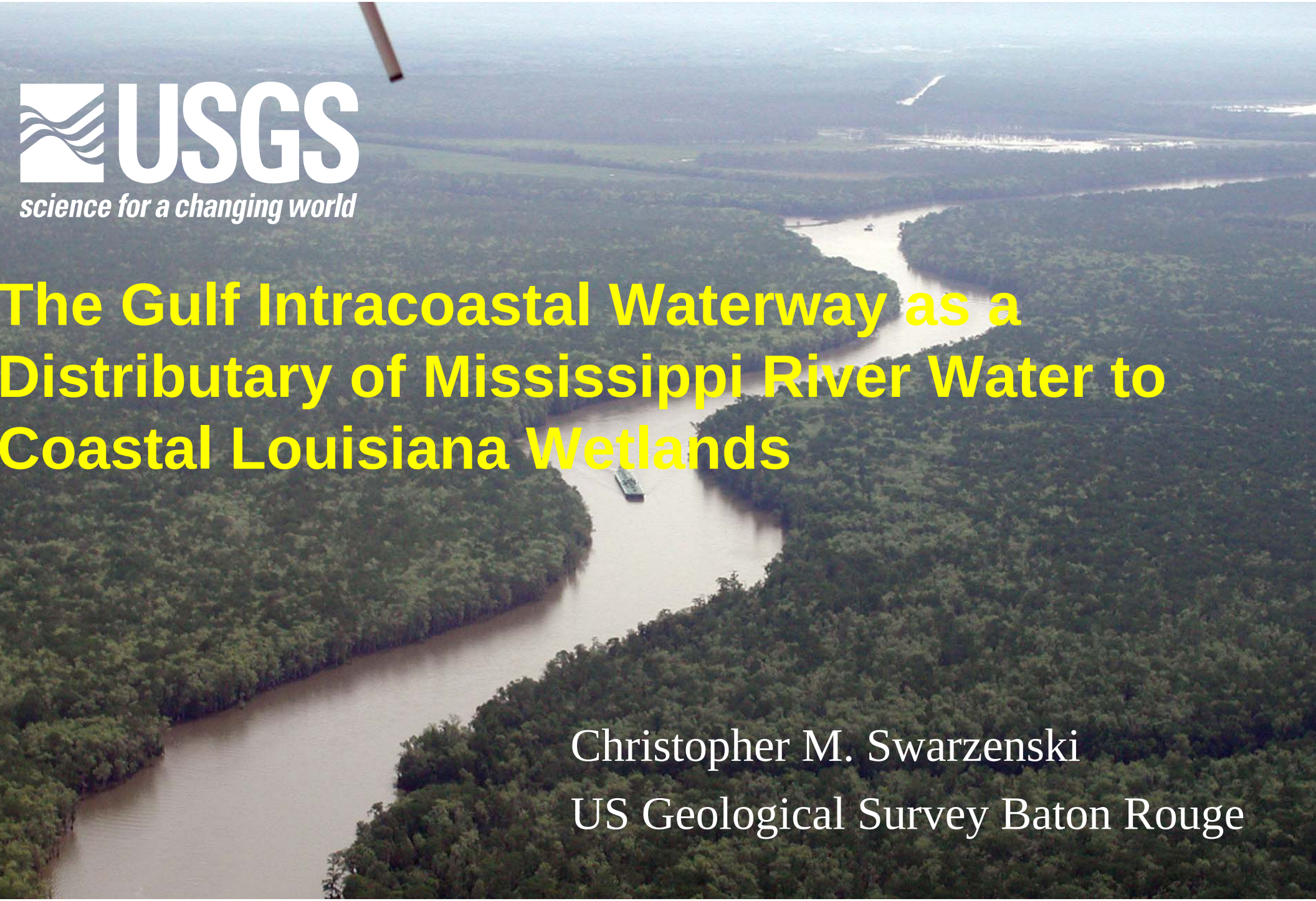


The Gulf Intracoastal Waterway as a Distributary of Mississippi River Water to Coastal Louisiana Wetlands

Christopher M. Swarzenski
US Geological Survey Baton Rouge

- East-west trending ship channel, 12-20 ft deep, at least 200 feet wide; in study area built mid-1930's
- Parallels upland/wetland interface near upland boundary; crosses marshes and swamps
- Crosses south flowing Lower Atchafalaya River and Wax Lake Outlet in south-central Louisiana

USGS
science for a changing world

Map of GIWW in coastal Louisiana

(Base map from Louisiana GIS CD, ver. 2.0)

0 15 30 45 60 MILES

0 15 30 45 60 KILOMETERS

EXPLANATION

Wetland

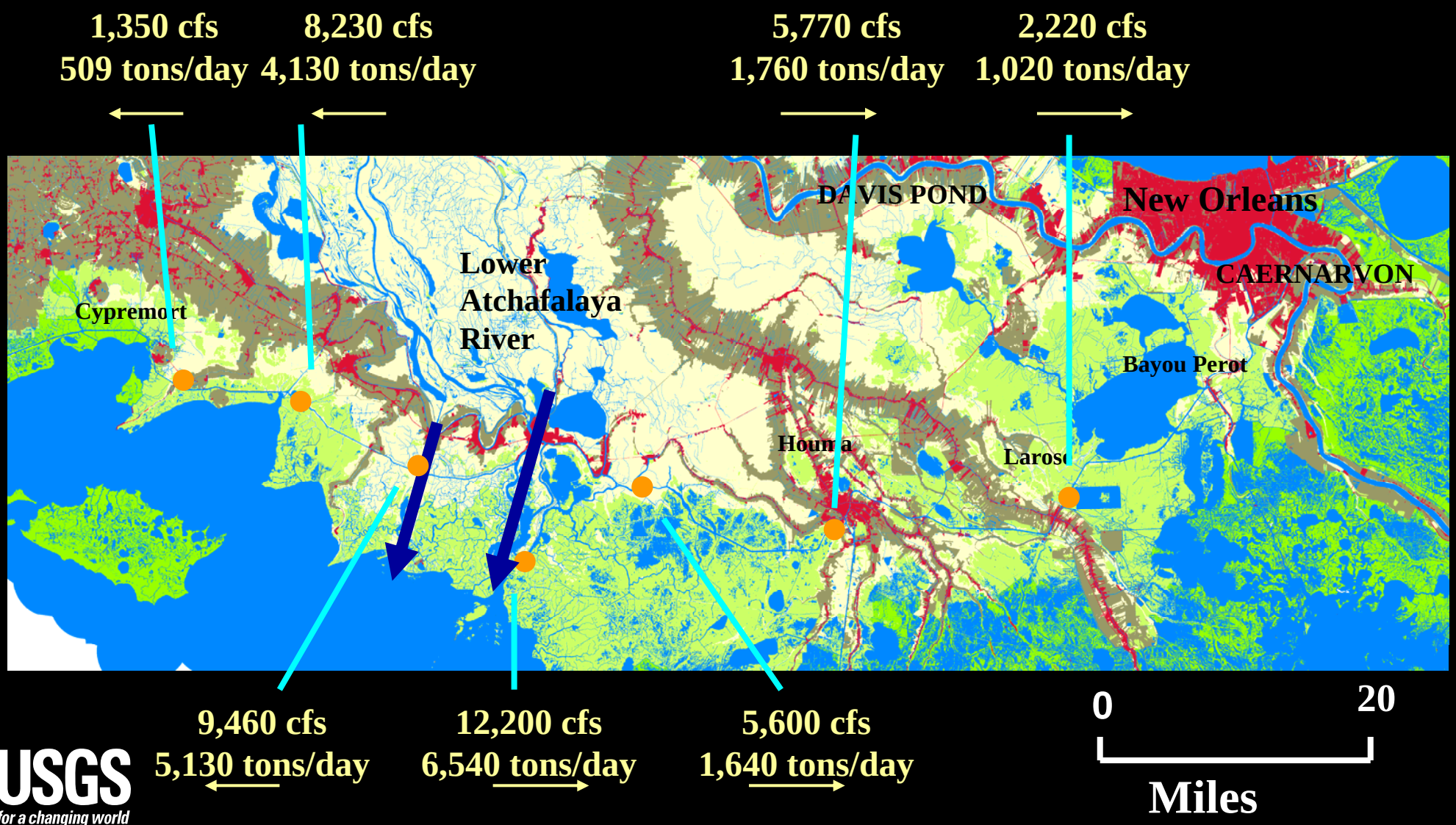
Data collection

- Measure instantaneous discharge and suspended sediment concentrations throughout year at about 15 locations along GIWW using Acoustic Doppler Velocity Meters

- Operate continuously recording data collection sondes at a subset of stations

USGS
science for a changing world

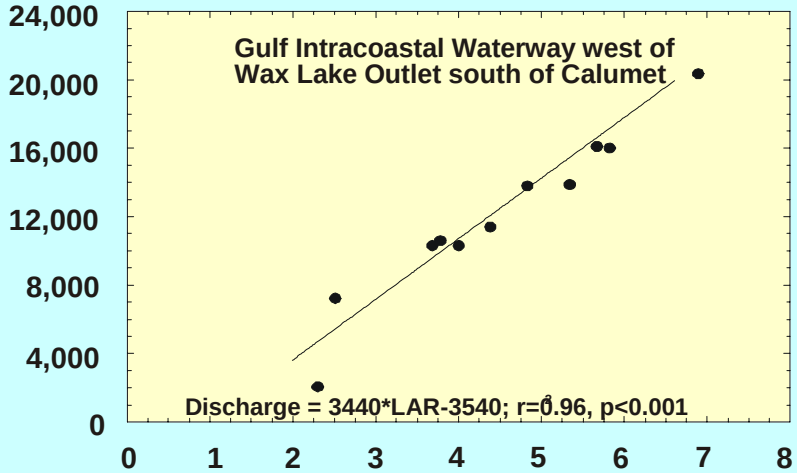
Average discharge (cubic feet per second) and average suspended sediment discharge (tons per day) along the GIWW

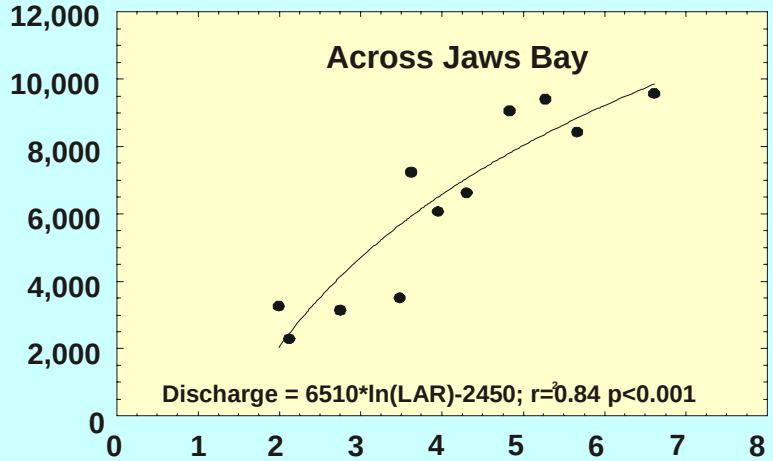


USGS
science for a changing world

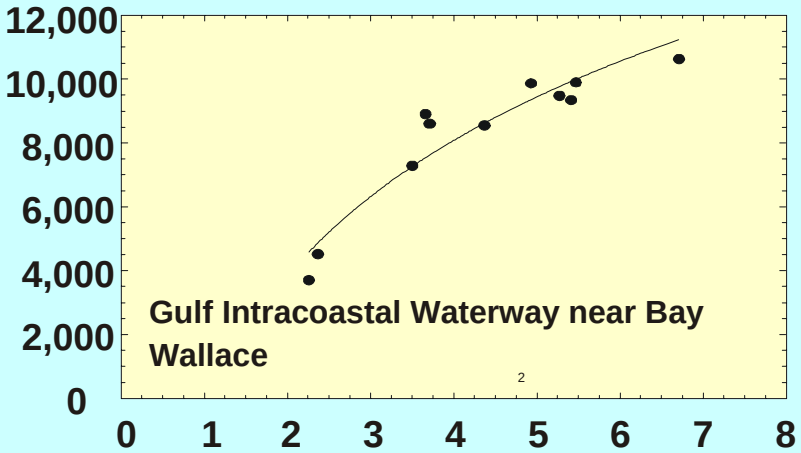
Relations between GIWW discharges and stage of the Lower Atchafalaya River

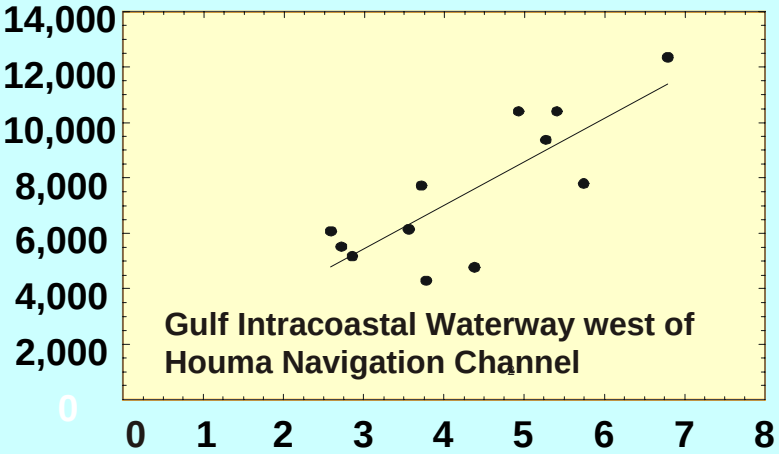
WESTWARD FLOW





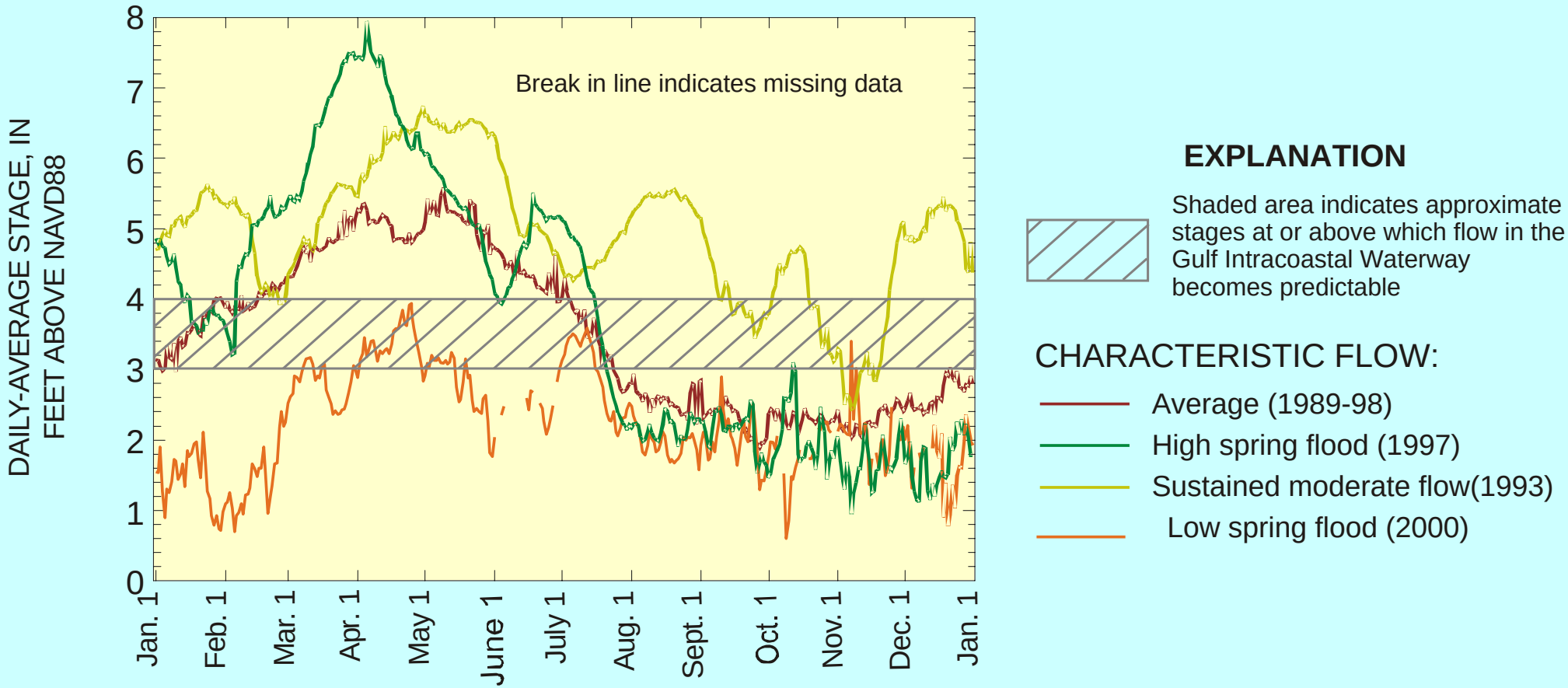
EASTWARD FLOW





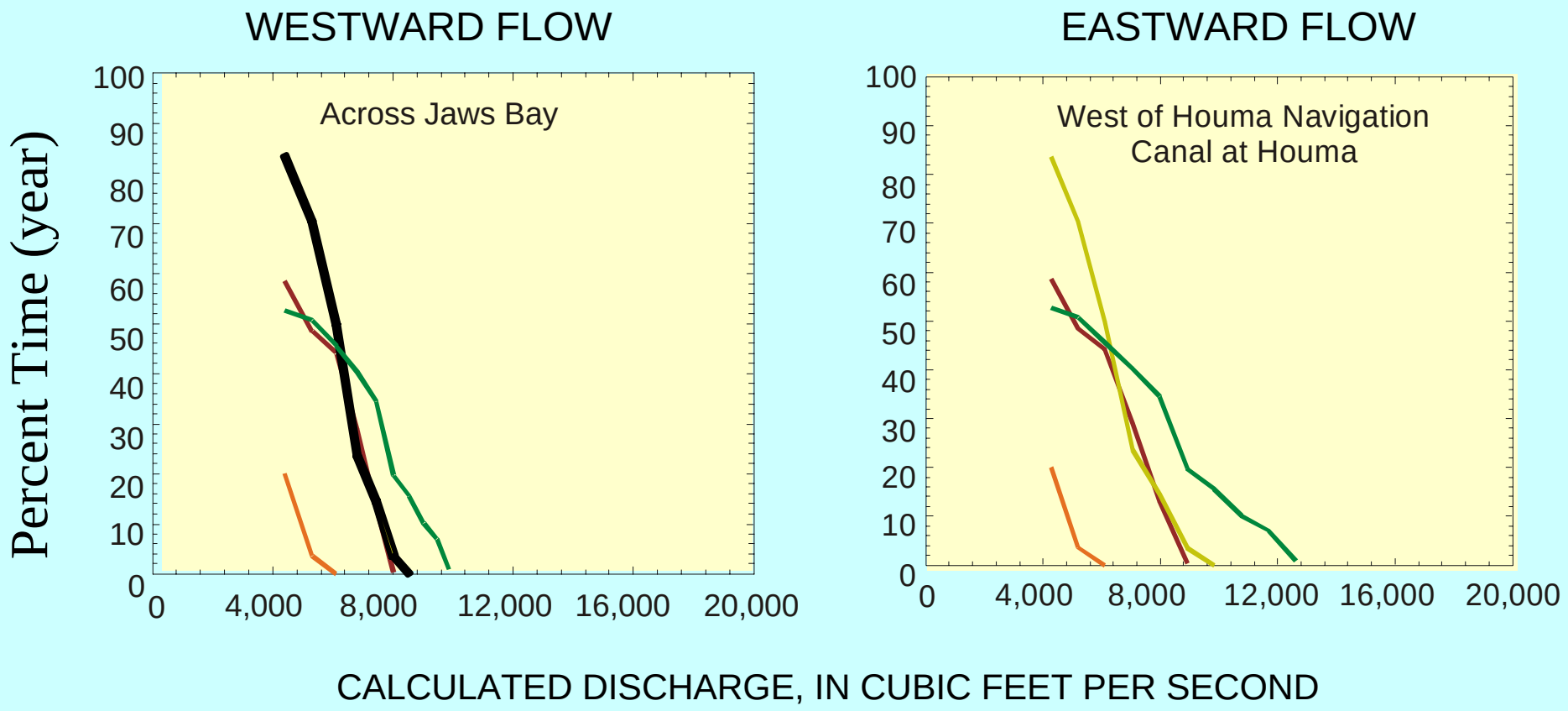
DAILY-AVERAGE STAGE OF LOWER ATCHAFALAYA RIVER

USGS
science for a changing world



DAILY AVERAGED STAGE OF THE LOWER ATCHAFALAYA RIVER FOR DIFFERENT TYPES OF WATER YEARS (shaded area indicates when flow in the GIWW becomes predictable)

USGS
science for a changing world

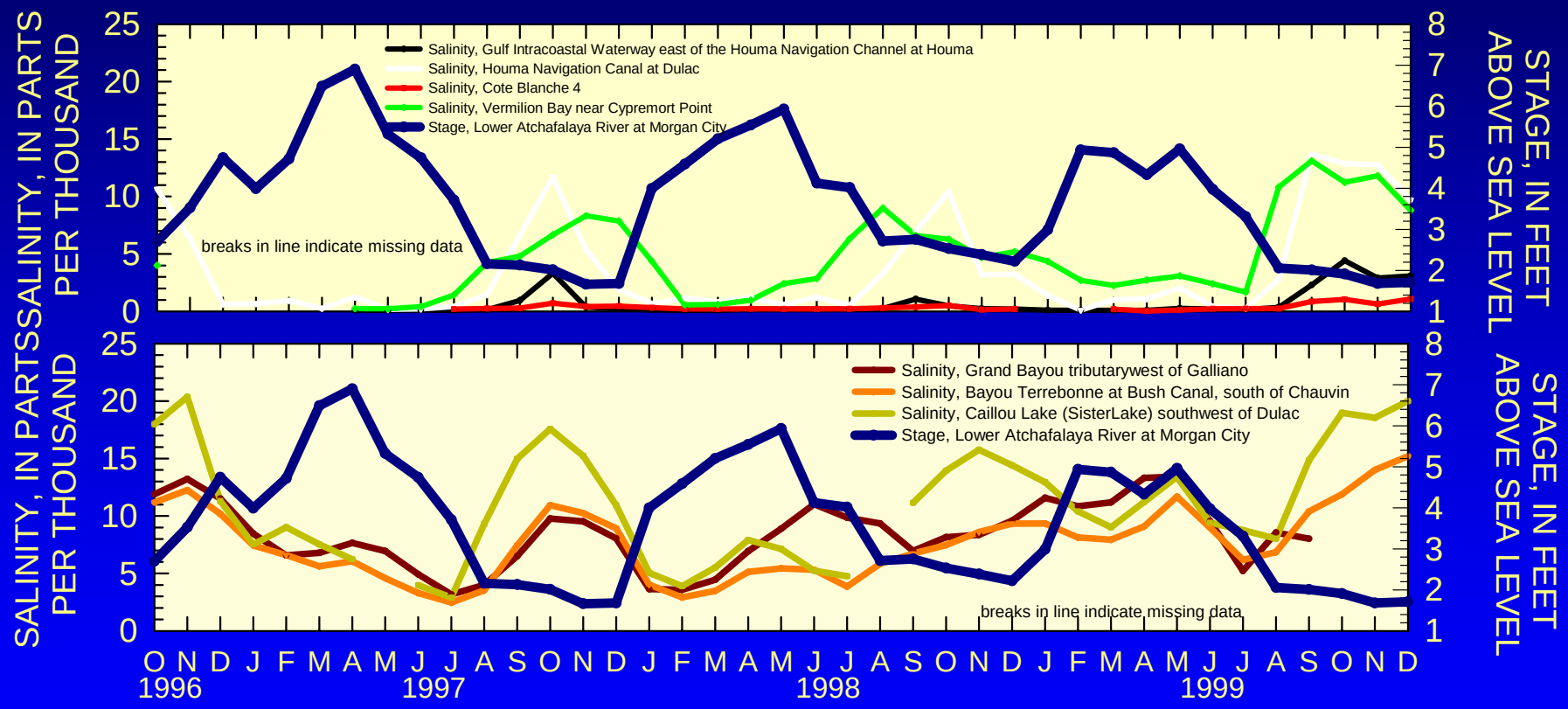


USING RELATIONS BETWEEN DISCHARGE AND RIVER STAGE IT IS POSSIBLE TO CALCULATE DISCHARGES DURING DIFFERENT TYPES OF WATER YEARS

CHARACTERISTIC FLOW:

- **Average (1989-98)**
- **High spring flood (1997)**
- **Sustained moderate flow (1993)**
- **Low spring flood (2000)**

BENEFITS: Discharge along the GIWW moderates salinity in surface waters near (top) and at some distance from the GIWW; wetlands may benefit



USGS
science for a changing world

Comparison of GIWW discharge with that of controlled river diversions (average Jan-Jun)

- GIWW
  - Across Jaws 8,040 cfs
  - At Bay Wallace 9,440 cfs
  - East of B. Lafourche 1,750 cfs

- Controlled River Diversion
  - Caernarvon 2,100 cfs
  - Davis Pond 2,340 cfs

Conclusions

- THE GIWW CAPTURES WATER FROM THE NORTH SOUTH FLOWING LOWER ATCHAFALAYA RIVER (ITSELF MAINLY MISSISSIPPI RIVER WATER) PASSIVLEY AND ROUTES IT EAST WEST TO POINTS AS FAR AS 50 MILES AWAY

- THE GIWW IS INTRODUCING MORE RIVER WATER AND SUSPENDED SEDIMENTS TO DELTA PLAIN MARSHES AT NO COST THAN THE LARGEST MAN-BUILT CONTROLLED RIVER DIVERSIONS

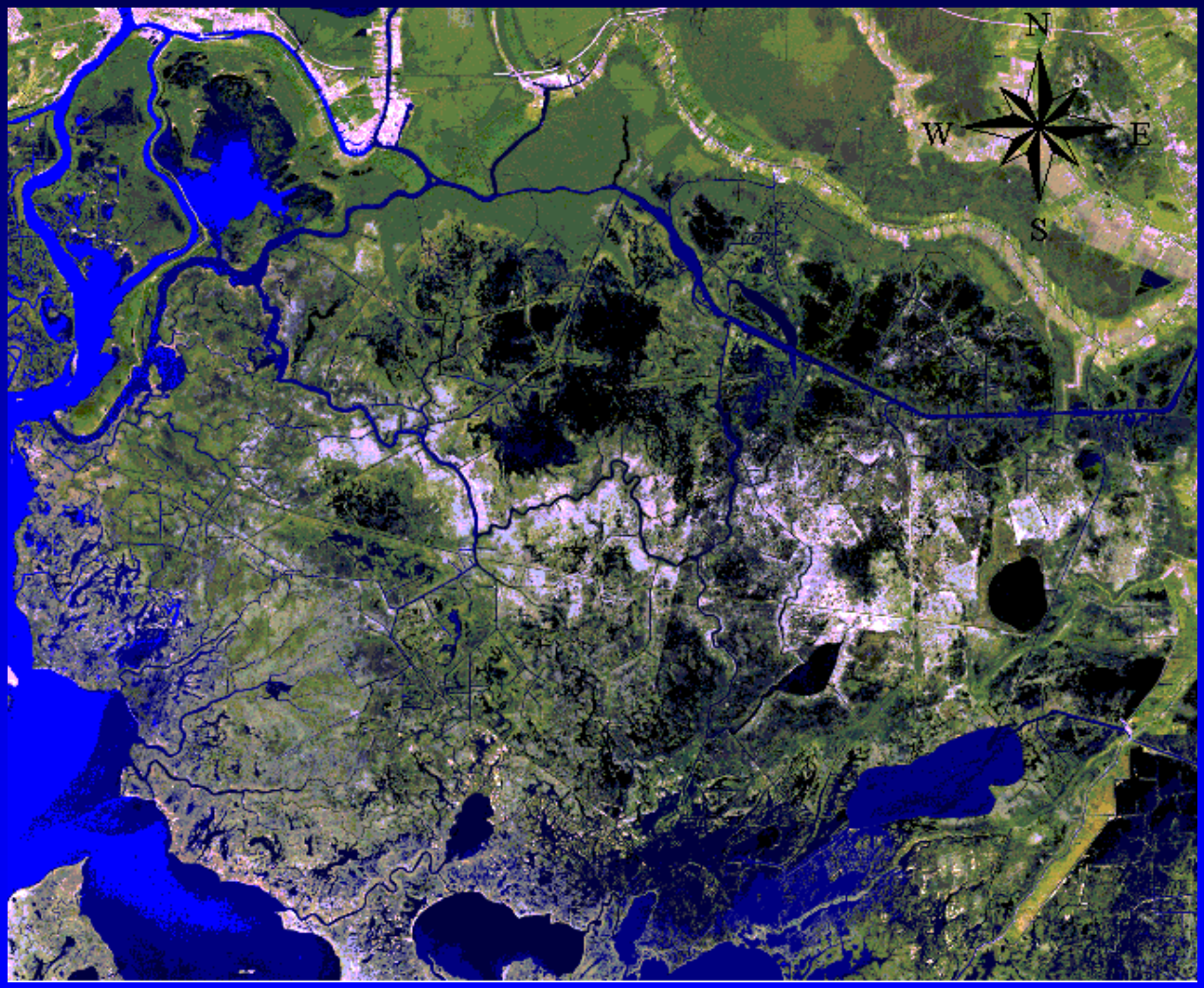
- THE IRONY IS THAT A SHIP CHANNEL BUILT IN 1933 HAS BECOME THE LARGEST DISTRIBUTARY OF RIVER WATER TO MARSHES OTHER THAN ACTIVE DELTAS

USGS
science for a changing world

WHAT ABOUT WETLAND BUILDING ?

- **THE THEORY IS THAT RIVER WATER INFLOW WILL REBUILD OR PERHAPS SUSTAIN THE DETERIORATING MARSH LANDSCAPE**

- **THE REALITY PROBABLY IS A BIT MORE NUANCED**



USGS
science for a changing world