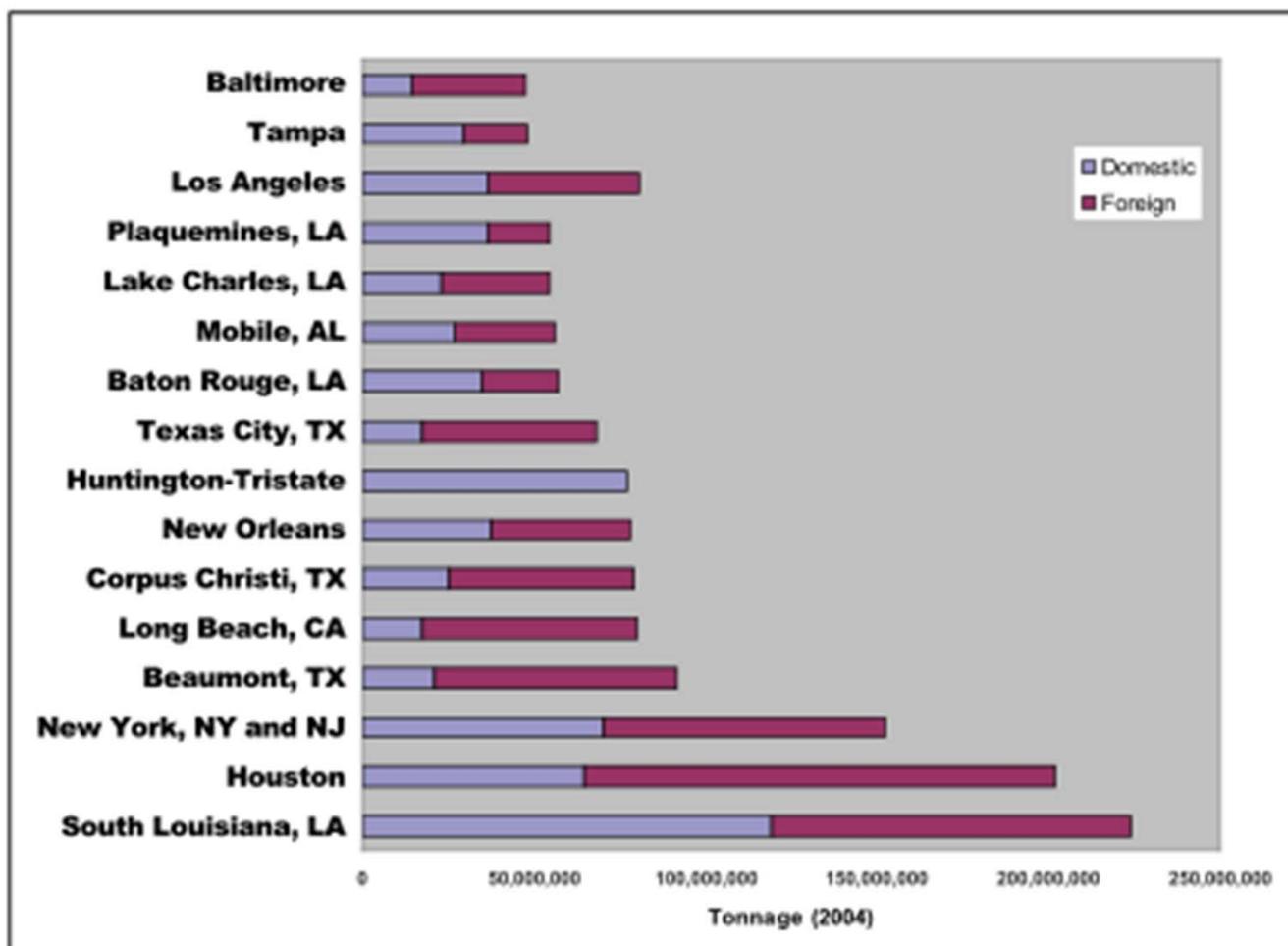


# The Houston Ship Channel: Water Quality Considerations

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# I. The Port of Houston



# I. The Port of Houston

- **Primary Categories of Shipping Cargo**
  - Petroleum and Petroleum Products (91.4 million tons)
  - Organic Chemicals (14.9 million tons)
  - Iron and Steel (8 million tons)
  - Natural Stone (7 million tons)
  - Cereal and Cereal Products (5.8 million tons)
- **Major Trading Partners**
  - Mexico (29.1 million tons)
  - Venezuela (10.6 million tons)
  - Saudi Arabia (8.5 million tons)
  - Algeria (6.2 million tons)
  - China (5.7 million tons)

## II. The Houston Ship Channel



Buffalo Bayou Portion of the Houston Ship Channel



## II. The Houston Ship Channel

- **San Jacinto River Tidal (1001):** from a point 100 meters (110 yards) downstream of IH 10 in Harris County to Lake Houston Dam in Harris County.
- **Houston Ship Channel/San Jacinto River Tidal (1005):** from the confluence with Galveston Bay at Morgan's Point in Harris/Chambers County to a point 100 meters (110 yards) downstream of IH 10 in Harris County.
- **Houston Ship Channel Tidal (1006):** from the confluence with the San Jacinto River in Harris County to a point immediately upstream of Greens Bayou in Harris County, including tidal portions of tributaries.
- **Houston Ship Channel/Buffalo Bayou Tidal (1007):** from a point immediately upstream of Greens Bayou in Harris County to a point 100 meters (110 yards) upstream of US 59 in Harris County, including tidal portion of tributaries.
- **Buffalo Bayou Tidal (1013):** from a point 100 meters (110 yards) upstream of US 59 in Harris County to a point 400 meters (440 yards) upstream of Shepherd Drive in Harris County.

## II. The Houston Ship Channel

- **Buffalo Bayou Above Tidal (1014):** from a point 400 meters (440 yards) upstream of Shepherd Drive in Harris County to SH 6 in Harris County.
- **Greens Bayou Above Tidal (1016):** from a point 0.7 km (0.4 miles) above the confluence of Halls Bayou in Harris County to a point 100 meters (110 yards) above FM 1960 in Harris County.
- **Whiteoak Bayou Above Tidal (1017):** from a point immediately upstream of the confluence of Little White Oak Bayou in Harris County to a point 3.0 km (1.9 miles) upstream of FM 1960 in Harris County.

## II. The Houston Ship Channel

- **Tabbs Bay (2426):** 3.6 square mile estuary.
- **San Jacinto Bay (2427):** 2.1 square mile estuary.
- **Black Duck Bay (2428):** 0.6 square mile estuary.
- **Scott Bay (2429):** 1.7 square mile estuary.
- **Burnett Bay (2430):** 2.7 square mile estuary.
- **Barbours Cut (2436):** 0.2 square mile estuary.

### III. Statutory Framework

- Rivers and Harbors Act of 1899 (33 U.S.C. §§ 401, 403, 407 (1988)).
  - Section 10
- Federal Water Pollution Control Act (Clean Water Act or CWA)(33 U.S.C. §§ 1251-1387).
  - Section 404
  - Section 402 and Section 402(p)
  - Section 319
  - Section 6217 of CZARA

## II. Statutory Framework

- **Section 10 of the Rivers and Harbors Act**
  - Requires a federal permit for the construction of structures, dredging, filling, and conducting other activities that may obstruct navigation (33 U.S.C. § 403).
  - Navigable waters subject to the Rivers and Harbors Act are limited to those that are, have been, or could with reasonable modifications be used for commercial transport and those waters subject to ebb and flow of the tide (See 33 C.F.R. § 329.4 (1990)).

## II. Statutory Framework

- **Clean Water Act**

- The CWA prohibits the discharge of “any pollutant” into waters of the United States from a point source unless it is authorized by a permit (33 U.S.C. § 1311).
- The CWA also regulates nonpoint source (NPS) discharges (See 33 U.S.C. § 1329; 40 C.F.R. § 122.26).

# III. Regulation of Point Source Pollution

- Section 402 of the Clean Water Act
  - The primary mechanism in the Clean Water Act regulating the discharge of traditional pollutants is the National Pollutant Discharge Elimination System (NPDES).
  - The NPDES requires a permit from EPA or an authorized state for the discharge of most pollutants from a point source into waters of the United States (33 U.S.C. § 1342).

# III. Regulation of Point Source Pollution

- Section 404 of the Clean Water Act
  - Section 404 is the primary statutory provision regulating development in wetlands (See 33 U.S.C. § 1344).
  - Authorizes a separate permit program implemented by the Army Corps of Engineers (USACE) for discharges of dredged or fill material into the waters of the United States.
- USACE authorization originates from its established role under the Rivers and Harbors Act of 1899.

## IV: Regulation of Nonpoint Source Pollution

- Section 319 of the Clean Water Act
  - In 1987 the CWA was amended to establish a national program to control nonpoint sources of pollution (33 U.S.C. § 1329).
  - Section 319(a) requires states to perform NPS assessments of navigable waters, which includes the identification of impaired or threatened waters and the activities causing impairment.

## IV: Regulation of Nonpoint Source Pollution

- **Section 319 of the Clean Water Act (continued)**
  - Under Section 319(b), states must develop management programs to address NPS runoff, including the identification of best management practices and measures.
    - Both the NPS assessment reports and management programs are subject to EPA approval.
  - The program stresses a watershed-based approach to nonpoint source management which can include protection or restoration of wetlands and riparian areas to reduce NPS pollution.
  - Section 319(h) authorizes grants to assist states with approved assessment reports and management programs in implementing their approved management programs.

## IV: Regulation of Nonpoint Source Pollution

- **Section 402(p) of Clean Water Act**
  - While Section 402 of the CWA primarily regulates point source pollution, a NPDES permit is also required for certain municipal and industrial stormwater discharges
    - Municipal Separate Storm Sewer System or “MS4” permits

## IV: Regulation of Nonpoint Source Pollution

- **Section 6217 of Coastal Zone Act Reauthorization Amendments (CZARA)**
  - Requires states and territories with approved Coastal Zone Management Programs to develop Coastal Nonpoint Pollution Control Programs to address nonpoint pollution control problems in coastal waters.

# What qualifies as a “pollutant” under the CWA, V&E and when is its discharge regulated?

- The term “pollutant” means dredged spoil, solid waste, incinerator residue, sewage, garbage, sewage sludge, munitions, chemical wastes, biological materials, radioactive materials, heat, wrecked or discarded equipment, rock, sand, cellar dirt and industrial, municipal, and agricultural waste discharged into water (33 U.S.C. § 1362(6)).
- The term “discharge of a pollutant” includes any addition of any pollutant to navigable waters from any point source (33 U.S.C. § 1362(12)).

# What qualifies as a “pollutant” under the CWA, and when is its discharge regulated? V&E

- Possibly all biological and chemical pesticide applications that leave a residue in water.
  - National Cotton Council et. al v. EPA, 553 F.3d 927, *stay granted* (6<sup>th</sup> Cir. June 8, 2009).
- Discharge of unaltered groundwater to a river where the groundwater differs chemically from the surface water to which it was discharged.
  - Northern Plains Resource Council v. Fidelity Exploration and Development Co., 325 F.3d 1155 (9<sup>th</sup> Cir. 2003).
- Not transfers of water from one distinct water body to another, as long as the waters are not subject to an intervening use.
  - South Florida Water Management District v. Miccosukee Tribe of Indians, 541 U.S. 95 (2004); 73 Fed. Reg. 33697 (June 13, 2008); Friends of the Everglades v. South Florida Water Management District No. 07-13829 (11<sup>th</sup> Cir. 2009).
- Water passing through a hydroelectric dam.
  - S.D. Warren Company vs. Bd of Environmental Protection, U.S. S.Ct. 04-1527 (2006).
- Thermal discharge (33 U.S.C. § 1362(6)).

# What qualifies as a “pollutant” under the CWA, and when is its discharge regulated? V&E

- Not incidental discharge of material during excavation (Section 404).
  - National Mining Congress v. U.S. Army Corps of Eng’rs 145 F.3d 1399 (D.C. Cir. 1998).
- Not always a municipal landfill constructed in wetlands (Section 404).
  - Resource Investments, Inc. v. U.S. Army Corps of Eng’rs, 151 F.3d 1162 (9<sup>th</sup> Cir. 1998).
- Sometimes increased siltation (Section 404).
  - U.S. v. United Homes, Inc., No. 98 C 3242, 1999 U.S. Dist. LEXIS 2354 (N.D. Ill. February 24, 1999) (poorly maintained erosion control structures near a construction site); Froebel v. Meyer, 1998 U.S. Dist. LEXIS 12085 (E.D. Wisc., July 30, 1998) (poorly executed removal of a dam).
  - Greenfield Mills v. Macklin, 361 F.3d 934 (7<sup>th</sup> Cir. 2004) (drawdown of a supply pond into a river).

# Nonpoint Source Pollutants

- Excess fertilizers, herbicides, and insecticides from agricultural lands and residential areas.
  - Mississippi River and the Gulf of Mexico dead zone.
- Oil, grease, and toxic chemicals from urban runoff and energy production.
- Sediment from improperly managed construction sites, crop and forest lands, and eroding streambanks.
  - Sediment is currently the leading cause of water quality impairment for streams and rivers.

# Nonpoint Source Pollutants

- Salt from irrigation practices and acid drainage from abandoned mines.
- Bacteria and nutrients from livestock, pet wastes, and faulty septic systems.
  - Concentrated Animal Feeding Operations (CAFOs) are regulated under the CWA as point source dischargers, and thus are required to obtain permits to discharge. However, where the discharge is an “agricultural stormwater discharge,” it is exempt (33 U.S.C. §1362(14)). Thus any “agricultural stormwater discharge” would qualify as a nonpoint source.

# Total Maximum Daily Loads (TMDLs)

- A Total Maximum Daily Load (TMDL) is the maximum amount of a single pollutant that a water body can receive, from both point and nonpoint sources, and still safely meet the water quality standards set by the state.
  - In establishing a TMDL, a margin of safety must be included depending on the intended usage of the waterbody; seasonal variations must also be provided for.
  - Natural background sources of a pollutant are considered in the nonpoint source determination.
- The establishment of TMDLs for pollutants is supposed to ensure that water quality standards can be attained notwithstanding pollutant contributions from unregulated sources, such as nonpoint sources
- Viewed as a “pollution budget”

# Total Maximum Daily Loads (TMDLs)

- Under Section 303(d), states are required to develop lists of **impaired waters**, which are waters for which technology-based regulations and other required controls are not stringent enough to meet the water quality standards set by the states.
- The states must then establish priority rankings for waters on the 303(d) lists and develop TMDLs for every water body/pollutant combination.
- After adoption by the state's regulatory body, EPA must review and approve. If EPA rejects a 303(d) list, EPA is then responsible for developing that list.
- States also must develop implementation plans that outline steps to reduce the pollutant load.

# Origin of the TMDL Program: Nonpoint Sources

- The TMDL program and water quality standards were established in the 1972, however, it was only recently that the states and EPA focused on implementation of the program.
  - The recent implementation was in response to lawsuits seeking implementation of Section 303(d) to address nonpoint and other sources that were responsible for many of the existing water quality impairments nationwide, but that were yet unregulated.

# TMDLs and the Houston Ship Channel

- On April 1, 2008, TCEQ submitted its current 303(d) list of impaired waters to EPA
- The list was approved by EPA on July 9, 2008, with the exception of Corpus Christi Bay, which EPA added to the list for bacteria
- The 303(d) list must be updated every 2 years
- The 2010 draft 303(d) list was released for public comment in February 2010

# TMDLs and the Houston Ship Channel

- The following pollutants are either included on the state's 303(d) list as a basis for impairment, or have already had a TMDL established:
  - Dioxin and Polychlorinated Biphenyls (PCBs):
    - Dioxins were first listed in 1996; PCBs in 2002.
    - Draft TMDLs established for 10 of the 14 ship channel segments, including:
      - the San Jacinto River Tidal,
      - the Houston Ship Channel/San Jacinto River Tidal,
      - the Houston Ship Channel Tidal,
      - the Houston Ship Channel/Buffalo Bayou Tidal,
      - the five estuaries, and
      - Barbours Cut.
    - TMDL programs are currently in process for each of these pollutants.

# TMDLs and the Houston Ship Channel

- The following pollutants are either included on the state's 303(d) list as a basis for impairment, or have already had a TMDL established:
  - Mercury:
    - Draft TMDL established for the Patrick Bayou Tidal area.
    - First listed in 1998.
  - Bacteria:
    - First listed in 1996.
    - Draft TMDL established for the Houston Ship Channel/San Jacinto River Tidal, the Houston Ship Channel Tidal, and the Houston Ship Channel/Buffalo Bayou Tidal segments.
    - In April 2009, TCEQ adopted TMDLs for Buffalo and Whiteoak Bayous, which were approved by EPA in June 2009.
    - In June 2010, TCEQ adopted TMDLs for Greens Bayou, which were approved by EPA in August 2010.
    - On September 15, 2010, TCEQ adopted TMDLs for Brays, Halls, and Sims Bayous.

# TMDLs and the Houston Ship Channel

- The following pollutants are either included on the state's 303(d) list as a basis for impairment, or have already had a TMDL established:
  - Nickel:
    - First listed in 1990.
    - In August 2000, TCEQ adopted a TMDL for each of the 14 segments of the ship channel, which EPA approved in May 2003.
  - Toxicity in Sediment:
    - First listed in 2000.
    - Draft TDML established for the Houston Ship Channel Tidal and the Houston Ship Channel/Buffalo Bayou Tidal.
  - Depressed Dissolved Oxygen:
    - First listed in 2002.
    - Draft TDML established for 5 of the ship channel segments: the Houston Ship Channel Tidal, the Houston Ship Channel/Buffalo Bayou Tidal, the Buffalo Bayou Tidal, the Greens Bayou Above Tidal, and the Whiteoak Bayou Above Tidal.

# TMDLs and the Houston Ship Channel

- Proposed revisions to the 2010 303(d) List:
  - Addition of a number of unclassified waterbodies in HSC watershed as impaired for bacteria, dioxin, and depressed dissolved oxygen
  - Removal of Houston Ship Channel/San Jacinto River Tidal for bacteria because it now meets the water quality standards
  - Removal of HSC segments for bacteria for which TMDLs have been approved

# Trends in Water Quality Regulation

- Increasing focus on sediment
- Increasing focus on numerical standards rather than qualitative standards

# Trends in Water Quality Regulation—Sediment

- Total Suspended Solids (TSS):
  - While there is currently no TMDL in process for TSS, one may be introduced in the future given that turbidity and suspended solids are major sources of water quality impairment nationwide, and a handful of other states have developed and adopted TMDLs for TSS (e.g. Arkansas, Florida, Louisiana, and Ohio) (See 73 Fed. Reg. 72,562 (November 8, 2008)).

# Trends in Water Quality Regulation—Sediment

- Multiple initiatives are linked to reducing the quantity of stormwater
- EPA issued a proposed rulemaking in December 2009 to increase and strengthen the consistency of MS4 permits nationwide
- Final action expected by November 2012

# Trends in Water Quality Regulation—Sediment

- Washington, D.C. draft MS4 permit (April 2010)
- Incorporates standards similar to those developed for federal facilities in the area
- Draft would require non-federal facilities to prevent off-site discharge from all rainfall events less than or equal to the 90<sup>th</sup> percentile rainfall event to METF or retain predevelopment runoff volume for 24-hour storm for 1, 2, 10, and 100 year event

# Trends in Water Quality Regulation—Sediment

- TMDL for Accotink Creek watershed, Virginia
- Equates stormwater volume with sediment volume
- Proposed regulation of stormwater itself as a pollutant
- Would require reduction of stormwater volume from all permitted discharges of roughly 50%

# Trends in Water Quality Regulation—Numerical Standards V&E

- The Florida experience:
  - High nutrient levels, particularly phosphorous and nitrogen
  - *Florida Wildlife Federation v. Jackson*, No. 4:08CV324
  - January 2009, EPA decision under 303(c)(4)(B) of case-by-case narrative nutrient approach insufficient to protect designated uses; entry of phased consent decree

# Trends in Water Quality Regulation—Numerical Standards V&E

- January 2010—EPA proposed rule with numeric nutrient criteria for lakes, streams, springs, and canals
- EPA has urged states along this path for many years; the potential for broader application is significant

# Trends in Water Quality Regulation—Numerical Standards V&E

- On December 1, 2009, EPA published a final rule re construction stormwater discharges; effective February 1, 2010, but requirements are phased in over 4 years
- Sets numeric limits on turbidity for larger construction sites (>20 acres by August 2011; >10 acres by February 2014)
- Imposes erosion and sediment control BMPs
- Prohibits discharges from certain activities (dewatering and concrete washout; paint, stucco, etc. washout; oils, solvents, etc. from vehicle and equipment maintenance)

# Trends in Water Quality Regulation—Numerical Standards V&E

- Large construction site stormwater standards:
  - Daily maximum of 280 NTU (nephelometric turbidity unit) (average of daily measurement)
  - At least 3 samples per discharge point per day while discharge occurs

# Uses of TMDLs Today

- The TMDL process is intended to work with CWA Sections 402 and 404, and nonpoint source programs under CWA Section 319 and CZARA Section 6217.
- The TMDL process also provides a mechanism for integrating the management of both the point and nonpoint sources that together may contribute to a waterbody's impairment.

- How much of a load of a particular pollutant can a waterbody handle?
- Who should pay for the consequences associated with elevated natural background conditions?
- Who should pay for any pre-treatment that may be required prior to pollutants being received by waterbodies.
- Apportionment of the load to industries: first come first served or a possible cap and trade structure?
- Can the TMDL process play a role in climate change regulation?