Chabreck, R. H. 1973. **Bird usage of marsh ponds subjected to oil spills.** Proceedings of the Louisiana Academy of Sciences 26:101-110. Effects of a crude oil spill in three freshwater ponds in Louisiana over a 2-year period. Data on bird usage, plants, invertebrates, fish, and oil in sediments and water. The petroleum concentrations are suspect because they are so high.

Anderson, R. D. 1975. **Petroleum hydrocarbons and oyster resources of Galveston Bay, Texas.** Pages 541-548 in 1975 Conference on Prevention and Control of Oil Pollution. American Petroleum Institute, Washington, DC Note: Field collections and experiments to assess the ability of oysters from the Galveston Bay area to accumulate and eliminate petroleum hydrocarbons. Field collected oysters were analyzed for hydrocarbons at collection and after a summer in clean water. Experiments exposed oysters to 1 or 5% oil-water mixtures of Kuwait or South Louisiana crude oils, No. 2 fuel oil, or Bunker C fuel oil for up to 7 da; oysters analyzed periodically for saturated and non-saturated hydrocarbons up to 52 da after exposure ended.

Stainken, D. M. 1976. **The effect of a No. 2 fuel oil and a South Louisiana crude oil on the behavior of the soft shell clam, *Mya arenaria* L.** Bulletin of Environmental Contamination and Toxicology 16(6):724-729. Determination of the effect of oil-in-water emulsions of South Louisiana crude oil, No. 2 fuel oil, benzene, and phenol on the behavior of the soft shell clam. Clams were exposed to five concentrations of each substance for 96 hrs in a static bioassay performed at two water temperatures. Measured mucus secretion and tactile response, and attempted to calculate LC_{50s}


Rossi, S. S. and J. W. Anderson. 1977. **Effect of No. 2 fuel oil and South Louisiana crude oil water-soluble fractions on hemoglobin compensation and hypoxia tolerance in the polychaetous annelid, *Neanthes arenaceodentata* (Moore).** Marine Science Communications 3(2):117-131. A marine polychaete was exposed in a static bioassay to several concentrations of the water-soluble fraction of either No. 2 fuel oil or South Louisiana crude oil for 11 da. Some of the test groups were subjected to water containing reduced oxygen. Measured survival, dissolved oxygen, and hemoglobin concentration of tissue.

Szaro, R. C., M. P. Dieter, G. H. Heinz, and J. F. Ferrell. 1978. **Effects of chronic ingestion of South Louisiana crude oil on mallard ducklings.** Environmental Research 17:426-436. Effects on mallard ducklings of varying amounts of South Louisiana crude oil in the diet (0.025-5%) for 8 weeks. Measured survival, growth, blood chemistry, tissue and organ pathology, and behavior of 7-da old ducklings.

Tatem, H. E., B. A. Cox, and J. W. Anderson. 1978. **The toxicity of oils and petroleum hydrocarbons to estuarine crustaceans.** Estuarine and Coastal Marine Science 6(4): 365-373. Experiments on the effects of Bunker C and No. 2 fuel oils and Kuwait and South Louisiana crude oils on three species of shrimp. Petroleum exposure was by static bioassay to water-soluble fractions or oil-in-water dispersions for 96 hrs. Also tested were direct mixtures of eight one- and two-ring aromatic hydrocarbons. Effects of salinity and water temperature were determined. Exposure effects on three life stages of one species of shrimp and two or three size classes of the other two species were compared. Concentrations of total hydrocarbons or total aromatic hydrocarbons were determined. Measured survival and calculated LC_{50s}.
Delaune, R. D., W. H. Patrick, Jr., and R. J. Buresh. 1979. **Effect of crude oil on a Louisiana Spartina alterniflora salt marsh.** Environmental Pollution 20(1):21-31. An assessment of the effects of Louisiana crude oil on a Spartina salt marsh in Louisiana. Three experiments were performed. In a field experiment, four quantities of crude oil were added to wetland sediment enclosures in May. Plant biomass was harvested in September, weighed, and analyzed for P and N. Regenerated shoots were measured in the following April and vegetation harvested again in September; stem density also was measured in September. Sediment cores were analyzed for alkanes, aromatics, and NSO compounds. In a greenhouse study, potted plants were exposed to one of seven quantities of oil. The plants were harvested after 75 da and weighed. Two wks later, the number of new tillers was counted; biomass of the second growth was determined 60 da after the first cutting. The effect of crude oil on sediment processes was determined in a 28-da experiment by exposed sediment in flasks to one of five amounts of crude oil and measuring production of manganous manganese, ferrous iron, and sulphide; nitrogen mineralisation; nitrate reduction; and methane production.

Lawler, G. C., J. P. Holmes, B. J. Fiorito, and J. L. Laseter. 1979. **Quantification of petroleum hydrocarbons in selected tissues of male mallard ducklings chronically exposed to South Louisiana crude oil.** Pages 583-612 in Conference on Assessment of Ecological Impacts of Oil Spills. American Institute of Biological Sciences, Arlington, VA. Note: A detailed description of the analytical methods employed to analyze tissue from male mallard ducklings exposed to South Louisiana crude oil. Ducklings were fed diets containing 0, 0.025, 0.25, 2.5, or 5.0 % crude oil from hatching until 8 wks of age. Heart, liver, and kidney were removed and analyzed for saturated and aromatic hydrocarbons. Results were discussed with respect to previously reported toxic responses in ducklings.


Coon, N. C. and M. P. Dieter. 1981. **Responses of adult mallard ducks to ingested South Louisiana crude oil.** Environmental Research 24:309-314. Assessment of the effects on mallards of ingested crude oil. Adult mallard ducks were fed diets containing 0.25% or 2.5% South Louisiana crude oil, or 1% paraffin mixture for 26 wk. Measured survival, body and organ weights, reproduction, blood chemistry, and tissue pathology.


Fleeger, J. W. and G. T. Chandler. 1983. **Meiofauna responses to an experimental oil spill in a Louisiana salt marsh.** Marine Ecology Progress Series 11:257-264. Effects of an oil spill on meiofauna of a Louisiana salt marsh were determined through use of experimental plots sprayed with South Louisiana crude oil. Plots were sampled before spraying and on days 2, 5, 10, 20, 30, 60, 95, and 144 after spraying. Measured densities of meiofauna and hydrocarbon concentrations in sediment, and calculated measures of community structure.

Delaune, R. D., C. J. Smith, W. H. Patrick, Jr., J. W. Fleeger, and M. D. Tolley. 1984. Effect of oil on salt marsh biota: methods for restoration. Environmental Pollution (Series A) 36(3):207-227. Experimental application of South Louisiana crude oil (2 l/m²) to 6 m² plots of coastal salt marsh in Louisiana. Treatments were no oil, oil, oil plus mechanical water flush, oil plus dispersant plus water flush, dispersant, dispersant plus oil, and oil followed by vegetation removal. Aromatic hydrocarbon content of sediment was measured 2 da post treatment. Photosynthetic carbon fixation determined on days 7, 20, and 37 after treatment. Standing crop biomass determined after the end of the first and second growing season. Marsh infauna (macrofauna) were sampled on days 10, 30, 60, and 144 post treatment; meiofauna were sampled on days 2, 5, 10, 20, 30, 60, 95, and 144. Snails were sampled on days 2, 5, 20, 60, and 95 post treatment.

Smith, C. J., R. D. Delaune, W. H. Patrick, Jr., and J. W. Fleeger. 1984. Impact of dispersed and undispersed oil entering a Gulf coast salt marsh. Environmental Toxicology and Chemistry 3(4):609-616. Replicated test plots (n = 4) along the edge of a salt water marsh in Louisiana were used to determine the effects of dispersed and undispersed crude oil. Plots were either controls or exposed to South Louisiana crude oil alone or crude oil plus chemical dispersant (unidentified). Measured total aromatic hydrocarbons in sediment after 1 da. Measured CO₂ fixation of Spartina alterniflora on days 6, 13, and 53. Measured meiofauna (nematodes, copepods, polychaetes, total meiofauna) density on days 0, 5, 36, and 77.


Mendelssohn, I. A., M. W. Hester, and J. M. Hill. 1993. *Assessing the recovery of coastal wetlands from oil spills*. Pages 141-145 in Proceedings 1993 International Oil Spill Conference. American Petroleum Institute, Washington, D.C. Note: An assessment of the effects of a 1985 pipeline rupture (Louisiana crude oil) on the vegetation and the possible effects on natural loss rate of Louisiana wetlands. Two mos after the spill, the affected site was divided into a heavily oiled core (20 ha), intermediate (possibly oiled) wetland on both sides, and areas beyond the intermediate wetland that served as controls. Fifteen transects were established and evaluated for vegetation condition; the evaluation was repeated 4 yrs later. Aerial photographs were used to quantify wetland loss in all areas between 1950 and 1990.


Lin, Q. and I. A. Mendelssohn. 1996. *A comparative investigation of the effects of South Louisiana crude oil on the vegetation of fresh, brackish and salt marshes*. Marine Pollution Bulletin 32(2):202-209. An assessment of the effects of South Louisiana crude oil on vegetation from salt, brackish, and freshwater wetlands. Spartina alterniflora, S. patens, and Sagittaria lancifolia were exposed to either 0, 4, 8, 16, or 24 l/m² and monitored for 4 mos. Measured photosynthetic rate, plant stem density, above ground biomass, soil redox potential, residual oil concentrations in soil, and soil organic content. Vegetation regrowth was measured 9 mos after oil application.

Lin, Q. and I. A. Mendelssohn. 1998. *The combined effects of phytoremediation and biostimulation in enhancing habitat restoration and oil degradation of petroleum contaminated wetlands*. Ecological Engineering 10:263-274. Louisiana marsh sod treated with 4,8,16, or 24 liters per m² of South Louisiana crude oil. Above ground vegetation clipped after 9 mos, allowed to regrow from rhizomes, and clipped again at 15 mos after oil application. At 2 yrs post-application, two spartina species were transplanted to the sod with or without the addition of fertilizer. The transplanted spartina was harvested at 6 mos and 12 mos after transplantation. Petroleum concentration in the soil was determined at 2 yrs and 3 yrs post-application. Measured above ground biomass and stem density.


Bennett, A., T. S. Bianchi, J. C. Means, and K. R. Carman. 1999. *The effects of polycyclic aromatic hydrocarbon contamination and grazing on the abundance and composition of microphytobenthos in salt marsh sediments (Pass Fourchon, LA) I. A microcosm experiment*. Journal of Experimental Marine Biology and Ecology 242:1-20. An assessment of the effects of sediment PAHs on the composition and abundance of microphytobenthos and related epibenthic grazing by the periwinkle in a south Louisiana salt marsh. A laboratory microcosm experiment employing high and low PAH contamination; no snails, low-exposure snails, high-exposure snails; and nine sampling times (days 0, 4, 12, 20, 28, 36, 44, 52, 60) was conducted. Sediments were sampled on days 0, 28,
and 60. Sediments were analyzed for selected aromatic hydrocarbons, organic carbon, and nitrogen. Snails were analyzed for selected aromatic hydrocarbons and monitored for weight change. Surface sediment and snail digestive tracts were analyzed for chlorophyll-α, phaeophytin-α, phaeophorbide, fucoxanthin, and zeaxanthin concentrations. [Authors use the undefined terms "unexposed" and "exposed" snails in six of nine figures; they probably mean low-exposure and high-exposure]

Jackson, W. A. and J. H. Pardue. 1999. **Potential for enhancement of biodegradation of crude oil in Louisiana salt marshes using nutrient amendments.** Water, Air, and Soil Pollution 109(1-4):343-355. Evaluation of the effects of nutrient enhancement on biodegradation of South Louisiana crude oil. One experiment performed in aquatic mesocosms (N and P used) and a second performed with intact cores of marsh soil and vegetation (N only). Loading rates and the best form of N were determined. Measured the degradation of selected alkane and aromatic hydrocarbons

Hester, M. W. and I. A. Mendelssohn. 2000. **Long-term recovery of a Louisiana brackish marsh plant community from oil-spill impact: vegetation response and mitigating effects of marsh surface elevation.** Marine Environmental Research 49:233-254. An oil pipeline break in 1985 affected 20 ha of brackish wetland in Louisiana. A total of 15 transects with 68 sampling plots were established in the affected wetland, adjacent wetland, and control areas; and sampled in 1985 and 1989. Measured percent vegetative cover in 1985 and 1989 and photosynthetic response of vegetation in 1990. A transplantation experiment was employed to determine the cause of revegetation failure in the oil-affected area; vegetation was harvested 15 mos later. Remote sensing data from 1985 was compared with data from 1990

Lindau, C. W. and R. D. Delaune. 2000. **Vegetative response of Sagittaria lancifolia to burning of applied crude oil.** Water, Air, and Soil Pollution 121(1-4):161-172. Assessment of the the effects of oiling and burning on Sagittaria lancifolia in a freshwater marsh in Louisiana. Twelve plots (unoiled, oiled, oiled and burned) were treated in August and then repeated on 12 different plots in April. South Louisiana crude oil was used. In the August study, live stem density and plant growth were measured 1, 5, 9, 36, 42, 44, 48, and 52 wks after treatment; carbon fixation was measured eight times; and above ground biomass was harvested at 53 wks. In the April study, live stem density, plant growth, and carbon fixation were measure 3, 6, 9, 11, 15, and 19 wks after treatment; above ground biomass was harvested at 20 wks

Pezeshki, S. R., R. D. Delaune, and A. Jugsujinda. 2001. **The effects of crude oil and the effectiveness of cleaner application following oiling on US Gulf of Mexico coastal marsh plants.** Environmental Pollution 112(3):483-489. An assessment of the efficacy of a petroleum chemical dispersant in fresh and brackish water wetlands. Plots containing either saltwater vegetation (Spartina patens) or freshwater vegetation (Sagittaria lancifolia) were treated with South Louisiana crude oil only, crude oil plus Corexit 9580 2 da after oiling, or no treatment. Measured stomatal conductance, transpiration, and photosynthetic carbon fixation at 4, 8, and 12 wks post-treatment for Spartina and at 2, 6, 8, and 12 wks for Sagittaria. Also, the number of live and dead plants, new shoots, and plant height were measured at unspecified intervals (but not at the beginning of the experiment). Above-ground biomass was measured at the end of the first growing season for Spartina and at the end of the second growing season for Sagittaria

Penn, T. and T. Tomasi. 2002. **Calculating resource restoration for an oil discharge in Lake Barre, Louisiana, USA.** Environmental Management 29(5):691-702. A Texaco pipeline rupture in May 1997 discharged crude oil into Lake Barre, LA. This is a report of a cooperative (trustees and Texaco) natural resource damage assessment and restoration proposal for the spill. Emphasis is on the quantitative determination of compensatory restoration.

oiled and burned, an area oiled and not burned, and an area not affected by the spill. Vegetation was sampled six times over a 3-yr period following the spill; measured percent cover, stem density, and biomass. Soil was sampled after oiling but before the burn, after the burn, and at a reference site, and analyzed for alkanes and selected aromatic hydrocarbons.

Lin, Q., I. A. Mendelssohn, N. P. Bryner, and W. D. Walton. 2005. In-situ burning of oil in coastal marshes. 1. Vegetation recovery and soil temperature as a function of water depth, oil type, and marsh type. Environmental Science and Technology 39:1848-1854. The effect of burning on marsh plants was determined with vegetation cores from three types of marsh (salt, brackish, freshwater), with or without South Louisiana crude oil or diesel fuel, and either unburned or burned with three water depths. Burn time was 700 sec. After burning, the recovery of plants (four species) was monitored for 12 mos. Measured soil temperature below the burn, plant survival, plant stem density, and aboveground biomass.

Lin, Q., I. A. Mendelssohn, K. Carney, S. M. Miles, N. P. Bryner, and W. D. Walton. 2005. In-situ burning of oil in coastal marshes. 2. Oil spill cleanup efficiency as a function of oil type, marsh type, and water depth. Environmental Science and Technology 39:1855-1860. The effect of burning on marsh plants was determined with vegetation cores from three types of marsh (salt, brackish, freshwater), with or without South Louisiana crude oil or diesel fuel, and either unburned or burned with three water depths. Burn time was 700 sec. The crude oil and diesel fuel on the water or soil surface was sampled before and immediately after the burn. Surface sediment (0-4 cm) was sampled after the burn. Both petroleum and sediment were analyzed for selected PAHs and alkanes (nC-10 through nC-35, pristane, phytane, hopane).