using two-hybrid yeast transformants based on the ligand-dependent interaction between nuclear hormone receptor and co-activator. Specific activities of the extract estrogenicity were 3.7 - 59.6% of the E2 maximum. The highest response (59.6%) was detected in Sueo River. Cell viability, three sub-lethal cytotoxicity and estrogenicity of the extracts did not show any correlation with total concentration of toxicants analyzed. On the other hand, inhibition of esterase activity (r = 0.72) and enhancement of cell membrane viscosity (r = 0.70) were negatively correlated with total PAH concentration. The total butyltin concentrations are negatively correlated with double strand DNA contents (r = 0.92). Estrogenicity of the extracts demonstrated positive correlation (r = 0.63) with concentrations of alkylphenols in the sediments. However, toxicity and estrogenicity of the extract does not necessarily mean that toxicants in the sediments are toxic toward the marine organisms in the bay, because bioavailability of the toxicants is not taken into account.

PT118 Organic contaminants in surface sediments from Gwangyang Bay, Korea: Trace analysis. Shim, W.J., Yim, U.H., Hong, S.H., Lee, D.H., Kim, M.S. and Oh, J.R. KORDI, South Sea Institute, Geoje, Korea. Gwangyang Bay located in the southern coast of Korea is a semi-enclosed embayment including a big steel mill plant and petroleum refinery plant complex around the bay. Organic toxicants of PAHs, PCBs, DDTs, Hexachlorocyclohexane (HCH), chlorodine (CHL), butyltins (BTs), alkylphenols (APs) and phthalate esters (PHs) in surface sediments were quantitatively analyzed. Among the toxicants, PAHs showed the highest concentration in the range of 87 - 9436 ng/g on a dry weight basis. Relatively higher PAH concentrations were found in the creek sediments. Total PCB concentrations were higher in the creek (1.78 - 24.2 ng/g) than in the bay (0.61 - 2.20 ng/g). Organochlorine pesticides demonstrated similar concentration ranges of 0.14 - 6.20 for DDTs, 0.09 - 0.83 for HCHs, ND - 2.60 ng/g for CHLs in both the creek and the bay. Total butyltin concentrations in the bay sediment ND - 54 ng/g, which are lower end of the butyltin levels in surface sediments found in Korea. Among the eight alkylphenols and bisphenol A, nonylphenol and less extent octylphenol were major phenolic compounds in the bay sediment with the range of not detected - 74.3 ng/g. Diethylhexyl- and dibutyl-phthalate were only detected in the bay sediment among the 11 phthalate analytes including diethylhexyl adipate. Relatively high concentrations of PHs were found at Sts. 12 and 22 near the mouths of Sueo River (270 ng/g) and Seomjin River (501 ng/g).

PT119 Levels and distribution of PBDE in sediments from the Barents Sea and the Sea of Azov. Chernyak, S.M.1,2, Savinova, T.N.2, Dahle, S.2, Matishov, G.G.1 and Hickey, J.P.1 1USGS/Great Lakes Science Center, Ann Arbor, MI, USA. Johnson Controls, GSA USGS BRD project office, Cape Canaveral, FL, USA. 2Akvaplan-niva, Polar Environmental Center, Tromso, Norway. 3Murmansk Marine Biological Institute, Murmansk, Russia. PBDEs are emerging issue contaminants especially noted for their fire retarding properties. They enter Arctic ecosystems predominantly via atmospheric transport from industrialized areas. We analyzed archive sediments collected in the Barents Sea where we had previously identified a huge abundance of pesticides (including Toxaphene), never used in adjacent environment. The cities of Murmansk, Severomorsk, smaller settlements and more than 60 industrial enterprises situated along the Kola Bay coast discharge waste water containing domestic sewage and industrial effluents into the coastal waters. The annual discharges from enterprises, fishing and naval fleets into Kola Bay were estimated as 80x10^3 m^3/yr, 91% of which were discharged without treatment. Some of the collected sediments, extremely contaminated with oil and grease, were significantly higher yet in halogenated hydrocarbons. Near the city of Polarny, contaminant levels were 270 ng/g in oily sediments, while general concentrations of PBDE in the investigated area were 0.2-0.6 ng/g. Congener distributions in this area, at PBDE # 100:99:47 = 2:1:1, differed from that found in the surrounding areas, at 10:2:1. At the same time we analyzed sediments from the southern Sea of Azov, located far away from the sites of PBDE application. The total PBDE concentration was 0.1 - 0.3 ng/g, and 1.0 ng/g in oily sediments. The ratio of congeners was similar to those in the Barents Sea.

PT120 Uptake and depuration of polycyclic aromatic hydrocarbons from sediments by crayfish (Procambarus spp.) Lin, H., Abdelghani, A., Hartley, W.R. and Watanabe, K.H. Department of Environmental Health Sciences Tulane University, New Orleans, LA, USA. Polycyclic Aromatic Hydrocarbons (PAHs) are toxic to a variety of aquatic organisms and humans. Crayfish are a major food source for carnivorous vertebrates and are directly consumed by humans. One approach to estimate the exposure level in higher organisms [e.g., fish and humans] is via bioaccumulation modeling. Kinetic parameters are necessary to improve predictions of bioaccumulation. The object of this study is to investigate PAH uptake and depuration by crayfish from sediments. The crayfish were exposed to sediments collected from Bayous Trepagnier and LaBranche in the LaBranche Wetlands, Louisiana for 14 days. After a 14-day exposure, crayfish were transferred to tanks containing clean water for 6 days to study the elimination process. At intermittent times (1/2 day, 1 day, 3 day, etc.) PAH in water, sediments and organisms were extracted and analyzed by GC/MS. Rate constants of uptake (k_1) and total elimination (k_2) of PAHs were calculated using a first-order kinetic model. The data obtained from this study will increase our understanding of uptake and depuration of PAHs in crayfish and can be further utilized in a food-web model in an aquatic ecosystem.

PT121 Polycyclic Aromatic Hydrocarbons (PAHs) in sediments from the Sacramento Valley, CA. Hwang, H.M.1, Green, P.1, Holmes, R.2 and Young, T.1 1Department of Civil & Environmental Engineering, University of California, Davis, CA. 2Sacramento River Watershed Unit, Central Valley Regional Water Quality Control Board, Sacramento, CA. To investigate the distribution and sources of PAHs, sediment samples were collected from the Sacramento Valley, CA. Sediment samples were extracted with DCM and cleaned up using a Florisil column chromatography. PAHs were analyzed and quantified using a GC-MS equipped with a mass selective detector (MSD). Total concentrations of PAHs varied from 91 to 2960 ng/g (dry wt.). The highest concentration found in the sample collected from Jack Slough was likely due to diesel fuel spill and/or diesel emission. C1-C4 substituted phenanthrene and anthracene accounted for more than 50% of the total PAHs in this sediment. Selected PAH ratios and PAH distribution patterns indicated both pyrogenic and petrogenic sources in sediment samples. Methylphenanthrene to 4,5-methylenephenanthrene and benzo[b]chrysene ratios suggested that coal and biomass burning may account for a big steel mill plant and petroleum re®nery plant complex around the bay. Organic toxicants of PAHs, PCBs, DDTs, Hexachlorocyclohexane (HCH), chlorodine (CHL), butyltins (BTs), alkylphenols (APs) and phthalate esters (PHs) in surface sediments were quantitatively analyzed. Among the toxicants, PAHs showed the highest concentration in the range of 87 - 9436 ng/g on a dry weight basis. Relatively higher PAH concentrations were found in the creek sediments. Total PCB concentrations were higher in the creek (1.78 - 24.2 ng/g) than in the bay (0.61 - 2.20 ng/g). Organochlorine pesticides demonstrated similar concentration ranges of 0.14 - 6.20 for DDTs, 0.09 - 0.83 for HCHs, ND - 2.60 ng/g for CHLs in both the creek and the bay. Total butyltin concentrations in the bay sediment ND - 54 ng/g, which are lower end of the butyltin levels in surface sediments found in Korea. Among the eight alkylphenols and bisphenol A, nonylphenol and less extent octylphenol were major phenolic compounds in the bay sediment with the range of not detected - 74.3 ng/g. Diethylhexyl- and dibutyl-phthalate were only detected in the bay sediment among the 11 phthalate analytes including diethylhexyl adipate. Relatively high concentrations of PHs were found at Sts. 12 and 22 near the mouths of Sueo River (270 ng/g) and Seomjin River (501 ng/g).

PT122 Contributions of PCDD/Fs and Dioxin-like PCBs Sources in Rivers Flowing into the Tokyo Bay, Japan. Kobayashi, N.1, 2, Mannaga, S.1 and Nakamshi, J.1, 2 1Yokohama National University. 2National Institute of Advanced Industrial Science and Technology. There are few reports which estimate quantitatively the contributions of sources of polychlorinated dibenzof-p-dioxins and dibenzofurans (PCDD/Fs) and dioxin-like PCBs in an environmental medium. However, in order to develop effective countermeasures against dioxin pollution, information about contributions of different PCDD/F and dioxin-like PCB sources to the environmental medium is necessary. In this study, source identification of PCDD/Fs and dioxin-like PCBs are presented. PCDD/F and 12 dioxin-like PCB congeners were measured in 6 major rivers that flow into the Tokyo Bay. To estimate the contributions of sources to total TEQ (Toxic Equivalency) in river water, chemical mass balance (CMB) approach was used in this study. It was assumed that incineration emission and impurity of agrochemicals (PCP and
PT125 Distribution and transport of current-use pesticides within the Salton Sea watershed, California. LeBlanc, L.A.1, Schroeder, R.A.2 and Kuivila, K.M.1 1U.S. Geological Survey, Sacramento, CA, USA. 2U.S. Geological Survey, San Diego, CA, USA. Current-use pesticides (e.g., triazines, carbamates, organophosphates, pyrethroids) have been shown to be present in sediments and soils, despite greater environmental reactivity and (except for pyrethroids) lesser hydrophobicity, relative to organochlorine pesticides. The association of current-use pesticides with sediments can provide an important mechanism for transport of pesticides throughout a watershed and can contribute to the dissolved-pesticide load through desorption. A study was initiated in fall 2001 to determine concentrations of pesticides in filtered water and suspended and bed sediments from the Salton Sea watershed in southern California. Rivers in this watershed receive significant amounts of agricultural return water, which is the major source of pesticides. Sampling was done along transects on the New, Alamo, and Whitewater Rivers and into the Sea. Water, suspended-sediment and bed-sediment samples were collected during times of peak pesticide application in fall 2001, spring 2002, and fall 2002. Results showed that concentrations of dissolved pesticides decreased from river stations to offshore stations. Eptam and malathion were detected in the highest concentrations (1100–3800 ng/L); most compounds were between 10–100 ng/L. Concentrations of current-use pesticides in suspended and bed sediments ranged from 1 ng/g (at or near detection limits) to 90 ng/g dry weight, and generally decreased from the river stations to offshore stations. Chlorpyrifos, dacthal, eptam, and trifluralin, among the pesticides of heaviest use, were detected with the greatest frequency in both water and sediments. The distribution of pesticide concentrations in water and sediments is consistent with runoff of dissolved and soil-associated pesticides into the rivers via agricultural return water and subsequent transport into the Salton Sea.

PT126 Degradation kinetics of selected organophosphate and carbamate insecticides in urban creek sediments. Bondarenko, S.V. and Gan, J. Department of Environmental Sciences, University of California, Riverside, Riverside, CA, USA. Organophosphate and carbamate insecticides have been frequently detected in urban streams. Due to their acute toxicity to many aquatic organisms, compounds such as chlorpyrifos and diazinon have become target toxics in the TMDL program. A number of OPs and carbamates have been detected in the San Diego Creek/ Newport Bay watershed. However, there is very little site-specific information about their persistence in the urban creek sediments. We studied the degradation kinetics of chlorpyrifos, diazinon, malathion and carbarly in San Diego Creek and Bonita Creek sediments under both aerobic and anaerobic conditions. Malathion and carbaryl quickly dissipated under aerobic conditions, with half-lives of only 0.8–4.9 d. Under anaerobic conditions, malathion degraded rapidly, with half-lives of 1.6–2.3 d. However, carbaryl became virtually non-degradable under anaerobic conditions, and its half-life increased to 125 d in San Diego Creek sediment and 746 d in Bonita Creek sediment. Persistence of diazinon was moderate, and its half-life (14–24 d) seemed to be unaffected by the redox conditions. Chlorpyrifos was moderately persistent under aerobic conditions, with half-life (20–24 d) similar to that of diazinon. However, significant increase in persistence also occurred with chlorpyrifos under anaerobic conditions, and its half-life was extended to 58–223 d. This study suggests that the persistence of OPs and carbamates in urban creek sediments varies greatly among compounds, and for the same compound, depends closely on the redox conditions. Prolonged persistence may occur under anaerobic conditions for the otherwise non-persistent compounds.

PT124 Sediment toxicity associated with oil and/or brine spills in intermittent streams in southern Illinois. Orr, T.B. and Halbrook, R.S. Southern Illinois University, Carbondale, Illinois, USA. A triad approach was used to assess the sediment toxicity of oil and/or brine spills in intermittent streams in Illinois. Sediment and macroinvertebrate samples were collected in fall 2002 and spring 2003 from 30 streams exposed to oil and/or brine spills and 3 reference streams not located within the oil-producing region of Illinois. A gas chromatograph with flame ionization detection was used to quantify 12 polycyclic aromatic hydrocarbons (PAH) and total petroleum hydrocarbons (TPH) concentrations. Total chloride concentrations were determined by ion exchange chromatography. Chronic sediment toxicity tests were conducted with Hyalella azteca and Chironomus tentans, and family-level biotic indices (total abundance, total richness, percent EPT abundance, and Hilsenhoff index) were used to assess benthic macroinvertebrate community structure. Total PAH concentrations in sediment collected in fall 2002 exceeded upper sediment-quality screening values at 1 site and lower sediment-quality screening values at 10 sites. Individual polycyclic aromatic hydrocarbon concentrations in study streams did not differ significantly from concentrations in reference streams (p > 0.05). Initial chemical analyses indicate that 53% of the study streams contain PAHs at concentrations that may have adverse effects on aquatic organisms.