concentration and isomer distribution between production lot data and ECF manufacturing environmental samples provides a basis for interpretation of other environmental data.

**456 Persistent organic chemicals pollution of pinnipeds living in the Sea of Okhotsk.** H. Hoshino, S. Fujita, Veterinary Medicine, Hokkaido University, Sapporo, Hokkaido, Japan; B.N. Vladimir, National Marine Mammal Labolatory, National Marine Fisheries Service, Seattle, WA; Y. Goto, Hokkaido Kushiro Fisheries Experiment Station, Kushiro, Hokkaido, Japan; T. Isono, Hokkaido National Fisheries Research Institute, Kushiro, Hokkaido, Japan; T. Ishinazaka, Rausu Ranger Office, Shiretoko National Park, Rausu, Hokkaido, Japan; M. Kobayashi, Aqua Bioscience and Industry, Tokyou University of Agriculture, Abashiri, Hokkaido, Japan; Y. Sakurai, Fisheries Sciences, Hokkaido University, Hakodate, Hokkaido, Japan. The Sea of Okhotsk has the unique marine ecosystem and high biodiversity. However, this area is possibly polluted by persistent organic chemicals; e.g. PCBs, DDTs and PFOS. These chemicals are major pollutants of the marine ecosystem released from human activities. They tend to accumulate in higher trophic predators among marine species because of their high stability. Marine mammals; whales and pinniped, are higher trophic predator in the marine ecosystem and some of them are reported to suffer from pollution. Thus they are good indicators of pollution in the marine ecosystem where they dwell. To clarify the extent of organic chemicals pollution in the Sea of Okhotsk ecosystem, we examined levels of persistent organic chemicals in pinnipeds in the Sea of Okhotsk.We collected blubbers and fetuses of Steller sea lions *Eumetopias jubatus* in the Sea of Okhotsk. Blubbers were also collected in the western Bering Sea which faces lower human activity area than the Sea of Okhotsk. We measured levels of hexachlorocyclohexans, chlordanes, DDTs and PCBs in blubbers and fetal livers. To examine toxic effect of these chemicals, testosterone levels in the fetal livers were also measured. These studies showed levels of DDTs and PCBs in sea lions in the Sea of Okhotsk are higher than those in sea lions in the western Bering Sea. However, no relationships were observed between levels of these chemicals and testosterone in the fetal livers. In addition, we are examining the effect of DDT and PFOS exposure on gene expressions related to the adipogenesis and endocrine function of seal primary adipocyte now. Preliminary result showed short exposure of DDT to adipocyte during adipogenesis did not affect on the later expression of adiponectin gene.

**457 Biovector Transport of Contaminants to Terrestrial Food Webs at Cape Vera, Devon Island, NU, Canada.** E.S. Choy, J.M. Blais, L. Kimpe, Biology, University of Ottawa, Ottawa, Ontario, Canada; M. Mallory, Canadian Wildlife Service, Iqaluit, Nunavut, Canada; J. Smol, Biology, Queen's University, Kingston, Ontario, Canada. At Cape Vera, Devon Island, Nunavut, Canada, a colony of northern fulmars can surpass atmospheric sources of pollutants by heavily concentrating and releasing contaminants through guano to the terrestrial environment. Based on a survey of twelve ponds, concentrations of hexachlorobenzene (HCB), total mercury (THg) and dichlorodiphenyltrichloroethane (DDT) from the sediment of ponds closer to seabird colonies were 10 to 60-fold higher than ponds outside the area of seabird influence. At Cape Vera, fulmars serve as a keystone species, creating important habitats to emergent insect species, a snow bunting population that is higher than elsewhere in the Canadian High Arctic, and other species by depositing nutrients via guano. Since diet is the primary route of organochlorines (OCs) and methylmercury (MeHg) to Arctic biota, contaminant transfer from seabirds to the biota is of concern for ecosystem health. We examined contaminants from the seabirds to members of the terrestrial food web at Cape Vera. THg concentrations in lichens and flora strongly correlated with indicators of seabird-derived nutrients, such as δ15N and δ13C values. Our analysis of lichen, plant, and invertebrate species, as well as snow buntings and collared lemmings from twelve ponds support seabird guano as a major pathway of contaminants to the terrestrial food web of Cape Vera.

**458 Bioaccmulation of chlorinated hydrocarbons in relation to productivity and dietary factors in ospreys breeding in alpine regions of western Canada.** J. Elliott, C. Morrissey, S. Lee, L. Wilson, Pacific Wildlife Research Centre, Environment Canada, Delta, British Columbia, Canada; M. Wayland, Prairie Wildlife Research Centre, Environment Canada, Saskatoon, Saskatchewan, Canada; D. Muir, National Water Research Institute, Environment Canada, Burlington, Ontario, Canada. From 1999 to 2002 we studied ospreys (Pandion haliaetus) breeding in lakes and rivers varying in altitudes and drainage size across the alpine regions of western Canada. Eggs were collected, nest success determined and where possible blood and feathers were taken from nestlings and adults. Mean concentrations of organochlorine (OC) pesticides and polychlorinated biphenyls (PCBs) varied significantly across the spatial range of the study from the southern Yukon to southeastern British Columbia. There were no significant differences in contaminant concentrations in eggs in relation to altitude of nests; however, both DDE and PCB concentrations increased with size of the drainage basin. We also studied whether contaminants or other ecological factors such as variation in prey delivery rates and biomass were affecting Osprey productivity. In total, 68 Osprey nests from 5 different lake sites across southern British Columbia, Canada were surveyed for productivity in 2001, while 25 of those nests were intensively observed to identify prey deliveries. Prey biomass per nest increased with the number of young/active nest indicating Ospreys at some locations were capable of increasing their delivery effort to feed larger broods. Two sites, Lillooet and Nakusp, consistently had the lowest prey sizes, prey delivery rates and prey biomass per nest, and subsequently had lower overall productivity and nest success. In addition, Lillooet Ospreys also experienced the largest reduction in brood size (63%). Differences in productivity among sites could not be explained by contaminants. Concentrations of organochlorines, PCBs and mercury in eggs collected from the same five locations in 1999 or 2000 were below levels known to cause reproductive toxicity. This study highlights the importance of food availability to breeding Osprey that can confound the interpretation of contaminant related reproductive effects.

**459 The relevance of ecological principles in explaining accumulation of contaminants in terrestrial food webs.** N. van den Brink, H. Baveco, Alterra, Wageningen, Netherlands; F. Vermeulen, University of Antwerp, Antwerp, Belgium. Exposure to most environmental contaminants started only recently in evolutionary terms. There are examples of invertebrates that have shown adaptation to contaminant exposure. However, higher organisms have in general a longer lifespan, and there are no signs that they have adapted to exposure to environmental contaminants. Hence, the pattern of accumulation through food uptake is not only governed by characteristics of the contaminants, but should also be explained from an ecological perspective. This implies that in modeling bioaccumulation in food webs such factors need to be incorporated. In the presentation we will illustrate the relevance of feeding behavior, including foraging strategies and functional responses, and habitat preferences of predators and prey in predicting the accumulation of contaminants to higher organisms. This will be done based on virtual scenarios and on spatially explicit accumulation models developed in the BERISP project (see www.berisp.org).

**460 Mass balance and transfer efficiency of BDE-99 and BDE-47 topically applied to snapping turtle and red-eared slider egg surfaces.** K.M. Eisenreich, A.M. Sides, C.L. Rowe, University of Maryland Center for Environmental Sciences: Chesapeake Biological Lab, Solomons, MD. Embryonic development is highly sensitive to chemical insult resulting from maternal transfer of lipophilic contaminants. Maternal transfer of contaminants is difficult to study in turtles because, unlike avian eggs which can be injected with a contaminant thus ensuring accurate embryonic exposure, injecting turtle eggs results in very high embryonic mortality rates. Thus, reptilian studies typically deliver contaminants to embryos via topical exposures to the eggshell with the use of a solvent carrier. In this study, snapping turtle (*Chelydra serpentina*) and red-eared slider (*Trachemys scripta*) eggs were topically dosed with either BDE-47 or BDE-99 dissolved in dimethyl sulfoxide (DMSO) as the carrier to achieve a target dose of 40 ng/g in the embryo. Dosing solutions, adjusted for mean egg mass, were placed on each egg in 5 µl volumes over six days to avoid acute lethality as well as to obtain maximum transfer across the eggshell. Based a pilot study, dosing solutions were made assuming a 20% transfer rate. Eggs were frozen two weeks after dosing for subsequent chemical analyses. For both species, more BDE-47 was transferred across the eggshell than BDE-99. Mean concentrations of BDE-47 measured in egg contents were 73.29 ng/g ww (SE = 3.58) and 55.25 ng/g ww (SE = 3.77) for snapping turtles and sliders, respectively, whereas mean BDE-99 concentrations in egg contents were 40.71 ng/g ww (SE = 4.65) and 19.48 ng/g ww (SE = 4.95). Transfer efficiency is likely dependent upon the steric properties of the compound as BDE-99 contains an additional bromine atom compared to BDE-47. Analyses are underway to quantify transfer efficiency across the eggshell as well as transfer across the allantoic membrane to understand the partitioning of BDEs among egg components.