## Is Endocrine Disruption Occurring in Marine Wildlife?

- The age at which minke whales reach sexual maturity has fallen from 14 years to 6 years, when data from pre-1944 is compared to data from the 1960s. In fin whales, sexual maturity is now attained at six years rather than ten, and in sei whales at eight rather than eleven years (Brown and Lockyer, 1984; Lockyer, 1972, 1974; Masaki, 1979). Of course, it is not possible to say with certainty that this trend is attributable to exposure to plastics and their chemical constituents. I suspect that the etiology is multi factorial, but plastics may be playing a role. Several chemicals that have been found in laboratory studies to lower the age at onset of puberty in mice and rats, such as lead, certain phthalates, and bisphenol-A, are components of plastics. Other endocrine disrupting compounds appear to be concentrating in the plastics.

- Basheer (2004) tested samples of prawn, crab, blood cockle, white clam, squid, and fish (a pelagic species, *Decapterus russelli*) purchased at a Singapore market. Six samples were taken at each of twenty-eight locations both near shore and offshore, and representing diverse uses (industrial zones, beach, marina, and so on). All samples were contaminated with BPA (range 13.3 to 213.1 ng/g wet weight). The highest BPA levels were in the crab, the lowest in prawns. The levels of BPA measured in seafood were significantly higher than the concentrations found in the sea water (which ranged from non-detectable to 2.47 µg/l). BPA is the monomer of polycarbonate plastic, and is an additive in several other plastics. It is also used in a variety of non-polymer products.

- Benzotriazole UV stabilizers (UV-320, UV-326, UV-327, and UV-328) are added to many plastics to retard yellowing. These compounds were measured in sediment, crustaceans, birds, and sharks in the Ariake Sea, Japan. The highest concentration found was in the hammerhead shark (190 ng/g lipid weight). The authors conclude that these endocrine-disrupting chemicals are persistent, bioaccumulative, and that post-consumer plastics are most likely the major source (Nakata et al., 2009).

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