CENTER for BIOLOGICAL DIVERSITY Because life is good.

January 19, 2010

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Re: Request for a public hearing and objection to the proposed determination by the Administrator to issue Permit # NV0023647.

Dear Administrator Drozdoff and Supervisor Tinney:

The Center for Biological Diversity ("Center") respectfully objects to your proposal to issue Permit # NV0023647 to the City of North Las Vegas for the discharge of treated municipal wastewater into the Las Vegas Wash without establishing limitations for the endocrine-disrupting chemical pollution found in that discharge. The Center also formally requests a public hearing pursuant to the Nevada Administrative Code and Nevada Revised Statutes.

I. Introduction

As you are well aware, Lake Mead is a beloved national treasure, as well as a valuable regional resource. Not only is it the largest reservoir in the United States, it is also the premier supplier of Las Vegas' drinking water. It is also federally designated critical habitat for the endangered razorback sucker and sustains multiple other imperiled species. You are likely also aware that the discharge of treated wastewater into Las Vegas Wash is impacting the water quality of both the Wash and Lake Mead. Wastewater effluent comprises about 90 percent of the flow in Las Vegas Wash, which equals more than 150 million gallons per day ("MGD") of effluent that is discharged directly into Las Vegas Wash. Las Vegas Wash then empties into Lake Mead where

razorback suckers breed and the uptake structures for Las Vegas' drinking water sit merely six miles downstream.

Even the highly treated effluent wastewater discharged into Las Vegas Wash contains a variety of potentially harmful compounds. It is well recognized that wastewater discharged from treatment plants contain endocrine-disrupting chemicals ("EDCs"). EDCs are compounds that alter "the hormonal and homeostatic systems that enable [an] organism to communicate with and respond to its environment."[1] EDCs are cause for public concern because they are having widespread environmental effects.[2]

In our submittal to the Nevada Division of Environmental Protection ("NDEP") on November 12, 2009 regarding Nevada's proposed 303(d) list of impaired waters, we detailed the degraded status of Las Vegas Wash, Las Vegas Bay, and Lake Mead due to unchecked EDC pollution.[3] The current proposal by NDEP and the City of North Las Vegas to discharge 25 MGD, more than 15% of the total effluent discharged into Las Vegas Wash, would allow the continued EDC pollution of these waterways. We urge you again to review the latest scientific information demonstrating that wastewater effluent discharged into Las Vegas Wash is harming fish and wildlife in Lake Mead, including the endangered razorback sucker, and may be impairing Las Vegas' drinking water.

II. Endocrine Disrupting Chemicals Science

Pollutants released into Las Vegas Wash and Lake Mead include pharmaceuticals and personal care products ("PPCPs") such as soaps and shampoos, plasticizers, and other compounds that can evoke hormonal responses in fish and wildlife. These are generally referred to as endocrine-disrupting chemicals or compounds, or simply EDCs.[4] The Environmental Protection Agency ("EPA") defines an EDC as "an exogenous chemical substance or mixture that alters the structure or function(s) of the endocrine system and causes adverse effects at the level of the organism, its progeny, populations, or subpopulations of organisms…."[5] EDCs interfere with the synthesis, secretion, transport, binding, or elimination of natural hormones of an organism, and can compromise normal reproduction, development, growth, and homeostasis.

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[1] Diamanti-Kandarakis, E. *et. al.* 2009, Endocrine-Disrupting Chemicals: An Endocrine Society Scientific Statement, *Endocrine Reviews*, 30(4):293-342, available at http://www.endo-society.org/journals/ScientificStatements/upload/EDC_Scientific_Statement.pdf.

[2] *See generally* Benotti, M.J., R.A. Trenholm, B.J. Vanderford, J.C. Holady, B.D. Stanford, and S. Snyder, 2009, Pharmaceuticals and Endocrine Disrupting Compounds in U.S. Drinking Water, *Environ. Sci. Technol.* 43, 597-603.

[3] *See* http://biologicaldiversity.org/campaigns/pesticides_reduction/pdfs/LVW_303_petition.pdf.

[4] For information on PPCPs, *see generally* Sass, J., 2008, Testimony of Jennifer Sass, PhD and Senior Scientist for Natural Resources Defense Council, *Pharmaceuticals in the Nation's Water: Assessing Potential Risks and Actions to Address the Issue*, Apr. 15, 2008; Daughton, C.G., 2007, *PPCPs in the Environment: an Overview of the Science* (PowerPoint); Daughton, C.G., 2005, "Emerging" Chemicals as Pollutants in the Environment: a 21st Century Perspective, *Renewable Resources Journal* Winter 2005; *see also* Alpert, M., 2008, Fighting Toxins in the Home: Everyday materials may pose health and environmental threats, *SciAm* (Jan. 2008), p. 46; Emery, G., 2007, Scented oils linked to male breast growth, *The Australian* (Feb. 1, 2007).

[5] USEPA, 1998, *Endocrine Disruptor Screening and Testing Advisory Committee (EDSTAC) Final Report*, Washington, D.C..

Municipal wastewater contains a multitude of EDCs, many of which are derived from the domestic application of active ingredients found in PPCPs. Betablockers, antibiotics, antiphlogistics, estrogens, antiepileptics and contrast agents have been detected in Las Vegas Wash and Lake Mead. These EDCs are affecting the biological, chemical, and physical integrity of Las Vegas Wash and Lake Mead.

A recent study by Jenkins et. al. (2009) investigated the impacts of effluents from wastewater treatment plants using the western mosquitofish as a surrogate fish model.[6] Fifteen organic wastewater compounds and EDCs were detected, and the site showing compounds having the highest influence on sex steroid hormone activities was the point source for the wastewater effluent. The study found that male mosquitofish sex steroid hormone levels, secondary sex characteristics, organosomatic indices, and sperm quality parameters indicating impairment of endocrine and reproductive function were worse off closer to the wastewater treatment plants' effluent discharges. It found that exposure to EDCs and consequent impairment showed most significant effects at the wastewater treatment point sources, with gradually lesser effects further away from the point sources. This is just one of many studies that identify a connection between wastewater effluent, EDCs, and environmental harm.[7] In fact, a multitude of studies have shown that wastewater is affecting Lake Mead, with EDC concentrations and effects greatest at Las Vegas Wash and in the waters where Las Vegas Wash empties into Lake Mead.

III. Endocrine Disrupting Chemicals in Las Vegas Wash, Las Vegas Bay, and Lake Mead

Past monitoring of Las Vegas Wash, Las Vegas Bay (Las Vegas Bay is where Las Vegas Wash empties into Lake Mead), and Lake Mead have detected EDCs including pesticides, organochlorine compounds ("OCs"), dioxins, furans, polycyclic aromatic hydrocarbons ("PAHs"), phthalates, polychlorinated biphenyls ("PCBs"), phenolic compounds and "emerging contaminants" such as fragrances/musks, flame retardants, triclosan and its breakdown products, and PPCPs.[8] These environmental conditions are not conducive to healthy populations of fish and wildlife, nor do they support the beneficial uses of these waterbodies.[9]

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[6] Jenkins, J.A., S.L. Goodbred, S.A. Sobiech, H.M. Olivier, R.O. Draugelis-Dale, and D.A. Alvarez, 2009, Effects of Wastewater Discharges on Endocrine and Reproductive Function of Western Mosquitofish (*Gambusia spp.*) and Implications for the Threatened Santa Ana Sucker (*Catostomus santaanae*), *U.S. Geological Survey Open-File Report 2009-1097*, 46p. (Revised May 2009), available at http://pubs.usgs.gov/of/2009/1097/pdf/OF2009-1097.pdf.

[7] *See* Fent, K., A.A. Weston, and D. Caminada, 2006, Ecotoxicology of human pharmaceuticals, *Aquatic Toxicology* 76, 122-159.

[8] Bevans, H.E., S.L. Goodbred, J.F. Miesner, S.A. Watkins, T.S. Gross, N.D. Denslow, and T. Schoeb, 1996, Synthetic organic compounds and carp endocrinology and histology in Las Vegas Wash and Las Vegas and Callville Bays of Lake Mead, Nevada, 1992 and 1995, *Water-Resources Investigations Report* 96-4266, Nevada Basin and Range Study Unit, National Water-Quality Assessment Program, U.S. Geological Survey; Boyd, R.A. and E.T. Furlong, 2002, Human-Health Pharmaceutical Compounds in Lake Mead, Nevada and Arizona, and Las Vegas Wash, Nevada, October 2000-August 2001, *Open-File Report 02-385*, available at http://pubs.usgs.gov/of/2002/ofr02385/ofr02385.pdf; Goodbred, S.L., T.J. Leiker, R. Patiño, J.A. Jenkins, N.D. Denslow, E. Orsak, and M.R. Rosen, 2007, Organic chemical concentrations and reproductive biomarkers in common carp (*Cyprinus carpio*) collected from two areas in Lake Mead, Nevada, May 1999 through May 2000, *U.S. Geological Survey Data Series Report 286*, 18 p. http://pubs.usgs.gov/ds/2007/286/; Rosen et. al., 2009, Lake Mead Endocrine Disruption Studies: Environmental Assessment of Chemical Stressors and Effects on Fish Health within Lake Mead National Recreation Area (PowerPoint), available at http://nevada.usgs.gov/water/projects/mead_endocrine.htm; USFWS, Nevada Office letter to Mr. Alan Biaggi, Administrator of the Nevada Division of Environmental Protection, Aug. 15, 2001, Subject: Issuance of Permits

Many of these chemicals are known to disrupt the endocrine systems of animals in laboratory studies, and compelling evidence has accumulated that the endocrine systems of certain fish and wildlife in Lake Mead have been affected by these chemical contaminants. A presentation by Southern Nevada Water Authority ("SNWA") to the Wash Coordination Committee entitled "Xenobiotics in Lake Mead" determined there was "significant estrogenic activity" in Las Vegas Wash and Las Vegas Bay, including a suite of natural and synthetic compounds, including PCBs, DDT, alkylphenols, and pharmaceutical compounds like codeine, phenobarbitol, and primidone.[10] A study by Lange et. al. (2000) revealed that the human estrogen 17-beta-estradiol (E2) and a synthetic estrogen used in oral contraceptives, ethynylestradiol (EE2), were in these waterbodies at concentrations of up to 2.7 ng/L and 0.5 ng/L, respectively. As a reference, the no-observed-adverse-effect concentration for EE2 to the fathead minnow (*Pimephales promelas*) is considered to be 1.0 ng/L.[11]

There is also evidence of a higher number and higher concentrations of environmental contaminants in lake sediment, water, and fish tissue from Las Vegas Bay and Las Vegas Wash, relative to other parts of Lake Mead.[12] Contaminants include OCs, PAHs, furans, phthalates, phenols, and PCBs. Dioxins and furans, and twice as many organic contaminants, pesticides, and PCBs have been found in sediment from Las Vegas Bay (compared to Overton Arm).[13] Water samples collected from Las Vegas Wash and Las Vegas Bay contained feminizing compounds such as EE2, nonylphenol, octylphenol, and E2 while samples from reference sites tested negative for these compounds.[14] Significantly higher concentrations of OC compounds and tetrachlorodibenzo-*p*-dioxins and tetrachlorodibenzofurans have been detected at Las Vegas Wash and Las Vegas Bay compared to sites below the Hoover Dam.[15] Other compounds

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Allowing the Increased Discharge of Municipal Effluent into Las Vegas Wash, Clark County, Nevada [*hereinafter* USFWS 2001].

[9] U.S. Geological Survey, 2001, Presentation to SNWA by Dr. Tim Gross, Dr. Steve Goodbred, and Dr. Tom Leiker on the preliminary results ongoing contaminant studies on the fishes of Lake Mead; Bevans, H.E., M.S. Lico, and S.J. Lawrence, 1998, Water quality in the Las Vegas Valley area and the Carson and Truckee River basins, Nevada and California, 1992-96, *U.S. Geological Survey Circular 1170*, p. 47, available at http://pubs.usgs.gov/circ/circ1170/nvbr.book.pdf; Covay, K.J. and T.J. Leiker, 1998, Synthetic organic compounds in water and bottom sediment from streams, detention basins, and sewage-treatment plant outfalls in Las Vegas Valley, Nevada, 1997, *U.S. Geological Survey Open-File Report 98-633*, p. 15; LaBounty, J.F., and M.J. Horn, 1997, The influence of drainage from Las Vegas Valley on the limnology of Boulder Basin, Lake Mead, Arizona-Nevada, *Journal of Lakes and Reservoir Management* 13(2):95-108.

[10] Southern Nevada Water Authority, 2000, Presentation by Dr. Shane Snyder on xenobiotics in Lake Mead to the Las Vegas Wash Coordination Committee.

[11] Lange, R., T.H. Hutchinson, C.P. Croudace, F. Siegmund, H. Schweinfurth, P. Hampe, G.H. Panter, and J.P. Sumpter, 2000, Effects of the synthetic estrogen 17□-ethinylestradiol on the life-cycle of the fathead minnow (*Pimephales Promelas*), *Environ Toxicol Chem* 20:1216-1227.

[12] Rosen, M.R., S.L. Goodbred, and T.J. Leiker, 2007, Use of passive samplers for detecting vertical gradients of organic contaminants in Lake Mead, *Nevada Water Resources Association 2007 annual conference, Reno, Nev.* Feb. 20-22, abstracts, unpaginated, available at http://www.nvwra.org/annual_conf/2007/docs/FINAL%20NWRA%202007%20Conference%20program%20and%20abstracts.pdf.

[13] Covay, K.J. and D.A. Beck, 2001, Sediment-deposition rates and organic compounds in bottom sediment at four sites in Lake Mead, Nevada, May 1998, *U.S. Geological Survey Open-File Report 01-282*, p. 34, available at http://www.dtic.mil/cgi-bin/GetTRDoc?AD=ADA445148&Location=U2&doc=GetTRDoc.pdf.

[14] Snyder, S.A., D.L. Villeneuve, E.M. Snyder, and J.P. Giesy, 2001, Identification and quantification of estrogen receptor agonists in wastewater effluents, *Environmental Science and Technology*, vol. 35, p. 3620-3625.

[15] FWS 2001.

detected included hexachlorobenzene, cis-chlordane, trans-chlordane, trans-nonachlor, dieldrin, *p,p'*-DDD, *p,p'*-DDE, and PCBs.

Historically, the most frequently detected EDCs in samples from Las Vegas Wash have been caffeine, carbamazepine (used to treat epilepsy), cotinine (a metabolite of nicotine), and dehydronifedipine (a metabolite of the antianginal Procardia).[16] Less frequently detected EDCs have been antibiotics (clarithromycin, erythromycin, sulfamethoxazole, and trimethoprim), acetaminophen (an analgesic and anti-inflammatory), cimetidine (used to treat ulcers), codeine (a narcotic and analgesic), diltiazem (an antihypertensive), and 1,7-dimethylxanthine (a metabolite of caffeine). In general, fewer compounds were detected in samples collected from Lake Mead than from Las Vegas Wash. However, caffeine was detected in all samples collected from Lake Mead, and acetaminophen, carbamazepine, cotinine, 1,7-dimethylxanthine, and sulfamethoxazole were also detected in samples from Lake Mead.

A recent study by Rosen et. al. (2009) was the first to delineate synthetic organic compound ("SOC") sources to Las Vegas Bay.[17] It found that water downstream of the wastewater treatment plants generally have higher concentrations of EDCs, including benzophenone, galaxolide, indole, phosphate Tris (2-butoxyethyl), tributylphosphate, triclosan, triphenyl phosphate, methyl-1*H*-benzotriazole, lindane, and chlorpyrifos, than sites upstream of the wastewater treatment plants.[18] This study discovered that some hydrophobic SOCs entering Lake Mead from the Las Vegas Wash distribute laterally across 10 km of Lake Mead from Las Vegas Wash to Boulder Basin.

Evidence of endocrine disruption in common carp[19]

Not only have OC compounds, PAHs, phthalates, phenols, dioxins, synthetic musks, and furans been found in water, sediment and carp tissue from Las Vegas Wash and Las Vegas Bay, these

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[16] Boyd, R.A. and E.T. Furlong, 2002, Human-Health Pharmaceutical Compounds in Lake Mead, Nevada and Arizona, and Las Vegas Wash, Nevada, October 2000-August 2001, *Open-File Report 02-385*, available at http://pubs.usgs.gov/of/2002/ofr02385/ofr02385.pdf.

[17] Rosen, M.R., D.A. Alvarez, S.L. Goodbred, T.J. Leiker, and R. Patiño, 2009, Sources and distribution of organic compounds using passive samplers in Lake Mead National Recreation Area, Nevada and Arizona, and their implications for potential effects on aquatic biota, *Journal of Environmental Quality*; see also Vermeirssen, E.L.M., O. Korner, R. Schonenberger, M.J. Suter, and P. Burkhardt-Holm, 2005, Characterization of Environmental Estrogens in River Water Using a Three Pronged Approach: Active and Passive Water Sampling and the Analysis of Accumulated Estrogens in the Bile of Caged Fish, *Environ. Sci. Technol.*, 39, 8191-8198.

[18] Additional potential sources of chemicals measured in the passive samplers at Las Vegas Wash and Bay include. 4-dichlorophenyl isocyanate, *tert*-octylphenol, Acetophenone, BDEs, Dacthal, Fipronil, Hexachlorobenzene (HCB), Isophorone, Isoquinoline, Lindane, Methyl salicylate, *para*-cresol, PCBs, Pentachloroanisole (PCA), Tonalide (AHTN), and Trifluralin.

[19] *See also* Patino, R., 2008, Preliminary Assessment of Field Endocrine and Gonadal Condition of Male Common Carp from Lake Mead National Recreation Area (2007-2008); Patino, R., 2008, Preliminary Assessment of Field Endocrine and Gonadal Condition of Male Largemouth Bass from Lake Mead National Recreation Area (2007-2008); Patino, R., J.A. Jenkins, S.L. Goodbred, M.R. Rosen, and E. Orsak, 2007, Indices of endocrine disruption and reproductive dysfunction in common carp of Lake Mead, Nevada (PowerPoint); Bevans, H.E., S.L. Goodbred, J.F. Miesner, S.A. Satkins, T.S. Gross, N.D. Denslow, and T. Schoeb, 1996, Synthetic organic compounds and carp endocrinology and histology in Las Vegas Wash and Las Vegas and Callville Bays and Lake Mead, Nevada, 1992 and 1995, *U.S. Department of the Interior, U.S. Geological Survey, Water Resources Investigations Report 96-4266, Carson City, NV*.

carp exhibit endocrine disruption relative to fish from other areas of Lake Mead.[20] Results of a study by Linder and Little (2009) indicate that the reproductive condition of fish at Las Vegas Bay are markedly reduced compared to other fish farther away from Las Vegas Wash and the influx of EDCs.[21]

Studies have also shown that male carp from Las Vegas Bay have significantly lower levels of the sex steroid hormone 11-ketotestosterone (11KT), a major androgen responsible for testicular function and sperm production in fishes.[22] They have smaller testes (gonadosomatic index) and higher levels of testicular macrophage aggregates (biomarkers of contaminant exposure).[23] Degradation products of triclosan, a commonly used antimicrobial compound, have also been found in these carp, but not in male fish from the reference site in Overton Arm.[24]

A study by Leiker (2009) identified methyl triclosan and four halogenated analogues in male carp collected from Las Vegas Bay as well as from semipermeable devices deployed in Las Vegas Wash.[25] Methyl triclosan is a microbially methylated product of triclosan. Triclosan is an antibacterial and antimicrobial agent used in liquid detergents, hand soaps, deodorants, cosmetics, creams, lotions, mouthwash and toothpaste and is impregnated in many fabrics, plastics, carpets, plastic kitchenware, and toys. Studies suggest a variety of effects of triclosan including the inhibition of fatty acid and lipid biosynthesis, the resistance of some bacteria to triclosan, altered activity of kinase enzymes, reduced membrane stability of immune cells, interference with redox balance in organs, endocrine disruption of the thyroid system, augmented estrogenic and androgenic activity, and effects as a nonspecific depressant on the central nervous system.

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[20] Rosen, M.R., S.L. Goodbred, R. Patino, T.A. Leiker, and E. Orsak, 2006, Investigations of the Effects of Synthetic Chemicals on the Endocrine System of Common Carp in Lake Mead, Nevada and Arizona, Fact Sheet 2006-3131, available at http://pubs.usgs.gov/fs/2006/3131/; Osemwengie, L.I. and S.L. Gerstenberger, 2004, Levels of synthetic musk compounds in municipal wastewater for potential estimation of biota exposure in receiving waters, *J. Environ. Monit.* 6, 1-8.

[21] Linder, G. and E.E. Little, 2009, Competing risks and the development of adaptive management plans for water resources: field reconnaissance investigation of risks to fishes and other aquatic biota exposed to endocrine disrupting chemicals (EDCs) in Lake Mead, Nevada USA, *EWRI 2009 World Environmental & Water Resources Congress*, Kansas City, Missouri May 17-21, 2009.

[22] Schulz, R.W. and T. Miura, 2002, Spermatogenesis and its endocrine regulation: Fish Physiology and Biochemistry, vol. 26, p 43-56.

[23] Patino, R., S.L. Goodbred, R. Draugelis-Dale, C.E. Barry, J.S. Foott, M.R. Wainscott, T.S. Gross, and K.J. Covay, 2003, Morphometric and histopathological parameters of gonadal development in adult common carp from contaminated and reference sites in Lake Mead, Nevada, *Journal of Aquatic Animal Health*, vol. 15, p. 55-68.

[24] Goodbred et al. 2007.

[25] Leiker, T.J., S.R. Abney, S.L. Goodbred, and M.R. Rosen, 2009, Identification of methyl triclosan and halogenated analogues in male common carp (*Cyprinus carpio*) from Las Vegas Bay and semipermeable membrane devices from Las Vegas Wash, Nevada, *Science of the Total Environment* 407, 2102-2114.

EDCs are harming endangered and threatened species[26]

Ongoing studies have detected a variety of contaminants in fish and wildlife that rely on Las Vegas Wash and Las Vegas Bay.[27] Imperiled birds using Las Vegas Wash and Las Vegas Bay include the Yuma clapper rail, southwestern willow flycatcher, yellow-billed cuckoo, and over 150 species of migratory birds. Some of the migratory bird species in the area include the great blue heron, great egret, snowy egret, eared grebe, Western grebe, Clark's grebe, gadwall, American wigeon, mallard, blu-winged teal, cinnamon teal, northern shoveler, northern pintail, American coot, red-winged blackbird, brewer's blackbird, yellow-headed blackbird, marsh wren, double-crested cormorant, American avocet, killdeer, and black-necked stilt. These species are likely being impacted by the discharge of EDCs into Las Vegas Wash.

The endangered razorback sucker is also found in Las Vegas Bay and Lake Mead and has federally designated critical habitat throughout these waterbodies. Razorback suckers are long-lived fish that can grow up to three feet long. However, they are struggling to survive and face threats from habitat loss and competition with other fish species. Blackbird Point at Las Vegas Bay is known spawning habitat for the razorback sucker. Distinct differences have been found in razorback suckers from Las Vegas Bay and razorback suckers from other locations.[28] One study found concentrations of E2 were significantly higher, concentrations of 11KT were lower, and the ratio of E2 to 11KT higher in male razorback suckers from Las Vegas Bay than those from Echo Bay.[29] In another study, a razorback sucker from Las Vegas Bay had 9 OC compounds, while none were detected in a razorback sucker from Echo Bay. DDT residues accounted for more than half the detected OC concentrations in the fish, and PCBs accounted for a third of the total detected OC concentrations.

The Endangered Species Act ("ESA") prohibits the "take" of endangered species. The ESA defines take as "to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect" endangered species.[30] The U.S. Fish and Wildlife Service has further defined "harm" to include "significant habitat modification or degradation" that "actually kills or injures wildlife by significantly impairing essential behavior patterns, including breeding, feeding, or sheltering."[31] EDCs enter Lake Mead under the delegated authority of NDEP. There is evidence that these EDCs are significantly degrading razorback sucker habitat, including federally designated critical habitat, and are likely injuring wildlife by disrupting behavior patterns such as breeding

[26] *See generally* Intertox, Inc., 2008, Las Vegas Wash Monitoring and Characterization Study: Ecotoxicologic Screening Assessment of Selected Contaminants of Potential Concern in Sediment, Whole Fish, Bird Eggs, and Water, 2005-2006, *Prepared for: Southern Nevada Water Authority, U.S. Bureau of Reclamation, and U.S. Fish & Wildlife Service*; Intertox, Inc., 2006, Las Vegas Wash Monitoring and Characterization Study: Ecotoxicologic Screening Assessment of Selected Contaminants of Potential Concern in Sediment, Whole Fish, Bird Eggs, and Water, 2000-2003, *Prepared for: Southern Nevada Water Authority, U.S. Bureau of Reclamation, and U.S. Fish & Wildlife Service.*

[27] USFWS 2001; *See generally* Tuttle, P.L. and E.L. Orsak, 2001, Las Vegas Wash Water Quality and Implications to Fish and Wildlife, available at http://www.fws.gov/Pacific/ecoservices/envicon/pim/reports/LasVegas/WaterQuality.htm.

[28] FWS 2001.

[29] FWS 2001.

[30] ESA §9(a)(1).

[31] 50 CFR §17.3.

ability.[32] Therefore, NDEP is likely already engaging in the illegal take of razorback suckers, and possibly other endangered species, by failing to protect the water quality of these waterbodies when it issues permits like Permit # NV0023647.

EDCs may be harming National Recreation Area resources and impairing Las Vegas' drinking water

Lake Mead is part of a designated National Recreation Area ("NRA") managed by the National Park Service. With over 157,000 acres of fishable water, and 8 million visitors annually, Lake Mead NRA provides anglers with the opportunity to fish a variety of species including striped and large mouth bass and stocked trout. As a national recreation area, Lake Mead is to be managed to specifically provide for water based recreation including boating, swimming, and fishing in a manner that preserves the scenic, historic, scientific, and other important features of the area. The unregulated introduction of EDCs into Lake Mead NRA is harming these resources and diminishing the integrity of this national treasure.

Not only is Lake Mead an important recreational resource, it is also the largest reservoir in the United States. The Bureau of Reclamation manages the Hoover Dam and Lake Mead for water resources for southern Nevada, Arizona, southern California, and Mexico. Lake Mead receives water for about half of southern Nevada's potable water to be returned as highly treated effluent for return flow credit as additional water resource withdrawal. Boulder Basin of Lake Mead is the sole source of drinking water to over 1.6 million Las Vegans and more than 35 million tourists annually. The Saddle Island intake structures for Las Vegas' drinking water is only six short miles downstream of the Las Vegas Wash. Although SWNA is ultimately responsible for treating its customers' water, NDEP has a duty to protect Lake Mead's beneficial uses as a municipal and domestic water supply.

Specific EDCs are discharged into Las Vegas Wash and are harming fish and wildlife in Lake Mead

Infinitesimally small levels of EDC exposure, in fact any level of exposure at all – may cause endocrine or reproductive abnormalities.[33] The EPA recognizes that EDCs discharged from wastewater treatment plants are contaminants of emerging concern with potentially widespread environmental effects.[34] A variety of EDC pollutants are entering Las Vegas Wash from treated wastewater. They can each independently have adverse affects to water quality, fish and wildlife,

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[32] Jobling, S., S. Coey, J.G. Whitmore, D.E. Kime, K.J.W. Van Look, B.G. McAllister, N. Beresford, A.C. Henshaw, G. Brighty, C.R. Tyler, and J.P. Sumpter, 2002, Wild Intersex Roach (*Rutilus rutilus*) Have Reduced Fertility, *Biology of Reproduction* 67, 515-524.

[33] Sheehan, D.M., E.J. Willingam, J.M. Bergeron, C.T. Osborn, and D. Crews, 1999, No threshold dose for estradiol-induced sex reversal of turtle embryos: how little is too much? *Environ Health Perspect* 107:155-159, available at http://www.ncbi.nlm.nih.gov/pmc/articles/PMC1566346/pdf/envhper00507-0101.pdf; National Institute of Environmental Health Sciences, 2006, Endocrine Disruptor Fact Sheet June 2006.

[34] OW/ORD Emerging Contaminants Workgroup, 2008, Aquatic Life Criteria for Contaminants of Emerging Concern, Part I, General Challenges and Recommendations, June 3, 2008, available at http://www.epa.gov/waterscience/criteria/library/sab-emergingconcerns.pdf.

and though the extent is not fully understood, are likely interacting in ways that degrade water quality and prevent the beneficial uses of Las Vegas Wash, Las Vegas Bay, and Lake Mead.[35]

NDEP has established standards for some of these pollutants, including heptachlorepoxide, lindane, PCBs, and selenium.[36] However, these standards are either being exceeded or are not stringent enough as they are being detected in both the waterbodies and in fish and wildlife, and are impairing the beneficial uses of the waterbodies.

Heptachlorepoxide Heptachlorepoxide is the degradate of heptachlor, a manufactured chemical used to make mothballs. The EPA has recognized that longterm exposure to this pollutant can result in adverse health effects at .0002 mg/L and has established a public health goal of zero exposure.[37] NDEP has established human health consumption criteria at .001 ppb (for water plus organism) and .00011 ppb (for organism only). However, it has been detected in common carp in Las Vegas at .62 micrograms per kilogram (approximately .0062 ppb).[38]

Lindane and related compounds This chlorinated hydrocarbon (y hexachlorocyclohexane – HCH) is banned for agricultural uses but is still allowed as a pharmaceutical. It may accumulate in sediment and can be toxic to fish at high concentrations and at lower concentrations can affect growth, hormones, and the immune system. The EPA has recognized that longterm exposure to this pollutant can result in adverse health effects at .0002 mg/L,[39] and has placed alpha-hexachlorocyclohexane on the Contaminant Candidate List.[40] NDEP has established aquatic life criteria at 2 ppb, criteria for human health consumption at .019 ppb (for water plus organism), and 4 ppb for water supply. Yet, these compounds have been found throughout the waterbodies and in common carp in Las Vegas Bay at 9.9 micrograms per kilogram.[41]

PCBs Polychlorinated biphenyls (PCBs) do not degrade readily or dissolve in water, and therefore bioaccumulate in body fat and biomagnify up the food chain. They were once widely used as insulators and cooling compounds in electrical equipment, and have been incorporated into a variety of consumer products including lubricants, paints, varnishes, and

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[35] Sumpter, J.P. and A.C. Johnson, 2005, Lessons from Endocrine Disruption and Their Application to Other Issues Concerning Trace Organics in the Aquatic Environment, *Environmental Science & Technology* 4321-4332; Brian, J.V., C.A. Harris, M. Scholze, T. Backhaus, P. Booy, M. Lamoree, G. Pojana, N. Jonkers, T. Runnalls, A. Bonfa, A. Marcomini, and J.P. Sumpter, 2005, Accurate Prediction of the Response of Freshwater Fish to a Mixture of Estrogenic Chemicals, *Environmental Health Perspective*, v. 113, N. 6, June 2005.

[36] Please refer to the *State Numeric Criteria vs. EPA Numeric Criteria Report for Nevada* for Nevada water criteria values.

[37] EPA, 2009, Fact Sheet: Final Third Drinking Water Contaminant Candidate List (CCL3) [*hereinafter* EPA 2009], available at http://www.epa.gov/ogwdw000/ccl/pdfs/ccl3_docs/fs_cc3_final.pdf.

[38] Goodbred 2007, Table 3; Intertox 2008, Table 15.

[39] EPA 2009.

[40] EPA, 2009.

[41] Rosen 2009, Table 2, Table 3, Table 4; Goodbred 2007, Table 3.

inks. PCBs come in 209 forms, or congeners. Though the U.S. banned the manufacture of PCBs in 1979, they are still used in closed electrical equipment. One EPA study shows that gulls from areas with high-PCB exposures have altered thyroid function which compromises their ability to respond to changing environmental conditions.[42] The EPA has recognized that longterm exposure to this pollutant can result in adverse health effects at levels greater than .0005 mg/L and has established a public health goal of zero exposure.[43] NDEP has established aquatic life criteria at .014 ppb, human health consumption criteria at .0007 ppb (for organism only), and zero for water supply. PCBs have been found throughout the waterbodies and in common carp in Las Vegas Bay at 1.25 micrograms per kilogram (approximately .00125 ppb, well over NDEP's limit).[44]

Selenium Selenium bioaccumulates and causes reproductive effects at very low concentrations. Waterborne selenium in the Las Vegas Wash is currently between 3-4 ppb, a level of concern for wildlife. Selenium concentrations in the Las Vegas Wash exceed minimum levels of concern, as well as EPA's chronic criterion and NDEP's chronic criterion for protection of aquatic life. Elevated levels of selenium pose a concern for razorback suckers because adults readily bioaccumulate selenium in various tissues, including egg tissues. Fish collected in Las Vegas Wash exhibited selenium in whole body tissue ranging from 3.5-13.7 ppm, and 2.5-6.9 from the Bay.[45] By comparison, the majority of selenium literature supports a whole-body toxicity threshold of 4 ppm dry weight.[46]

Other EDCs are present for which the EPA has established national recommended water quality criteria, but NDEP has not adopted.[47]

Isophorone Isophorone is used as a solvent in ink, paint, adhesives, and pesticides and can be found in wood preservatives and floor sealants. The EPA has identified it in its Endocrine Disruptor Screening Program, Tier I

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[42] EPA, Final Report: Field and Laboratory Studies of the Effects of Polychlorinated Biphenyls and Other Persistent Organic Pollutants on Thyroid Function During Avian Development, 2003, available at http://cfpub.epa.gov/ncer_abstracts/index.cfm/fuseaction/display.abstractDetail/abstract/444/report/F.

[43] EPA 2009.

[44] Rosen 2009, Table 2, Table 3; Goodbred 2007, Table 3; Intertox 2008 Table 15.

[45] USFWS, 2007, Biological Opinion for Systems Conveyance and Operations Program for the Discharge of Municipal Wastewater into Lake Mead, Clark County, Nevada.

[46] *See* Hamilton, S.J., K.M. Holley, and K.J. Buhl, 2002, Hazard assessment of selenium to endangered razorback suckers (*Xyrauchen texanus*), *The Science of the Total Environment e Science of the Total Environment* 291, 111-121; Hamilton, S., 2003, Review of residue-based selenium toxicity thresholds for freshwater fish, *Ecotoxicology and Environmental Safety* 65, 201-210; Intertox 2008, Table 21, Table 22.

[47] EPA, 2009, National Recommended Water Quality Criteria, available at http://www.epa.gov/ost/criteria/wqctable/.

Screening List.[48] The EPA has recommended 35 *m*g/L CCC; 960 *m*g/L CMC. It has been detected in waterbodies.[49]

Pentachloroanisole Pentachloroanisole is a chlorinated aromatic compound, a degradate of pentachlorophenol and pentachloronitrobenzene, and is toxic to rodents.[50] It is a suspected carcinogen and has been linked to liver lesions. It is a chlorinated aromatic compound and has an EPA water quality standard of .001 *m*g/L CCC, yet has been found all around the waterbodies, and been detected in common carp from Las Vegas Bay at 3.8 micrograms per kilogram.[51]

Pyrene Pyrene is a polycyclic hydrocarbon used in dyes and is known to be toxic to the kidneys and liver. EPA has recommended 830 *m*g/L CCC; 4000 *m*g/L CMC. It has been detected in Las Vegas Bay.[52]

For other EDCs found in the waterbodies, the EPA has identified them as pollutants, but has not yet established national recommended water quality criteria, and neither has NDEP.

Naphthalene Naphthalene is a polycyclic aromatic hydrocarbon and is the primary ingredient in mothballs. It has the ability to damage or destroy red blood cells. It has been detected in the waterbodies at concentrations of at least 1600 pg/L.[53] Similar compounds, 1-methyl-naphthalene and 2-methyl-naphthalene should be considered to act similarly to naphthalene. 1-methyl-naphthalene has been detected in the waterbodies at concentrations up to 1200pg/L. 2-methyl-naphthalene has been detected in the waterbodies at concentrations up to 1200 pg/L.

Perchlorate Perchlorate reduces iodine uptake into the thyroid gland.[54] A 2002 EPA report proposes secondary acute values for short-term and long-term exposure to perchlorate. Perchlorate concentrations substantially exceeded those levels in sampling from Las Vegas Wash.[55]

Phenanthrene Phenanthrene is a polycyclic aromatic hydrocarbon used in dyes. It targets fat tissues, kidneys and liver. PAHs have caused tumors and reproductive problems in laboratory animals, as well as birth defects and decreased

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[48] 74 Fed. Reg. 17579.
[49] Rosen 2009, Table 4.
[50] ATSDR, 1997, Toxicological Profile for Pentachlorophenol, available at http://www.atsdr.cdc.gov/toxprofiles/tp51.html.
[51] Rosen 2009, Table 2, Table 3; Goodbred 2007, Table 3.
[52] Rosen 2009, Table 2.
[53] Rosen 2009, Table 2.
[54] EPA, 2008, Interim Drinking Water Health Advisory for Perchlorate, available at http://www.epa.gov/safewater/contaminants/unregulated/pdfs/healthadvisory_perchlorate_interim.pdf.
[55] Intertox 2008, p. 50; ADEQ, 2004, Perchlorate in Arizona: Occurrence Study of 2004, available at http://www.azdeq.gov/function/about/download/perch1201.pdf.

body weight in offspring.[56] It has been detected in the waterbodies at concentrations up to 1300 pg/L.[57]

Other EDCs have been detected in the waterbodies and are impairing water quality standards and are harming fish and wildlife.

1,7-Dimethylxanthine	Also known as paraxanthine, is a dimethyl derivative of xanthine. It is a psychoactive central nervous system stimulant and can act as an inhibitor of adenosine receptors. It has been detected in the waterbodies.[58]
2,6-dimethyl-naphthalene	It is a polycyclic aromatic hydrocarbon and has been detected in the waterbodies at concentrations of 860 pg/L.[59]
4-*tert*-octylphenol	Chronic exposure to this chemical can interfere with the secretion of luteinizing hormone, follicle-stimulating hormone, prolactin, and testosterone. It has been detected in Las Vegas Bay.[60]
5-methyl-1*H*-benzotriazole	It can be found in aircraft deicing and anti-icing fluid. It bioaccumulates in fish fat. It has been detected in the waterbodies at concentrations up to 20,000 pg/L.[61]
17B-estradiol	Male trout exposed to low levels of 17B-estradiol have reduced semen volume, sperm density, and sperm fertility.[62] Largemouth bass exposed to 17B-estradiol had changes in expression of hapcidins, a highly conserved antimicrobrial peptide and iron-regulatory hormone, reducing hep-1 levels in the liver.[63] It has been detected in the waterbodies.
Acetophenone	Acetophenone is an aromatic ketone used in fragrances, is an excipient used in some pharmaceuticals and is an additive in cigarettes. Oral exposure can cause central nervous system depression and hematologic effects. It has been detected in the waterbodies.[64]
Benzophenone	It is a UV-absorbing chemical. It is considered toxic. It has been detected in the waterbodies.[65]

[56] EPA, Phenanthrene Fact Sheet, available at http://www.epa.gov/waste/hazard/wastemin/minimize/factshts/phenanth.pdf.
[57] Rosen 2009, Table 3.
[58] Rosen 2009.
[59] Rosen 2009, Table 2.
[60] Rosen 2009, Table 2, Table 4.
[61] Rosen 2009, Table 4.
[62] Lahnsteiner, F., B. Berger, M. Kletzl, T. Weismann, 2006, Effect of 17B-estradiol on gamete quality and maturation in two salmonid species, *Aquatic Toxicology* 79 (2006) 124-131.
[63] Robertson, L.S., L.R. Iwanowicz, and J.M. Marranca, 2009, Identification of centrarchid hepcidins and evidence that 17B-estradiol disrupts constitutive expression of hepcidin-1 and inducible expression of hepcidin-2 in largemouth bass (*Micropterus salmoides*), *Fish & Shellfish Immunology* 26 (2009) 898-907.
[64] Rosen 2009, Table 2, Table 4.
[65] Rosen 2009, Table 4.

Caffeine	Effects of caffeine include decreased insulin sensitivity and can have adverse affects on the adrenal glands. It has been detected in the waterbodies.[66]
Cotinine	Cotenine is a metabolite of nicotine. It has been detected in the waterbodies.[67]
Dacthal	Dacthal is used to kill weeds. It and its degradates are toxic to the liver, kidneys, and thyroid. Longterm health effects can be expected at .07 mg/L exposure.[68] It has been detected in the waterbodies.[69]
Dehydronifedipine	It is a by-product of heart medication. It has been detected in the waterbodies.[70]
Diltiazem	It used to treat heart conditions and has been detected in the waterbodies.[71]
Ethynylestradiol	It is a potent endocrine modulator present in the aquatic environment at biologically active concentrations. Lifelong exposure to 5ng/L EE2 in zebrafish led to a 56% reduction in fecundity and complete population failure with no fertilization.[72] Fathead minnows chronically exposed to low concentrations of EE2 led to feminization of males through the production of vitellogenin mRNA and protein, impacts on gonadal development, and near extinction of species form the lake where they were being tested.[73] Trout exposed to EE2 during sexual development had increased levels of aneuploid sperm, leading to decreased embryonic survival and ultimately diminished reproductive success.[74] *Lumbriculus variegatus* exposed to EE2 accumulated high amounts, indicating

[66] Rosen 2009, Table 4.
[67] Boyd 2002.
[68] EPA, Summary from the Health Advisory for Dacthal and Dacthal Degradates, Document Number: 822-S-08-002, available at http://www.epa.gov/ogwdw000/ccl/pdfs/reg_determine2/healthadvisory_ccl2-reg2_dacthaldegradates_summary.pdf.
[69] Rosen 2009, Table 2, Table 3.
[70] Boyd 2002.
[71] Boyd 2002.
[72] Nash, J.P., D.E. Kime, L.T.M. Van der Ven, P.W. Wester, F. Brion, G. Maack, P. Stahlschmidt-Allner, and C.R. Tyler, 2004, Long-term Exposure to Environmental Concentrations of the Pharmaceutical Ethynylestradiol Causes Reproductive Failure in Fish, *Environ Health Perspective* 112:1725-1733 (2004), available at http://www.ehponline.org/members/2004/7209/7209.pdf.
[73] Kidd, K.A., P.L. Blanchfield, K.H. Mills, V.P. Palace, R.E. Evans, J.M. Lazorchak, and R.W. Flick, 2007, Collapse of a fish population after exposure to a synthetic estrogen, *PNAW*, May 2007, available at http://www.ncbi.nlm.nih.gov/pmc/articles/PMC1874224/pdf/zpq8897.pdf.
[74] Brown, K.H., I.R. Schultz, J.G. Cloud, and J.J. Nagler, 2008, Aneuploid sperm formation in rainbow trout exposed to the environmental estrogen 17a-ethynylestradiol, Dec. 16, 2008, *PNAS* 19786-19791, vol. 105, no. 50, available at http://www.ncbi.nlm.nih.gov/pmc/articles/PMC2604943/pdf/zpq19786.pdf.

	secondary poisoning of predators might be possible.[75] It is also on the EPA's CCL3 list.[76] It has been detected in the waterbodies.[77]
Indole	Indole is an aromatic heterocyclic organic compound found in fragrances and pharmaceuticals. It has been detected in the waterbodies.[78]
methyl salicylate	Methyl salicylate is a fragrant oil, known as wintergreen. It is found in numerous consumer products including insect repellents, topical treatments for muscle and joint pain, and in suntan lotion. It has been detected in the waterbodies.[79]
Octachlorostyrene	Octachlorostyrene is a halogenated aromatic compound and persistent and bioaccumulative toxicant pesticide. It has been detected in the waterbodies.[80]
para-cresol	Cresols have a variety of uses including disinfectants, fragrances, herbicides, pharmaceuticals, and wood preservatives. Para-cresol has been detected in the waterbodies.[81]
Polybrominated diphenyl ethers	PBDEs are a class of synthetic flame retardants used in plastics, cushions, and clothing. They are similar to PCBs, and like PCBs, they come in 209 different congeners. They bioaccumulate in freshwater and marine fish, and their effects are believed to be similar to that of PCBs. PBDE and a-hexabromocyclododecane (HBCD) are flame retardant additives used in household and commercial applications. Captive American kestrels exposed to DE-71 and HBCD resulting in the birds laying eggs that contain concentrations currently found in wild herring gulls ad peregrine falcons. It resulted in delayed egg laying and smaller eggs being laid, causing thinner eggshells and differential weight loss during embryonic development, and reduced fertility and reproductive.[82] Another study found that PBDE may reduce reproductive success in ospreys.[83] BDE 47, BDE 99, and BDE 100 have been detected in the waterbodies at varying concentrations.[84]

[75] Liebig, M., P. Egeler, J. Oehlmann, and T. Knacker, 2005, Bioaccumulation of C-17a0ethinylestradiol by the aquatic oligochaete *Lumriculus variegates* in spiked artificial sediment, *Chemosphere* 59 (2005) 271-280.
[76] EPA 2009 CCL3.
[77] Boyd 2002.
[78] Rosen 2009, Table 4.
[79] Rosen 2009, Table 4.
[80] Rosen 2009, Table 2.
[81] Rosen 2009, Table 4.
[82] Fernie, K.J., J.L. Shutt, R.J. Letcher, I.J. Ritchie, and D.M. Bird, 2009, Environmentally Relevant Concentrations of DE-71 and HBCD Alter Eggshell Thickness and Reproductive Success of American Kestrels, *Environ. Sci. Technol.*, 2009, 43(6), pp. 2124-2130.
[83] Henry, C.J., J.L. Kaiser, R.A., Grove, B.L. Johnson, and R.J. Letcher, 2009, Polybrominated diphenyl ether flame retardants in eggs may reduce reproductive success of ospreys in Oregon and Washington, USA, *Ecotoxicology* June 10, 2009.
[84] Rosen 2009, Table 2, Table 3.

Sulfamethoxazole It is commonly used to treat urinary tract infections and sinusitis. It has been detected in the waterbodies.[85]

Synthetic musks Synthetic musks are chemicals used in fragrances. Among the most ubiquitous are Galaxolide and Tonalide. These chemicals bioaccumulate in fish and have been detected in Las Vegas Wash and Lake Mead.[86] Galaxolide and Tonalide have been detected in the waterbodies.[87]

Triphenolphosphate It is a flame retardant added to computer products. It is water resistant and is a neurotoxin in animals. It has been detected in the waterbodies.[88]

Tributyl phosphate Commonly known as TBP, it is an organophosphorus compound used as an extractant and plasticizer. It has been detected in the waterbodies.[89]

Triclosan It is used in soaps and toothpaste and can act as an endocrine disruptor at concentrations found in US streams. More than 55% of streams examined in 2002 had a median concentration of 0.14 ppb. Research indicates .15 ppb is capable of perturbing hormonal signaling mechanisms. It has a similar chemical structure to PBDEs and PCBs and bioaccumulate in fish and can be found in human breast milk.[90] It has been detected in the waterbodies.[91]

Trifluralin Trifluralin is an herbicide used to control weeds. It can cause liver and kidney damage, decreased fetal weight and size, and increased miscarriages. It is on the EPA's Tier 1 EDSP list.[92] It has been detected in the waterbodies.[93]

Tris(2-chloroethyl) Phosphate It is used as a flame retardant in automobiles and furniture. It has been shown to decrease cell viability, DNA synthesis, and cell numbers. It has been detected in the waterbodies.[94]

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[85] Boyd 2002.
[86] Osemwengie, L.I. and S.L. Gerstenberger, 2004, Levels of synthetic musk compounds in municipal wastewater for potential estimation of biota exposure in receiving waters, *J. Environ. Monit.*, 2004, 6, 1-8.
[87] Goodbred 2007, Table 3; Rosen 2009, Table 2, Table 3.
[88] Rosen 2009, Table 4.
[89] Rosen 2009, Table 4.
[90] Pelley, J., 2006, Germ fighter works as endocrine disruptor: Triclosan, popular in soaps and lotions, perturbs the thyroid system of frogs and humans, *Science News* (Oct. 24, 2006); Veldhoen, N., R.C. Skirrow, H. Osachoff, H. Wigmore, D.J. Clapson, M.P. Gunderson, G. Van Aggelen, and C.C. Helbing, 2006, The bactericidal agent triclosan modulates thyroid hormone-associated gene expression and disrupts postembryonic anunran development, *Aquatic Toxicology*, August 2006; Fair, P.A., L. Hing-Biu, J. Adams, C. Darling, G. Pacepavicus, M. Alaee, G.D. Bossart, N. Henry, and D. Muir, 2009, Occurrence of triclosan in plasma of wild Atlantic bottlenose dolphins (Tursiops truncates) and in their environment, *Environmental Pollution* 157, 2248-2254.
[91] Leiker 2009.
[92] 74 Fed. Reg. 17579.
[93] Rosen 2009, Table 3.
[94] Rosen 2009, Table 4.

Tris(2-butoxyethyl) Phosphate It is a flame retardant used in floor polish and as a plasticizer in rubber and plastics. It has been detected in the waterbodies.[95]

IV. NDEP Must Protect Las Vegas Wash, Las Vegas Bay, and Lake Mead From EDC Pollution

The purpose of the Clean Water Act is to restore and maintain the chemical, physical, and biological integrity of our Nation's waters. Establishing water quality standards and issuing discharge permits are the primary mechanisms to achieve that goal. Section 301 of the Clean Water Act clearly prohibits "the discharge of any pollutant by any person" absent a permit. This means that a person may not discharge a pollutant without a permit that incorporates restrictions on the quantities of pollutants that will be discharged. The fact that the federal EPA has not established National Recommended Water Quality Criteria for some of these EDCs does not absolve the NDEP of its responsibility to issue permits that limit the discharge of EDCs.[96] Furthermore, section 301(b)(1)(C) requires that a National Pollutant Discharge Elimination System ("NDPES") permit include more stringent limits than are necessary to ensure compliance with water quality standards established by NDEP. Finally, section 302 of the Act requires that permitted discharges do not interfere with the attainment or maintainment of water quality standards – which includes designated uses and water quality criteria.

Nevada's water quality standards define the water quality goals for waterbodies by designating beneficial uses and setting criteria necessary to protect the beneficial uses.[97] These standards apply to all surface waters of the state and require waters to be free from various pollutants in sufficient levels so as to not interfere with any beneficial uses. Treated wastewater that is discharged into Las Vegas Wash pervades the Wash and is then emptied into Las Vegas Bay and Lake Mead. Therefore, all three waterbodies must be taken into consideration in issuing Permit # NV0023647.

For the area from the confluence of the Las Vegas Wash with Lake Mead to Telephone Line Road, the beneficial uses include: (a) Irrigation; (b) Watering of livestock; (c) Recreation not involving contact with the water; (d) Maintenance of a freshwater marsh; (e) Propagation of wildlife; and (f) Propagation of aquatic life, excluding fish. There is a goal of ensuring that the beneficial uses for this segment will include, without limitation, the propagation of aquatic life, including, without limitation, fish by the next triennial review.[98] The highest number and the greatest concentration of EDCs have been detected in this segment (relative to other parts of Lake Mead). The information proffered in this comment letter indicates that this segment is unable to meet its beneficial uses due to EDC pollution, namely the propagation of wildlife, and will likely not meet its goal of being beneficial to the propagation of fish by the next triennial review.

[95] Rosen 2009, Table 4.
[96] *See NRDC v. Train*, 510 F.2d 692(D.C. Cir. 1975).
[97] NAC 445A.118-445A.225.
[98] NAC 445A.200 Requirements to maintain existing higher quality for area from confluence of Las Vegas Wash with Lake Mead to Telephone Line Road; standards for beneficial uses; goal of requirements and standards.

The beneficial uses for the area of Lake Mead from a distance of 1.2 miles into Las Vegas Bay from the confluence of the Las Vegas Wash with Lake Mead include: (a) Irrigation; (b) Watering of livestock; (c) Recreation not involving contact with the water; (d) Industrial supply; (e) Propagation of wildlife; and (f) Propagation of aquatic life, including without limitation, a warm-water fishery.[99] This segment has the second greatest number and highest concentration of EDCs. The information provided in this comment letter indicates that water quality standards are not being met here as EDCs are currently impairing the beneficial uses of the waterbodies, including the propagation of wildlife and aquatic life.

For all other areas of Lake Mead, the beneficial uses include: (a) Irrigation; (b) Watering of livestock; (c) Recreation involving contact with the water; (d) Recreation not involving contact with the water; (e) Industrial supply; (f) Municipal or domestic supply, or both; (g) Propagation of wildlife; and (h) Propagation of aquatic life, including, without limitation, a warmwater fishery.[100] Additionally, the Clean Water Act and Nevada Administrative Code have an anti-degradation standard based on the "Requirement to Maintain Existing Higher Water Quality." Where existing water quality is higher than the standards required for beneficial uses, such as with Lake Mead, NDEP must ensure these standards continue to be met. Meeting anti-degradation standards is necessary to maintain high quality recreation experiences, viable fish and wildlife populations, and protect the source drinking water supplies. Lake Mead is receiving EDCs from wastewater effluent discharged through Las Vegas Wash. The introduction of these EDCs is preventing the beneficial uses of this waterbody as the EDCs are impairing fish and wildlife and infiltrating Las Vegas' drinking water supply.

In addition to the waterbodies not meeting their beneficial uses or their requirements to maintain existing higher water qualities, they are in violation of the standards applicable to all surface waters.[101] The Nevada Administrative Code requires that all waters be free from "deleterious substances attributable to domestic or industrial waste or other controllable sources at levels or combinations sufficient to be toxic to human, animal, plant or aquatic life or in amounts sufficient to interfere with any beneficial use of the water."[102] These EDCs are deleterious

[99] NAC 445A.196(2) Requirements to maintain existing higher quality for area of Lake Mead from distance of 1.2 miles into Las Vegas Bay from confluence of Las Vegas Wash with Lake Mead; standards for beneficial uses; goal of requirements and standards. For (a) Watering of livestock. The water must be suitable for the watering of livestock without treatment; (b) Irrigation. The water must be suitable for irrigation without treatment; (e) Recreation not involving contact with the water. The water must be free from: (1) Visible floating, suspended or settled solids arising from man's activities; (2) Sludge banks; (3) Slime infestation; (4) Heavy growth of attached plants, blooms or high concentrations of plankton, discoloration or excessive acidity or alkalinity that leads to corrosion of boats and docks; (5) Surfactants that foam when the water is agitated or aerated; and (6) excessive water temperatures; (g) Industrial supply. The water must be treatable to provide a quality of water which is suitable for the intended use. (h) Propagation of wildlife. The water must be suitable for the propagation of wildlife and waterfowl without treatment. *See* NAC 445A.122 Standards applicable to beneficial uses.

[100] NAC 445A.194 Requirements to maintain existing higher quality for area of Lake Mead not covered by NAC 445A.197; standards for beneficial uses. (c) Aquatic life. The water must be suitable as a habitat for fish and other aquatic life existing in a body of water. This does not preclude the reestablishment of other fish or aquatic life. (d) Recreation involving contact with the water. There must be no evidence of man-made pollution, floating debris, sludge accumulation or similar pollutants. (f) Municipal or domestic supply. The water must be capable of bring treated by conventional methods of water treatment in order to comply with Nevada's drinking water standards. NRS 445A.425, 445A.520; NAC 445A.122 Standards applicable to beneficial uses.

[101] NAC 445A.121.

[102] NAC 445A.121(4) Standards applicable to all surface waters.

substances that are currently at levels or in combinations sufficient to interfere with the beneficial uses of the waterbodies and have adverse effects on all living organisms.

V. Request for a Public Hearing

Any person may request a public hearing conducted by the Director with respect to a permit application.[103] The Director must hold a public hearing if there is a significant public interest for holding it.[104] Any doubt as to whether there is significant public interest in holding a public hearing shall be resolved in the favor of holding a hearing.[105] This comment letter has detailed the harm that unregulated EDC water pollution has caused fish and wildlife, as well as the diminished beneficial uses of Las Vegas Wash and Lake Mead. The Center has an interest in the proper issuance of this permit, and permits like it, because as currently conceived, the permit would allow the discharge of EDCs known to impact the endangered razorback sucker and other imperiled wildlife. Furthermore, Center staffer and member, Rob Mrowka, has a personal and professional interest in the issuance of this permit as a resident of North Las Vegas, Nevada. In his past employment as the Clark County Environmental Planning Manager, Mr. Mrowka was responsible for the County's water quality program, and regularly interacted with wastewater treatment professionals and members of the Clean Water Coalition and Lake Mead Water Quality Forum.

There is a significant public interest in holding a public hearing as evidenced by the numerous task forces and reports generated by the federal government and private companies on the status of EDC pollution in Lake Mead.[106] One USGS scientists noted that the water quality of Lake Mead "is a matter of public concern because of potential adverse effects on wildlife, and because Lake Mead is the major source of drinking water for about 1.6 million residents of Las Vegas, and about 35 million annual tourists."[107] Perhaps more telling of the significant public interest in this issue is the fact that the state of Lake Mead and upstream EDC pollution has peppered local and national media outlets for more than a decade.[108] We are confident that we have satisfied

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[103] NRS 445A.595 Permits: request for public hearing on application; NAC 445A.238 Request for public hearing.
[104] NAC 445A.238.2.
[105] *Id.*
[106] *See* USGS, *Lake Mead Endocrine Disrupting Contaminants Investigation: Passive Sampling of Estrogenics, Method Development, Contaminants Analyses*, available at http://www.cerc.usgs.gov/Projects.aspx?ProjectId=14; USGS, *Endocrine Disruption in Lake Mead*, available at http://nevada.usgs.gov/water/projects/mead_endocrine.htm; *Lake Mead Science Symposium*, available at http://www.lakemeadsymposium.org/index.html; and EPA, *Ion Composition Elucidation (ICE)*, available at http://www.epa.gov/esd/chemistry/ice/endo.htm.
[107] http://nevada.usgs.gov/water/projects/mead_endocrine.htm.
[108] *See* Donn, J., M. Mendoza, and J. Pritchard, *Article: Drug-tainted water harms fish, wildlife, study shows Medicines blamed for reproductive problems, shorter life spans*, The Oakland Tribune (Mar. 11, 2008); Associated Press, *Wildlife affected by drugs*, (Mar. 10, 2008) available from Forbes.com at http://www.forbes.com/feeds/afx/2008/03/10/afx4753738.html; Cornwall, W. and K. Ervin, *Hormonal chemicals may be imperiling fish*, The Seattle Times (April 8, 2007); Rake, L., *Chasing Lake Mead's Water: Part 2 of 3*, Las Vegas Sun (Dec. 30, 2006) http://www.lasvegassun.com/news/2006/dec/30/chasing-lake-meads-water-part-2-of-3/; Brean, H., *Writing the book on water quality*, reviewjournal.com (June 27, 2005) http://www.reviewjournal.com/lvrj_home/2005/Jun-27-Mon-2005/news/26765800.html; Bozall, B., *Vegas' Growth Is Gamble for Lake; Some fear sprawl will put more pollutants in Lake Mead and want treated sewage dumped deeper in it. Others say it'll just shift problems*, Las Angeles Times (June 19, 2005); Wills, L., *Thirsty for information: How much perchlorate in the water is safe? The government doesn't know*, Las Vegas Mercury (Dec. 4, 2003) http://www.lasvegasmercury.com/2003/MERC-Dec-04-Thu-2003/22689498.html; Manning, M. *Pollution*

both the requirement to demonstrate our interest in the permit as well as the significant public interest in granting a public hearing. We hope you will grant us, and the public, the opportunity to more fully discuss the impacts of the permit and the ongoing EDC pollution of Lake Mead.

VI. Conclusion

Methods for the extraction of EDCs from treated wastewater exist and NDEP must establish and enforce limitations. The lake is currently at 1,100 feet, a historic low. As draught conditions persist, the lake's elevation is expected to continue to drop. This will make it difficult for NDEP to protect and maintain the water quality of Lake Mead. NDEP has an opportunity to be a national leader in preventing a costly epidemic. It must take steps now to ensure that EDCs do not continue to compromise water quality.

This comment letter supports the finding that Las Vegas Wash, Las Vegas Bay, and Lake Mead are impaired due to EDCs, and that the proposal to approve permit # NV0023647 must be denied due to its potential contribution to that impairment. Please do not hesitate to contact me at jlopez@biologicaldiversity.org or 415-436-9682 x. 305 with any questions about this comment letter. I look forward to hearing your reply regarding our request for a public hearing.

Sincerely,

Jaclyn Lopez
Staff Attorney

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