PREASSESSMENT SCREEN
for the
BUFFALO RIVER IN BUFFALO, NEW YORK

Issued by:

The United States Department of the Interior, the Tuscarora Nation, and the State of New York
in their capacity as Trustees of Natural Resources

April 2008

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PREASSESSMENT SCREEN
for the
BUFFALO RIVER, NEW YORK

I. INTRODUCTION, AUTHORITIES, AND DELEGATIONS

This determination concerns potential claims authorized by the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA), 42 U.S.C §9601 *et seq*., as amended; the Oil Pollution Act of 1990 (OPA), 33 U.S.C. §*2701 et seq*.; and the Clean Water Act (CWA), 33 U.S.C. §1251 *et seq* for damages pertaining to injured natural resources of the Buffalo River and adjacent ecosystems. On the basis of a review of relevant information gathered to date, the Trustees have concluded that there is a reasonable probability that a successful claim for damages to natural resources within the trusteeship of the U.S. Department of the Interior (DOI), acting through the U.S. Fish and Wildlife Service (USFWS); the Tuscarora Nation, a member of the Haudenosaunee Confederacy; and the State of New York, acting through the New York State Department of Environmental Conservation (NYSDEC) [collectively the "Trustees"] can be made in this case.

This determination was prepared by the Trustees for natural resources under the authority of Section 107(f) of CERCLA, as amended, 42 U.S.C. §9607(f); the National Contingency Plan, Title 40 Code of Federal Regulations (CFR), Part 300; the DOI Natural Resource Damage Assessment Regulations, 43 CFR Part 11 and other applicable Federal regulations and directives which serve to designate Federal, Tribal, and State natural resource Trustees and which authorize the assessment and restoration of natural resource damages resulting from a discharge of oil or release of a hazardous substance.

The first step in developing a natural resource damage claim is preparation of a Preassessment Screen. The purpose of a Preassessment Screen is to provide a review of readily available information on hazardous substance releases and potential impacts of those releases on natural resources under the trusteeship of Federal, Tribal, and State authorities. The review should ensure there is a reasonable probability of making a successful claim against the responsible parties for releasing hazardous substances into the environment. Specifically, the Trustees have determined that:

(1) A discharge of oil or a release of a hazardous substance has occurred;
(2) Natural resources for which the Trustees may assert trusteeship under CERCLA, OPA, CWA, or state statutory law and common law claims have been or are likely to have been adversely affected by the discharge or release;
(3) The quantity and concentration of the discharged oil or released hazardous substance is sufficient to potentially cause injury to those natural resources;
(4) Data sufficient to pursue an assessment are readily available or likely to be obtained at a reasonable cost; and
(5) Response actions, if any, carried out or planned do not or will not sufficiently remedy the injury to natural resources without further action.

II. INFORMATION ON SITE AND DISCHARGE OR RELEASE

A. The Buffalo River

The Buffalo River is formed by the confluence of Buffalo Creek, Cayuga Creek, and Cazenovia Creek. It flows through the City of Buffalo, discharging into Lake Erie near the head of the Niagara River. It serves as important habitat for warmwater fish, migratory birds, and other wildlife.

The Buffalo River is the site of a famous Seneca settlement called 'Dosyowa,' which means place of the basswood tree. It is the place where several important United States treaties were negotiated, including the Canandaigua Treaty of 1794 and the controversial Buffalo Creek Treaties of 1838 and 1842. The banks of Buffalo Creek became the permanent home for many Indian Nations following the American Revolution, including members of the Six Nations (also referred to as the Haudenosaunee Confederacy) who moved toward British forts along the Niagara River. Under the 1797 Treaty of Big Tree between the Seneca Nation and the United States, a 130-square-mile reservation, called the Buffalo Creek Indian Reservation, was established on both sides of the Buffalo River. Between 1838 and 1842, members of the Seneca Nation sold the remaining land titles of the Buffalo Creek Reservation in response to actions by the United States to move the Haudenosaunee westward to Kansas. Although the reservation was cleared for development by 1850, it remains an important cultural and historical site of the Haudenosaunee people.

The Buffalo River is one of the 43 Areas of Concern (AOC) within the Great Lakes, so designated because they are considered to be severely degraded geographic areas, primarily due to contaminated sediment and point and non point source pollution, within the Great Lakes Basin. They are specifically identified in the Great Lakes Water Quality Agreement (GLWQA 1987) between the United States and Canada as "geographic areas that fail to meet the general or specific objectives of the Agreement, where such failure has caused or is likely to cause impairment of beneficial use of the area's ability to support aquatic life." The objectives of the GLWQA are not being met and remedial actions are necessary to restore or protect beneficial uses. The Buffalo River AOC "impact area" extends from the mouth of the Buffalo River to the farthest point upstream at which the backwater condition exists during Lake Erie's highest monthly average lake level. The AOC impact area encompasses 6.2 miles of the Buffalo River and the City Ship Canal, a 1.4-mile stretch located adjacent to the river. The Buffalo River historically experienced heavy industrial development in a growing municipality. It has been severely impaired by past industrial and municipal discharges and waste disposal and continues to be subject to discharges from some of these sources.

Beginning in 1987, the Niagara River and Buffalo River have been the focus of U.S. and Canadian parties with an interest in achieving significant reductions in toxic chemicals in the Rivers. These parties (U.S. Environmental Protection Agency [USEPA], Environment Canada, NYSDEC, and Ontario Ministry of the Environment [OMOE]) prepared the Niagara River Toxics Management Plan (NRTMP). The NRTMP identified 18 persistent toxic chemicals as "priority toxics" (USEPA and NYSDEC 2000, USEPA and NYSDEC 2003, 2004, and 2005) to the Buffalo and Niagara Rivers. These chemicals are benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(k)fluoranthene, chlordane, chrysene, dieldrin, hexachlorobenzene, mercury, mirex, octachlorostyrene, polychlorinated biphenyls (PCBs), dichlorodiphenyltrichloroethane (DDT), dioxins, tetrachloroethylene, arsenic, lead, and toxaphene.

The NYSDEC has prepared a Remedial Action Plan (RAP) for the Buffalo River (NYSDEC 1989). The major beneficial use impairment in the Buffalo River AOC is restriction on fish and wildlife consumption due to PCB contamination. Survival of aquatic life has been impaired by chemicals such as PCBs, chlordane, and polycyclic aromatic hydrocarbons (PAHs). Other chemicals of concern may include DDT, metals, and cyanide. The other beneficial use impairments listed for the Buffalo River include tainting of fish flesh, fish deformities, degradation of benthic organisms, restrictions on dredging activities, degradation of aesthetics, and loss of fish and wildlife habitat (NYSDEC 1989, Buffalo Niagara Riverkeeper 2005). Recent RAP activities and accomplishments have occurred in the areas of stream water quality monitoring, bottom sediments, inactive hazardous waste sites, municipal and industrial wastewater facilities and sewer systems, and fish and wildlife habitat (NYSDEC 2002a, Buffalo Niagara Riverkeeper 2005).

B. Hazardous Waste Sites

In 1988, the USEPA estimated potential toxic loading to the Niagara River from U.S. hazardous waste sites (Gradient Corp./Geotrans Inc. 1988). They found that an estimated 694 pounds (lbs) per day of toxic chemicals had the potential of migrating from hazardous waste sites to the Niagara River. The following three sites along the Buffalo River were designated as discharging 1-50 lbs per day of toxic chemicals to the Niagara River (Gradient Corp./Geotrans Inc. 1988):

Buffalo Color
Buffalo Color – Area D
Mobil Oil (Currently ExxonMobil)

Another site along the Buffalo River which was estimated to discharge less than 1 lb of toxic chemicals to the Niagara River per day was PVS Chemical (formerly known as Allied Chemical; Gradient Corp./Geotrans Inc. 1988).

There are 3 Inactive Hazardous Waste Disposal Sites along the Buffalo River, designated as such by the State of New York (NYSDEC 2002b, NYSDEC 2003), that have the potential to impact the Buffalo River. The Buffalo River assessment area is presented in Figure 1; Figure 2 shows the locations of the State Inactive Hazardous Waste Disposal Sites and other potential sites that may impact the Buffalo River. Some of the sites that may potentially impact the Buffalo River are described further in Appendix A. However, the Trustees believe that it is likely that there are other sources of contamination to the Buffalo River and its environment which have caused natural resource damages. During the preassessment and assessment processes, the Trustees will identify and document these other sources of contamination which have caused and/or are causing injury to natural resources. Therefore, the list of sources of contamination ("Sites") and Potential Responsible Parties (PRPs) specified in Appendix A does not preclude the Trustees from adding to and/or modifying the current list of Sites and/or PRPs as they obtain more information. *See* 43 CFR §11.32(e)(1).

C. Damages Excluded from Liability under CERCLA or CWA

The DOI regulations in 43 CFR §11.24 provides that the Natural Resource Trustees must determine whether the damages being considered are barred by specific defenses or exclusions from liability under CERCLA or CWA. The Trustees have made such determinations and believe that such defenses or exclusions from liability are not dispositive and are without merit,

at least in relation to a significant number of sites responsible for hazardous substance releases. The required determinations are as follows:

The Trustees must determine whether the damages:

(i) resulting from the discharge or release were specifically identified as an irreversible and irretrievable commitment of natural resources in an environmental impact statement or other comparable environmental analysis, that the decision to grant the permit or license authorizes such commitment of natural resources, and that the facility or project was otherwise operating within the terms of its permit or license, so long as, in the case of damages to an Indian Tribe occurring pursuant to a Federal permit or license, the issuance of that permit or license was not inconsistent with the fiduciary duty of the United States with respect to such Indian Tribe; or

(ii) the release of a hazardous substance from which the damages have resulted have occurred wholly before the enactment of CERCLA; or

(iii) resulted from the application of a pesticide product registered under the Federal Insecticide, Fungicide, and Rodenticide Act, 7 U.S.C. section 135-135k; or

(iv) resulted from any other Federally permitted release, as defined in section 101 (10) of CERCLA; or

(v) resulted from a release or threatened release of recycled oil from a service station dealer described in section 107(a)(3) or (4) of CERCLA if such recycled oil is not mixed with any other hazardous substance and is stored, treated, transported, or otherwise managed in compliance with regulations or standards promulgated pursuant to section 3014 of the Solid Waste Disposal Act and other applicable authorities.

The Trustees must also determine whether the discharge meets one or more of the exclusions provided in section 311 (a)(2) or (b)(3) of the CWA or Section 2703 of the Oil Pollution Act.

As the assessment proceeds and the Trustees acquire additional information, they will review their initial determinations regarding whether any of the potential injuries referred to herein meet one or more of the above criteria.

III. PRELIMINARY IDENTIFICATION OF RESOURCES POTENTIALLY AT RISK

A. Potentially Affected Resources

Numerous trust resources in the Buffalo River and adjacent ecosystems have potentially been affected by the releases of hazardous substances. Table 1 lists concentrations of PCBs, PAHs, and dioxin in media from the Buffalo River ecosystem.

The groundwater, surface water, sediment, and biological resources within the Buffalo River assessment area provide habitat for warmwater fish and wildlife trust species. The minnow and sunfish families comprise the two largest family abundances, with 11 and 7 different species, respectively. The perch family is third in relative abundance with four species: yellow perch (*Perca flavescens*), walleye (*Stizostedion vitreum*), darters (*Etheostoma* sp.), and logperch (*Percina caprodes*). Muskellunge (*Esox masquinongy*) and large schools of gizzard shad (*Dorosoma cepedianum*) are also present in the lower Buffalo River (NYSDEC 1993).

Waterfowl that breed along the Buffalo River include the Canada goose (*Branta canadensis*), mallard (*Anas platyrhynchos*), black duck (*Aythya rubripes*), and wood duck (*Aix sponsa*). Shorebirds, herons, rails, and other marsh birds are found along the river in wetlands and mudflats. During migration, wooded areas along the river are heavily populated with warblers and other passerines.

Other avian species found within the Buffalo River AOC include belted kingfishers (*Ceryle alcyon*), red-breasted mergansers (*Mergus serrator*), ring-necked pheasants (*Phasianus colchicus*), American crows (*Corvus brachyrhynchos*), horned grebes (*Podiceps auritus*), pied-billed grebes (*Podilymbus podiceps*, a New York State "threatened" species), ring-billed gulls (*Larus delawaensis*), tree swallows (*Tachycineta bicolor*), black-capped chickadees (*Parus atricapillus*), song sparrows (*Melospiza melodia*), and warblers (NYSDEC 1993). Osprey (*Pandion haliaetus*), a New York State species of "special concern," are known to feed at the mouth of the Buffalo River. Common terns (*Sterna hirundo),* a New York State "threatened" species, have been known to nest on the Buffalo Harbor breakwalls (NYSDEC 1993). The peregrine falcon (*Falco peregrinus*), a New York State listed "endangered" species, was observed in the Buffalo River AOC in 1981 (NYSDEC 1993).

A variety of mammalian species utilize the habitat along the Buffalo River and its tributaries (NYSDEC 1993). Some of these species include state game mammal species such as whitetail deer (*Odocoileus virginianus*), beaver (*Castor canadensis*), eastern cottontail (*Sylvilagus floridanus*), mink (*Mustela vison*), and red fox (*Vulpes vulpes*).

B. Exposed Areas

Areas presently identified into which oil and CERCLA and CWA hazardous substances have been released include the navigable and non-navigable portions of the Buffalo River (Figure 1). This includes Buffalo River AOC, surface waters, groundwater, sediment, submerged lands, wetlands, and associated uplands of the Buffalo River.

C. Preliminary Identification of Pathways

Contamination emanating from a variety of sources has migrated through numerous pathways to potentially adversely affect the ecological system of the Buffalo River environment. The suspected primary pathways for injury to Trustee resources include surface water transport, groundwater discharge, overland runoff and sedimentation, airborne transport and atmospheric fallout of particulates, and entry into the food chain.

D. Exposed Water Estimates

All of the area and volume of the Buffalo River AOC impact area is believed to have been exposed to contaminants.

E. Estimates of Concentrations

The Niagara River Toxics Committee (NRTC) estimated that the total loadings, in lbs per day, of USEPA Priority Pollutants to the Buffalo River in 1981-1982 were approximately 129 lbs per day (NRTC 1984). Contaminant concentrations in various media in the Buffalo River have been determined by a variety of researchers (Table 1). Concentrations in groundwater, surface water,

sediment, mussels, and fish are discussed below. Concentrations are further discussed under Criteria #3 of Section IV of this Preassessment Screen.

Groundwater in the Buffalo River assessment area is contaminated with hazardous substances, including metals, PCBs, chlorinated solvents, benzene, toluene, ethylbenzene, xylene (BTEX), and PAHs (NYSDEC 2003, Roux Associates 2007). Groundwater within the assessment area has also been shown to violate NYSDEC groundwater standards for pH, anilines, phenol, BTEX, dichlorobenzenes, chlorobenzenes, arsenic, cyanide, and manganese (NYSDEC 2003).

Surface water sampled within the Buffalo River assessment area (Table 1) exceeded NYSDEC (2000) Human Health (Fish Consumption) and USEPA (2004) Human Health (Consumption) water quality criteria for PCBs (0.000001 parts per billion [ppb] and 0.000064 ppb, respectively) and PAHs (Non Detectable and 0.0038 ppb, respectively). Oil has been, and continues to be, discharged into the Buffalo River as a result of seepages associated with the former Mobil Oil property (Roux Associates 2007). Any visible oil film or oil attributable to industrial or other wastes is a violation of the NYSDEC narrative water quality standard for "oil and floating substances".

Buffalo River sediment concentrations of the metals arsenic, cadmium, copper, lead, mercury, and zinc indicate that zinc and lead pose the highest potential risk for impacts to biota from metals in the Buffalo River (Assessment and Remediation of Contaminated Sediments [ARCS] 1995). The areas of significant metal contamination of sediment occurred in the southern end of the Buffalo River ship canal and areas upstream within the Buffalo River AOC. Concentrations of total PCBs in sediments from the Buffalo River ranged from 43.9 to 49,900 ppb dry weight (dw). The highest sediment total PCB concentrations occurred upstream in the AOC (ARCS 1995). Total PAH sediment concentrations from the Buffalo River AOC ranged from 514 to 327,000 ppb dw (Black 1983, ARCS 1993).

Freshwater mussels (*Elliptio complanata*) deployed in cages in the Buffalo River for three weeks (Richman 2003) accumulated trace concentrations of PCBs ranging from 40 to 60 ppb wet weight (ww) and 4,4'-dichlorordiphenyldichlororethylene (p,p'- DDE) concentrations, a breakdown product of DDT, ranging from 2 to 4 ppb ww in 2000. An accumulation study with freshwater mussels deployed in 1997 in the Niagara and Buffalo Rivers analyzed mussel tissue for PAHs (Richman 1999). Freshwater mussels deployed in the Buffalo River for three weeks in 1997 accumulated trace tissue chrysene concentrations ranging from 40 to 60 ppb ww and pyrene concentrations ranging from non-detect to 40 ppb ww (Richman 1999).

Concentrations of PCBs in fish from the Buffalo River have been monitored by the NYSDEC since 1977. Ten carp samples from 1977 had a mean sum (Σ) PCB Aroclors concentration of 4,260 ppb ww (NYSDEC 1989). Concentrations of the mean Σ PCB Aroclors in carp varied over the next 10 years with a mean of 755 ppb ww in 1980 and a mean of 6,670 ppb ww in 1984 (NYSDEC 1987, 1989).

In 1991, concentrations of total PCBs, DDT, total dioxins, and total furans were measured in carp, from the Buffalo River, which were separated by 3 broad age classes, (Loganathan *et al*. 1995). Total PCB concentrations in carp muscle ranged from a mean of 2,400 in young, 4,300 in middle age, and 5,000 ppb ww in old fish. Concentrations of DDT ranged from 250, 150, and 500 ppb ww in young, middle age, and old carp, respectively (Loganathan *et al*. 1995). Concentrations of total dioxins in carp muscle ranged from a mean of 0.027 in young, 0.073 in middle age, and 0.146 ppb ww in old fish (Loganathan *et al*. 1995). Concentrations of total

furans, in carp muscle were 0.022, 0.099, and 0.077 ppb ww in young, middle age, and old carp, respectively (Loganathan *et al*. 1995).

More recent PCB Aroclor concentrations, in whole body, young-of-the-year bluntnose minnows (*Pimephales notatus*) were measured by the NYSDEC in the Buffalo River in 1997, 2003, and 2004 (Preddice *et al*. 2002, NYSDEC 2006a,b). Concentrations of mean Σ PCB Aroclors were 61.0, 6,956.0, and 1,083.0 ppb ww, respectively.

IV. PREASSESSMENT SCREEN CRITERIA

Title 43 CFR §11.23(e) notes the five criteria that must be met before proceeding with a natural resource damage assessment. The criteria are as follows:

- A discharge of oil or a release of a hazardous substance has occurred.

- Natural resources for which the Trustees may assert trusteeship under CERCLA, OPA, CWA, or state statutory law and common law claims have been or are likely to have been adversely affected by the discharge or release.

- The quantity and concentration of the discharged oil or released hazardous substance is sufficient to potentially cause injury, as that term is used in this part, to those natural resources.

- Data sufficient to pursue an assessment are readily available or likely to be obtained at reasonable cost.

- Response actions, if any, carried out or planned do not or will not sufficiently remedy the injury to natural resources without further action.

These criteria are satisfied for the discharge of oil and releases of hazardous substances covered by this Preassessment Screen, as follows:

Criteria #1: Discharges of oil and releases of hazardous substances have occurred.

There have been releases of oil and hazardous substances, as defined by OPA, CERCLA, and the CWA. Oil and hazardous substances which have been released into the Buffalo River include, but are not limited to, the following:

- Anilines;
- Dioxin and related compounds;
- Metals, including lead, zinc, mercury, arsenic, and cadmium;
- PAHs;
- PCBs and related compounds;
- Pesticides, including hexachlorocyclohexane (lindane), endosulfan, mirex, DDT, and 2,4,5-trichlorophenoxyacetic acid (2,4,5-T);
- Phenols; and
- Volatile organic compounds (VOCs), including petroleum products (BTEX), and chlorinated benzenes.

Liability for damages to natural resources as a result of oil is addressed in OPA. The remaining substances identified above have been determined to be hazardous pursuant to CERCLA, 42 U.S.C. §9602(a) and its implementing regulations 40 CFR §302.4, as well as the CWA, 33 U.S.C. §1251 *et seq.* These substances have been released into the assessment area from various sources including landfills, hazardous waste disposal sites, manufacturing facilities, industrial and municipal outfalls, and from resuspension of contaminated sediments. These contaminants have entered the water column and accumulated in the sediments and biota of the Buffalo River and its adjacent ecosystems.

Criteria #2: Natural resources for which the Trustees may assert trusteeship under CERCLA, OPA, CWA, or state statutory law and common law claims have been or are likely to have been adversely affected by the releases.

Natural resources under Trusteeship that are in the assessment area that have been or are likely to have been adversely affected by releases of hazardous substances include, but are not limited to, surface water, including sediments, groundwater, and biological resources (43 CFR §11.14z). Surface water and groundwater resources have been contaminated with hazardous substances (NYSDEC 2003). The forage base of the Buffalo River ecosystem is contaminated (NRTC 1984, NYSDEC 1989, ARCS 1995, USEPA *et al*. 2004a,b). The investigations of the current Remedial Investigation Ecological Risk Assessment concluded that the contaminated Buffalo River sediment has the potential to impact benthic biota, bottom-dwelling fish, and piscivorous birds and mammals (SulTRAC 2007).

Criteria #3: The quantity and concentration of the discharged oil or released hazardous substance is sufficient to potentially cause injury to those natural resources.

43 CFR §11.14 (v) defines injury as "a measurable adverse change, either long- or short-term, in the chemical or physical quality or the viability of a natural resource resulting either directly or indirectly from exposure to a discharge or release of a hazardous substance, or exposure to a product of reactions resulting from such discharge or release…."

The quantity and concentration of the discharged oil or released hazardous substances have potentially injured natural resources within the Buffalo River assessment area. Likely injuries to the natural resources within the assessment area may include:

1) New York State Department of Health (NYSDOH) human health consumption advisories for various fish species from the assessment area;
2) exceedances of U.S. Food and Drug Administration (USFDA) tolerance levels for fish;
3) adverse changes in the viability of biological resources, including histopathological lesions and fish population effects;
4) toxicity of sediments to benthic organisms, as demonstrated by laboratory testing; and
5) concentrations of substances in excess of drinking water standards established by Federal or State laws or regulations that establish such standards for drinking water, in groundwater that was potable before the discharge or release.

These injuries are discussed below in greater detail. These biological responses satisfy the acceptance criteria for injury in accordance with 43 CFR Part 11.

New York State human health consumption advisories for various fish species from the Buffalo River:

The Buffalo River is the subject of health advisories by the NYSDOH (2007). The advisory provides that fish from these waters should not be eaten by women of childbearing age, or by children under the age of 15. With regard to other persons, the advisory warns against consumption of carp from the Buffalo River (NYSDOH 2007). These advisories are based on elevated concentrations of contaminants including, but not limited to, PCBs.

The NYSDOH also has a general health advisory for deformed or abnormal fish (NYSDOH 2007). The NYSDOH states that the health implications of eating deformed or abnormal fish are unknown. Any obviously diseased fish (marked by tumors, lesions, or other abnormal condition of the fish skin, meat, or internal organs) should be discarded. As noted in greater depth under the section "Histopathological lesions," tumors have been reported in fish from the Buffalo River.

The NYSDOH advisories limiting and/or banning consumption of these organisms constitute an injury to a biological resource in accordance with 43 CFR §11.62(f)(1)(iii).

Recreational fishing and the viability of the commercial sport fishing industry in the assessment area have been impaired by these health advisories limiting or banning consumption of a number of fish species and waterfowl. A report in the early 1990s on effects of the health advisory and advisory changes on fishing habits and fish consumption in New York sport fisheries found evidence of fish consumption suppression in New York anglers, as 47% of these people reported they would eat more sport-caught fish if contaminant problems did not exist (Connelly *et al.* 1992). There are damages associated with public perception of the contaminated nature of the Buffalo River; it is likely that the advisories had a negative impact on the public's determination of whether or not to pursue recreational activities in the contaminated areas.

Exceedances of USFDA tolerance levels for fish:

Concentrations of contaminants in fish species collected from the Buffalo River have exceeded applicable USFDA tolerance levels. The Federal Food, Drug and Cosmetic Act authorizes USFDA to set tolerances for poisonous or deleterious substance in human food, including fish or shellfish. The tolerances are enforceable standards specifying the maximum amount of a substance that can be legally present in the food. The tolerance guideline for PCBs in fish is 2,000 ppb (USFDA 2003).

The following are examples of exceedances of USFDA PCB tolerance levels in fish from the Buffalo River:

- Average Σ PCB Aroclors concentrations measured in carp by the NYSDEC in 1984 (6,670 ppb ww) were in excess of the USFDA PCB tolerance of 2,000 ppb (NYSDEC 1987).

- Total PCB concentrations measured in carp in 1991, which were divided into broad age classes of young (2,400 ppb), middle age (4,300 ppb), and old fish (5,000 ppb), all exceeded the USFDA PCB tolerance of 2,000 ppb (Loganathan *et al*. 1995).

- More recent Σ PCB Aroclors concentrations measured in whole body, young-of-the-year

bluntnose minnows in 2003 (6,956 ppb), exceeded the USFDA PCB tolerance of 2,000 ppb (NYSDEC 2006a).

These exceedances of USFDA tolerance levels constitute injuries pursuant to Title 43 CFR §11.62(f)(1)(ii).

Adverse changes in the viability of biological resources, including histopathological lesions and fish population effects:

Oil has been discharged, and continues to be discharged, either directly into the Buffalo River or into the groundwater aquifer, leading to eventual discharge into the Buffalo River (Roux Associates 2007). Oil may adversely affect fish by obstructing the gills, causing enlarged livers, reduced growth, fin erosion, reduced reproduction, altered behavior, genetic abnormalities, cancer, and death. Oil can reduce the insulating value of feathers and fur leading to hypothermia in birds and mammals. Ingestion of oil can lead to reproductive dysfunction and mortality. http://www.epa.gov/oem/docs/oil/edu/oilspill_book/chap5.pdf

***Histopathological lesions*:**

Prior studies appear to indicate the presence of tumors in fish from the Buffalo River and upper Niagara River (Black 1983, Hickey *et al*. 1990, and Hirethota 1992). There is a considerable body of evidence that indicates a causal relationship between exposure to contaminants and tumor frequency, deformities, and other lesions in fish, particularly bottom feeding fish (Grizzle *et al.* 1981, Black 1983, Black *et al*. 1985, Couch and Harshbarger 1985, Hendricks *et al*. 1985, Metcalfe *et al*. 1988, Metcalfe 1989, Hickey *et al*. 1990, Baumann 1992, Hirethota 1992, Folmar *et al.* 1993, Balch *et al*. 1995, and Baumann *et al.* 1996). In particular, Hirethota (1992) and Baumann *et al*. (1996) conclude, based on research and the literature, that it is highly probable that the etiology of hepatic cancers in bullheads and suckers from the Great Lakes is associated with exposure to environmental contaminants.

It is believed that the initial step in chemical carcinogenesis is the covalent attachment of the chemical to DNA to produce DNA adducts. If the DNA alterations are not repaired, these modifications may eventually lead to mutations and ultimately cancer. Maccubbin *et al*. (1990) analyzed liver DNA from Buffalo River bullhead fish to determine chemical-DNA interactions. The digested DNA were enriched in hydrophobic, bulky adducts and were identified as a variety of bulky, hydrophobic, aromatic genotoxic compounds (Maccubbin *et al*. 1990). Analysis of bile revealed that the Buffalo River fish had recent exposure to multi-ringed aromatic compounds, currently referred to as PAHs (Maccubbin *et al.* 1990).

Studies have been conducted using contaminated sediment and the Ames/*Salmonella* Test to screen organic chemical extracts from contaminated sediments for mutagenic activity. One goal of mutagenicity testing is to predict the carcinogenic and intergenerational effects a compound may have on organisms. Extracts of sediment samples from the Buffalo River were both cytotoxic and mutagenic (ARCS 1993, Papoulias and Buckler 1996). It was hypothesized that the mutagenicity detected in Buffalo River sediment could primarily be attributable to PAHs; however, other contaminants identified in the sediment are also reported to cause genetic damage in other organisms (Papoulias and Buckler 1996).

Toxicity of sediments to benthic organisms, as demonstrated by laboratory testing:

Impairment of the benthic community potentially exists within the Buffalo River (NYSDEC 1989, ARCS 1993, 1995). Concentrations of PAHs in sediments exceed sediment quality guidelines that have been developed to protect benthic invertebrates and other aquatic organisms. Buffalo River total PAH sediment concentrations have exceeded the consensus based Threshold Effects Concentration and Probable Effects Concentration of 1,600 and 22,800 ppb, respectively (MacDonald *et al.* 2000). Buffalo River sediment toxicity has been demonstrated for the amphipod *Hyalella azteca*, and the midges *Chironomus riparius* and *C. tentans* (NYSDEC 1989, ARCS 1993, 1995). Buffalo River sediment collected in 1989 significantly reduced *H. azteca* survival and reduced growth for the midges *C. riparius* and *C. tentans* (ARCS 1993). The above-specified conditions constitute injury pursuant to 43 CFR §11.62(f)(4)(i)(E).

In the Buffalo River, the mean density, richness, and diversity of organisms in the family Chironomidae decreased with increasing concentrations of metals. Mouthpart deformities in larvae of *Chironomus thummi* increased with higher trace element levels (Diggins and Stewart 1998). Although much of the Buffalo River AOC was devoid of macroinvertebrates in 1964, some recolonization and community expansion occurred during the following decades (Diggins and Snyder 2003). Diggins and Snyder (2003) contend that the continued dominance of pollution-tolerant tubificid oligochaetes and chironomids in the Buffalo River indicate the need for additional rehabilitation.

Concentrations of substances in excess of drinking water standards established by Federal or State laws or regulations, in ground water that was potable before the discharge or release:

Groundwater in the Buffalo River assessment area has been contaminated with hazardous substances. Groundwater within the assessment area that is above NYSDEC groundwater standards for pH, anilines, phenol, BTEX, dichlorobenzenes, chlorobenzenes, arsenic, cyanide, and manganese (NYSDEC 2003) constitutes an injury to natural resources pursuant to 43 CFR §11.62(c)(1)(i).

Criteria #4: Data sufficient to pursue an assessment are readily available or likely to be obtained at reasonable cost.

A database exists regarding Buffalo River contaminant concentrations, sources, and impacts of these contaminants. Available data support the conclusion that contaminants have potentially adversely affected natural resources in the Buffalo River and its environment. These data have been collected under the monitoring programs initiated in the Lake Erie and Lake Ontario Lake-wide Management Plans (USEPA *et al*. 2004a,b) and the Buffalo River RAP (NYSDEC 1989). The Trustees are currently reviewing site-specific information to evaluate contaminant pathways. There are administrative records associated with each of the Buffalo River State Inactive Hazardous Waste Disposal Sites. The availability of this information will facilitate preparation of the Assessment Plan and conducting the Assessment, thereby reducing associated costs. Any additional data sufficient to pursue an assessment can be obtained at a cost that is substantially less than the anticipated damage amount.

Criteria #5: Response actions, if any, carried out or planned do not or will not sufficiently remedy the injury to natural resources without further action.

Response actions will not sufficiently remedy the injury. Although contaminants have likely migrated considerable distances from the Sites in wastewater discharges, groundwater, and sediment, the response actions at only one State Inactive Hazardous Waste Disposal Site

(Buffalo Color Area D, Appendix A) have undertaken limited dredging of Buffalo River sediment adjacent to the Site.

The Trustees believe that response actions implemented under remedial programs have failed to address the likely cumulative ecosystem impacts of the contaminants on the Buffalo River system, particularly bioaccumulation in the biota of the Buffalo River and residual contamination of the sediments. Therefore, the Trustees have determined that response actions carried out or currently planned will not remedy the injury to the natural resources of the Buffalo River without further action.

V. PREASSESSMENT SCREEN DETERMINATION

Following review of inforn1atioi1 described in this Preassessment Screen, the Trustees have made a preliminary detennination that the criteria specified in 43 CFR Part 11 (Natural Resource Damage Assessments) have been met. The Trustees have further determined that there is a reasonable probability of making a successful claim for damages to natural resources within the Buffalo River and its affected environment over which the Trustees have trusteeship. Therefore, the Trustees have detcm1ined that an assessment of Buffalo River natural resource damages is warranted.

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Marvin E. Moriarty
N01iheast Regional Director
United States Fish and Wildlife
· Service
United States Depaiiment of the
Interior, Authorized Official

Date: _____

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Leo Henry
Chief
Tuscarora Nation

Date: _____

Alexander B. Grannis
Commissioner
New York State Department of
Environmental Conservation
For the State of New York

APR 28 20II

Qate: _____

V. PREASSESSMENT SCREEN DETERMINATION

Following review of information described in this Preassessment Screen, the Trustees have made a preliminary determination that the criteria specified in 43 CFR Part 11 (Natural Resource Damage Assessments) have been met. The Trustees have further determined that there is a reasonable probability of making a successful claim for damages to natural resources within the Buffalo River and its affected environment over which the Trustees have trusteeship. Therefore, the Trustees have determined that an assessment of Buffalo River natural resource damages is warranted.

Marvin E. Moriarty
Northeast Regional Director
United States Fish and Wildlife Service
United States Department of the Interior, Authorized Official

Date: MAY 0 9 2008

Leo Henry
Chief
Tuscarora Nation

Date: _____

Pete Grannis
Commissioner
New York State Department of Environmental Conservation
For the State of New York

Date: _____

V. PREASSESSMENT SCREEN DETERMINATION

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_____

Marvin E. Moriarty
Northeast Regional Director
United States Fish and Wildlife Service
United States Department of the Interior, Authorized Official

Date: _____

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Neil :Patterson, Jr.

Tuscarora Nation

Date: ***12/1/02***

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Alexander B. Grannis
Commissioner
New York State Department of Environmental Conservation
For the State of New York

Date: _____

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FIGURES

Figure 1. Buffalo River Preassessment Screen assessment area.

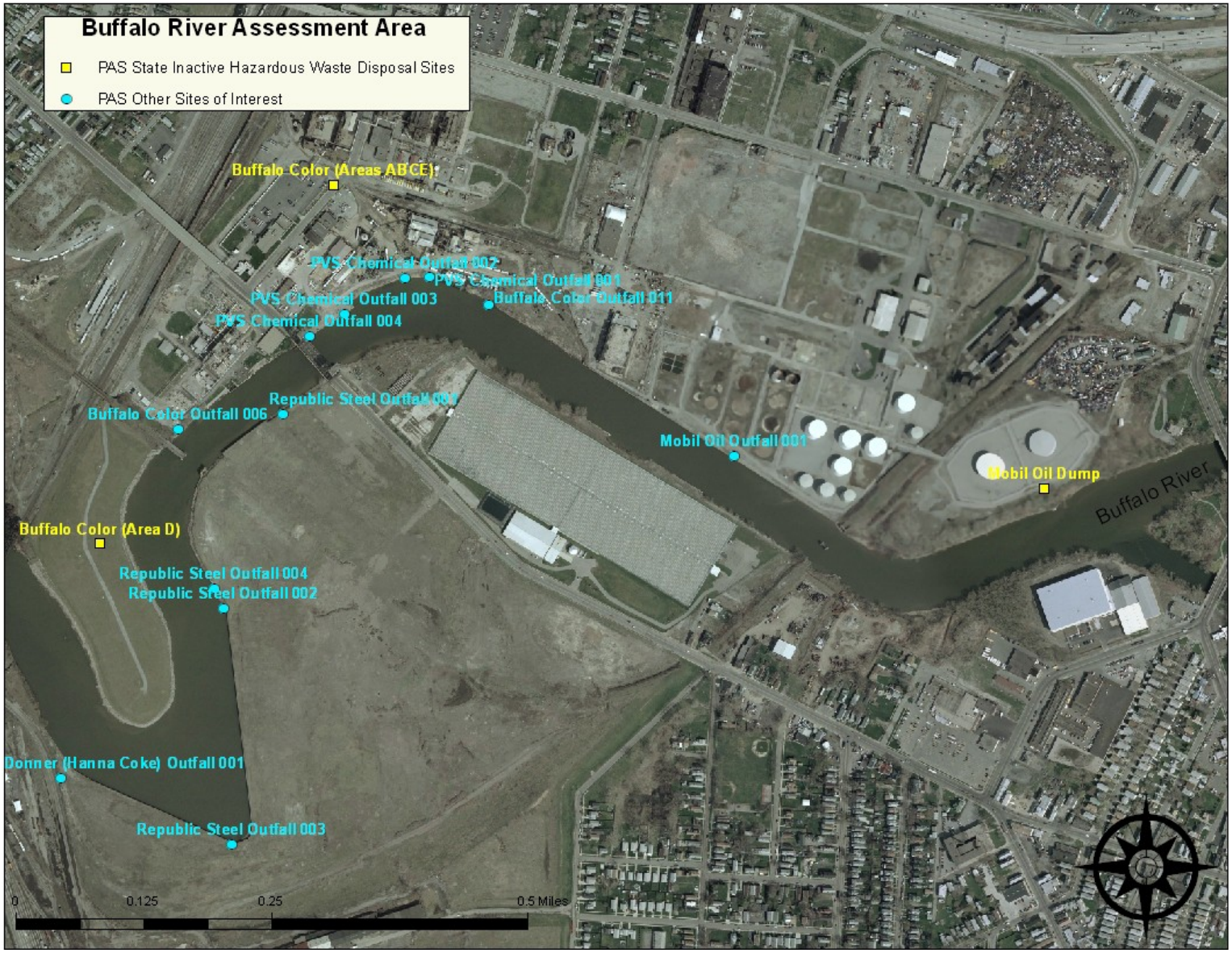

Figure 2. State Inactive Hazardous Waste Disposal Sites and Other Potential Sites that may impact the Buffalo River.

TABLE

Table 1. Contaminant concentrations and/or concentration ranges in media (by Year) in the Buffalo River.

	Buffalo River
PCBs in Water (ppb)	[1] 0.064 (1994), [2] 0.003 (1996)
PCBs in Fresh Water Mussels (ppb ww)	[3] 40-60 (2000)
PCBs in Sediment (ppb dw)	[4] 70-3,170 (1981), [5] 803 (1981), [6] 345-46,950 (1985), [4] 2,709 (1985), [7] 2,380-5,200 (1989-1990), [8] 43-49,935 (1989-1990)
PCBs in Fish (ppb ww)	[5] 4,260 (1977), [9] 6,670 (1984), [10] 352-448 (1985), [10] 58-128 (1987), [5] 144 (1987), [11] 2,400-5,000 (1995), [12] 61 (1997), [13] 140-6,956 (2003), [14] 324-759 (2004)

	Buffalo River
PAHs in water (ppb)	[15] 0.0036-0.053 (1980-1981)
PAHs in Sediment (ppb dw)	[15] 1,900-86,000 (1980-1981), [16] 514-17,027 ww (1980-1981), [4] 1,900-285,000 (1981), [5] 49,018 (1981), [5] 37,457 (1983), [5] 38,308 (1985) [6] 19,100-324,000 (1985), [17] 3,370-99,940 (1989), [7] 1,265-327,194 (1989-1990), [8] 880-177,330 (1989-1990)
PAHs in Fish (ppb ww)	[18] 4,671-904,062 (1991-1992)
Dioxin in Sediment (ppb dw)	[7] 0.065-14.21 (1989-1990)
Dioxin in Fish (ppb ww)	[11] 0.0027-0.146 (1995), [12] 0.0024 (1997)

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1. Loganathan *et al*. 1997
2. NYSDEC 1997
3. Richman 2003
4. Rockwell *et al*. 1984
5. NYSDEC 1989
   Sediment Sampling
      1981 – USEPA
      1983 – NYSDEC
      1985 - Erie County
   Fish Sampling
      1977 – Carp (*Cyprinus carpio*)
      1987 - NYSDEC YoY spottail shiner (*Notropis hudsonius*)
6. Litten 1987
7. ARCS 1993
8. ARCS 1995
9. NYSDEC 1987 carp
10. Skinner *et al*. 1994; YoY spottail shiner
11. Loganathan *et al*. 1995; carp
12. Preddice *et al*. 2002; bluntnose minnow (*Pimephales notatus*)
13. NYSDEC 2006a; bluntnose minnow
14. NYSDEC 2006b; bluntnose minnow
15. Kuzia and Black 1985
16. Black 1983
17. USCOE 1989
18. Hickey 1993; brown bullheads (*Ameiurus nebulosus*)

APPENDIX A. State Hazardous Waste Disposal Sites and Other Potential Sites that may impact the Buffalo River.

Appendix A describes New York State Inactive Hazardous Waste Disposal Sites and other potential sites that may impact the Buffalo River (Gradient/Geotrans 1988, NYSDEC 1989, USEPA and NYSDEC 2000, NYSDEC 2003, USEPA and NYSDEC 2003, 2004, and 2005, Roux Associates 2007). However, the Trustees believe that it is likely that there are other sources of contamination to the Buffalo River and its environment which have caused natural resource damages. During the preassessment and assessment processes, the Trustees will attempt to identify and document these other sources of contamination which have caused and/or are causing injury to natural resources. Therefore, the list of Sites and PRPs specified in Appendix A does not preclude the Trustees from adding to and/or modifying the current list of Sites and/or PRPs as they obtain more information during the natural resource damage preassessment and assessment processes. *See* 43 CFR §11.32(e)(1).

Buffalo Color Areas "ABCE" and Buffalo Color Area "D". The main Buffalo Color Site occupies 42 acres adjacent to the Buffalo River and was a major manufacturer of indigo dye. Dyestuffs and/or organic chemicals had been continuously produced at the facility for more than 110 years. Dye manufacturing produced approximately 450,000 gallons per day of process water.

Area **"D"** is a 19-acre NYSDEC Inactive Hazardous Waste Disposal Site that was used from 1905 through 1974 for chemical manufacturing, handling, and disposal. The Site is adjacent to the main Site property along the Buffalo River. Chemical manufacturing at the Site ceased in 1974 and chemical handling ceased in 1976. Chemicals of concern include acids (picric acid), petroleum-based detergents, dye intermediates, PAHs, chlorinated benzenes, VOCs, iron, nickel, cyanide, chromium, methanol, toluene, phenol, and anilines. High levels of PAHs, chlorinated benzenes, iron, other metals, and non-aqueous phase liquids (NAPL) were found in groundwater at the Area **"D"** Site.

Prior to 1971, Buffalo Color wastes were discharged directly to the Buffalo River. From 1971 to 1989, waste was diverted to impoundments for neutralization prior to discharge to the Buffalo Sewer Authority. In 1989, Buffalo Color installed a new neutralization tank to treat water before discharge to sewers. Groundwater flow in the upper aquifer is toward the Buffalo River and groundwater has been shown to be contaminated with VOCs and semi-volatile organic compounds (SVOCs) above NYSDEC groundwater standards. Remedial actions for the Area "D" Site include dredging river sediments adjacent to the Site and placing on-site, plus armoring shoreline, a cap, slurry wall, and groundwater collection and treatment system. The Remedial design and required work for Area "D" was completed in 1998. Long-term monitoring is underway and a long-term waste monitoring plan was finalized in 2002.

Buffalo Color filed for Chapter 11 Bankruptcy protection in October 2002. A NYSDEC Consent Order was issued to Honeywell (PRP) to implement an Interim Remedial Measure to collect and treat contaminated groundwater and perform a Remedial Investigation and Feasibility Study for Areas ABCE. The groundwater collection system was installed in 2006 and became operational in early 2007. The Remedial Investigation and Feasibility Study field work began in January 2007.

Buffalo Color (Outfalls). Beginning in 1967 and until 1971, approximately 22 million gallons per day of Buffalo River Improvement Corporation (BRIC)-supplied process water and cooling

water were discharged to the Buffalo River. From 1971 to 1989, waste was diverted to impoundments for neutralization prior to discharge to the Buffalo Sewer Authority.

Donner – Hanna Coke (Outfall). The plant produced metallurgical coke from the 1970s through the early 1980s. Approximately 16 million gallons per day of BRIC-supplied process water and cooling water were discharged to the Buffalo River. A phenol recovery system was used to treat the discharge until sedimentation facilities were added in 1975. In May 1982, coke production operations were terminated.

Mobil Oil (Dump). This NYSDEC Inactive Hazardous Waste Disposal Site is a 3-acre area (part of larger 62-acre site) located along the Buffalo River that was used for disposal of wastes such as demolition debris, tank sediments, sewer sediments, soils containing asphalt, and general refuse. Mobil Oil used the Site until 1976 for disposal of unknown quantities of tetraethyl lead sludge, lubricating sludges, spent catalysts, and other wastes. The City previously owned the Site and used it for disposal of municipal waste. Chemicals of concern include lead, spent catalysts, lube sludges, PAHs, and VOCs. Lead and VOCs have been found in Buffalo River sediment, SVOCs found in groundwater, and liquid petroleum found in a monitoring well. Lead and VOCs are among the contaminants of concern that have migrated to the Buffalo River. Groundwater flow across the Site is generally to the south toward the Buffalo River.

A State Superfund Phase I Investigation Report was completed in 1983. A Phase II Report was completed in 1987. Further Site investigation is being conducted under the NYSDEC Multi-Media Pollution Prevention (M2P2) Program. Two remedial systems are in place to contain and recover spilled oil in soils and groundwater. The M2P2 environmental program is assessing effectiveness of the existing remedial system. In 2004 ExxonMobil submitted plans to upgrade the containment system. As part of this effort buried abandoned pipes were removed from the northern portion of the terminal. ExxonMobil was accepted into the Brownfield Cleanup Program to address the entire site. A work plan to define the operable units and scope of work was completed in Spring 2006 and work continues through 2008.

Mobil Oil (Outfall). The facility was used for oil refining by Mobil Oil from 1951 until 1981 when refinery operations were terminated. Beginning in 1967 and continuing until refinery operations were terminated in 1981, BRIC supplied 21 million gallons per day of non-contact cooling water and process water to Mobil Oil. From the 1970s into the early 1980s, Mobil Oil operated a 43,000 barrel per day refinery at the Buffalo facility. In 1979, BRIC-supplied process water discharge was redirected from the Buffalo River to the Buffalo Sewer Authority Waste Water Treatment Plant. The facility currently functions as a storage and distribution terminal. Exxon and Mobil Oil merged in late 1999 to form ExxonMobil. A spill at the Mobil Oil Buffalo facility was documented on the Buffalo River on September 2004 (pers. comm. Walia). Oil has been discharged, and continues to be discharged, either directly into the Buffalo River or into the groundwater aquifer, leading to eventual discharge into the Buffalo River.

PVS Chemical - Allied Chemical (Outfalls). The Allied Chemical Corporation-Industrial Chemical Division was established in 1966 and by the late 1970s, the Buffalo Industrial Chemical Division facility manufactured sulfuric acid, sulfur trioxide, oleum (fuming sulfuric acid), nitric acid, oxalic acid, ammonium thiosulfate, potassium nitrate, and metal nitrates. Beginning in 1967, process and cooling water were supplied by BRIC at the rate of about 15 million gallons per day. In late 1980, the firm discontinued all nitrite and nitrate compound production operations, and in late 1981, sold the sulfuric acid, sulfur trioxide, and oleum production plant to PVS Chemical Corporation. The PVS Chemical Site is directly adjacent to

the Buffalo Color Site (another Allied Chemical facility purchased by an unaffiliated company). In November 1982, all chemical production was discontinued by Allied Chemical except ammonium thiosulfate production which was terminated in 1985. As of 1989, PVS discharged 10 million gallons per day of non-contact cooling water to the Buffalo River from production of sulfuric acid, sulfur trioxide, and oleum. As of 2007, PVS Chemical continued its production of chemicals at the Buffalo, New York facility.

Republic Steel (Outfalls). Republic Steel manufactured iron and steel products through the 1970s and early 1980s. The steel manufacturer discharged approximately 35 million gallons per day of BRIC-supplied non-contact cooling water and 13 million gallons per day of process water to the Buffalo River. In 1979, a program was implemented to eliminate process water discharges and a new wastewater treatment plant was completed in 1980. By mid-1981, production operations were terminated at the Buffalo facility.