2.0 Introduction

The Columbia River Basin is one of the world's great river basins in terms of its land area and river volume, as well as its environmental and cultural significance. However, public and scientific concern about the health of the Basin ecosystem is increasing, especially with regard to adverse impacts on the Basin associated with the presence of toxic contaminants. A full understanding of the toxics problem is essential because the health of the Basin's ecosystem is critical to the approximately 8 million people who inhabit the Basin and depend on its resources for their health and livelihood. [1] The health of the ecosystem is also critical to the survival of the hundreds of fish and wildlife species that inhabit the Basin. In this *State of the River Report for Toxics*, we make our first attempt to describe the risks to the Basin's human and animal communities from toxics and to set forth current and future efforts needed to reduce toxics.

The Basin drains about 259,000 square miles across seven U.S. states and British Columbia, Canada. Of that total, about 219,400 square miles, or 85 percent of the Pacific Northwest region, are in the United States; the remaining 39,500 square miles are in Canada. [2] The Basin's rivers and streams carry the fourth largest volume of runoff in North America. The Columbia River begins at Columbia Lake in the Canadian Rockies and travels 1,243 miles over 14 dams to reach the Pacific Ocean a hundred miles downstream from Portland, Oregon. The River's final 300 miles, including the dramatic Columbia River Gorge Scenic Area, form the border between Washington and Oregon. In this report, the Lower Columbia River is considered to be the reach from Bonneville Dam downstream to the Pacific Ocean, the Middle Columbia River is considered to be the reach from Bonneville Dam upstream to Grand Coulee Dam, and the Upper Columbia River is considered to be the reach above Grand Coulee Dam.

Major tributaries to the Columbia River include the Snake, Willamette, Spokane, Deschutes, Yakima, Wenatchee, John Day, Umatilla, Walla Walla, Pend Oreille/Clark Fork, Okanogan, Kettle, Methow, Kootenai, Flathead, Grande Ronde, Lewis, Cowlitz, Salmon, Clearwater, Owyhee, and Klickitat Rivers. The Snake River is the largest tributary to the Columbia River, with a drainage area of 108,500 square miles, or 49 percent of the U.S. portion of the watershed. Another major tributary is the Willamette River, which drains 11,200 square miles and is located entirely within the State of Oregon. [2]

The Basin's salmon and steelhead runs were once the largest runs in the world, with an estimated peak of between 10 million and 16 million fish returning to the Basin annually to about 1 million upriver adult salmon passing Bonneville Dam in recent years. [3] For thousands of years, the tribal people of the Basin have depended on these salmon runs and other native fish for physical, spiritual, and cultural sustenance. Bald eagles, osprey, bears, and many other animals also rely on fish from the Columbia River and its tributaries to survive and feed their young. Historically, the large annual returns of adult salmon and steelhead have contributed important marine nutrients to the ecosystems of the interior Columbia River Basin. The Basin is also economically vital to many Pacific Northwest industries such as sport and commercial fishing, agriculture, transportation, recreation, and tourism. Throughout history, and up to the present day, the Basin has supported settlement and development, agriculture, transportation, and recreation.

There are more than 370 major dams on tributaries of the Columbia River Basin. [4] With its many major federal and nonfederal hydropower dams, the River is one of the most intensive hydroelectric developments in the world. About 65 percent (approximately 33,000 megawatts) of the Pacific Northwest's generating capacity comes from hydroelectric dams. Under normal precipitation, the dams produce about three-quarters (16,200 average megawatts) of the region's electricity. Some of the other major uses of the multi-purpose dams on the Columbia and Snake Rivers include flood control, commercial navigation, irrigation, and recreation. [3]

A National Priority

In 2006, EPA designated the Columbia River Basin as a Critical Large Aquatic Ecosystem in our *2006-2011 Strategic Plan*. [5] The Plan's Goal 4, Healthy Communities and Ecosystems, is "to protect, sustain, or restore the health of people, communities, and ecosystems using integrated and comprehensive approaches and partnerships."

The Columbia River Basin goal states:

> "By 2011, prevent water pollution and improve and protect water quality and ecosystems in the Columbia River Basin to reduce risks to human health and the environment."

The focus of the *2006-2011 Strategic Plan* was achieving more measurable environmental results. Working with state, tribal, and local partners, we selected the following strategic targets for the Columbia River Basin:

- By 2011, protect, enhance, or restore 13,000 acres of wetland habitat and 3,000 acres of upland habitat in the Lower Columbia River watershed.
- By 2011, clean up 150 acres of known highly contaminated sediments in the Lower Columbia River Basin, including Portland Harbor.
- By 2011, demonstrate a 10 percent reduction in mean concentration of contaminants of concern found in water and fish tissue. Contaminants of concern include chlorpyrifos and azinphos methyl in the Little Walla Walla River, DDT in the Walla Walla and Yakima Rivers, and DDT and PCBs in the mainstem.

We selected these targets because historical data were available and each represented measurable outcomes for reduction of toxics in the Basin. Meeting these targets and the overarching goal depends on the states, tribes, local governments, federal government, and nongovernmental agencies working together to improve the health of the Columbia River Basin.

The Story of Contamination in the Columbia River Basin

Fish, wildlife, and people are exposed to many contaminants polluting the water and sediment of the Columbia River Basin. These contaminants come from current and past industrial discharges (point sources) to the air, land, and water and from more widespread sources such as runoff from farms and roads (nonpoint sources) and atmospheric deposition. Some contaminants, such as mercury, also come from natural sources. Even when released in small amounts, some of these contaminants can build up over time to toxic levels in plants and animals.

In 1992, an EPA national survey of contaminants in fish in the United States alerted EPA and others to a potential health threat to tribal and other people who eat fish from the Columbia River Basin. [6] The Columbia River Inter-Tribal Fish Commission (CRITFC) and its four member tribes—the Confederated Tribes of the Warm Springs Reservation of Oregon, the Confederated Tribes and Bands of the Yakama Nation, the Confederated Tribes of the Umatilla Indian Reservation, and Nez Perce Tribe—were concerned for their tribal members who consume fish.

To evaluate the likelihood that tribal people may be exposed to high levels of contaminants in fish, EPA funded the CRITFC tribes to conduct a Columbia River Basin tribal fish consumption survey, which was then followed by an EPA and tribal study of contaminant levels in fish caught at traditional tribal fishing sites. [7,8] The consumption survey showed that the tribal members were

Human activities have contributed many toxic contaminants to the Columbia River Basin over the last 150 years:

- Dioxins, PCBs, metals, and other toxic chemicals were spilled and dumped in Portland Harbor. The sources: boat-building, steel-milling, and sewer discharges.
- "Legacy pollutants"—chemicals banned in the 1970s such as PCBs and chlorinated pesticides such as DDT—still contaminate the river. The sources: farmland, roads, construction sites, and stormwater runoff.
- Newer chemicals, including modern pesticides, flame retardants such as PBDEs, pharmaceuticals, and personal care products, contaminate the river. The sources: runoff and sewers.
- Metals wash into Lake Roosevelt. The sources: metal smelters in Washington and British Columbia.
- Metals wash into the Spokane River. The source: mines in northern Idaho.

eating six to eleven times more fish than EPA's estimated national average at that time of 6.5 grams per day. The fish contaminant study showed the presence of 92 contaminants in fish consumed by CRITFC tribal members and other people in the Columbia River Basin. Some of these contaminant levels were above the levels of concerns for aquatic life or human health. [8] Contaminants measured in Columbia River fish included PCBs, dioxins, furans, arsenic, mercury, and DDE, a toxic breakdown product of the pesticide DDT.

The Origin and Purpose of the Columbia River Toxics Reduction Working Group

Over the past two decades, much information was collected on the levels of contaminants in water, sediment, and fish in the Columbia River Basin. The result was an accumulation of scattered data that needed to be compiled into a Basin-wide report of the potential impacts from contaminants to people, fish, and wildlife. In 2005, EPA joined other federal, state, tribal, local, and non-profit partners to form the Columbia River Toxics Reduction Working Group to better coordinate this work and share information. Our goal is to reduce toxics in the Basin and prevent further contamination. This goal includes reducing toxics in the plants and animals that people eat and ensuring the survival, reproduction, and growth of fish and wildlife in the Basin.

One of the first actions this multi-stakeholder group identified was the development of a report for the Columbia River Basin describing the state of the River. The Working Group recognized toxics as one of several important factors affecting the health of the Basin's people, plants, and animals. We also recognized that toxics had received less attention than other factors and that a report on the influence of toxics was a good first step in understanding the health of the Basin's ecosystem.

This *State of the River Report for Toxics* was prepared under the leadership of EPA Region 10 with the support and guidance of the Working Group. This report sets in motion the process by which we will address the following questions:

- Which toxics are we most concerned about in the Columbia River Basin, and why? Which toxics are the highest priority for cleanup?
- Where are the toxics coming from? How can they be controlled and cleaned up? How can we prevent contamination in the future?
- What can indicator species tell us about the health of the Columbia River Basin? What indicator species should we use to evaluate the health of the ecosystem? Is the health of the ecosystem improving or declining? What additional information do we need to collect so that we can determine changes over time to better understand and deal with the toxics problem?
- What toxics reduction actions are currently under way? Have they been successful? What actions are planned to further reduce toxics?
- What are the next steps to improve the health of the Columbia River Basin ecosystem? What are the short- and long-term monitoring and research needs?

This report will be used to inform people, communities, and decision-makers in the Basin about the toxics problem and to begin a dialogue to identify potential solutions for improving the Basin's health.

VISIT THE WEB In addition to this report, EPA's Columbia River Basin website (http://www.epa.gov/region10/columbia) will provide more detailed and up-to-date information on the health of the Columbia River Basin as work continues.