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## Introduction

### Geography

The St. Croix River basin covers 1,630 square miles (Basin Map 6). Approximately 20 miles south of Houlton, the St. Croix River flows out of North Lake on the border between Maine and New Brunswick, Canada. It runs generally south, forming the southern portion of Maine's eastern border. The upper part is mostly a succession of lakes (Chiputneticook Lakes). The St. Croix River mainstem forms at the towns of Vanceboro and St. Croix, the first developed area along its course, before continuing to flow south through miles of wetlands and wilderness. The lower portion of the St. Croix River basin eventually is influenced by a pulp and paper mill in Woodland. It then flows through Baring, and Calais, before emptying into Passamaquoddy Bay. The total length from North Lake to the Bay is about 95 miles.

The North Coastal Region covers 3,466 square miles and encompasses a number of minor river basins (Basin Map 6, p. 167). Three of the largest rivers in

this region are the Union River, the Narraguagus River, and the Machias River. The West Branch of the Union River begins in Great Pond, north of Ellsworth, and runs approximately 17 miles before entering Graham Lake. The mainstem, starting at Graham Dam flows 4 miles to tidewater in Ellsworth, emptying into Union River Bay. The Narraguagus River, begins in Deer Lake, approximately 8.5 miles northeast of Great Pond. It runs south for approximately 42 miles, to the town of Cherryfield (tidewater), emptying into Narraguagus Bay 5 miles below Cherryfield at Milbridge. The Machias River headwaters begin as a series of lakes (Machias Lakes). From First Machias Lake the river flows south-southeast through hills, ridges, and wetlands for about 46 miles before reaching the developed regions near Machias. Here it joins the E. Machias River and empties into Machias Bay. Besides the Narraguagus, there are four other sampled streams in this basin.

<b>Basin Summary Statistics</b>	
<b>Biomonitoring Activities in the Basin</b>	Period of Record: 1984-1998 Waterbodies Sampled: 16 Established Stations: 30 Number of Sampling Events: 38
<b>Wastewater Discharges</b>	<b>St. Croix R. Basin</b> --1 paper mill and 4 municipal treatment plants serving a population of approximately 7,000 in the U.S. <b>North Coastal Region</b> --3 municipal treatment plants, 1 on the Union R. and 2 on the Machias River. <b>Note:</b> There are 20 other municipal treatment plants in this basin discharging into tidal waters. These impacts are not measured by the Biological Monitoring Program.
<b>Other Sources</b>	Agricultural runoff (pesticides); peat mining; BOD from fish hatchery; in-place contamination (old mining site and a Superfund site).
<b>Flow Regulation</b>	<b>St. Croix R. Basin</b> --Water level controlled by approximately 29 dams including 4 FERC-licensed projects and 1 International Joint Commission (Canada and US) licensed dam. <b>North Coastal Region</b> --Water level controlled by approx. 120 dams (87 for hydropower generation) including 4 FERC-licensed hydro-projects
<b>Quality</b>	Generally high quality water except for localized impacts from fish hatchery, agricultural activities and pulp mill discharge.

<b>Drainage area</b>	<b>Average Annual Discharge</b>	<b>Wastewater Flow Volume (Major Industrials and All Municipal Discharges Only)</b>	<b>Mainstem Average Dilution</b>
St.Croix---1,374mi <sup>2</sup> (at Baring)	St.Croix---2,639cfs (at Baring)	41.8 mgd (64.8 cfs)	41:1
North Coastal—N/A	N/A	N/A	N/A



## Overview of Biological Monitoring Activities

These two basins cover a large, sparsely populated geographic area (Basin Map 6, p. 167). This region of the state has a higher proportion of waterbodies of statutory Class AA and Class A than the more populated areas in the central and southern parts of the state. Unfortunately the St. Croix and North Coastal basins are scheduled for NPDES Five Year rotational sampling during the same field season as the entire Penobscot River basin (Chapter 1, Table 5, p. 14). Due to the problems with travel distances and limited staff resources this region of the state is relatively under-sampled by the Biological Monitoring Program (Basin Table 6, p. 150). It was last sampled for NPDES re-licensing in 1996. Only 3 new stations were added by MDEP in 1996, but a cooperative arrangement with National Park Service has added 6 additional stations in Acadia National Park, on Mt. Desert Island, in the past 3 years. Of the thirty stations established in these two basins, ten (all in the North Coastal region) are failing to attain assigned aquatic life standards. Causes are varied and include aqua-culture (Basin Table 6, Stas. 235; 236 and 113) and in-place contamination (Stas. 150 and 297) as well as agricultural and mining non-point sources. Two stations on the St. Croix mainstem and 2 in the North Coastal region exceed standards of their assigned class. The region is next due for intensive sampling in 2001.

The North Coastal basin is notable for containing five of the seven rivers designated in the Atlantic Salmon Conservation Plan (ASCP) (Maine State Planning Office 1998). These rivers are the Dennys, the Machias, the East Machias, the Narraguagus and the Pleasant. The other two rivers covered by the Plan are the Sheepscot (Chapter 7); and the Ducktrap, between Camden and Belfast (not sampled by the Biomonitoring Program).

The ASCP is a five-year, comprehensive directive of conservation actions designed to protect, restore and promote the success of wild Atlantic salmon in the above listed seven rivers in Maine. The Plan resulted from the work of a task force convened by Maine Governor Angus King in 1998. Over twenty federal and state agencies and public and private organizations are included as partners in the Plan. Partners include: the US Fish and Wildlife Service, US EPA, the Atlantic Salmon Federation, the Maine State Planning Office, the Maine Department of Inland Fisheries and Wildlife, the Maine Department of Environmental Protection, Champion International, Cherryfield Foods and local Watershed Councils, among others. The Plan is intended to address existing, known threats to Atlantic salmon survival as well as a broad range of potential threats. Pursuant to addressing potential threats, the Plan places a significant emphasis on encouragement of best management practices in forestry and agriculture, monitoring of pesticide use, adoption of water use management plans, protection of riparian habitat, establishment of buffers and the prevention of potential negative impacts from cultured fish. The MDEP has participated in the Plan by providing summaries of existing, baseline information on these important rivers and by providing technical support related to monitoring and water quality management.

Site remediation is currently in progress for the hazardous waste site located in Meddybemps on the Dennys River. This site has a variety of contaminants, especially PCB's. Repeat sampling in 1999 at Station 297 did not indicate a noticeable improvement in the community compared to 1997, however, processing of these samples is incomplete at this time.