AN ENVIRONMENTAL GUIDEBOOK TO THE BUFFALO RIVER

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I. INTRODUCTION

The lower reach of the Buffalo River has been designated an Area of Concern (AOC) by the International Joint Commission (IJC) due to poor water and sediment quality and general environmental impairment. A level I Remedial Action Plan (RAP) has been developed for the Buffalo River and was submitted to the IJC for review in November, 1989 (New York State Department of Environmental Conservation (NYSDEC), 1989). A very active Buffalo River Citizens' Committee assisted the NYSDEC in the development of the RAP. Environmental impairments that were identified in the RAP include: restrictions on fish and wildlife consumption; fish tumors and other deformities; degradation of benthos; restrictions on disposal of dredged sediment; and loss of fish and wildlife habitat. In addition, the RAP noted that degradation of fish and wildlife populations and bird or animal deformities/reproduction problems were likely.

A variety of metals and organic compounds have been identified in the water and sediment of the river. There are multiple possible sources for these different pollutants, including: direct industrial discharges; leaching from inactive hazardous waste sites; combined sewer overflows; water column interaction with historically contaminated bed sediment; and upstream point and non-point sources such as municipal wastewater treatment plants and agricultural runoff.

This guidebook provides an introduction to the complex and unique Buffalo River environment, as well as a summary of current information on pollutant levels and sources. "Environment" is defined in the broadest sense, in this guidebook, as pertaining to both the physical and cultural environment. In particular, it is essential to have a view of the industrial and commercial history of the Buffalo River in order to understand current pollutant dynamics within the river. Historically, the lower reach of the river flowed through an area of heavy industrial and commercial activity. For various reasons, outlined below, commercial and industrial activities have experienced a decline along the river. The former industrial and commercial activities have left a varied and interesting legacy, from abandoned grain elevators to inactive hazardous waste sites.

This guidebook is divided into three sections. The first section describes the physical characteristics of the river, including the hydrology, channelization and lake effects. The second section briefly summarizes pollutant levels for Buffalo River water and sediment and identifies possible pollutant sources. The final section provides a tour guide as the boat travels up the river. The final section also provides the commercial and industrial overview needed to complete the picture of the Buffalo River impairment.

II. PHYSICAL CHARACTERISTICS

The Buffalo River basin has a total drainage area of 446 mi^2 and is fed by three major tributaries: Cayuga Creek; Buffalo Creek; and Cazenovia Creek (Figure 1). The Buffalo River itself begins at the confluence of Cayuga and Buffalo creeks, approximately 8.1 miles above the mouth at Lake Erie. Cazenovia Creek enters the Buffalo River about 6 miles above the mouth. Landuse within the watershed varies. Much of the upper portion of the watershed is characterized by woods and farmland, but prior to joining the Buffalo River the creeks also pass through several small communities and receive both industrial and municipal discharges.

Most of the watershed lies within Erie County, with the exception of the uppermost reaches. The bedrock of Erie County is of the Silurian, Middle and Upper Devonian periods and includes shales, dolomites and limestones. The bedrock is relatively flat, dipping approximately 50 feet per mile to the southwest (USDA, 1986).

The county is in two physiographic regions. The northern half and western edge of the county are within the Erie-Ontario Lake Plain Province, while the southern half of the county is within the Allegheny Plateau Province. The Erie-Ontario Province formerly was a glacial lakebed and therefore has limited relief except in the areas of the major drainage ways. The southern and eastern boundaries of the Erie-Ontario Province are formed primarily by glacial lake beaches. The Allegheny Plateau has characteristic wide ridge tops and flat-topped hills.

Erie county experienced several glacial advances and retreats between approximately 300,000 and 10,000 B.P. and the resulting mix of deposited material has given rise to several soil types. Various tills are an important parent material in the county, although soils also have developed from glacial lacustrine and glacial outwash deposits. Modern alluvial deposits along major waterways also have produced grayish brown silt loams that exhibit variable drainage classifications from well to poorly drained. A general map of soils in the county and associated physical characteristics is presented in Figure 2.

Temperature and precipitation data for the period 1951-1977 from the Buffalo Airport are plotted in Figure 3. In general, the watershed experiences cold and snowy winters and moderately warm summers, the moderating effect becoming more pronounced nearer the lake. Approximately 50% of the total annual precipitation (37.31 inches, 1951-1977 average at the Buffalo Airport) falls in the months of April through September, with the month of August being the wettest. The precipitation in this April to September period is generated primarily by convectional processes and frontal systems. Average seasonal snowfall in Erie

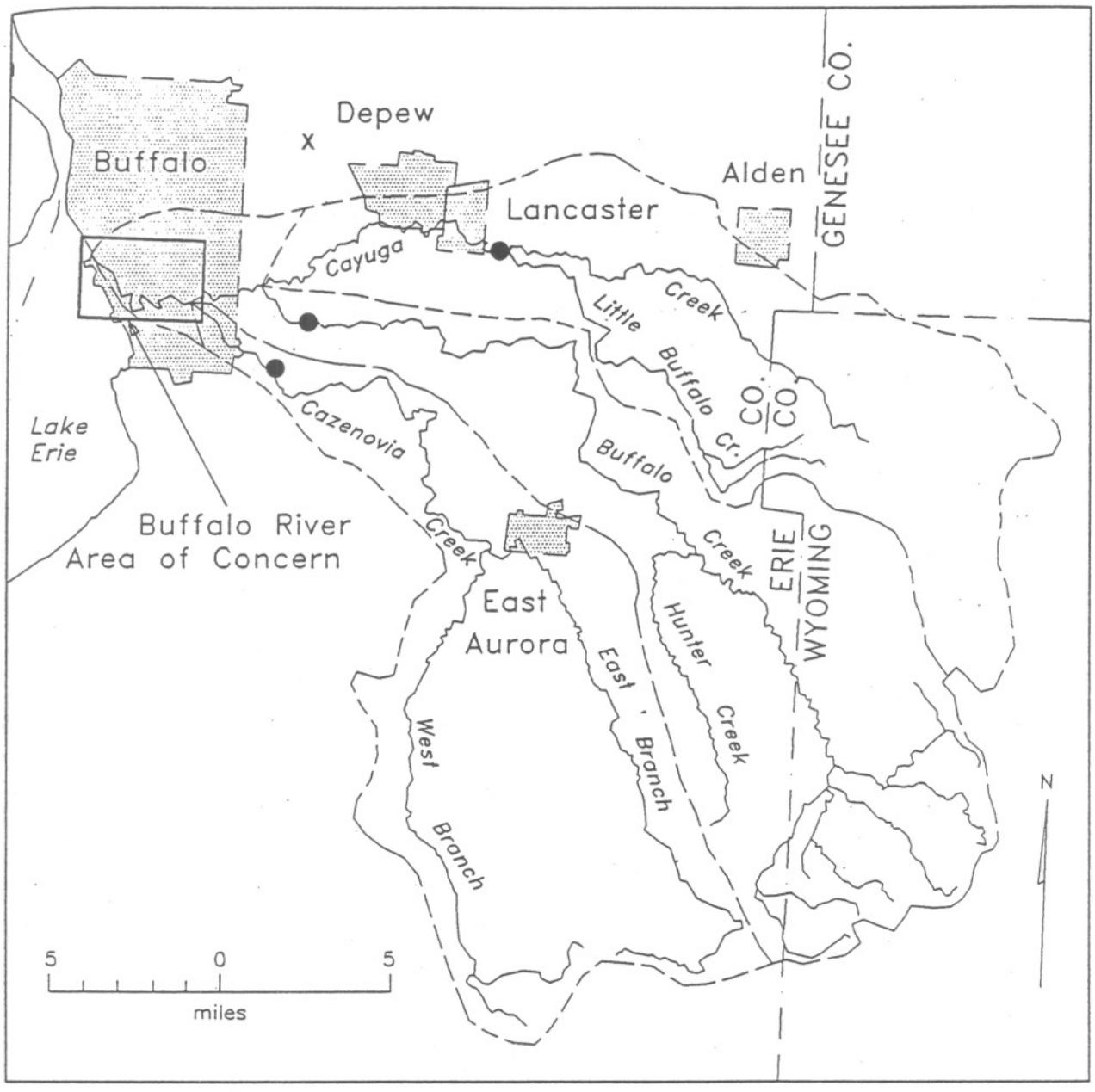
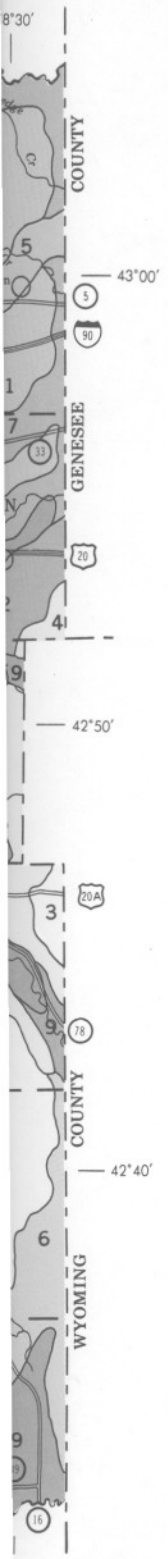


FIGURE 1 The Buffalo River watershed and Area of Concern. The locations of U.S. Geological Survey gauging stations (●) and the Buffalo Airport (x) are shown.



LEGEND*

AREAS DOMINATED BY DEEP SOILS FORMED IN GLACIAL TILL DEPOSITS

1 — Churchville-Ovid-Lima: Dominantly nearly level, deep, somewhat poorly drained and moderately well drained, medium textured soils; on lowland plains

2 — Darien-Remsen-Angola: Dominantly nearly level and gently sloping, deep and moderately deep, somewhat poorly drained, medium textured and moderately fine textured soils; on uplands underlain by alkaline shale bedrock

3 — Volusia-Mardin-Erie: Dominantly gently sloping and sloping, deep, somewhat poorly drained and moderately well drained, medium textured soils that have a fragipan; on uplands

AREAS DOMINATED BY MODERATELY DEEP AND SHALLOW SOILS FORMED IN GLACIAL TILL DEPOSITS

4 — Orpark-Manlius-Derb: Dominantly nearly level through very steep, moderately deep and deep, somewhat poorly drained to excessively drained, moderately fine textured or medium textured soils; on uplands underlain by acid shale bedrock

5 — Wassaic-Benson-Farmington: Dominantly nearly level, moderately deep and shallow, moderately well drained to excessively drained, medium textured soils; on uplands underlain by limestone bedrock

AREAS DOMINATED BY DEEP SOILS FORMED IN GLACIAL LAKE SEDIMENTS

6 — Hudson-Varysburg-Valois: Dominantly gently sloping through moderately steep, deep, moderately well drained and well drained, medium textured and moderately fine textured soils; in valleys

7 — Niagara-Canandaigua-Cosad: Dominantly nearly level, deep, somewhat poorly drained to very poorly drained, medium textured soils; on lowland plains

8 — Odessa-Schoharie-Rhinebeck: Dominantly nearly level and gently sloping, deep, somewhat poorly drained to well drained, medium textured and moderately fine textured soils; on lowland plains

AREAS DOMINATED BY DEEP SOILS FORMED IN GLACIAL OUTWASH DEPOSITS

9 — Chenango-Castile-Varysburg: Dominantly nearly level through moderately steep, deep, somewhat excessively drained to moderately well drained, medium textured soils; on plains and in valleys

10 — Blasdell-Farnham-Alton: Dominantly nearly level through sloping, deep, moderately well drained to somewhat excessively drained, medium textured soils; in valleys and on plains

AREAS DOMINATED BY SOILS IN URBAN AREAS

11 — Urban Land: Dominantly nearly level urbanized areas and areas of well drained to poorly drained soils and disturbed soils; on lowland plains

*The texture given in the descriptive heading refers to the texture of the surface layer of the major soils in each map unit. Depth to bedrock and drainage classes given are also for the major soils.

Compiled 1984

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE
CORNELL UNIVERSITY AGRICULTURAL
EXPERIMENT STATION

GENERAL SOIL MAP

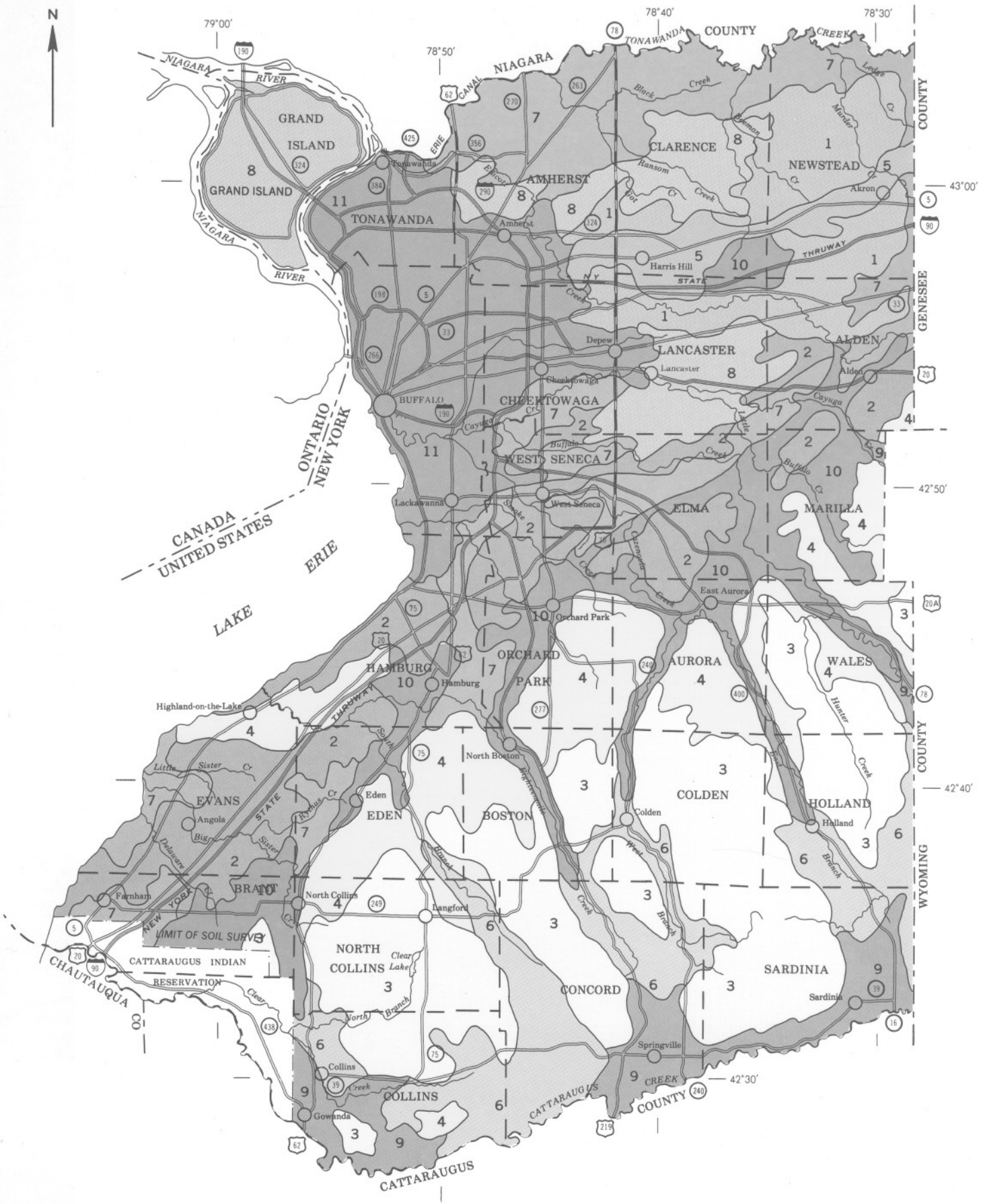
ERIE COUNTY, NEW YORK

Scale 1:316,800

1 0 1 2 3 4 5 Miles

1 0 5 10 Km

Each area outlined on this map consists of more than one kind of soil. The map is thus meant for general planning rather than a basis for decisions on the use of specific tracts.



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