Ausable River Watershed Management Strategy
Essex and Clinton Counties, New York

Compiled by:

Carol Treadwell, Ph.D.

Ausable River Association

Directed and Assisted by:

The Ausable Watershed Management Advisory Committee

State/County Representatives:
DOS/DCW - Andrew Labruzzo; Stephanie Wojtowicz
NY DEC - Fred Dunlap
NY DOT – Mike Fayette,
Essex County – Garret Dague
Essex Co. Soil and Water, Dave Reckan
Clinton Co. Soil and Water, Steve Mahoney
Town Representatives:
Town of Au Sable – Louis Murray
Town of Black Brook – Ricky Nolan
Town of Chesterfield – Richard Klages, Walter LaMountain,
Town of Jay – Joe Kahn
Town of Keene – Paul Martin
Town of North Elba – John Hopkinson
Chubb subwatershed, Madeliene Killeen
Town of Wilmington – Jeanne Ashworth/Randy Preston
Village of Keeseville – Mary King
Village of Lake Placid – Stuart Baird

Partners

State Partners:
Adirondack Park Agency – Brian Grisi
Whiteface/ORDA – Jay Rand, Bruce McCulley, Kirsten
Local Partners:
AMC/AC - Adirondack Mountain Reserve/Ausable Club, Field, Lakes and Streams Committee, Bill Gremp
ASCI – -Adirondack Sustainable Communities
SOA – Shore Owners Association of Lake Placid – Mark Wilson, President
MLWA – Mirror Lake Watershed Association – Bill Billerman
Trout Unlimited Adirondack Chapter – Chris Williamson

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Table of Contents

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Introduction

The Ausable[1] River Watershed is a jewel of the Adirondacks. It is nationally and internationally known for its resources which include a nationally ranked trout fishery, exceptional white-water recreation, numerous tourist attractions, and astounding beauty. It is on the list of NYS Wild, Scenic, and Recreational Rivers, and is included in the National Park Service's Nationwide Rivers Inventory. Nine of the highest peaks in New York State lie within the watershed, including: Mt. Marcy, Algonquin, Whiteface, Haystack, Cascade, Giant, Skylight, Nipple Top, and Gothics.

The value of this resource to wildlife, local residents, New York State, and visitors from around the world is priceless. This Plan has been prepared so that all users can "share the water" of the Ausable and preserve it for years to come.

Objectives/Purpose

The purpose of this document is to describe the Ausable Watershed, summarize and synthesize current and past watershed studies in order to make recommendations for improving water quality within the Ausable River and its watershed. First, the Watershed Management Strategy reviews **Current and Past Watershed Studies.** Second, it describes the physical aspects of the watershed such as boundaries, topography, geology, land use, waterbody classification, and important habitat and cultural resources. Third, this document synthesizes studies and data collected within the Ausable Watershed by Federal, State, and private organizations. The analysis of these three components will be used to identify priority watershed actions for the management of key water quality issues throughout the watershed. These recommendations and implementation action will then be folded into a Watershed Management Plan as planning work proceeds and grant funds are obtained. The purpose of this plan is to protect and enhance water the quality and quality of life within the watershed. Both documents should be used as a guide by Municipal Boards Planning Boards, and County Planning Offices within the Ausable Watershed.

The creation of this Watershed Management Strategy has been overseen by and guided by an Advisory Committee with representatives from each of the seven watershed towns, two villages, the Essex and Clinton County Soil and Water Conservation Districts (SWCDs), the Essex County Water Quality Coordinating Committee (WQCC), and departments of NYS DEC, NYS DOT, and NY DOS. Other partnering organizations include Adirondack Sustainable Communities, NYS Adirondack Park Agency, the Lake Placid Shore Owners Association, the Nature Conservancy, Mirror Lake Watershed Association, and Whiteface Mountain Ski area.

Current and Past Watershed Studies

The Ausable River Study (1994) was the first watershed wide study conducted for the Ausable. It led to the formation of the Ausable River Association (ASRA) in 1998. Since its inception, ASRA has worked with municipalities within the watershed and continued to collect data

[1] You will notice two spellings for the name "Ausable/Au Sable" in this document. According to the U.S. Department of Geographic Names, either spelling is correct depending on its usage. The river, valley, and watershed are officially spelled Ausable. The Town, hamlet, and school are officially spelled Au Sable.

throughout the watershed. This data and information from the Ausable River Study are incorporated into this document as part of a "Characterization of the Watershed."

Ausable River Study Summary: There were seven significant findings of the Ausable River Study[1]:

(1) The entire Ausable River (i.e., East and West Branches and Main Stem), 94 miles, is included in the National Park Service's Nationwide Rivers Inventory;

(2) The entire Ausable River is designated part of the Wild, Scenic and Recreational Rivers System of New York State;

(3) One-third of the watershed of the Ausable River, including all of its headwaters, is located within six areas designated as units of New York State's Adirondack Wilderness System (High Peaks, Dix Mountain, Giant Mountain, Sentinel Range, McKenzie Mountain and Jay Mountain Wildernesses);

(4) Within the watershed of the Ausable River habitat exists three globally rare plants and one globally rare animal, in addition to dozens of plant and animal species classified by New York State's Natural Heritage Program as rare (at levels below global);

(5) There are numerous significant recreational resources, both public and private, located within the river corridor, including trail systems, ice and rock climbing, flat-water and white-water boating, tourist attractions, opportunities for nature study, swimming and trout fishing;

(6) There are eighteen separate areas within the river corridor designated by the Adirondack Park Agency for significant scenic, geologic or geographic features; and

(7) There are several sites and structures within the river corridor that reflect the importance of the River to settlement in the nineteenth century, as listed on the National Register of Historic Places.

While most of these findings remain true, some small changes and abundant new data are now available and can be added to these findings published 16 years ago. Protecting the cultural and natural resources outlined and described in detail in the Ausable River Study has been the mission of the Ausable River Association for ten years. An assimilation of this information with new data will be used to uncover gaps in resource protection and to formulate a plan for protecting water quality etc..

Ausable Watershed Characteristics

Regional Context

Geology and Physiography: The region in and around the Ausable Watershed is dominated by the Adirondack Mountains, some of the loftiest mountains in eastern North America. The Adirondacks are a dome shaped uplift composed of peaks between 4,000 and 5,000 feet; the highest is Mt. Marcy at 5,344 feet. The eastern border is bordered by a long narrow lowland region, occupied by Lake Champlain and Lake George. The rivers of the Adirondacks emanate from the center of the dome and radiate outward, like spokes on a wheel, flowing into the Mohawk and Hudson Rivers on the south, Lake Ontario to the west, the St. Lawrence River to the north, and Lake Champlain to the east. The Ausable River is one of these spokes starting on Mt. Marcy and descending to Lake Chaplain at an elevation of 100 feet above sea level.

Geologically, the dome is composed of crystalline rock created 1.1 billion years ago when the North American plate collided with another large continent to create the Grenville Mountains. These mountains, long since eradicated by a billion years of erosion, had at their core crystalline igneous rocks - Gabbro and Anorthosite – which underlies most of the highest peaks, and metamorphic rocks – assorted gneisses and some marble. This geology is unique because Anorthosite, though rare at the surface of the Earth, underlies the highlands of Earth's moon!

The mountains that we see today came into existence much later in Earth's history. Uplift began 65 million years ago (Roden-Tice, 2000[2]) and according to some geologists (Isachsen[3], 1975, 1981; Treadwell, 1985[4]) domal uplift continues today at a rate of 1 mm/year (Isachsen, oral comm).

In the last 1 million years the dome has been assaulted by continental ice sheets; glaciers emanated from northern Canada and flowed southward over and around the Adirondacks. The glaciers did little to deflate the elevation of the mountains but left in their wake huge deposits of glacial outwash (sand and gravel) in the central part the Adirondacks. In northerly draining river valleys the receding glacial ice sheet dammed the outlets of rivers, creating huge glacial lakes. As the glacier melted sandy beaches and deltas were left high and dry along upper valley walls and clay deposits were left where lake bottoms once quietly inhabited the valley bottoms.

The recent episode of snow and ice came to an end 12,000 years ago. For the last 10,000 years rivers have become the dominant land shaping force.

The rivers of the Adirondacks are one of the world's largest sources of fresh, pure water, fed by the humid continental climate of northern New York. Rainfall varies from 50 inches in the west to 30 inches in the vicinity of Lake Champlain. Maximum seasonal snowfall is more than 175 inches on the western and southwestern slopes of the Adirondacks. Average snowfall is around 90 inches, with amounts decreasing to 60 to 70 inches in the lowlands of the St. Lawrence and Champlain Valleys. Temperatures in the Adirondack Region are cool compared to the rest of the state. The average annual mean temperature is 40°F; winter temperatures average 16°F.

Watershed Summary

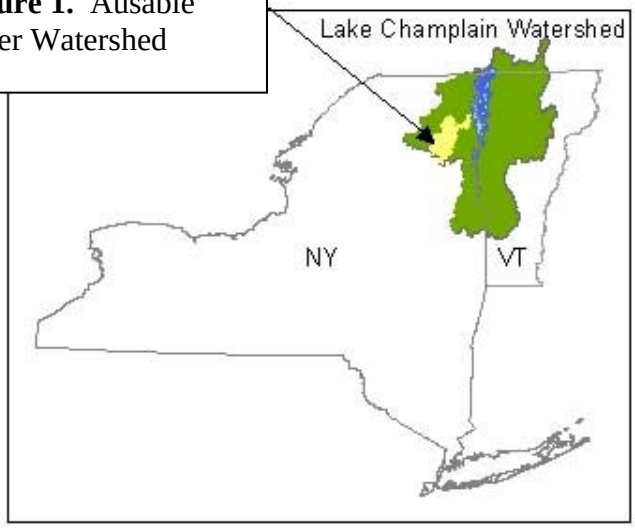

Figure 1. Ausable River Watershed

The Ausable River Watershed drains 512 square miles on the northeastern side of the Adirondack Mountains of New York State (Figures 1). It contains 94 miles of channel and is fed by more than 70 small streams, including two major tributaries, the Chubb River and Black Brook. The watershed is divided into three subwatersheds the East Branch, West Branch and Main Stem (Figure 2).

The Ausable River begins in the High Peaks Region of the Adirondack Mountains, traverses through mountainous terrain and exits spectacularly through a bedrock gorge into Lake Champlain. A large sandy delta at its mouth is responsible for giving the river its name "of the sand." Due to

the mountainous terrain it traverses, the Ausable River is the second steepest river in New York State, having an average gradient between 0.37% and 0.80%[2].

Historically the river has been used to support industry but in recent years its main human use is to support recreational and windshield tourism. Heavy industrial use, logging and mining, led to the formation of the Adirondack Forest Preserve and Park in 1885 and precipitated environmental protections that have been administered by the Adirondack Park Agency since 1973.

The Ausable River watershed is located almost entirely within the Adirondack Park except for a small area located on the north eastern side of the watershed near its mouth (Figure 3). While the upper part of the watershed publicly owned by New York State as part of the Adirondack Park Forest Preserve, approximately 85% of the land is privately owned (Figure 2). Lands within the Adirondack Park are classified by the "Adirondack Park Land use and Development Plan Map." The largest land classes for the watershed are: Wilderness, 27.7%, and Resource Management, 22.5% (Figure 3). Hamlets and Industrial use make up the smallest portion of watershed land 2.1% and <1% respectively (Figure 3).

Private lands within the Ausable Watershed are jurisdictionally governed by eight towns, two incorporated villages, and two counties. Over 80% of the watershed area is within Essex County and the remaining 15% lies within Clinton County. In Essex County, the watershed includes parts of the Towns of Chesterfield, Jay, Keene, North Elba, and Wilmington. Clinton County Towns included in the watershed are Black Brook, AuSable and Peru (Figure 2).

Watershed land cover is predominantly forest (91.8%); only 4.7% is urban and 3.4% is agricultural land (Table1). Wetlands cover 2.4% of the watershed inside the Adirondack Park[5] (Diggory, 2008) (Figure 4).

Table 1. Land Cover for the Ausable Watershed and Subwatersheds.

Watershed/Land Use	**Ausable** 512 sq. miles	**Main Stem** 80 sq. miles	**West Branch** 236 sq. miles	**East Branch** 196 sq. mi.
Forest/wetlands	89.4%/2.4%	79.1%	94.0%	94.7%
Urban	4.7%	9.0%	4.3%	3.5%
Agriculture	3.4%	11.9%	1.7%	1.8%

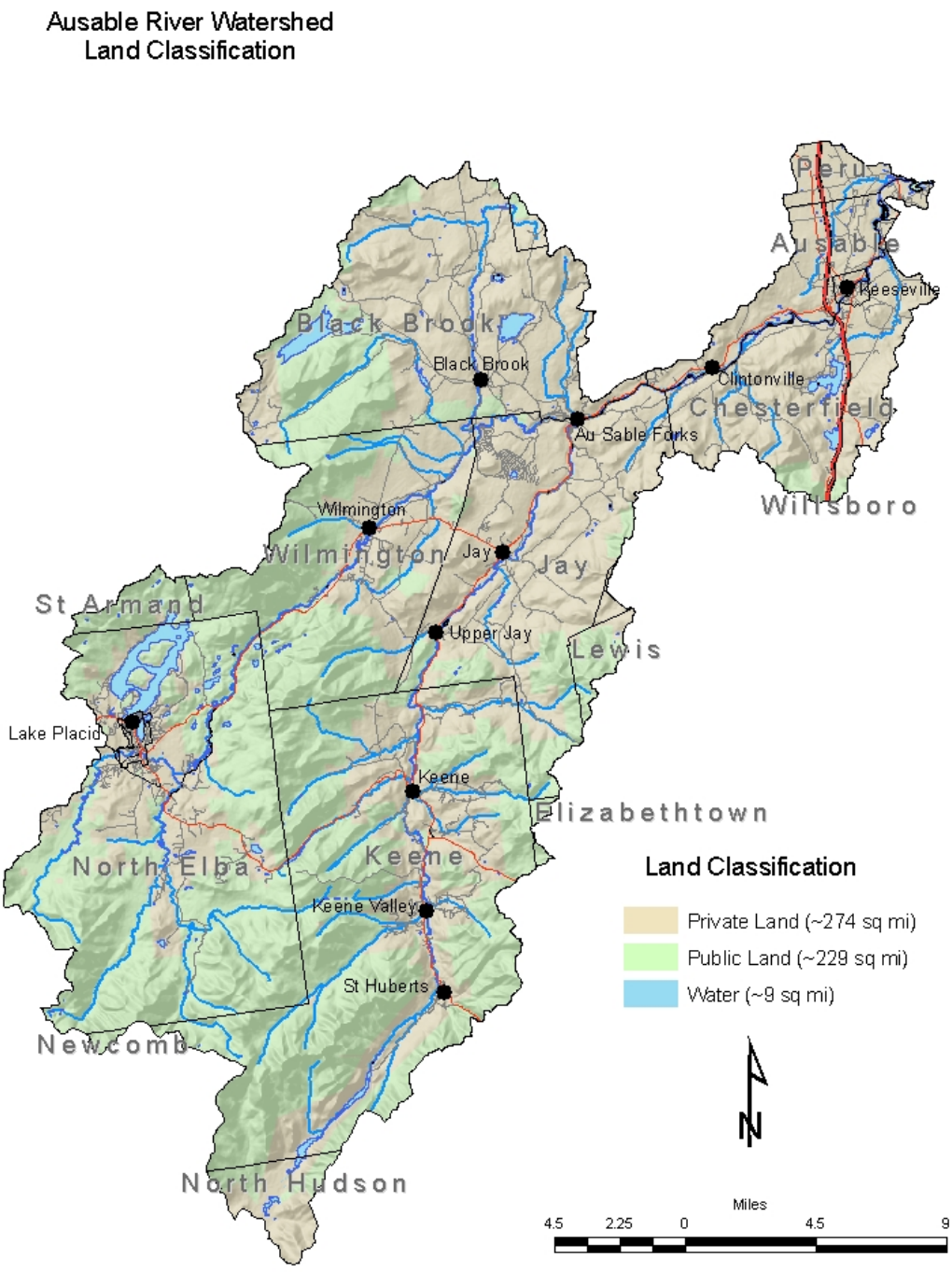

Figure 2. Map of the Ausable Watershed showing public and private land cover, and watershed towns, hamlets, and villages.

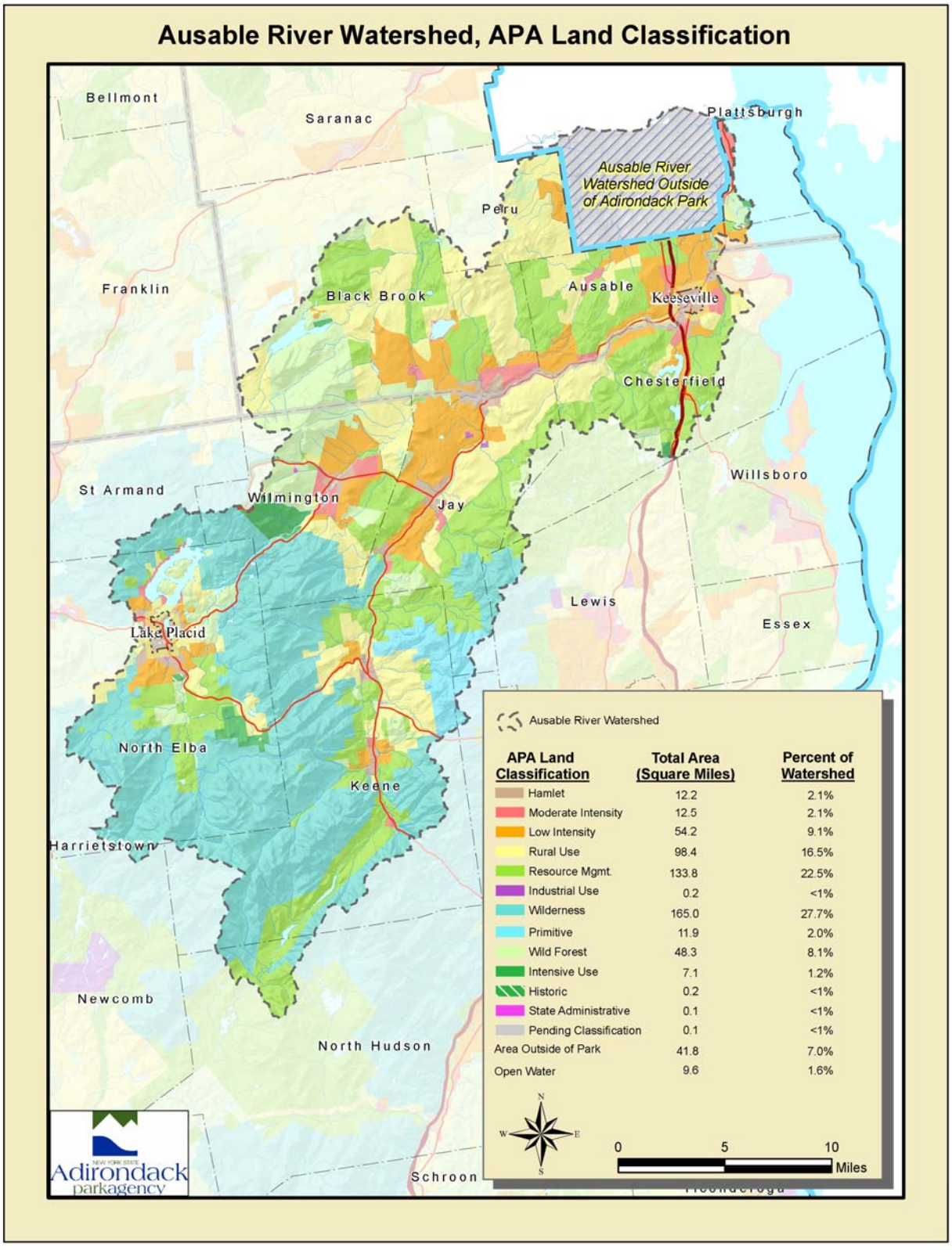

Figure 3. APA land class map.

Subwatershed Descriptions

West Branch: The West Branch Subwatershed drains 236 square miles, and is the largest subwatershed of the Ausable River. It is 94% forested, 4.3% urban, and 1.7% agriculture use (Table 1). The largest proportion of forested public land is in the headwaters area (Figure 2). Residential areas include the Hamlet of Wilmington and the Village of Lake Placid.

The Placid Lake Watershed, a subwatershed of the West Branch, drains 19.8 sq. miles into a 3.4 sq. mi. lake. The watershed is 82 % forested, 0.6 % developed, and 16% water. The lake is oligotrophic (free of algae) and characterized by low levels of phosphorus and chlorophyll A. It is moderately susceptible to sources of chemical and phosphorus contamination but has "no noteworthy threats to water quality[6]." NYSDEC has placed it on its Priority Waterbody List because of its high quality of drinking water and the possibility for contamination. Possible contaminant sources include residential and commercial properties adjacent to the waterbody, wastewater, marinas and boat launches, and non-point stormwater pollution. Contaminant threats include classified hazardous waste, petroleum, nutrients, and pathogens. Coliform bacteria and *E. Coli* have been found in parts of the lake and the location of positive samples suggest an anthropogenic source[7].

The Mirror Lake Subwatershed drains 1.5 square miles into a 0.5 sq. mi. lake. The shoreline of the lake is heavily urbanized but the eastern, upland portion of the watershed is forested. Water quality is considered to be generally good and considerable attention has been given to reducing siltation by installing storm drain filters. Other issues of concern are chemical and salt run off from streets and other impervious surfaces[8].

East Branch: The East Branch Subwatershed contains 198 square miles. Most of the East Branch passes through privately owned lands with residential, forest or pasture uses. It is 94.5% forested, 3.5% urban, and 1.8% agricultural use (Table 1). A 2.5 mile stretch on the west side of the river upstream of Upper Jay, is the only publicly owned land (Figure 2). Roads run along the East Branch throughout most of its length and the hamlets of Keene Valley, Keene, Upper Jay, and Jay[2] also sit directly on its banks.

The two branches carry about the same amount of water with the West Branch having an average flow of 374 cfs and the East Branch averaging 314 cfs.

Main Stem: The Main Stem is the most heavily developed river segment. It runs through primarily private lands, including Ausable Chasm, several former industrial sites, and an automobile junkyard. It is 79% forest, 9% urban and 11.9% agricultural use (Table 1). It passes through the hamlets of Au Sable Forks, Clintonville and the Village of Keeseville and roads run directly adjacent to the channel along much of its length. The only public land is at its delta, were the Main Stem passes through Ausable Marsh Wildlife Management Area, managed by New York State DEC[2].

Population, Income, and School Districts of the Watershed

The Ausable Watershed is a lightly populated area containing roughly 20,000 residents (see Appendix A, Table A-1). One third of the population is concentrated in the incorporated villages and hamlets. There are nine schools containing roughly 2,360 students. Income levels vary little across the watershed; all watershed communities have median household incomes below the national average (Appendix A, Table A-2). Average income is $38,000 per household for the permanent population[9].

Cultural and Historic Resources

Water power, human ingenuity, and the availability of raw materials, principally timber and iron ore, fueled the settlement and development of the Ausable Valley in the 19th century. The Ausable River was at the heart of this early development because of its usefulness as a power supply, as a water supply for communities, and as a way of disposing of wastes.

The Ausable Valley has a number of designated historic sites. The entire Adirondack Forest Preserve (est. 1885) is designated as a National Historic Landmark by the U.S. Department of the Interior[2]. Also listed on the National Register of Historic Landmarks, are John Brown Farm (1849) in North Elba; and the Elkanah Watson House (1828) in Port Kent.

There are also an abundance of structures within the Ausable River corridor that are on the National Register of Historic Places; these include: the Keeseville Historic District which includes 125 residential, commercial, ecclesiastical, and industrial buildings, and three historic bridges that are also listed as a national Historic Civil Engineering Landmark. The river is spanned by a variety of old and historic bridges that represent one hundred and sixty-six years of engineering history[10] (Appendix A).

While receiving no official historic designations to date, numerous sites in and around the village of Lake Placid and Whiteface Mountain, in Wilmington, associated with the Winter Olympics in 1932 and 1980, have developed as popular destinations for both residents and tourists alike[2].

Scenery and Recreation within the Watershed

The entire length of the Ausable River is included on the NPS's Nationwide Rivers Inventory, which identifies rivers, and river segments, with resources of statewide or national significance. The Nationwide Rivers Inventory recognizes the entire Ausable River as having "outstanding, remarkable, free-flowing, undeveloped and scenic values". It also recognizes the fisheries of the Main Stem and West Branch as being "outstandingly remarkable".

Furthermore, The State of New York recognizes the entire length of the Ausable River in the New York State Wild, Scenic and Recreational Rivers System. Inclusion on this listed qualifies the River as possessing outstanding natural, scenic, historic, ecological and recreational values. The nine miles of the East Branch between Marcy Swamp and St. Huberts is classified as a Scenic River. Twenty-eight miles of the East Branch from St. Huberts to Au Sable Forks, and twenty-two miles of the Main Stem from Au Sable Forks to Lake Champlain, are designated as Recreational Rivers.

Among the most scenic spots in the Ausable Watershed are Wilmington Notch, along the West Branch, for both scenic and geologic interest. Also on the West Branch is High Falls Gorge, a major tourist attraction and the Flume[2]. On the East Branch, Hulls Falls, three miles upstream of the hamlet of Keene and is recognized for its scenic and geologic significance. Scenic vistas on the East Branch include Noonmark Mountain, Little Porter Mountain and Blueberry Mountain[2]. Ausable Chasm, a major tourist attraction since the 1850's, is located on the Main Stem, one mile downstream of Keeseville. It is unique among the gorges and falls of the Ausable River because it cuts through Potsdam Sandstone, unlike the crystalline rocks of the mountains. The walls of Ausable Chasm are 175 vertical feet in some spots, deeper than any the other gorge on the Ausable River. The most scenic vista on the Main Stem is from the mouth of the Ausable River looking across Lake Champlain to the Green Mountains of Vermont. Other attractions, vistas, recreational opportunities and historic places can found in a brochure "A Traveler's Guide to River and Scenic Byway Resources," available from the Ausable River Association[11].

The Adirondack region's numerous lakes, ponds, streams, rivers, trails and public and private recreation facilities provide an extremely favorable environment for recreation in all seasons of the year. The DEC recognizes the West Branch of the Ausable River as a "Blue Ribbon Trout Stream". There are only 16 other streams in New York State with this designation. The DEC also recognizes Upper Cascade Lake (a tributary to the East Branch) and the Chubb River as "Top Brook Trout Fishing Waters"[2].

The Ausable River is noted for its fine white-water opportunities for both canoeing and kayaking. The American White-water Affiliation recognizes a segment of the Main Stem and two segments of the West Branch as "Outstanding White-water Streams". In Canoeable Waterways of New York State and Vicinity, a seven mile segment of the West Branch is credited as being the most enjoyable small stream in the State for canoe touring because of the scenic views of Whiteface Mountain as it winds through the forest. The East Branch provides scenic flat-water and has rapids from class II to class V, depending on flow levels, in its upper reaches[2].

An extensive system of trails, managed by the New York State Department of Environmental Conservation on Forest Preserve lands within the watershed, provides hiking, camping and cross-country skiing opportunities[2]. The Jack Rabbit Ski Trial also provides extensive cross-country skiing were it crosses the watershed from Saranac Lake to Keene. Whiteface Mountain Ski Center, one of the finest downhill skiing areas on the East Coast (and ranked #1 in the East for the 1993/94 and 1999/2000 seasons), is located on the banks of the West Branch.

Keene/Keene Valley region and Wilmington Notch are well known for a variety of rock climbing and ice climbing opportunities. The Adirondack Mountaineering Festival, held annually in January in Keene Valley, attracts internationally known guest climbers who lead local climbs.

Natural Resources of the Ausable Watershed

The rich natural resources in the Adirondacks and the Ausable River Watershed are vast and diverse. As a result of the biodiversity found in the Adirondacks, the United Nations: Educational, Scientific, and Cultural Organization designated the Champlain-Adirondack Biosphere Reserve which includes the Adirondack Mountain Region and the Lake Champlain Watershed in Vermont. Designated in 1989, it is a largely natural area and will be used to develop sustainable approaches to conservation and preservation of natural resources and improve environmental health. Research and monitoring priorities for the Biosphere Reserve include water quality and watershed planning. The Ausable River Watershed is a part of the Champlain-Adirondack Biosphere Reserve and shares these priorities for improving water quality and watershed planning. Below is a summary of resources found in the Ausable River.

Fisheries: The Ausable River is identified by fisheries biologists as one of the top ten trout streams in New York State. The entire Ausable River offers good trout habitat. Brook and Brown Trout are mainly found in the East and West Branch. Rainbow Trout and Smallmouth Bass are found in the Main Stem[2]. Landlocked Salmon can be found in the lower five miles of the Ausable River below Ausable Chasm.

Although trout reproduce naturally in the river, Essex County, in conjunction with the New York State DEC, stock hatchery-raised strains throughout the Ausable River[2]. Brown Trout make up most of the stocking population with lower numbers of Brook and Rainbow Trout being introduced. In 2007, 19,290 trout were released into the East Branch and 24,770 trout were

released into the West Branch. The Fish stocking report for spring 2007 is given in Appendix A, Table A-3.

Fishing on the Ausable generates an estimated $3.7 million in local expenditures annually[12] and the West Branch is one of the most heavily fished streams in the state. The river received the highest satisfaction rating for waters in the state in the 1996 "Statewide Angler Survey." The 2006 Angler's Diary's from the West Branch Reported fishing was "fairly good" with a catch rate of 0.8 trout per hour of fishing and reasonable numbers of brown trout 14"-16" in size[13].

Despite heavy fishing demands on the West Branch, a 2003 electro-fishing study recorded significant increases in average Brown Trout length and abundance of wild trout fingerling over a 1992 study[14]. Fingerling increases were observed in both the catch-and-release and in the harvest allowed reaches of the West Branch. The largest brown trout collected in 2003 was 19 inches long. Wild trout made up 23 percent of the yearling and older brown trout population, up 1% from 1992.

In contrast to the positive outcome of the fish shocking report, the "New York Brook Trout Population Status by Watershed[15]" report shows "reduced" numbers of Brook Trout in the West Branch and Main Stem, and "intact" populations of Brook Trout in the East Branch. The report suggests that the population decline on the Main Stem may be due to high water temperatures there.

Native Mussel Populations: In the late 20th and early 21st centuries the introduction of non-native, invasive Zebra Mussels into the Lake Champlain basin made it important to assess populations of native mussels. In 2001-2002, the Ausable River Association examined existing populations of mussels in the river and watershed lakes[16]. Historic data suggest that the Ausable River never supported large native populations of mussel species. The ASRA study found small numbers of two native mussel species – *Elliptio complanata* and *Lampsilis radiata* at the river's mouth. Lakes within the watershed that feed the river also support mussels. *Elliptio complanata* was found in large numbers (50 – 500) in Auger Lake, Upper Ausable Lake and Mirror Lake; *Pyganodon cataracta* was found in small numbers in Upper Ausable and Mirror Lakes. Zebra Mussels were found on the Ausable delta by Vermont DEC in 1994[17] but no zebra mussels were found at the mouth or in the watershed lakes by ASRA. It is thought that the Ausable River lacks mussel habitat because of its cobble-boulder substrate and steep gradient.[18]

Invertebrate Populations: Invertebrate populations in the Ausable are sampled on a five year cycle as part of the NYS DEC "Rotating Intensive Basin Study" (RIBS). The most recent sampling at the time of this report was from 2003 however the report was not published so the data listed below is from a sample taken in 1993 and published in 1996.

Throughout the last three decades invertebrate sampling has indicated "excellent" to "good" species richness and "excellent" to "good" Biotic Index for the entire length of the West Branch from Rt. 73 in Lake Placid to Haselton[19].

Overall, the invertebrates observed in the East, West, and Main Stem are non-impacted, dominated by clean-water mayflies and caddis flies. Of concern, however, are crayfish containing titanium exceeding levels of concern and Methoxychlor in low levels at West Branch site in Au Sable Forks[20].

An informal study done by ASRA in 2000 with local high school science classes examined two river sites on each Branch and Main Stem. All sites had Biotic Index indicating excellent water

quality, with the exception of the West Branch at the Route 73 bridge which had only a “good” water quality rating.

Rare Plant and Animal Species: In addition to fisheries, the watershed of the Ausable River is an important area for rare species. The New York State Natural Heritage Program has identified several rare and endangered plants, plant communities, and animals in the region. There are thirty-six rare plants within the Ausable Watershed. This is an increase from thirty-four reported in the 1994 Ausable River Study. Six globally rare plants are found in the watershed; these are Alpine Sweetgrass, Boott’s Rattle Snake Root, Diapensia, Fernald’s Bluegrass, Lancelear Arnica, and Ram’s-head Ladyslipper. In 1991-2 only three globally rare plants were reported, disappearing from the list are Clustered Sedge, and Pickering's Reed grass; Ram's-head Lady Slipper remains. Thirty rare vegetative communities are found within the watershed (Appendix A, Table A-4).

The New York State Natural Heritage Program has identified the Ausable River as providing one of the few habitats in New York State for the Peregrine Falcon and the Round Whitefish. Both species are known to have five or fewer occurrences in New York State. The Peregrine Falcon is classified as “rare” in New York State but “Apparently secure” globally. The Round Whitefish is "Critically impaired" in New York but globally "Secure[2]."

Invasive Plant Species: Surveys of terrestrial invasive plant populations were conducted in the watershed in 2002, 2005-06 and on the East Branch, and 2007 on the West Branch. In 2002, 32 invasive plant sites covering less than 0.5 an acre (2,236 sq. yd.) were recorded (Appendix A, Figure A-3). The majority of these were located in private yards or farm fields with one site containing approximately half of the invasive population in the watershed. Purple Loosestrife was the most abundant invasive documented, covering 1,721 square yards. Japanese Knotweed was the second most abundant at 297 square yards, and *Phragmites* the least abundant at 218 square yards.

Significant increases in invasive plant populations were noted in a 2006 East branch inventory condected by walking and wading the riparian. A total of 214 sites containing Purple Loosestrife, Japanese Knotweed, and Japanese Barberry, and Indian Cup Plant were discovered (Appendix A, Figure A-5). The most prolific of these was Indian Cup Plant which appears to have spread 30 miles downstream from its original sighting near Keene to Keeseville[21].

Inventory of invasive terrestrial plants in the West Branch subwatershed in 2007 discovered two regions of concentrated infestation. These are on the banks of Mill and Power Ponds in the Village of Lake Placid (ponds formed by damming the Chubb River) and on Lake Everest on the West Branch in the hamlet of Wilmington. The area between these two impoundments was free of invasive plants except for two occurrences found in road ditches along NYS Route 86 between Lake Placid and Wilmington. Detailed plant numbers and aerial distribution of infestations can be found in Appendix A, Figures A-3).

Water Quality

Overall quality of water in the Ausable River appears good for fish habitat and human recreation. Stream segments are classified as suitable for drinking, bathing or fishing (Figure 5). Invertebrate sampling indicates excellent to good water quality but other sources of data indicate localized problems.

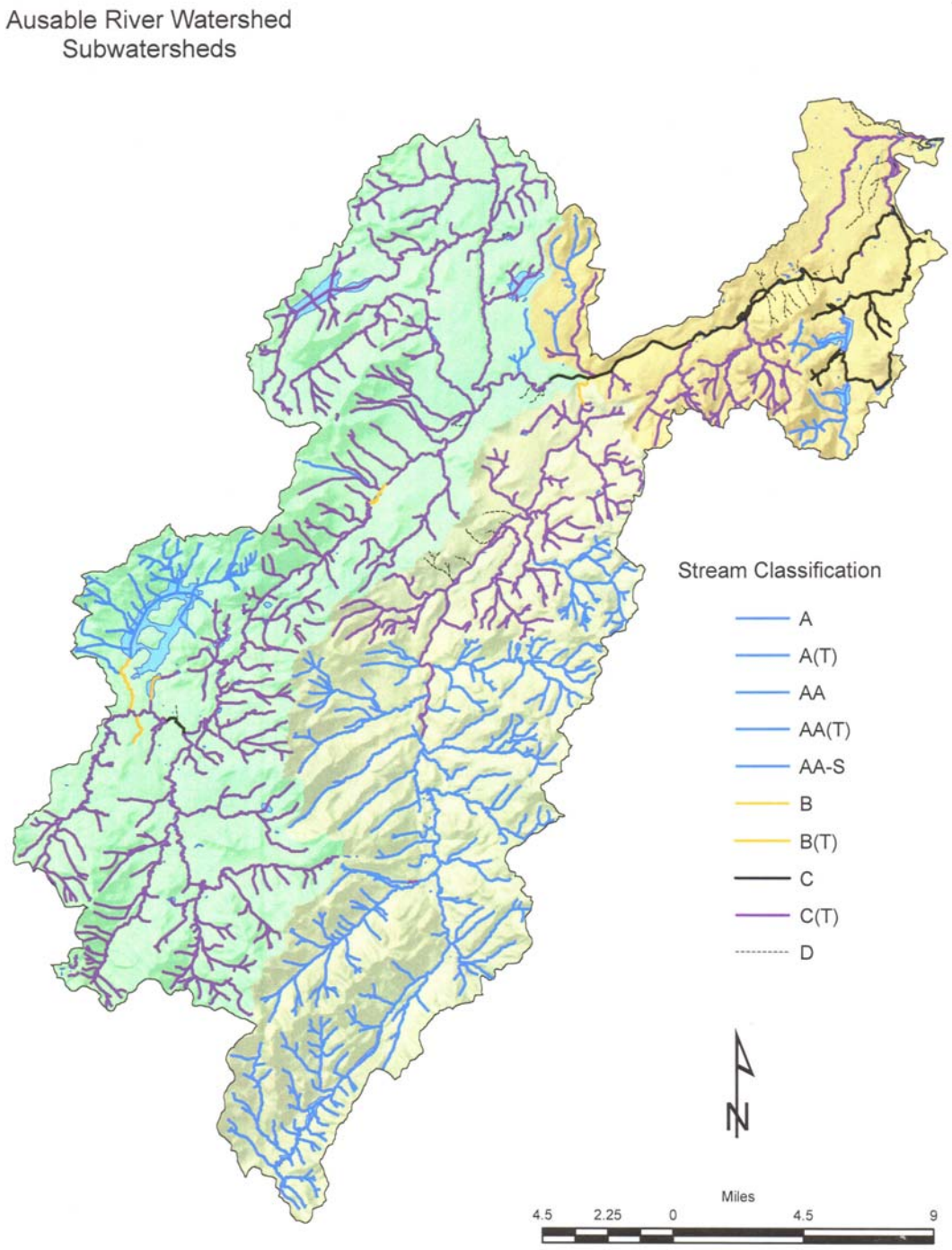

Figure 5. Stream Classification for the Ausable River and its tributaries. A – Drinking water, filter and disinfect; AA – drinking water, disinfect; B – Bathing, C – fishing, D – intermittent streams, (T) – suitable for trout, (S) special.

According to the NYS Department of Environmental Conservation's Waterbody Inventory and Priority Waterbodies List(WI/PWL), there are eleven (11) river segments that have no known impact throughout the watershed. In addition there are seven (7) impacted segments; four (4) segments that need verification of impairment; and thirteen (13) unassessed segments. Table 2 summarizes the WI/PWL for the impacted segments and those in need of verification.

Table 2. Summary of stream segments for impacted segments of the Ausable River, tributaries, and lakes within the watershed.[25]

River Segment	Stream Class	Use Impacted	Severity	Pollutant	Source of Pollutant
Ausable River, Lower, minor tribs	C(T)	• Aquatic Life • Habitat/Hydrology	• Stressed • Impaired	Water level/flow	Hydro modification
Ausable River, Upper, minor tribs	C	• Aquatic Life • Recreation • Habitat/Hydrology • Aesthetics	• Threatened • Threatened • Stressed • Stressed	Oil and grease, silt/sediment, aesthetics, metals, pH, unknown toxicity	Chemical leak/spill; deicing (storage/application); landfill
Augur Lake	A	• Public Bathing • Recreation	• Stressed • Stressed	Problem Species(milfoil)	Habitat Modification
West Br, Ausable lower, minor tribs	C(T)	• Habitat/Hydrology	• Stressed	Silt/Sediment	Deicing (storage/application); streambank erosion
West Br Ausable, Middle	C(T)	• Habitat/Hydrology	• Stressed	Silt/Sediment	Deicing (storage/application); streambank erosion
Taylor Pond(and Mud Pond)	C(T)	• Aquatic Life	• Threatened	D.O./Oxygen Demand	Unknown source
Chubb River and tribs	C and C(T)	• Aquatic Life • Recreation • Aesthetics	• Stressed • Stressed • Stressed	Nutrients, floatable debris, silt/sediment	Lake Placid WWTP (suspected), other
Lake Placid	AA spc	• Water Supply	• Threatened	Other pollutants	Other source
East Branch, Lower, and minor tribs	C(T)	• Recreation • Habitat/Hydrology • Aesthetics	• Stressed • Stressed • Stressed	Silt/Sediment; aesthetics; pathogens; D.O./Oxygen Demand, Nutrients	Deicing (storage/application); streambank erosion; failing onsite systems; roadbank erosion
East Branch Middle, and tribs	AA(T)	• Habitat/Hydrology	• Stressed	Silt/Sediment	Deicing(storage/application); resource extraction (logging); streambank erosion
East Branch Upper, and tribs	AA(T)	• Habitat/Hydrology	• Stressed	Silt/Sediment	Deicing(storage/application); streambank erosion
Lower/Upper	AA(T)	• Aquatic Life	• Threatened	D.O>/Oxygen	Unkown Source

Cascade, Mud Lakes				Demand	

West Branch Water Quality: Water quality on the West Branch has had improvements since a new waste water treatment plant was built in Lake Placid in 2005. Water quality was monitored on the West Branch and Chubb Rivers from 2002 to 2005[17] [18]. A study conducted by ASRA captured an occurrence of extremely elevated bacterial levels in the Chubb and West Branch[22]. A second study conducted by DEC monitored levels of bacteria over the time frame when a new waste water treatment plant was built at Lake Placid (2003-2005) [23].

After completion of a new plant with added UV treatment, *E Coli* levels in the West Branch declined significantly. Some remaining bacteria in the water were attributed to cultural sources outside of the plant but further study to pinpoint a source was inconclusive. Other possible sources of bacteria appear to be the result of a combination of resuspension of sediment, faulty septic treatment, or may have been a construct of sampling location at a spot where incomplete mixing of river and treated water took place.

DNA used to further pinpoint the source *E. Coli* revealed a significant portion came from wildlife. Small numbers of DNA sampled make the data inconclusive but suggest sources are from: Pets (4%), Domestic animals (11%), Humans (18%), Wildlife (42%), and, other Unidentified (25%) sources[18]. The number of wildlife matches decline downstream while human matches increase. Of note is that no human DNA was detected in samples from the Wilmington beach but pet DNA had one match.

Following completion of the LP WWTP monthly water tests at the Wilmington town beach all showed excellent water quality and bacteria levels below NYS DOH standards for public beaches[24].

East Branch Water Quality: The East Branch of the Ausable contains the only stretch of river in the watershed that is listed for suspected pathogens as a pollutant, on the WI/PWL. The East Branch from its mouth in Au Sable Forks to Upper Jay is affected by the direct discharge of sewage from homes along the river[25]. Coliform levels as well as unpleasant aesthetics (floatable, solids , toilet paper, odor, etc.) are listed as a concern in the 2000 Lake Champlain Basin WI/PWL.

Main Stem Water Quality: Water quality on the Main Stem is affected by automotive fluids coming from a large junk yard situated adjacent to the stream downstream from Clintonville. Hundreds of cars and busses are stored on sandy outwash and fluvial deposits within the flood plain of the river. The junkyard has been there for many years and continues to expand. The WI/PWL[21] lists oil and grease, metals, acids, on other toxics washed into the river during flood events as a concern.

Water quality on the Main Stem improved after a Water Treatment Plant was built in Au Sable Forks. The plant serves 353 customers in the Towns of Black Brook and Jay. Prior to construction levels of fecal coliform in river water at Au Sable Forks were as high as from 700-800 per 100 ml. After construction 0-200 fecal coliform per 100 ml were recorded in a study conducted by the Boquet River Association (Figure A-3).

Impairments to Water Quality

Onsite Wastewater Treatment Systems (Septic Tanks)

Onsite wastewater treatment systems(OWTS) if not properly maintained can contribute to water quality impairment through the introduction of high levels of nitrogen, phosphorus, pathogens, and potentially pharmaceuticals. The majority residences in the Ausable River Watershed (with the exception of those in Lake Placid, Au Sable Forks, and Keeseville) are services by OWTS. As many of these systems are older, the potential for failure is increased and water quality in surface and ground waters could suffer. Further studies should be conducted to gain a greater understanding of the systems that exist within the watershed.

To protect help protect water quality in Placid Lake, the Village and Town of North Elba has instituted an ordinance that requires onsite wastewater treatment systems be at least 300 feet from the Placid Lake shoreline. NYS DOH standards require a 100 foot separation from waterways and this regulation is applied for septic systems on the lake in the Towns of St. Armand and Wilmington.

There are 15 properties within the watershed that have OSWT tanks larger than 1000 gallons requiring a SPDES permit; 10 are within the West Branch subwatershed, 6 of these are located within 300 feet of the river or a tributary. Five are in the East Branch subwatershed and 2 of these are within 300 feet of the river or a tributary (Appendix A, Table A-5). The permits are in varying states of renewal, some have expired.

The knowledge and attitudes of riparian (waterfront) property owners is of importance in maintaining or improving the water quality of lakes and rivers. Of primary importance is the maintenance of on-site wastewater treatment systems. In 2006 property owners within the Ausable Watershed were included in an online survey created by the College of Engineering at St. Cloud State. Data was gathered concerning waterfront properties, the presence and age of septic systems on those properties, and perception of environmental regulations by owners. Significant findings include:

- 56% of respondents' properties are served by septic systems.
- 23% of septic systems in use are 30 years old or over.
- 11% of respondents did not know when the last service had been performed on their septic system. A single respondent indicated that his system had not been serviced in over 20 years.

These data are important to consider, however, the low response rate (41 for the entire study) make them statistically insignificant. Important gaps in information are the numbers, location, size, and age of septic tanks within the Ausable Watershed.

Silt/Sediment

One of the top impairments to habitat and a concern to watershed citizens is sediment entering a waterbody. Several sources of sediment have been identified including natural and unnatural sources. The Ausable Valley is characterized by numerous sandy, glacial deposits, therefore the stream is supplied with an abundance of sand which easily flows downstream impacting habitat, water quality, and recreation. Other significant sources of sand come from winter road maintenance as well as road washouts on dirt roads along steep tributary streams, bank collapse, and unvegetated road ditches.[26].

Several ASRA and DEC studies outline these sources and are described below.

Geomorphic Assessment of the Ausable River: One of the most important tools for understanding river dynamics and assessing the condition and stability of a stream channel is through geomorphic assessment. Geomorphology is the study of landforms and how they are shaped by natural process. Rivers are one of the most powerful mechanisms for shaping the surface of the earth and have been the topic of a huge volume of research. In the late 1990's geomorphic assessment of rivers became a popular tool for assessing the condition of rivers and laying the groundwork for "restoring" badly eroding rivers to their natural state.

The ASRA with the assistance of BRASS were leaders in conducting geomorphic assessment of Adirondack streams. Starting in 1999, detailed study was conducted at four locations along the Ausable River. Continuing through 2006 both general and detailed geomorphic surveys were conducted on the Ausable, including the "Windshield Survey" of the East, West, and Main Stem, which was the most extensive study conducted in 2005-2006. The Windshield Survey examined bank height and aerial extent of erosion on channels. Within the entire length of the Ausable River there are 19.8 miles of highly eroded channel; 25 miles with low erosion, and 8.4 miles that show no erosion (Figure B-1). Erosion and bank heights are defined as:

- "High erosion"- Greater than 30% of the bank is bare of vegetation and show signs that sediment is actively being carried away by the stream.
- "Low" erosion" - Less than 35% of bank is bare of vegetation and show signs that sediment is actively being carried away by the stream.
- High bank height – Greater than 15 ft high (13.6 miles of the Ausable River display high bank height).
- Medium bank height – Between 5 to 15 feet high (36 miles of the Ausable River display medium bank height).
- Low bank height – Less than 5 feet high (4.2 miles of the Ausable River display low bank height)

High banks indicate the river is actively eroding downward, which is a major concern for the stability of the river banks as well as water quality downstream. Banks along the Ausable display various amounts of incision; 13.6 miles of river have high banks, 36 miles of river have medium high banks, 4.2 miles have low banks . Over all, 1.8 miles of river are recorded as having high banks *and* high erosion, but 18 miles have high erosion and medium high banks.

The area of highest erosion (high banks, high erosion) is found below Jay and upstream from Stickney Bridge (Figure B-1). Other "problem areas" are found at St. Hubert's, at Rivermede Farm in Keene Valley, along Hulls Falls Road, between Lacy Bridge and Upper Jay on the East Branch. On the West Branch locations of high erosion and medium banks are found from the Ski Jumps to High Falls Gorge. Two locations on the Main Stem show high erosion and medium banks: at the foot bridge in Keeseville and a location near the mouth at the railroad.

Detailed stream geomorphic assessment was conducted at four problem spots on the Ausable in 1999[27]. These locations are at the upper Catch and Release on the West Branch; on Black Brook, a tributary to the West Branch; in The Bush, a 2 mile segment between Black Brook and Au Sable Forks; on Gulf Book, a tributary to the East Branch in Keene.

Detailed results pertaining to erosion quantities and channel stability are found in Appendix B, Tables B-2 and B-3. Overall, the most common cause for stream instability found in the detailed

study are man made structures in the stream. This includes bridges and structures designed to keep bank erosion from undermining roads. These structures pin the channel in place and cause lateral bank erosion downstream of the structure. Much of the length of the stream is paralleled by roads which confine the channel and keep it from its natural process of erosion and slow migration sideways across the valley floor.

Affect of Sediment in the Ausable River: Embededness is a measure of the degree to which the channel bottom is covered with fine sediment – sand, silt, or mud. Fish eggs are held in openings between gravel and cobbles therefore good stream conditions support salmonid reds (nests) but when openings are filled with fines, eggs have no resting or breathing space and spawning is not supported.

The NYSDEC WI/PWL for Essex County lists 132 miles of embedded streams that stress or threaten fisheries habitat[22]. Fifty-eight (58) miles of the Ausable are embedded. According to DEC the source of embedding material is winter road sand. In embededness studies done in 1993-1994 twenty-five percent of the sites on the East Branch Ausable had embededness percentages above what is considered to impair fish reproduction (Figure A-1, Appendix A).

A NYSDEC Division of Fisheries study showed embededness levels on the West Branch at three of twelve sites exceeded those supporting fish reproduction. Sediment box collectors had sediment collection weights 2 to 4 times above streams with salmonid reproduction[29].

Because studies have shown that man-made structures are a major source of streambank instability and erosion, further studies of roadways and bridges should be conducted along the stream course to locate "problem source areas" for road sand. Formerly known as an "outfall report" this study would identify all roadways, bridges, stormwater structures that directly cause sand to enter the stream.

Road Salt

Salt (Sodium Chloride) from winter road treatment has long been a concern because of its negative effect on road side flora, fauna and to local water quality. Impacts from winter deicing compounds have been noted throughout the Ausable watershed with the most prevalent examples seen in Cascade Notch and Chapel Pond. In addition, Town water wells in Keene were contaminated with salt that is thought to have come from a State salt storage facility above the aquifer.

In 2004-5 NYSDOT funded a study conducted by the Clarkson Center for the Environment that investigated the environmental impacts of road salting on the Cascade Lakes and Chapel Pond. Analysis of lake sediment cores and historical records indicate that large changes to the Cascade Lakes and Chapel Ponds occurred following road improvements in the 1930s and dramatic changes began in the 1980s. Because of the number of foul weather events in an average Adirondack winter, salt application per lane mile here are among the highest in North America and Europe. Alternative chemical deicers were experimentally applied in the '90s but none were determined to be satisfactory to NYSDOT.

Affected resources are the roadside soil, vegetation, lake chemistry, and species composition within the lakes. The soil is sandier, denser, less permeable and drier than native soils in the area. Sodium accumulation has also lead to the loss of soil nutrients.

Birch trees along the shoreline are aging and dying but at a faster rate than other local trees due to unstable slopes, salt on the leaves, and the loss of soil fertility. Die off is especially prevalent down slope from the road to the shoreline.

Upper and Lower Cascade Lakes have chloride concentrations up to 100 times greater than expected for Adirondack Lakes. The concentration of salt increases with depth and could affect the biannual turn over/mixing of lake layers if salt continues to accumulate in the lake.

All three lakes have seen an increase in chloride-tolerant diatom species. The Round Whitefish (*Prosopium cylindraceum*) was of particular interest to the study because of its status on the state and global list of endangered species. In Lower Cascade Lake the fish appears to be stunted and thin as a result of environmental stress created by prolonged low oxygen conditions that may indirectly result from high salt concentrations.

Declines in soil fertility and increases in Chloride concentration are expected to continue unless active remediation and an alternative road application is put into practice.

Phosphorus

The 1990 Lake Champlain Special Designation Act[30] specifies examining water quality, fisheries, wetlands, wildlife, recreational and cultural resource issues within the Champlain Basin. The designation also lead to the creation of a Lake Champlain Basin Phosphorous TMDL. The Ausable Watershed is a part of Champlain Basin (figure 1)and is therefore governed by the TMDL.

Phosphorous enters Lake Champlain from multiple point and non-point sources in Vermont and New York. The Lake Champlain TMDL commits New York to reducing Phosphorous inputs by 10% from 1991 levels[31]. Within the Champlain Basin 10% of Phosphorus comes from point sources, mainly municipal wastewater treatment plants; the other 90% comes from non-point sources which include forested land, agricultural land, or urban run-off such as parking lots and roads[32].

The lake is divided into 13 phosphorus monitoring segments and the Ausable Watershed, in combination with the Boquet Watershed, feed the "Main Lake" segment. The target for the Main Lake on the NY side, is to reduce Phosphorus outputs from 37.5 metric tons/yr to 35.0 metric tons[33]. Point sources from the Ausable contributed 4.00 metric tons in 2003[34] but only 2.03 metric tons in 2007 (table 3). According to a study done to model the volume of Phosphorous from non-point sources (run-off),[34] agriculture accounts for 18.4% of non-point Phosphorus, forested lands contribute 16.7%, while urban lands contribute 64.9% in the Ausable/Boquet Watershed.[34]

Table 3. NYS DEC Reported measured and non-point source Phosphorus Loads, 2007 (Fred Dunalp, oral communication)

	Total Load	**Forest**	**Urban**	**Agriculture**
Point Sources:	2.03 mt/yr.			
NPS (modeled)	22.9 mt/yr.	4.79 mt/yr	15.4 mt/yr.	2.68 mt/yr

Urban areas cover only 4.7% of the Ausable Watershed; therefore, a very small proportion of its area contributes almost 65% of the Phosphorous. These estimates are based on regional analysis

and modeling at a broad basin scale and may not be accurate at a local level. They suggest that within the Ausable Watershed, managing urban stormwater run off and waste water may be an important strategy for reducing Phosphorous loading to the Lake but an outfall report of stormwater run-off is recommended to identify local points of run-off and Phosphorus. Furthermore, as of 2004, reduction in Phosphorus from within the Ausable Watershed has only been marginally successful.[33]

Floods and Flood Damage

Floods arising from a variety of causes have been recorded in all seasons throughout the Ausable River watershed. Floods frequently occur in the early spring when substantial rains combine with rapid snow melt to produce a heavy runoff. In northern New York, however, colder early spring temperatures are conducive to a slower rate of snowmelt and major spring floods have been less frequent along streams draining into the St. Lawrence and Champlain Valleys. Instead, ice jams more commonly contribute to flooding on the Ausable River.

Although major floods are relatively infrequent, the Ausable River has experienced several floods that have damaged infrastructure, degraded aquatic habitat, and caused severe streambank erosion. Near flooding conditions resulting from ice jams regularly result in road and school closures and in extreme cases, flooding has caused emergency evacuations, isolation of residents, and loss of public utilities.

Ice jams occur throughout the Ausable River, however, there are certain areas where jams are more frequent:

- In Upper Jay, an island in the middle of the river, creates jams that cause flooding of structures on the south side of the river. "The Land of Make Believe" amusement park was forced to close due to recurring flooding damage.
- An island downstream of the confluence of the East and West Branch in Au Sable Forks frequently creates ice jams and water back-ups (Grove Street homes flooded almost annually before being removed by FEMA). Homes remaining on Sheldrake and Road and Intervale Avenue in Au Sable Forks are also subject to flooding and ice jam flooding.
- Ice jams at Stickney Bridge in the Town of Jay. Ice jams form in both winter and spring seasons and flooding occurs annually at the bridge isolating residents who live on the south side of the bridge.

Damaging floods have occurred during all seasons of the year including January 1978, 1996, and 1998, March 1979, April 1980, June 1937 and 1998, October 1924, 1986, 1990, and 1992, November 1979, and 1996. An increase in flood damage in the1990s led some residents and local officials to believe that the intensity and frequency of flooding has increased[35].

Some of the most recent and damaging floods occurred back to back in 1996 and 1998. In January 1996 Essex and Clinton Counties were declared a federal disaster area when ice jams coupled with snow melt and rainfall resulted in road and bridge washouts. Water depths in excess of 3 feet flowed over Route 9N in the Town of Jay and ice slabs the size of Volkswagens were reported. Fifteen residences were damaged and 20 homes along Stickney Bridge road were cut off from emergency services by flooding on the East Branch.

In November 1996 Essex and Clinton Counties were once again declared a Federal Disaster area when flooding occurred after 7 inches of rain fell in a 24 hour period. River levels on the East

Branch at Au Sable Forks reached as high as 15.1 feet, which is 8 feet above flood stage. Homes were knocked off their foundations and families from 39 homes were evacuated in Au Sable Forks. Helicopter evacuations were made in the Town of Jay for residents living along Route 9N.

In June 1998 extensive flooding caused millions of dollars of damage. In Keeseville, residents were evacuated from Beech and Spring Streets when the river overtopped its banks. Interstate 87 and several town roads were washed out and the railroad near Port Douglas Road collapsed into a 150 foot ravine spilling diesel fuel in to Lake Champlain and causing $3 million dollars in track damage.

A January 1998 ice storm not only wreaked havoc on trees, power lines, and roadways; it caused flooding in low lying areas.

The destructive events of 1996 and 1998 prompted a reconnaissance visit by the Army Corp of Engineers (ACOE) in July 1996 and a second visit in March 1997[24]. The Reconnaissance Study recommended building flood walls, levees, ice retention structures and raising roadways. The report also listed non-structural solutions such as relocating structures (on the flood plain) and wet or dry proofing the flood prone structures. A FEMA buyout of houses on Grove Street in Au Sable Forks, a partial buyout and relocation of structures on Sheldrake Road and Intervale Avenue in Au Sable Forks, and a partial buyout of structures in "The Land of Make Believe" in Upper Jay have been the only flood damage prevention measures made to date. Since 1998, flood levels have stayed below those that cause significant infrastructure damage. A feasibility study for the other recommendations has never been completed.

Affects of Climate Change

There is mounting scientific evidence that global warming is affecting climate and ecosystems in the Adirondacks. Little data is available to predict the impacts of climate change on rivers however. A study of rivers using data from USGS stream gauges (Chiarenzelli[36]); shows that on average, the discharge of Adirondack rivers has increased over the last 100 years of record. The Ausable discharge has increased by 8%. Chiarenzelli attributes changes in discharge to increases in regional precipitation but fails to find a link to climate warming. This interpretation is open to comment and further study is needed.

Acid Rain

New York State's Acid Rain Monitoring Network collects and analyzes precipitation parameters (including pH, Sulfate, Nitrate, Calcium and Magnesium) to assess the effectiveness of sulfur control policy and other strategies aimed at reducing the effects of acid rain. Twenty sites are monitored throughout New York State and one of these stations, on Whiteface Mountain, is in the Ausable Watershed. Data collected on Whiteface over the last decade shows only slight decreases in the sulfur dioxide and nitrogen oxide content in precipitation. Analysis indicates only a slight increase in pH (decrease in acidity) of 0.4 (Hydrogen ions 4 times less abundant). (www.ded.ny.gov/chemical/8422.html).

Summary

"Ausable Watershed Characteristics" incorporates all available existing information and data collected to date from within the watershed. It is significant and important to understand these

existing conditions so that the watershed plan can build on existing knowledge and make recommendations to fill gaps in knowledge and address existing problems.

Summary of Noted Impairments

- "Reduced" numbers of Brook Trout in the West Branch and Main Stem as noted in the "Trout Population Status by Watershed[11] report.
- Heavy fishing demands affecting the scenic resource and demanding heavy state stocking.
- Heavy use by increasing numbers of visitors and users.
- Declines in soil fertility and increases in Chloride concentration along roadsides and in roadside lakes.
- Decline in Round Whitefish populations in the Cascade Lakes
- Invasion of Purple Loosestrife, Indian Cup Plant, Phragmites, and Japanese Knotweed within the watershed
- Need for study of septic tank distribution in the watershed, and landowner responsibility to upkeep of both permitted and unpermited systems. Determine the numbers, location, size and age of septic tanks within the Ausable Watershed.
- Stream banks that are highly eroded (20 miles of measured high erosion)
- Sand entering river from roadways, stream crossings, and culverts. Need for documentation in an "outfall report"
- Flooding and bank erosion resulting from ice jams along the entire Main Stem and at Stickney Bridge and Upper Jay on the East Branch.
- Phosphorous loading from non-point source pollution especially from urban areas. Reduce Phosphorus loading by managing urban stormwater run off and waste water within the Ausable Watershed.

The next section will describe how the public was involved in the planning process and their perception and statement of needs for watershed planning. This and the list of needs stated above will then be present in a "Priority Recommendations Matrix" a list of projects and issues to be addressed within the watershed.

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Stake Holder Involvement and Public Participation

The success of watershed management planning is dependent upon the involvement of all levels of government and the public. While forming the plan two levels of input were gathered. The planning was closely guided by an Advisory Committee made up of expert and citizen supporters. Watershed citizens were also involved through public input meetings and printed surveys.

The creation of the Ausable Watershed Management Strategy has been overseen by and guided by an Advisory Committee with representatives from each of the seven watershed towns, two villages, the Essex and Clinton County Soil and Water Conservation Districts (SWCDs), the Essex County Water Quality Coordinating Committee (WQCC), and departments of NYS DEC, NYS DOT, and NY DOS. Other partnering organizations include Adirondack Sustainable Communities, NYS Adirondack Park Agency, the Lake Placid Shore Owners Association, the Nature Conservancy, Mirror Lake Watershed Association, and Whiteface Mountain Ski area. A list of Advisory committee members and partners is given below.

State/County Representatives:
DOS/DCW - Andrew Labruzzo; Stephanie Wojtowicz
NY DEC - Fred Dunlap
NY DOT – Mike Fayette,
Essex County – Garret Dague
Essex Co. Soil and Water, Dave Reckan
Clinton Co. Soil and Water, Steve Mahoney
Town Representatives:
Town of Au Sable – Louis Murray
Town of Black Brook – Ricky Nolan
Town of Chesterfield – Richard Klages, Walter LaMountain,
Town of Jay – Joe Kahn
Town of Keene – Paul Martin
Town of North Elba – John Hopkinson
Chubb subwatershed, Madeliene Killeen
Town of Wilmington – Jeanne Ashworth/Randy Preston
Village of Keeseville – Mary King
Village of Lake Placid – Stuart Baird

Partners

State Partners:
Adirondack Park Agency – Brian Grisi
Whiteface/ORDA – Jay Rand, Bruce McCulley, Kirsten
Local Partners:
AMC/AC - Adirondack Mountain Reserve/Ausable Club, Field, Lakes and Streams Committee, Bill Gremp
ASCI – -Adirondack Sustainable Communities
SOA – Shore Owners Association of Lake Placid – Mark Wilson, President
MLWA – Mirror Lake Watershed Association – Bill Billerman
Trout Unlimited Adirondack Chapter – Chris Williamson

Public participation process

In addition to representation on the AC, watershed citizens have been involved in the watershed planning process through three public input meetings. The watershed planning consultant, the Ausable River Association, also informed and educated the watershed Town and Village Boards about the watershed planning process by presenting at Town Board/Village Trustee meetings. Four Public Input meetings were held throughout Fall 2007 and Spring 2008. The meetings were centered within the West, East, and Main Branch Subwatersheds. The locations were North Elba Town Hall in Village of Lake Placid, Wells Memorial Library in Upper Jay, and Keeseville Fire Hall in Town of Ausable, Village of Keeseville, and a Trout Unlimited – Tri Lake Chapter meeting .

The Public input meetings were advertised by newsletter entries, press releases, and by informing Town Boards/Village Trustees, and placing posters and fliers in Town Halls, Fire Halls, Post Offices, and Libraries throughout the watershed.

Input meetings were designed to be both informative and educational as well as to solicit public concerns. Educational displays and games were highlighted at the West and East Branch Meetings and a Stream Demonstration Table (Figure 1) was used at the Main Stem meeting. Public input process was facilitated by members of the AC using predetermined questions that were consistent for each meeting.

The meetings were well attended and received copious support and concerns for the river.

Figure 1. EMRiver stream Table demonstration. Picture taken on February 21, 2008 at the Keeseville Public Input Meeting.

In total, 80 people attended the input meetings. Attendees included residents of the towns, hamlets, cities, and villages of: Albany, Ausable, Chesterfield, Jay, Keene, Keene Valley, Keeseville, Lake Placid, New Russia, Port Douglas, Saranac Lake, Wilmington, New Russia, and North Elba, New York and Pasadena, California!

Partners in "Ausable Watershed Planning" were present from: the Ausable River Association, Cornell Cooperative Extension, Lake Placid Wastewater Treatment Plant, Mirror Lake Watershed Association, the Lake Placid Shore Owners Association, Whiteface Mountain Ski Area, New York Department of State, Essex County Planning, Clinton County Soil and Water District, the Towns of Ausable, Chesterfield, Jay, Keene, and Wilmington and the Villages of Keeseville and Lake Placid.

Input to the following questions was solicited from the citizens present:

1. **What town/village in the watershed do you live in?**
2. **What things do you value most about the Ausable River and its tributaries and lakes?**

   Where do you do these things on the river? (A watershed map was used to pinpoint areas).
3. **What are the most significant problem(s) or issues facing the Ausable River and its tributaries and lakes?**

   Which of these issues do you feel are most important to address and where have you noticed these types of problems? (Use the map to identify these problems).
4. **What do you feel could be done to improve the river?**

The results of all four meetings are summarized in Appendix C. The most commonly cited concerns and suggestions are shown in Table 3, below.

Table 3. Top Issues of Concern of Watershed Citizens Attending Public Input Meetings:

Main	East	West
Flooding from ice jams	Stream bank erosion	Education: Land use planning tools, local governments, state agencies, communities
Bank Erosion	Sedimentation	Reduce stormwater run off from roads, impervious surfaces, construction sites. Work with DOT.
Trash in the River and Unauthorized Dumping	Water quality	Streambank Erosion (esp. River Road Section)

Watershed Surveys

The third venue for public input into WMP was a Watershed Questionnaire. The purpose of the survey was to collect input from watershed residents who could not attend the meetings. This survey was sent to members of the Ausable River Association and was made available at all of the locations where public meeting posters were posted, and at the public meetings.

Coincident with Ausable Watershed Planning, the Town of AuSable is creating a Comprehensive Plan. Results of their public opinion survey included important input into attitudes and concerns for the Ausabel River in that Town.

Results from both surveys are shown on below.

Ausable River Watershed Planning Questionnaire

The Ausable River Watershed includes the Ausable River and all of its tributaries and lakes for example: the Chubb River, Black Brook, Lake Placid, and Mirror Lake **64 Returned Surveys**

1) What part of the watershed do you live in? **64 responses**

a. Au Sable 2
b. Black Brook 1
c. Chesterfield
d. Jay 1
e. Keene 2
f. North Elba 11
g. Wilmington 11
h. Keeseville 2
i. Lake Placid 33
j. New Russia 1

2) What activities do you enjoy doing on the river & tributaries or lakes? **64 responses**

a. Fishing 44
b. Canoeing, kayaking 46
c. Swimming, wading 43
d. Picnicking 22
e. Hiking/walking 47
f. Educational activities 13

3) How concerned are you with the water quality in the Ausable River? **44 total responses**

a. Very concerned __22__
b. Somewhat concerned__19__
c. Not very concerned ___2__
d. Not at all concerned___1__
e. Don't know ____

4) What would you like to do on/in the river/tributaries/lakes that you don't feel you can do? **14 responses**

Drink the water 5, Eat Fish 2, Swim 6, whitewater rafting 2, keep the fish I catch

5) What are the most significant problems or issues facing the Ausable River and/or its tributaries, and lakes? (circle all that apply) **64 total responses**

a. Streambank erosion 25
b. Road runoff 50
c. Wastewater treatment plants, septic systems 30
d. Impairments to fishing 20
e. Flooding 8
f. Ice damage 9
g. Construction 21

- Damage from Road Salt 10
- Septic tanks 13
- Invasives 1, acid rain 2, ignorance 1, trash 1

6) Which problems or issues do you feel are the most important to fix?

Road Salt/sand/stormwater runoff 18
WWT/septic systems 9
Pollution 9
Streambank erosion 7
Construction 5
Impairments to fishing 5
Trash 4
Siltation 3
Habitat 3
Ice damage 3
Flooding 2
Over fishing 1
Acid rain 1
Dams 1
Pesticides 1
Phosphates 1
Education 1
Invasives 1

7) Do you think the Ausable River has gotten better, worse, or remained the same over the last 15 years?

Better: __7_ Worse: _18__
Same__10__
Don't Know __3__

8) If you think river quality has gotten worse or better what do you attribute these changes to?

-Pollution 3
-Human Waste at Trailheads 2
-Trash 2
-Roadway salting and sanding 2
-Increasing house construction 1
-Iron man, hotels, motels 1
-road runoff 1

9) Would you be interested in more information about watershed planning and improving water quality within the Ausable River Watershed? **43 responses**

Yes_30____ No__13___

10) How would you like to be more involved in watershed planning? **37 responses**

a. Community events 22
b. School programs 17
c. Stream walks 14
d. Outreach and education 13
e. Workshops 9
f. Stream and upland monitoring 7
g. Angler Surveys 5
h. Other:_Clean-up 3

Please provide any additional comments regarding water quality or water use in the Ausable River Watershed:

--Too many fishermen**,**
--Need better zoning laws,
--Stock more fish,
-- Too much building close to the shoreline,
-- This is one of the few prime trout fisheries anywhere and we need to protect and enhance it require stronger code/laws and mandatory stormwater mngt. Including DOT
-- need to build new state arteries that do not parallel the river
--I didn't get the idea that there was a problem
--We all need to be aware of conserving water through it always seem plentiful
--The watershed should be returned to and maintained in the pristine condition the creator intended, no exceptions!
--Repair dam at Lussi property to restore water levels at Averyville Bridge of Chubb

Summary and Conclusions Public Input Process

A majority of the public responding to the survey (nearly 75%) perceive the river as not improved or in worse condition as compared to 15 years ago. This underlines the importance of planning and creating implementation steps toward river improvement. Respondents thought that the most significant problems facing the Ausable water are: road runoff (50), wastewater treatment plants, septic systems (30), and streambank erosion (25).

The most commonly stated problems respondents want to see fixed are: salt/sand/stormwater runoff (18) and waste water treatment/septic systems (9) and pollution (9).

In the Town of Ausable the issue of water quality was of greatest importance with 72% of respondents stating they were concerned or very concerned about this issue. Other priority concerns were WWTP and septic systems (59%), public access (58%), road run off (56%), ice damage and streambank erosion (48%). The issue of junk yards was the most commonly occurring comment written under least likeable aspects of Ausable (37 occurrences).

Overall the public was very supportive and provided good input to the planning process. Public meetings were well attended and local government was well represented at AC meetings. AC meetings were also well attended by State and County government.

Priority Recommendations

Recommendations for implementing solutions to the issues uncovered during watershed characterization and the public input process were developed by the Ausable Watershed Management Committee. Problems and gaps in information were assessed and projects and plans to address these items were placed into an Action Matrix (found below).

Complete a Final Watershed Management Plan

The first priority is to complete a Final Watershed Management Plan. The strategy presented in this document is an interim step to a complete plan and will be incorporated into a final plan.

Several gaps need to be filled in order to complete a final plan: First, an agreement to solicit cooperation from all watershed municipalities needs to be drafted. This agreement would ensure that all municipalities will participate in the plan to help maintain and improve the watershed. "We all share the water;" if one entity fails to steward water quality the plan is a failure for all up and downstream.

Second, a Gap Analysis of local land use controls and zoning laws needs to be conducted. This entails gathering existing local laws and ordinances that address water quality and stormwater runoff and noting where no such protections exist. This "Gap Analysis" will be conducted according to the Genesee Finger Lakes Regional Planning Council's template published by the NY DOS. The third planning action would provide model local laws to Towns that lack necessary legislation in order to fill the identified gaps.

Fourth, an inventory of wetlands and riparian areas will be compiled in order to assess the ability of watershed to hold and filter water, and provide the habitat required for wetland species.

Lastly, an inventory of flood prone areas, especially those prone to ice jam flooding, will be finalized in order to identify the potential for remediation and feasibility for prevention and to encourage municipalities to pass or enforce existing local laws that govern building in flood planes.

Assessment, Monitoring, and Management of Watershed Resources

Complete Geomorphic Assessments and prepare plans for restoration: Addressing stream bank erosion is a high priority among watershed citizens and key locations are identified on the windshield geomorphic assessments map (Appendix B, figure B-1). This mapping will be extended to the upper West and East Branches. Design Plans to remediate locations identified as "High Erosion" and "High Banks" (red thick lines on figure B-1) will be implemented.

Prepare education material related to Riparian Buffers: This item will address replacing riparian buffers and educating the local landowners about the importance of maintaining streamside vegetation. Existing publications and programs include:

- ASRA, 2005, "Using Vegetation to Reduce Erosion & Stabilize Your Streambank: A Step-by-step Guide."
- ASRA provides trees for stream side planting to its members each spring
- ASRA holds an annual tree planting day

Encourage participation in the Agriculture Environmental Management Program (AEM): Agricultural areas cover 3.4% of the watershed and run off from farm fields and pasture is

identified as a concern of watershed citizens. Identifying solutions through completing a thorough AEM survey will help to reduce non-point source pollution. Implementing livestock exclosures is a priority to watershed citizens.

Develop education programs related to agriculture and logging: Along with agriculture, forestry and the production of forestry products compose a significant land use within the watershed. Encouraging good logging practices to reduce sediment run off, and to protect stream crossings will be promoted and supported through education and assistance with in stream structures.

Develop Stormwater Outfall Monitoring Plan: Sediment from urban and roadway areas is of major concern. Sources for this pollutant will be clearly identified by careful mapping of stormwater outfalls, bridges, and roadways along the streambank.

Develop Best Management Practices for Public Works Department:
Develop training programs related to stormwater management and non-point source pollution:

Propose alternative BMP's that address road deicing, road construction standards, ditching with hydroseeding, capturing sediment from stormwater runoff. This will be partially implemented by offering DEC seminars to contractors, code enforcement officers, town boards, planning and zoning boards. Seminars topics will include training on state and local regulations and the how to's of stormwater management. Existing programming includes: DEC 1.5 hour, ½ day or full day seminars on SPDES GP-01-02, or understanding SWMPs

This item also includes ensuring that NYS DOT also follows BMP's put forth in "New York State Department of Transportation, Guidelines for working in the Adirondack Park April 2008" including placement of proper sediment settling structures for run off from state roads within the watershed (https://www.nysdot.gov/portal/page/portal/divisions/engineering/environmental-analysis/repository/chapters1-6.pdf). Identify people and a method for working with NYS DOT to ensure their cooperation in drawing adequate stormwater design plans for state roads in the watershed. Have a DOT Stormwater design engineer lead workshops for planning boards – the how's and why's of stormwater plans so that planning boards are properly informed when state plans come before them for approval in their town.

Address Onsite Wastewater Treatment Systems:
Develop Waste Develop an Onsite Wastewater Treatment System Database:
Prepare Alternative Wastewater Treatment Feasibility Studies:
Develop a training program related to OWWT:
Assess potential funding opportunities for septic system maintenance and replacement:
Accurately locate septic tanks using GPS and put data into a GIS database. Use maps generated from GIS to analyze location and proximity of septic tanks to waterbodies. Database information would include location, age, condition, last pump-out and could be used to plan for and identify remedial actions such as pump out scheduling and replacement of failing and failed systems. There are currently plans being made within the state to make funds available for replacement of failed tanks and as these will be exploited when/if funds become available.

Continue to seek funds to promote a septic pump-out cost share for river front homeowners. Include in this program education and water use reduction education to homeowners. Educate public leaders of the importance of proper septic maintenance and programs through the Conference of Mayors.

Develop an Invasive Species Management and Monitoring Plan: Continue to map and monitor the spread and elimination of invasive species in the watershed. Mapping has been on–going since 2002 (Appendix A, Figure A-3) and some eradication methods have begun. The distribution of invasive species needs to be continually updated and the success of eradication efforts monitored. A comprehensive invasive species management plan needs to be formulated and published. An invasive species rapid response plan needs to be adopted from the Adirondack Park Invasive Program. ASRA will continue to be a partner of this program.

Evaluate potential locations for and find funding for boat washing stations.

Prepare education materials related to Invasive Species: Continue to publish and distribute brochures and rack cards that describe invasive threats to the Ausable watershed. Distribute information through local outfitters, libraries, at Lake Steward stations. Hold educational programs about invasive species through library lecture series, town meetings etc.

Develop educational materials on flood plain management, including wetlands and riparian areas; Develop materials for homeowners and local government decision makers to educate them concerning local law regulating flood plane development. Emphasize building safe distance from flood prone areas. Hold floodplain Management/Regulations Workshops for County/Town government officials, CEOs, and Contractors that holds continuing ed. Credits for the appropriate parties.

Assess the feasibility for flood prevention in ice jam prone areas: Continue to expand upon ACOE (1998) study that describes locations of ice jamb flooding in the Ausable Valley and seek funding for ice jamb prevention measures where feasible.

Develop a water quality monitoring plan: Identifying locations, methods, parameters, funding, and partners. Identify areas where Water quality testing has been lacking and is needed. Identify parameters to be tested based on the research question and need to know. These could include *E. coli*, salinity, conductivity, Phosphorous, pH, temperature, and dissolved oxygen. Develop protocols for testing water quality. Write quality assurance plans for instrument up-keep, calibration, and record keeping methods.

Develop a river monitoring program: Secure volunteers to keep an up-to-date assessments on channel condition, stream bank erosion, and vegetative cover. Develop protocols based on currently used geomorphic assessment protocols. Develop and implement methods to quantify sediment production from bank loss.

Develop general watershed education materials and programs: Collect existing literature and develop a package of materials related to land use and best management practices for forestry, pesticides, herbicides, fertilizers, water quality, and waste management. The educational package would be tailored to land owner location and needs. These will be distributed through land owner contacts and local programming.

Continue to hold an ASRA annual river clean up day: Hold river clean up activities at multiple locations along the river. Work with local citizens to find the most appropriate stream stretches to be cleaned. Continue and expand clean-up by adding programs that educate the public to keep trash/pollutants out of the river.

A complete list of <u>Priority Recommendations</u> with time lines, stakeholders, and funding sources is found starting on the next page.

Ausable River Watershed
Priority Projects Matrix

edited by cjt-s 8/18/08

Project	Description	Time Frame**	Stakeholders	Possible Funding Sources
Complete Comprehensive Watershed Management Plan:	Based on Ausable River Watershed Strategy Report, including prioritization of subwatersheds, identification of principle point and nonpoint source pollutants, etc	Short	Ausable Watershed Municipalities, NYSDOS, NYSDEC, SWCD, County Planning, LCBP	NYSDOS
*Develop Formal Agreement for intermunicipal cooperation	MOU, MOA or other mechanism for implementation watershed plan recommendations	Short	Ausable Watershed Municipalities, NYSDOS	NYSDOS
*Prepare Gap Analysis of local land use controls and zoning laws	Identify gaps related to water quality protection, including local sediment and erosion control laws including salt storage, road de-icing, road standards, ditch remediation, hydroseeding, stormwater	Short	Ausable Watershed Municipalities, ASRA, LC/LG Regional Planning Council, County Planning	NYSDOS,
*Identify Model Local Laws to address identified gaps	Assess sample and model laws for use by watershed communities	Short	Ausable Watershed Municipalities, ASRA, LC/LG Regional Planning Council, NYSDOS, NYSDEC, County Planning, County WQCC	NYSDOS, NYSDEC
*Inventory of wetlands and riparian areas	Address water quality, habitat, and hydrology. Identify resources and develop management strategies	Short	Ausable Municipalities, ASRA, NYSDEC,NYSDOS, County SWCD, NRCS, Trout Unlimited, LCBP	NYSDEC, NYSDOS, National Fish and Wildlife Foundation

**Short = 1 - 2 years
Medium = 3 - 5 years
Long = > 5 years

Ausable River Watershed
Priority Projects Matrix

edited by cjt-s 8/18/08

Project	Description	Time Frame**	Stakeholders	Possible Funding Sources
*Develop an inventory and analysis of flood prone areas	Assess remediation recommendations	Short	Ausable Municipalities, ASRA, NYSDEC, County SWCD, NRCS, Trout Unlimited, LCBP, County WQCC	NYSDEC, NYSDOS
Complete Geomorphic Assessments for the Upper West and East Branches	Assess stream channel stability	Short	Ausable Watershed Municipalities, ASRA, NYSDEC, Trout Unlimited, NYSDOS	NYSDOS, NYSDEC
Prepare Geomorphic Restoration Plans	Create for the reaches identified as impaired in the geomorphic assesments	Medium	Ausable Watershed Municipalities, ASRA, NYSDEC, Trout Unlimited, NYSDOS	NYSDOS, NYSDEC
Prepare educational material related to riparian buffers	Geared towards landowners	Short	Ausable Watershed Municipalities, NYSDOS, ASRA, Trout Unlimited, local schools,	NYSDOS, NYSDEC, LCBP?,
Encourage participation in the Agriculture Environmental Management Program (AEM)	Encourage voluntary particiaption in Ag and Markets to control nonpoint source pollution from agricultural practices; -- Identify farms where stream exclosures are needed	Short	Ausable Watershed Municipalities, ASRA, NYSDAM, County SWCD, individual farms/farm business, County WQCC	NYSDAM, County SWCD

**Short = 1 - 2 years
Medium = 3 - 5 years
Long = > 5 years

Ausable River Watershed
Priority Projects Matrix

edited by cjt-s 8/18/08

Project	Description	Time Frame**	Stakeholders	Possible Funding Sources
Develop education programs related to logging	Develop and distribute education and outreach to loggers on nonpoint source pollution and best management practices	Short	Ausable Watershed Municipalities, ASRA, NYSDAM, County SWCD, individual farms/farm business	NYSDAM, County SWCD
Develop Stormwater Outfall Monitoring Plan	Plan should include mapping all stormwater outfalls, using GPS and GIS database	Medium	Ausable Watershed Municipalities, ASRA, Town/County DPW, Trout Unlimited, NYSDOS; County WQCC	NYSDOS, NYSDEC
Develop Best Management Practices for Public Works Departments and ensure that DOT follows state mandated BMP's	Including Salt Storage, Road De-icing, road standards, ditch remediation, hydroseeding, stormwater infrastructure etc..	Medium	Ausable Watershed Municipalities, ASRA, NYSDOS, Town/County DPW, Trout Unlimited, County WQCC	NYSDOS, NYSDEC
Develop training program related to Stormwater Management and nonpoint source pollution	Geared towards local officials, planning boards, etc.	Medium	Ausable Watershed Municipalities, ASRA, Town/County DPW, Town Boards, LC/LG Regional Planning Council, NYSDOS, County WQCC	NYSDOS, LCBP?
Develop Onsite Wastewater Treatment System Database	Including GPS locations and GIS database	Medium- Long	Ausable Watershed Municipalities, ASRA, Town Boards, LC/LG Regional Planning Council, County SWCD, NYS OTN, NYDOS, County WQCC	NYSDOS

**Short = 1 - 2 years
Medium = 3 - 5 years
Long = > 5 years

Ausable River Watershed
Priority Projects Matrix

edited by cjt-s 8/18/08

Project	Description	Time Frame**	Stakeholders	Possible Funding Sources
Prepare Wastewater Treatment Feasibility Studies	Identify existing service areas and opportunities for new or expanded areas	Medium- Long	NYSDEC, NYSEFC, ASRA, NYSDOS, NYCAP, Specific Municipalities? ; County WQCC	NYSEFC (SRF), NYS DEC, NYSDOS?
Develop training program related to Onsite Waste Water Treatment Systems	Geared towards local officials, landowners, and installers on fundamentals, installation, maintenance, and inspections. Utilize the Onsite Wastewater Treatment Training Network.	Medium- Long	Ausable Municipalities, ASRA, NYSDOS, NYSDEC, NYSOTN, County SWCD, Coutny WQCC	NYSDEC, NYSOTN, NYSDOS
Assess potential funding opportunities for septic system maintenance and replacement	Identify and evaluate potential fundning mechanisms for maintenance and remediation of septic systems	Medium- Long	Ausable Municipalities, ASRA, NYSDEC, NYSEFC, NYSDOS, NYSOTN, County WQCC	NYSDEC, NYSEFC, NYSDOS
Develop an Invasive Species Monitoring and Management Plan	Continue to identify and map invasive species and develop management strategies; Develop a invasive species rapid response plan	Short-Medium	Ausable Municipalities, APIPP, ASRA, NYSDOS, NYSDEC, County SWCD, NRCS, Trout Unlimited, LCBP	NYSDEC, NYSDOS, National Fish and Wildlife Foundation
Prepare education materials related to Invasive Species	Geared toward homeowners and boat owners. Evaluate potential locations and find funding for boat washing stations	Short	Ausable Municipalities, ASRA, NYSDOS, NYSDEC, County SWCD, NRCS, Trout Unlimited, LCBP, APIPP	NYSDEC, NYSDOS, National Fish and Wildlife Foundation

**Short = 1 - 2 years
Medium = 3 - 5 years
Long = > 5 years

Ausable River Watershed
Priority Projects Matrix

edited by cjt-s 8/18/08

Project	Description	Time Frame**	Stakeholders	Possible Funding Sources
Develop educational materials on floodplain management, including wetlands and riparian areas	Develop educational material for homeowners and local government decision makers	Short	Ausable Municipalities, ASRA, NYSDOS	NYSDOS, NYSDEC, LCBP?
Assess the feasibility for flood prevention in ice jamb prone areas	Continue to expand upon ACOE study that described ice jamb flooding at locations in the Ausable Valley	Medium	Ausable Municipalities, ASRA, NYSDOS, ACOE	
Develop a Water Quality Monitoring Plan	Identifying locations, methods, parameters, funding, and partners	Medium	Ausable Municipalities, ASRA, NYSDOS, NYSDEC, County SWCD, LCBP, County WQCC	NYSDOS, NYSDEC
Monitor Junk yards	promote programs to ensure that junk yards do not compromise water quality	Medium	Ausable Municipalities, ASRA, NYSDOS, NYSDEC, County SWCD, LCBP, County WQCC	NYSDOS, NYSDEC
Develop a river monitoring program	Secure volunteers to keep an up to date assessments on channel condition, stream bank erosion	Short	Ausable Municipalities, ASRA, NYSDOS, NYSDEC, County SWCD, NRCS, Trout Unlimited, TNC, LCBP	

**Short = 1 - 2 years
Medium = 3 - 5 years
Long = > 5 years

Ausable River Watershed
Priority Projects Matrix

edited by cjt-s 8/18/08

Project	Description	Time Frame**	Stakeholders	Possible Funding Sources
Develop General Watershed Education Materials and programs	Related to land use, forestry, aggriculture, pesticides, herbicides, fertilizers, water quality, waste management, etc.	Short	Ausable Municipalities, ASRA, NYSDOS, LCBP	NYSDOS, NYSDEC
Continue and further develop Annual River Clean-up Day	Continue and expand clean-up by adding programs that educate the public about trash/pollutants in the river	Short	Ausable Municipalities, ASRA	Municipalities

**Short = 1 - 2 years
Medium = 3 - 5 years
Long = > 5 years

Appendix A
Data and Research details to Support the Ausable Watershed Characteristization

Table A-1. Population and Community Income Levels within the Ausable Watershed.

Town/Village/Hamlet	Population*	Median Household Income (National = $41, 994)
Au Sable	3,015	$34,118
Keeseville	1,850	$32,815
Black Brook	1,660	$32,634
Chesterfield	2,409	$39,875
Jay	2,306	$35,612
Au Sable Forks	670	
Jay		
Upper Jay		
Keene	1,063	$34,226
Keene Valley		
Keene		
North Elba	8,661	$35,321
Lake Placid	2,733	28,239
Wilmington	1,131	$34,118
*Source: 2000 census, U.S. Census Bureau		

Table A-2. Size of student body in Ausable Watershed school districts and private schools.

Public Schools	Grade Level	Student Body Size**
Keene Central School District	K-12	192
Au Sable Forks Primary	K-6	251
Au Sable Valley C.S.D.	6-8	232
Au Sable Valley C.S.D.	9-12	465
Lake Placid C.S.D.	k-12	931
Private Schools		
National Sports Academy	10-12	90
North Country		74
Northwood's	10-12	158
St. Agnes		116
Wilmington Christian		53
Total Student Population:		**2562**
**Source: schooltree.org		

Historic Places and Bridges of the Ausable River

Sixteen historic bridges, built between 1843 and 1941, span the river and represent one hundred and sixty-six years of engineering history.

- 2 Delaware & Hudson Company Railroad Bridges (1913) which cross near the mouth of the Ausable.
- Carpenter's Flats Bridge (1941) a steel Warren through truss bridge on Rt. 9 north of Ausable Chasm
- Ausable Chasm Bridge (1934) of iron and stone –faced concrete
- Old State Road Bridge (circa 1890) a Pratt pony truss bridge in Ausable Chasm
- Stone Arch Bridge (1843) in Keeseville
- Upper Bridge (1878) in Keeseville the oldest wrought iron truss bridge in the Adirondack Champlain Region
- Swing Bridge (1888) a suspension bridge in Keeseville
- Wilmington Bridge (1935) concrete with two stone faced arches
- Rolling Mill Hill Bridge (1879) in Au Sable Forks Pratt through truss iron bridge (removed?)
- Jay Covered Bridge (1857) a Howe truss constructed of hand hewn timbers, removed, restored and replaced as a walking bridge in 2005-2006.
- Walton Bridge (1890) a lenticular iron truss bridge in Keene
- Ranney Bridge (1902) a iron truss bridge in Keene Valley
- Beer's Bridge (circa 1900) a pin connected, iron Pratt pony truss in Keene Valley
- Notman Bridge (1913) a concrete, stone faced arch bridge in Keene Valley
- Slater's Bridge (circa 1900) Warren iron truss bridge in St Huberts

Other places within the watershed also listed on the National Register of Historic Places are:

- Whiteface Veterans Memorial Highway (1934) in Wilmington
- Wellscroft Lodge (1903) in Upper Jay
- Wells Memorial Library (1907) in Upper Jay
- Keene Valley Library (1875)
- Ausable Club (1890) in St. Huberts
- United States Post Office (1936) in Lake Placid

While receiving no official historic designations to date, numerous sites in and around the village of Lake Placid and Whiteface Mountain, in Wilmington, associated with the Winter Olympics in 1932 and 1980, have developed as popular destinations for both residents and tourists alike[2].

Table A-2. Fish Stocking Report for the Ausable, Spring 2007

Water	Town	No.	Date	Species	Size (in.)
East Branch Ausable River	Jay	4,170	April	Brown Trout	8 - 9
East Branch Ausable River	Jay	4,170	May - June	Brown Trout	8 - 9
East Branch Ausable River	Jay & Keene	5,060	April	Brown Trout	8 - 9
East Branch Ausable River	Jay & Keene	1,770	May	Brown Trout	8 - 9
East Branch Ausable River	Jay & Keene	2,720	Spring	Rainbow	8 - 9
East Branch Ausable River	Keene	1,400	May	Brook Trout	8 - 9
Total East Branch		**19,290**			
Johns Brook	Keene	550	May	Brook Trout	8 - 9
Lake Placid Outlet	North Elba	590	May	Brown Trout	8 - 9
Mirror Lake	North Elba	1,180	Spring	Rainbow	8 - 9
West Branch Ausable River	Jay	2,020	April	Brown Trout	8 - 9
West Branch Ausable River	Jay	180	May	Brown Trout	12 -15
West Branch Ausable River	Jay	2,190	May - June	Brown Trout	8 - 9
West Branch Ausable River	North Elba	800	April	Brook Trout	8 - 9
West Branch Ausable River	North Elba	2,860	April	Brown Trout	8 - 9
West Branch Ausable River	North Elba	650	May	Brown Trout	12 -15
West Branch Ausable River	North Elba	2,360	May	Brown Trout	8 - 9
West Branch Ausable River	North Elba	350	May - June	Brook Trout	8 - 9
West Branch Ausable River	North Elba	3,030	May - June	Brown Trout	8 - 9
West Branch Ausable River	Wilmington	4,720	April	Brown Trout	8 - 9
West Branch Ausable River	Wilmington	640	May	Brown Trout	12 -15
West Branch Ausable River	Wilmington	4,970	May - June	Brown Trout	8 - 9
Total West Branch		**24,770**			

Table A-3. Rare plants, animals, and significant natural Communities in the Ausable River Watershed, provided by the New York Natural Heritage Program.

NEW YORK NATURAL HERITAGE PROGRAM
Report on Rare Plants, Rare Animals, and Significant Natural Communities

IN THE AU SABLE RIVER WATERSHED

This report does not contain precise locations, and therefore may be included in documents. However, information that does disclose the precise locations of rare plants or animals may lead to the collection or disturbance of those plants or animals. Therefore, information on precise locations should not be included in any reports or maps made available to the public. The New York Natural Heritage Program can offer guidance on presenting rare species location information in such a way as to minimize the risks to the plants and animals.

Prepared December 2007, from the Biodiversity Databases of the New York Natural Heritage Program, NYS DEC, 625 Broadway, Albany, NY, 12233-4757.

	COMMON NAME	SCIENTIFIC NAME	NY STATE LISTING	NY STATE RANK*	GLOBAL RANK**
Last observed within the last 30 years					
Animals	Bat Colony	*Bat Colony*	Unlisted	SNR	GNR
	Eastern Small-footed Myotis	*Myotis leibii*	Special Concern	S2	G3
	Bicknell's Thrush	*Catharus bicknelli*	Special Concern	S2S3B	G4
	Clay-colored Sparrow	*Spizella pallida*	Protected	S2	G5
	Common Loon	*Gavia immer*	Special Concern	S3	G5
	Peregrine Falcon	*Falco peregrinus*	Endangered	S3B	G4
	Round Whitefish	*Prosopium cylindraceum*	Endangered	S1S2	G5
	Acadian Swordgrass Moth	*Xylena thoracica*	Unlisted	S1S2	G4
	A Noctuid Moth	*Lithophane lepida lepida*	Endangered	S1	G4T3T4Q
	Thaxter's Pinion Moth	*Lithophane thaxteri*	Unlisted	SU	G4
	Appalachian Tiger Beetle	*Cicindela ancocisconensis*	Unlisted	S2	G3
	Black Meadowhawk	*Sympetrum danae*	Unlisted	S2S3	G5
	Boreal Snaketail	*Ophiogomphus colubrinus*	Unlisted	S1	G5
	Brook Snaketail	*Ophiogomphus aspersus*	Unlisted	S2	G4
	Eastern Pearlshell	*Margaritifera margaritifera*	Unlisted	S2	G4
					15
Globally Rare Plants	Alpine Sweetgrass	*Anthoxanthum monticola ssp. monticola*	Endangered	S1	G5T3T5
	Boott's Rattlesnake-root	*Prenanthes boottii*	Endangered	S1	G2
	Diapensia	*Diapensia lapponica var. lapponica*	Threatened	S2	G5T3T5
	Fernald's Bluegrass	*Poa laxa ssp. fernaldiana*	Endangered	S1	G5?T3
	Lanceleaf Arnica	*Arnica lanceolata ssp. lanceolata*	Endangered	S1	G3T3
	Ram's-head Ladyslipper	*Cypripedium arietinum*	Threatened	S2	G3
					6
Other Rare Plants	Alpine Azalea	*Loiseleuria procumbens*	Endangered	S1	G5

COMMON NAME	SCIENTIFIC NAME	NY STATE LISTING	NY STATE RANK*	GLOBAL RANK**
Alpine Cliff Fern	*Woodsia alpina*	Endangered	S1	G4
Alpine Goldenrod	*Solidago leiocarpa*	Threatened	S2	G4
Alpine Willow-herb	*Epilobium hornemannii ssp. hornemannii*	Endangered	S1	G5T5
Appalachian Firmoss	*Huperzia appressa*	Threatened	S2	G4G5
Arctic Rush	*Juncus trifidus*	Threatened	S2	G5
Back's Sedge	*Carex backii*	Threatened	S2	G4
Balsam Willow	*Salix pyrifolia*	Threatened	S2S3	G5
Bearberry Willow	*Salix uva-ursi*	Threatened	S2	G5
Bigelow's Sedge	*Carex bigelowii*	Threatened	S2	G5
Black Crowberry	*Empetrum nigrum ssp. hermaphroditum*	Rare	S3	G5T5
Blunt Spikerush	*Eleocharis ovata*	Endangered	S1S2	G5
Canadian Single-spike Sedge	*Carex scirpoidea ssp. scirpoidea*	Endangered	S1	G5T5
Deer's Hair Sedge	*Trichophorum cespitosum ssp. cespitosum*	Threatened	S2	G5T5
Drummond's Rock-cress	*Boechera stricta*	Endangered	S2	G5
Dwarf Blueberry	*Vaccinium cespitosum*	Endangered	S1	G5
Dwarf White Birch	*Betula minor*	Endangered	S1	G4Q
False Toadflax	*Geocaulon lividum*	Endangered	S1	G5
High-mountain Blueberry	*Vaccinium boreale*	Endangered	S2	G4
Lapland Rosebay	*Rhododendron lapponicum var. lapponicum*	Endangered	S1	G5T5?
Meadow Horsetail	*Equisetum pratense*	Threatened	S2	G5
New England Northern Reedgrass	*Calamagrostis stricta ssp. inexpansa*	Threatened	S2	G5T5
Northern Bentgrass	*Agrostis mertensii*	Threatened	S2	G5
Northern Running-pine	*Diphasiastrum complanatum*	Endangered	S1	G5
Northern Wild Comfrey	*Cynoglossum virginianum var. boreale*	Endangered	S1S2	G5T4T5
Northern Wild-licorice	*Galium kamtschaticum*	Endangered	S1	G5
Prairie Redroot	*Ceanothus herbaceus*	Endangered	S1	G5
Purple Crowberry	*Empetrum eamesii ssp. atropurpureum*	Endangered	S1	G5T5
Rand's Mountain Goldenrod	*Solidago simplex var. monticola*	Threatened	S2	G5T4
Riverweed	*Podostemum ceratophyllum*	Threatened	S2	G5
Rock-cress	*Draba arabisans*	Threatened	S2	G4
Scabrous Black Sedge	*Carex atratiformis*	Endangered	S1	G5
Smooth Cliff Brake	*Pellaea glabella ssp. glabella*	Threatened	S2	G5T5
Smooth Cliff Fern	*Woodsia glabella*	Endangered	S1	G5
Spurred Gentian	*Halenia deflexa*	Endangered	S1	G5
Squashberry	*Viburnum edule*	Threatened	S2	G5
Tundra Dwarf Birch	*Betula glandulosa*	Endangered	S1	G5
White Bluegrass	*Poa glauca ssp. glauca*	Endangered	S1	G5T5?

1/30

Communities

Acidic Talus Slope Woodland		S3	G4?

COMMON NAME	SCIENTIFIC NAME	NY STATE LISTING	NY STATE RANK*	GLOBAL RANK**
Alpine Krummholz			S2	G3G4
Alpine Meadow			S1	G3G4
Alpine Sliding Fen			S1S2	G3G4
Beech-Maple Mesic Forest			S4	G4
Calcareous Shoreline Outcrop			S2	G3G4
Calcareous Talus Slope Woodland			S3	G3G4
Cliff Community			S4	G5
Cobble Shore			S4	G4G5
Dwarf Shrub Bog			S3	G4
Floodplain Forest			S2S3	G3G4
Hemlock-Northern Hardwood Forest			S4	G4G5
Ice Cave Talus Community			S1S2	G3?
Inland Calcareous Lake Shore			S3	G4?
Intermittent Stream			S4	G4
Medium Fen			S2S3	G3G4
Mountain Fir Forest			S2	G3
Mountain Spruce-Fir Forest			S2S3	G3
Northern White Cedar Swamp			S2S3	G4
Pine-Northern Hardwood Forest			S4	G4
Pitch Pine-Heath Barrens			S1S2	G4
Riverside Sand/Gravel Bar			S3S4	G5
Rocky Headwater Stream			S4	G4
Rocky Summit Grassland			S3	G3G4
Sand Beach			S3	G5
Sedge Meadow			S4	G5
Spruce-Fir Rocky Summit			S3	G4
Spruce-Northern Hardwood Forest			S3S4	G3G4
Successional Red Cedar Woodland			S5	G5
Talus Cave Community			S2S3	G4

/30

Last observed more than 30 years ago

Rare Plants	Cloud Sedge	*Carex haydenii*	Endangered	S1	G5
	Clustered Sedge	*Carex cumulata*	Threatened	S2S3	G4?
	Common Mare's-tail	*Hippuris vulgaris*	Endangered	S1	G5
	Inland Bluegrass	*Poa interior*	Endangered	SH	G5
	Northern Clustered Sedge	*Carex arcta*	Endangered	S1	G5
	White Mountain-saxifrage	*Saxifraga paniculata ssp. neogaea*	Endangered	S1	G5T5?

* Rarity in NYS as ranked by NY Natural Heritage Program on a 1 to 5 scale:
S1 = Critically imperiled; S2 = Imperiled; S3 = Rare or uncommon;
S4 = Abundant and apparently secure; S5 = Demonstrably abundant and secure;
SH = Historical records only; no recent information available.
B = Breeding population; N = Non-breeding/wintering population.

** Global rarity as ranked by Nature Serve on a 1 to 5 scale:
G1 = Critically imperiled; G2 = Imperiled; G3 = Rare or vulnerable;
G4 = Apparently secure; G5 = Secure;
GH = Historically known, with the expectation that it might be rediscovered;
GX = Species believed to be extinct; GU = Status unknown.
Range ranks, e.g. G1G2, indicate not enough information is available to distinguish between two ranks.
? = a question exists about the rank. Q = a question exists whether or not the species or variety is a good taxonomic entity.
T-ranks (T1 - T5) are defined the same as G-ranks (G1 - G5), but the T-rank refers only to the rarity of the subspecies or variety.

Table A-4 Ausable River Watershed On-Site Waste Water Treatment systems SPEDES Permits Summary:

Ausable River Watershed SPDES Permits Issue Summary:

Facility Name/Town	Surface Discharge	Subsurface Discharge	Type Waste	Design Flow (Gal/Day)	Nearest Surface Water	Distance from Water (ft)	Expiration Dates
Holiday Lodge, Wilmington	No	Yes	Sanitary and Kitchen Waste	6000	Intermittent Stream	100+	1991-1996 **Indefinite Period**
Hungary Trout Restaurant, Wilmington	No	Yes	Domestic Sewage	2340	Ausable River	300+	1989-1994 **Indefinite Period**
Keene Valley Central School, Keene Valley	No	Yes	Sanitary	3120	East Branch Ausable	1000	1999-2009 (1994 ten year amendment)
High Peaks Base Camp, Wilmington	No	Yes	Sanitary	300 (?)	Man Made Pond	150+	1995-2000
Green Mountain Lodge, Wilmington	No	Yes	Domestic Sewage	4040	White Brook	110	2005-2015 (1994 ten year amendment)
John Fountain Rd I.C.F., Jay	No	Yes	Sanitary	750	East Branch Ausable River	No distance listed	1991-1996 **Indefinite Period**
Whiteface Mtn Ski Center, Wilmington	No	Yes	Domestic Sewage	5350	West Branch Ausable River	200+	1989-1994 Renewed 2003
Paradise Pines RU Park, North Hudson	No	Yes	Sanitary	1990	Schroon River	200+	2004-2014 (1994 ten year amendment)

South Meadow Farm Lodge, Lake Placid	No	Yes	Sanitary	1125	North Meadow Brook	300	1994-2004 Renewed 2003
Trail's End B&B, Keene Valley	No	Yes	Sanitary	1500	Johns Brook	550	1994-2004 (1994 Ten Year Amendment)
Mickey Danielle Restaurant, Wilmington	No	Yes	Sewage	1120	Ausable River	1300+	2001-2006
Relocated High School Athletic Facilities, Lake Placid	No	Yes	Sanitary	2000	West Branch Ausable River	3000	1982-1987
Ledge Rock at Whiteface, Wilmington	No	Yes	Sanitary	2170	West Branch Ausable River	800-1000	2004-2014 (1994 ten year Amendment)
Mountain Lake Children's Residence, Lake Placid	No	Yes	Sanitary	5150	Roaring Brook	300	2006-2016 (1994 ten year Amendment)
KV Neighborhood House, Keene Valley	No	Yes	Kitchen	276	East Branch Ausable River	200+	1993-2003 (1994 ten year Amendment)
Whispering Pines Campground, Lake Placid	No	Yes	Sanitary	1000	North Meadow Brook	2450+	2002-2012 (1994 ten year Amendment)

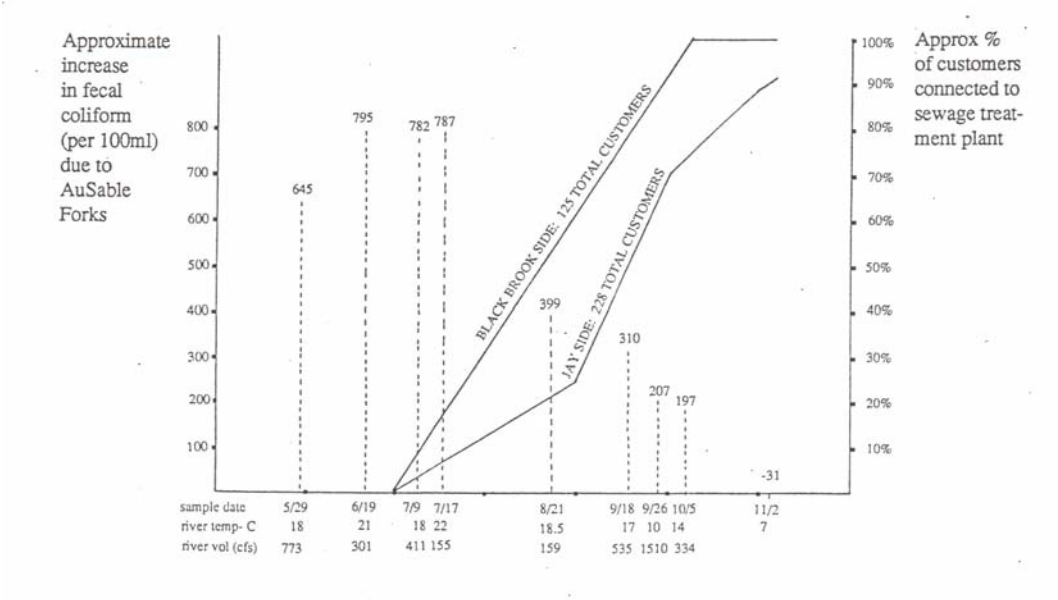


Figure A-1. Results of water quality testing conducted on the Ausable River by BRASS during the installation of the Au Sable Forks waste water treatment plant.

Invasive Plant Surveys

Table A-5. Land use and type of invasive plants found in the 2002 survey.

Location	Sq. Yd. Abundance
Drainage Ditch	16
Farm	1,200
Hamlet	200
Lake/Pond	65
Route	29
Stream Corridor	24
Wetland	441
Yard/Garden	261
Total:	**2,236 square yards**

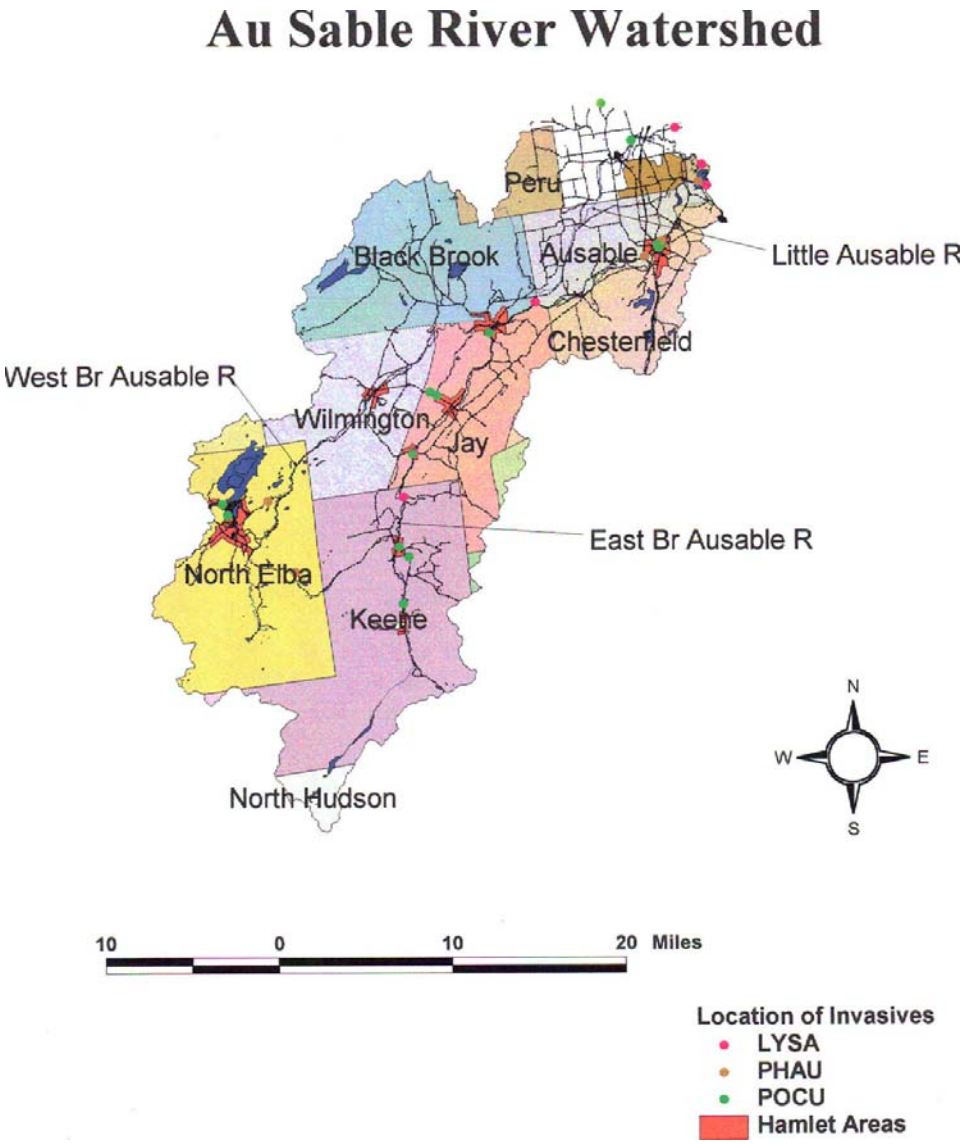


Figure A-2. Invasive Plant distribution in the Ausable Watershed - 2002.

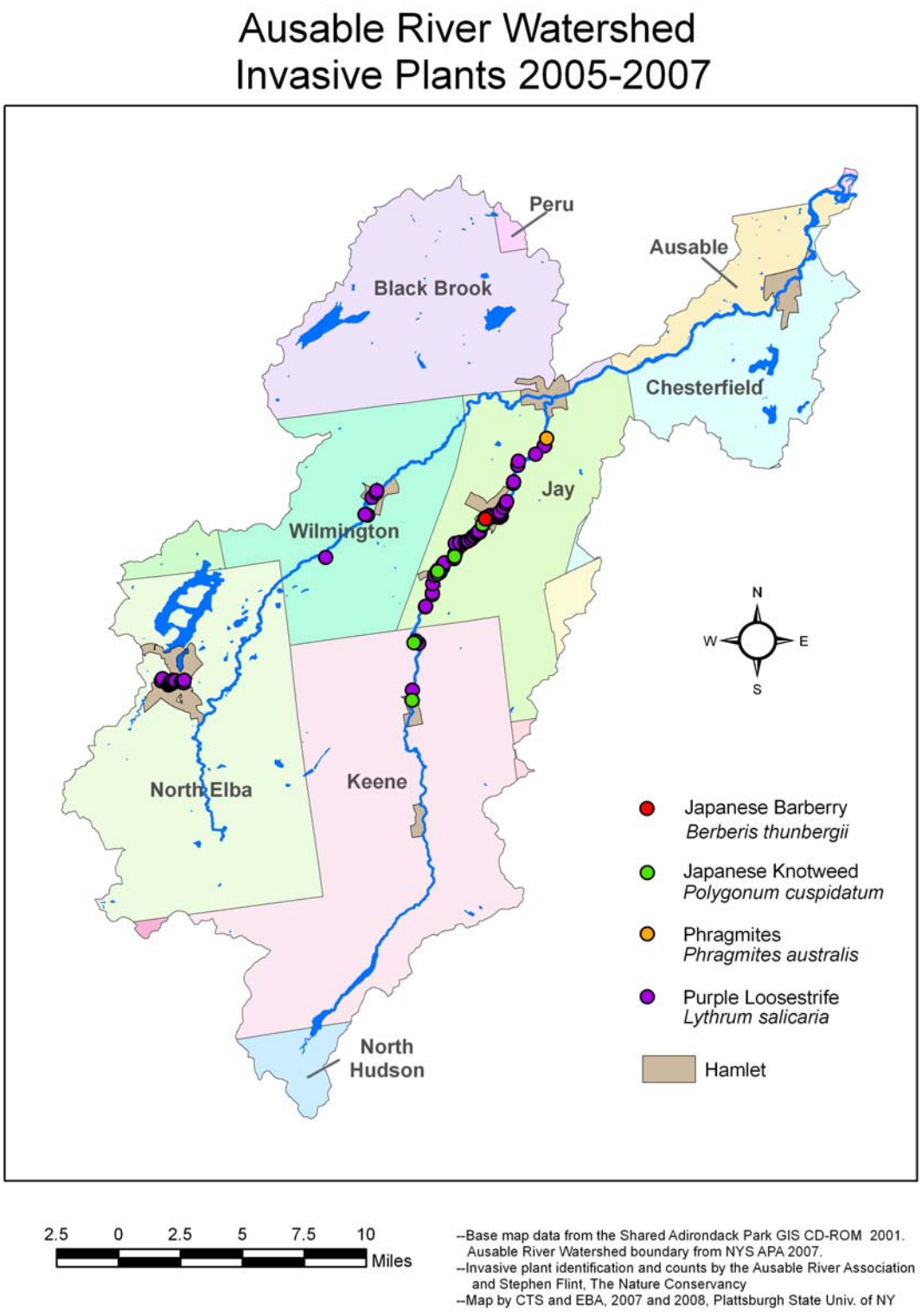


Figure A-3. Distribution of terrestrial invasive plants in the Ausable Watershed 2005 to 2007.

West Branch Invasive Survey

The West Branch study recorded 11 infestations of purple loosestrife along the shoreline of Mill Pond covering approximately 61,750 square feet (Figure A-5). Smaller infestations of Yellow Iris totaling 30 square feet were also found at two locations on Mill Pond. Large populations of Purple Loosestrife were also found directly downstream in Power Pond but no further infestations were found along the Chubb River. The area covered by Purple Loosestrife in Power Pond is approximately 3,780 square feet, concentrated in 7 infested areas. Most of these populations are found at the mouth of streams flowing from ditches along Route 86. Because seed typically survive short transport distances in water it is suspected that a single Purple Loosestrife plant in a ditch directly upstream on Route 86 (site 18 on Figure A-6) is the seed source for the Power Pond plants.

The banks of the West Branch are free of invasives between Lake Placid and Wilmington until another manmade impoundment is reached, Lake Everest. Within the shoreline of Lake Everest there are 4 infestations of purple loosestrife covering 2,630 square feet and one large infestation of *Phragmites* (Figure A-6). All of the Purple Loosestrife is found at the mouth of tributary streams coming from Route 86 (sites 22 and 23) or within a short distance from Route 86.

Appendix B

Detailed results of the Geomorphic Survey and Embededness Studies.

Geomorphic Assessment of the Ausable River

The ASRA with the assistance of BRASS were leaders in conducting geomorphic assessment of the local streams. A comprehensive "windshield" survey of the entire length of the main river was made in 2005 and 2006 (Figure 6). The study found 19.8 miles of highly eroded channel; 25 miles with low erosion, and 8.4 miles that show no erosion (see table B-1 for explanation for terms). Banks display various amounts of entrenchment also; 13.6 miles of high banks (greater than 15 ft. high), 4.2 miles of low banks (less than 5 feet high), and 36 miles of banks 5 to 15 feet high (medium). Over all, 1.8 miles are recorded as having high banks *and* high erosion, but 18 miles have high erosion and medium high banks.

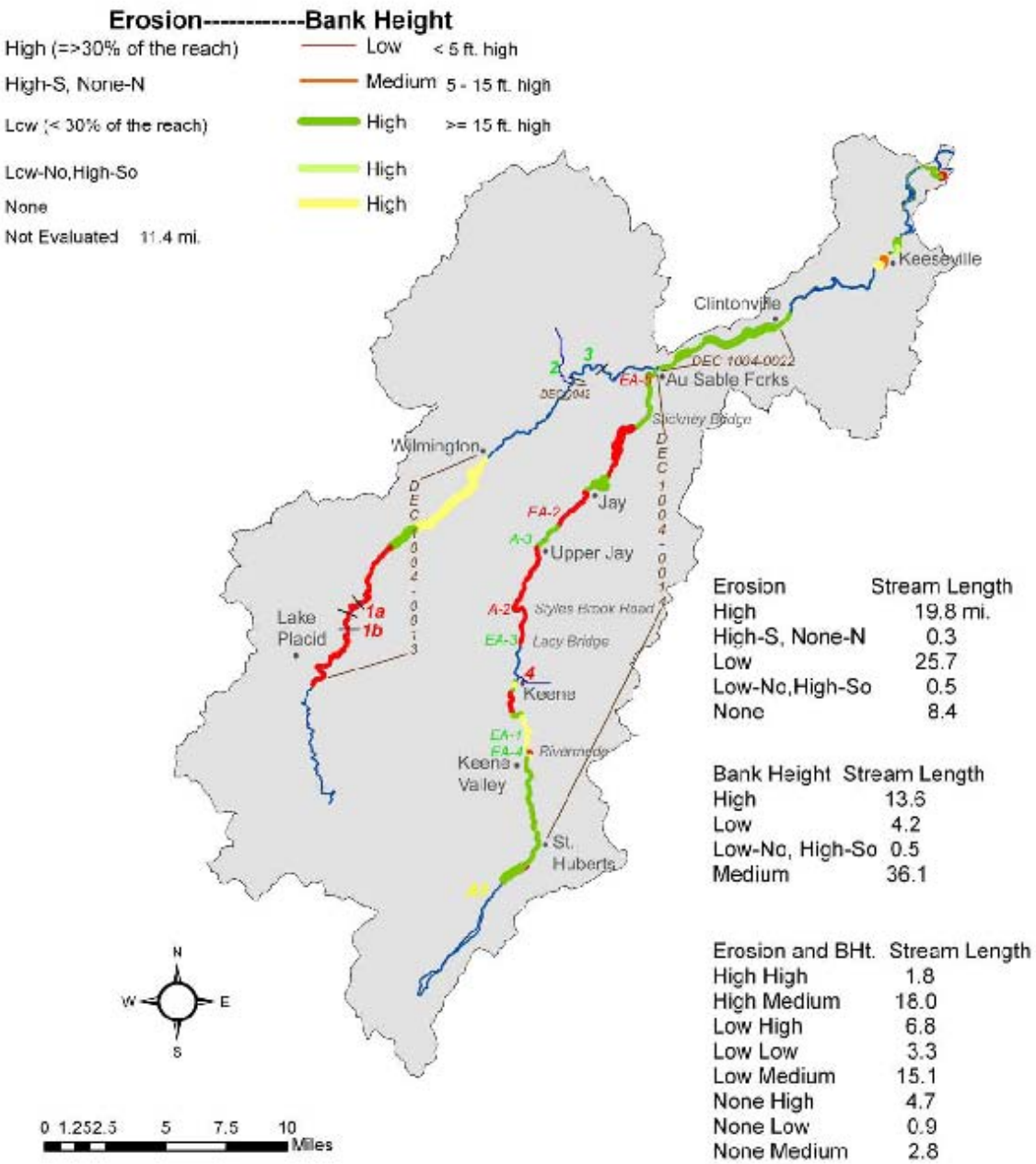
Table B-1. Explanation of terms for 2006 Stream Geomorphic Survey

Amount of Erosion Present:	**Bank Height :**
High – Bank erosion observed along ≥30% of the reach length	**High** - >15 ft from streambed to top of bank or slope
Low – Bank erosion observed along <30% of the reach length	**Medium** – 5-15 ft from streambed to top of bank or slope
None – No bank erosion observed	**Low** - <5ft from streambed to top of bank or slope
Not Evaluated – The reach was not assessed	**Not Evaluated** – The reach was not assessed

Locations of high bank erosion occur on the West Branch between the Route 73 bridge in Lake Placid and High Falls Gorge. In general, the East Branch (2005) was found to be in good health. Erosion, exposed roots, and overhanging banks were reported on a few meander bends between St. Huberts and Keene Valley, and along Hulls Falls Road (Figure B-1). East Branch stream banks (2006) show highly eroded, medium to high banks on 8.6 of 11 miles of stream between Lacy Bridge and Stickney Bridge. Two locations on the Main Stem show high erosion and high banks: at the foot bridge in Keeseville and stretch 1 mile upstream from the mouth near the railroad.

Figure B-1. (**next page**) Erosion and bank height for major streams within the Ausable Watershed taken from the 2005 and 2006 ASRA study and other State, ASRA, and BRASS studies. DEC numbers (brown) indicate NYSDEC non-point Priority Waterbodies listed sites. "A" and "EA" numbers correspond to embededness studies, and numbers correspond to detailed geomorphic assessment sites. Erosion is shown with color and bank height is represented as thickness of the line representing the stream segment. High, Low, No Erosion are represented by red, green, and yellow respectively. High, Medium, Low Bank Height are represented by thick, medium, and thin lines respectively. Excluded from coverage are the steep headwater channels of the West and East Branch (12 miles), a steep section between Wilmington and Au Sable Forks, and Ausable Chasm. ----------

Au Sable River
Erosion and Bank Height



Erosion	Stream Length
High	19.8 mi.
High-S, None-N	0.3
Low	25.7
Low-No,High-So	0.5
None	8.4

Bank Height	Stream Length
High	13.6
Low	4.2
Low-No, High-So	0.5
Medium	36.1

Erosion and BHt.	Stream Length
High High	1.8
High Medium	16.0
Low High	6.8
Low Low	3.3
Low Medium	15.1
None High	4.7
None Low	0.9
None Medium	2.8

Figure 1.

In the late 1990's when the application of geomorphic principles to stream restoration first became popular, ASRA and BRASS conducted stream geomorphic assessment at four problem spots on the Ausable[1]. These include the West Branch Catch and Release area from Holcomb Brook mouth to the Rt. 86 bridge; Black Brook, a tributary to the West Branch in the Town of Black Brook; The Bush, 2 mile segment between Black Brook and Au Sable Forks, Gulf Book, a tributary to the East Branch in Keene (Table B-2). .

"Stability and Inventory of Ausable" (1999)

Table B-2. Location of sites examined in 1999 Stream Geomorphic Assessment conducted by ASRA and BRASS.

Study Area #	Location
1a, 1b	West Branch Catch and release area from Holcomb Brook tributary to the Rt. 86 bridge
2	Black Brook, a tributary to the West Branch in the Town of Black Brook
3	The Bush, 2 mile segment between Black Brook and Au Sable Forks
4	Gulf Book, a tributary to the East Branch in Keene

Table B-3. Results of 1999 Geomorphic Survey

Study Stream	Pfankuch Channel Stability*	Bank Erosion Potential**	Considered Stable or Unstable
1a. Catch and Release 1	Poor	Moderate	Stable
1b Catch and Release 2	Fair	Stable	Moderate
2 Black Brook	Good	Low to Moderate	Stable
3 The Bush	Good	Low	Stable
4 Gulf Brook	Fair	Low	Stable

*Incorporates measurement of upper and lower bank and channel bottom cover, slope, vegetation, and scour or evidence of deposition.
** Utilizes bank height/bank full height ratio, root depth and density, and bank angle.

The cause of instability for all four reaches was determined to be various man-made structures that had compromised natural channel processes. The Catch and Release section is compromised by rip-rap that protects River Road and restricts lateral movement of the channel. The Bush has a man-made weir perpendicular to a streambank that creates a downstream island. Gulf Brook has been compromised by man-made adjustments to the channel and bridge abutments that constrict the flow.

Overall, the two most commonly cited caused for stream instability were "man made structures in the stream" and bridges. Bridges and structures designed to keep bank erosion from undermining roads pin the channel in place and lead to lateral erosion downstream of the structure. Much of the length of the stream is paralleled by roads that exacerbate the lateral confinement of the river throughout the valley.

[1] BRASS, 1999, "Stability and Inventory of Ausable," final report to the lake Champlain Basin Program in partial fulfillment of grant #...

Human and Natural Sources of Sand and Channel Sedimentation

The Ausable Valley is characterized by numerous sandy, glacial deposits as discussed in "Physiography and Geology" above. These deposits have contributed to river and flood plain deposits that are sandy and noncohesive. Streambank erosion therefore contributes an abundant source of sand to the channel bottom. A second source of sand are the numerous paved and dirt roadways adjacent the stream and its tributaries. Sand from winter road maintenance as well as road washouts have a significant affect on the streams. A 1999 study funded by Essex County WQCC showed that development and frequent washouts on dirt roads along steep tributary streams was responsible for significant quantities of sediment entering the stream[2].

Embededness results: Embededness is the degree to which the spaces between gravel, cobbles, and boulders on the stream bottom are filled with fines – sand, silt, mud. ..The measure of embededness is used to assess the condition of the stream to support salmonid spawning. Open space between gravel and cobles on the bottom of the stream supports salmonid rods (nests) because it can hold eggs. When filled with fines the eggs have no resting or breathing space and spawning is not supported.

The NYSDEC NPS PWPs for Essex County lists 132 miles of embedded streams that stress or threaten fisheries habitat. Fifty-eight (58) miles of the Ausable are embedded; according to DEC the source of embedding material is winter road sand. Supporting DEC assumptions are studies done in 1993-1994 on channel embededness or percent void space in gravel bottom material that is filled with sand. Results of a study of embededness for the East Branch of the Ausable (1993-1994). Twenty-five percent of sites studied had embededness percentages above what is considered to impair fish reproduction (Figure B-2). Sand was the dominant embedding material and bank scour and road sand were noted as possible sources[3]. Sand collection in sediment boxes is shown in (Figure B-3).

A study done by NYSDEC division of fisheries showed the West Branch is also heavily impacted by sediment. Embededness levels at three of twelve sites exceeded that for healthy fisheries reproduction. Sediment box collectors had sediment collection weights 2 to 4 times that of streams with salmonid reproduction[4].

[2] Treadwell-Steitz, Carol, 1999, Little Porter Watershed Study; findings and Suggestions for Drainage and road Improvements, 30 p.: prepared for the Ausable River Association, published in: Caring for our Rivers and Roads, **Ausable River Association**, 15 p.
[3] Boquet River Assoc., 1994, Boquet River Association's 1993 & 1994 Investigation into Non-Point-Source Pollution,
[4] Schoch, William, 1994, West Branch Ausable River; Habitat, Fishery Resources and Angler Concerns, New York State Department of Environmental conservation, Bureau of fishers, 39 p.

Table B-4. Embededness Sample sites East Branch 1993-1994.

Embededness Transect Locations for the East Branch	
Site	**Location**
A-1	Ausable Club
EA-4	Beede Road (Keene Valley)
EA-1	Fish Weir on Rt. 73
EA-3	300 ‘ downstream of Lacy Road Brg
A-2	Styles Brook Road
A-3	Upper Jay
EA-2	Upper Jay Parking Area
E-5	U.S.G.S. gauging station Au Sable Forks

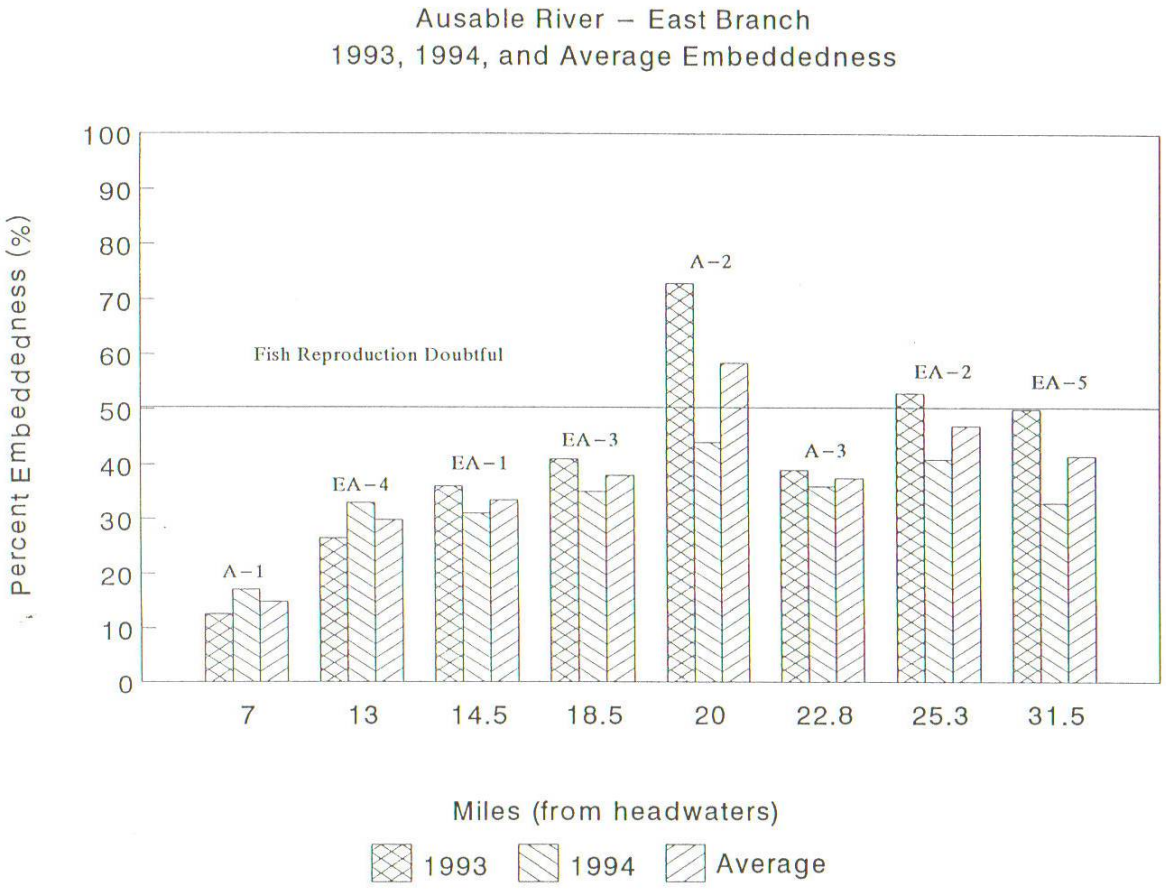


Figure B-2. Embededness Percentages on sites in the East Branch.

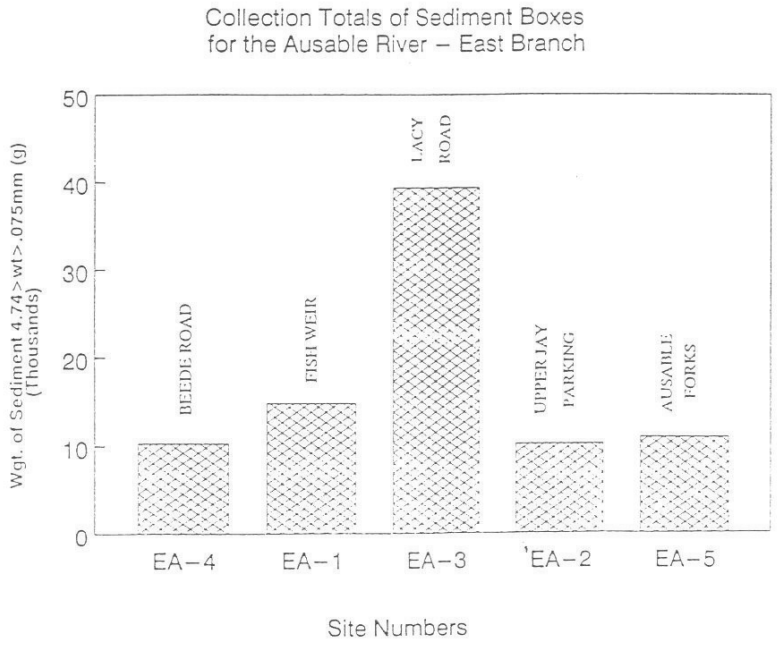


Figure B-3. Weight of sediment larger than silt smaller than course sand trapped in sediment traps on the bed of the Ausable River. Location correspond to embededness transects listed above.

Appendix C

Ausable Watershed Management Planning
Detailed Summary of Public Input Meetings

The results of all four public input meetings are summarized below. The most commonly cited concerns and suggestions are shown in a table below. Where pertinent, the comments are located by the meeting where they were mentioned – W, E, M, TU for West, East, Main Stem, Trout Unlimited respectively. **Statements in red are issues supported by data collected and reported in the body of this document.**

Top Issues of Concern:

Main	East	West
Flooding from ice jams	Stream bank erosion	Education: Land use planning tools, local governments, state agencies, communities
Bank Erosion	Sedimentation	Road issues; relationship between DOT and local practices
Trash in the River and Unauthorized Dumping	Water quality	Boat Access (DEC) – expansions
		Stormwater Basin Mapping

Education:

- Lack of broad public awareness on the importance of water quality

  Solutions:

  - Do not put trash in the river or near the river! (M)
  - General river education, how rivers work (M)
  - Don't Feed the Ducks (W, TU)
  - Educate residents of the watershed about the importance of a clean river for locals and the tourist economy (M)
  - Teach or make a display on the History of the river and industry (M)
  - No P fertilizers education for public and golf courses (W)
  - Boat washing education why, invasives, where, how to dispose of water (W)
  - Trout in the classroom (W)
  - Monthly education article in newspaper (W)
  - Public Service Announcements on radio (W)
  - Education of local government officials, planning boards, community organizations, Land use planning tools. (W)

Impairments to Water Quality/ (Pollution):

Trash in the river and along banks (M, E):

- Tires, refrigerators, bags of garbage, shopping carts, plastics, bottles and cans,
- Propane tanks from camps. (M)
- Unauthorized dumping (M)

Road Salt (W ,E, M, TU)

- Too much road salt is applied to roads
- Contaminating groundwater and drinking water supply
- Affecting river water chemistry
- Affecting the Cascade Lakes and Chapel Pond (Clarkson Study)

Solutions:

- Work with Town Hwy. Depts. to ensure green road maintenance, reduce and sand find alternatives to salt (W)

Septage (W, E, M)

- ASRA/DEC high coliform in W. Branch LP to Wilminton suspected septic
- NYSEC PWL/IW East Branch Upper Jay to Mouth, Pathogens from septic or direct discharge
- Failing and failed septic tanks leaking septage into the river
- Septage from poor septic tank maintenance and leach field failures; specifically: Jay, Wilmington, North Elba, Keene
- Grey water from old and newly constructed houses

Solutions:

- Inform, educate, enforce septic tank pumping every 3-5 years,
- proper maintenance of septic tanks,
- replace old, failed septic tanks and leach fields
- locate the septage problem areas and educate the owners
- Build a Waste Water Plant in problem areas

Phosphorous loading (W, M)

- Champlain Basin TMDL
- Fertilizers used on Golf Courses and lawns in the watershed
- Excess Algal Growth caused by P loadings from WWTP effluent and fertilizers (W)

Pollution *(general)*

- *Chemicals* added to the snow during snowmaking and onto ski trails during alpine races (W, E)
- Pollution sourced from Lake Placid & North Elba into Chubb River;
- Pollution from junk yards (Keeseville, Au Sable)

Groundwater Pollution

- Possible contamination of GW in Keeseville area due to junk yard run off (test wells?)
- Groundwater pollution, from specifically: salt, septage, and grey water from old and newly constructed houses (E)

Flooding:

Flooding from ice jams (ACOE, 1998 report), specifically:

- Upper Jay
- Ausable Forks
- Jersey Bridge
- Stickney Bridge
- Upper Jay
- Jay (Hamlet)
- Clintonville, Dugway Road

- Flooding as a result of keeping the river out of its flood plane (both ice jam and high water flooding)
- Houses on the flood plane (get flooded; they should not be built there!)
- Local laws regulating building on the flood plane are too weak!

Streambank Erosions and Sedimentation:

Stream bank erosion (W, E, M, ASRA study)

- Iron Bridge Parking
- Deerwood Hills to Basset Flats (North Elba)
- River Road (North Elba)
- Rivermede Farm (Keene Valley)
- St. Hubert's
- Inglenook (Keene Valley)
- John's Brook
- Gulf Brook
- Nicole's Brook
- Lacy Bridge to Upper Jay
- Jay to Stickney Bridge
- Carpenter Flats (Main Stem)
- Downstream of Ausable Chasm at Rt. 9N bridge to above mouth
- "Everywhere"

Sedimentation

- ASRA Embededness Studies (East Branch) from roads and bank collapse
- Sand from winter maintenance (Town/County Hwy. Depts.)
- Road washouts on gravel/dirt roads and graveled edges of paved roads
- Sand from Whiteface Mt. Ski Area Bridge, roads, and parking lots
- Sand from turnouts on Rt. 86 that bank toward the river. (W)
- In the West Branch up river from Lake Everest (W)
- In Lake Everest (W)
- In river upstream from mouth of Styles Brook (Island there) (E)
- At the delta (in L. Champlain)

Stormwater Management (W, M)

- Oil spills
- Illegal discharges
- Motor homes
- Car washing

Land use

- Land use change/Development/Construction (W, TU)
- Construction in LP, Wilmington, Keene
- Loss of Wildlife Habitat due to encroachment (W)
- Loss of Biodiversity in the River (E)

Habitat

- Loss of Wildlife Habitat due to encroachment (W)
- Loss of Biodiversity in the River (E)
- Too few fish on the East Branch, too few native fish (All)
- Degraded habitat due to widening and shallowing of the channel

Loss of Riparian Buffer (M, E)

- Inadequate riparian buffer widths that do not adequately protect the banks (subsequent tree collapse causes bank scour)
- Bank Beavers removing trees from stream side precipitating stream bank erosion (E, M)

Roads and Bridges

Bridge openings are too narrow (M, E)

- Dugway Road Bridge at Edward's Flats
- Butler Bridge
- Rt. 73 between Keene and Keene Valley
- Rt. 9N in Upper Jay (at Land of Make Believe)

Non-point source pollution roads that line the river; specifically: Rt. 9N, 86, 73

Junk Yards (M, E)

Junk piled on river banks washes down stream during floods

NYCEC PWL/IW Contaminants, oils and other toxic fluids, wash directly into the river and wash down storm drains during rainstorms and floods

Ground water contamination as a result of fluids spilling out of junk yards

Agriculture

- Impacts of agricultural land on the river:
  - Exotic Pet House
  - North Jay longhorn ranch – livestock in the stream
  - North Elba Horseshow Grounds – where does the manure go?

Public Access

Access Too limited (-)

- Fishing access where private land boarders both sides of the river (TU)
- Lack of Public Access (E)
- Lack of (Public Access for) Swimming(E)
- Limited access: Specifically failure to obtain public easements that could lead to better access to the river due to municipality veto's (W)
- overcrowded access (W, catch and release section)

Good Access (+) (E, W

- Extensive public fishing access (W)

Solutions:

- Improve fishing access for youth and handicapped
- Boat Access (DEC) – expansions
- Increase access to the river and stimulate appreciation, for example build a trail from Keeseville to Ausable Chasm

Aesthetics of the Watershed

(+)

- Scenic vistas (M, W, E)
- Scenic drives (M)

(-)

- Visual Degredation – houses in the scenic corridor (TU)
- Losing Scenic Views (W)

Invasive species: terrestrial and aquatic: (W, TU, ASRA studies)

- Didymo (Rock Snot)
- Japanese Knotweed – Upper Jay, Wes Valley
- Purple Loosestrife – everywhere!
- Milfoil
- Cross contamination by boat transport

Governance

- Lack of Enforcement of Regulations
- Lack of zoning, land use enforcement (capacity, priorities, facilities)
- Lack of Code Enforcement (W, E,
- Local laws regulating building on the flood plane are too weak!
- Lack of coordination of regulatory jurisdictions
- Dams on private land not being maintained and releasing large loads of sediment;
- Lack or regulation (enforcement) Who is watching?

Funding and Support for the River

- Lack of Funding
- Need for more funding for staff of the ASRA

Other:

Over use of the river

- Specifically in the no kill section of the West Branch (resulting in bank impacts and proliferation of trails streamside) (W)
- Cumulative affects of use/abuse by many users (W)

Bank Beavers

- destroying riparian buffer
- bank beavers causing water to be contaminate with Giardia

Acid Rain, Climate Change