Schroon Lake Watershed Management Plan Addendum

July 2019

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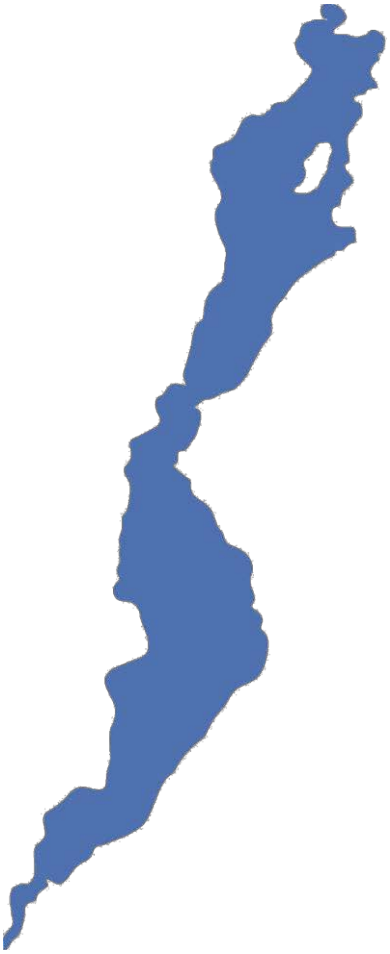

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Executive Summary

The Schroon Lake Watershed Management Plan was created with a Local Waterfront Revitalization Program (LWRP) grant from the New York State Department of State (NYSDOS) awarded to the Town of Chester. Completed and published in 2010, the Schroon Lake Watershed Management Plan is a comprehensive review of the state of Schroon Lake and its immediate watershed. The overarching goal of the plan is to identify issues affecting the water quality and ecology of Schroon Lake and to set forth specific recommendations to protect the lake for the future.

Photo 1: Members of the lake association conduct walk in surveillance for milfoil.

Recommendations of the 2010 plan included stormwater runoff mitigation, invasive species management and prevention, highway maintenance, and homeowner outreach and education. Over the past 9 years, the Towns of Chester, Horicon and Schroon, the Schroon Lake Association (SLA), the East Shore Schroon Lake Association (ESSLA), and numerous other partners have been working diligently to implement the recommendations of the plan. Through these efforts several stormwater infrastructure projects have been implemented within the Towns of Horicon and Schroon. Additionally, programming such as aquatic invasive species identification, management and surveillance, lakeshore homeowners septic pump-out days, and several other educational initiatives have been implemented since the publication of the plan.

Photo 2: Rain barrel educational workshops were conducted in 2015.

Nearly a decade after the completion of the Schroon Lake Watershed Management Plan, this Addendum seeks to continue evaluating and expanding upon the good work that has been and is being done in the Schroon Lake Watershed. In addition to the four main objectives of the 2010 plan, this Addendum identifies three new priority issues; terrestrial invasive species management, lake water level monitoring, and fisheries management. In recognition of the intrinsic tie that waterbodies have with one another, the study area for this Addendum has been expanded beyond the boundaries of Schroon Lake itself to include the upper and lower Schroon River and Paradox Lake. The purpose of the expanded study area is to encompass a greater portion of the Schroon Lake watershed and the activities that take place within it. This addendum is funded by the Lake Champlain – Lake George Regional Planning Board through the New York State Department of Environmental Conservation with funding from Section 604(b) of the Clean Water Act.

Background

Schroon Lake is a major Adirondack Lake located on the northern border of Warren County and the southern border of Essex County. The lake is approximately 9 miles long and over one mile wide at its widest point. It is bordered by three townships; Chester, Horicon, and Schroon, and lies wholly within the Adirondack Park.

Schroon Lake is a Class A waterbody suitable for drinking water supply, public bathing, general recreational use, and support of aquatic life. Water quality sampling was conducted by a volunteer lake monitoring program known as the Citizens Statewide Lake Assessment Program (CSLAP) from 1987-2016. Results of this sampling indicate an overall healthy lake. The chlorophyll/algal levels that were recorded during CSLAP monitoring were concluded to be normal and unlikely to impact recreational uses, and phosphorus concentrations are typically low in the lake. Lake clarity measurements indicate water transparency consistently meets the recommended minimum criteria for swimming beaches and readings of pH fall within the range established for state water quality standards for protection of aquatic life.[1]

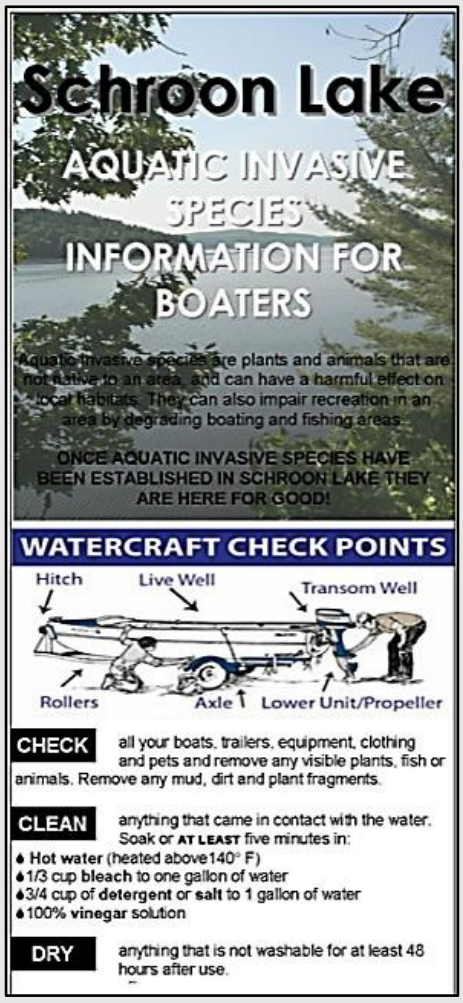


Photo 3: Educational materials are distributed to inform boaters about aquatic invasive species prevention.

Sediment deltas have been observed near the outlets of Rogers Brook and Horseshoe Pond Brook that may impact recreation and overall recreational opportunities. While sedimentation is a naturally occurring process, contributing factors to sedimentation in Schroon Lake likely include stormwater runoff, streambank and roadside erosion, and the application of sand for winter road maintenance purposes.

The shores of Schroon Lake are moderately developed with first and second homes mostly concentrated on the northwestern and southeastern shores. The hamlet of Schroon on the northwest tip of the lake is the largest population center. Schroon is a lakeside community with an economy based primarily on tourism and recreation of which the lake plays a very important role. Four public boat launches provide access for thousands of visitors to the lake every year, who enjoy excellent boating, swimming, and fishing. The water level of Schroon Lake is controlled by the Starbuckville Dam located approximately five miles downriver from the lake on the Schroon River. Operation of the dam and the water level is controlled by the Schroon Lake Park District (SLPD) Board of Commissioners.

The main tributary of Schroon Lake is the Schroon River which headwaters in the Town of North Hudson approximately 15 miles to the north of the lake. The Schroon River flows through the length of the lake and outlets at the southern end. The Schroon River terminates in the Town of Warrensburg in Warren County, where it joins the Hudson River.

Expansion of Study Area

The original scope of the Schroon Lake Watershed Management Plan was limited to the lake itself and its immediate HUC-12 subwatershed. A HUC is a hydrological unit code, a HUC-12 is a local sub-watershed level that captures tributary systems. Schroon Lake is part of the larger Upper Hudson River Watershed and is affected by land uses and water uses that take place in a much wider reaching area than the lake itself. In an effort to complete a more encompassing watershed planning exercise and acknowledge the interconnectedness of nearby HUC-12 subwatersheds the study area for this Addendum has been expanded to include the watersheds of the Upper and Lower Schroon River, and Paradox Lake.

Study Area

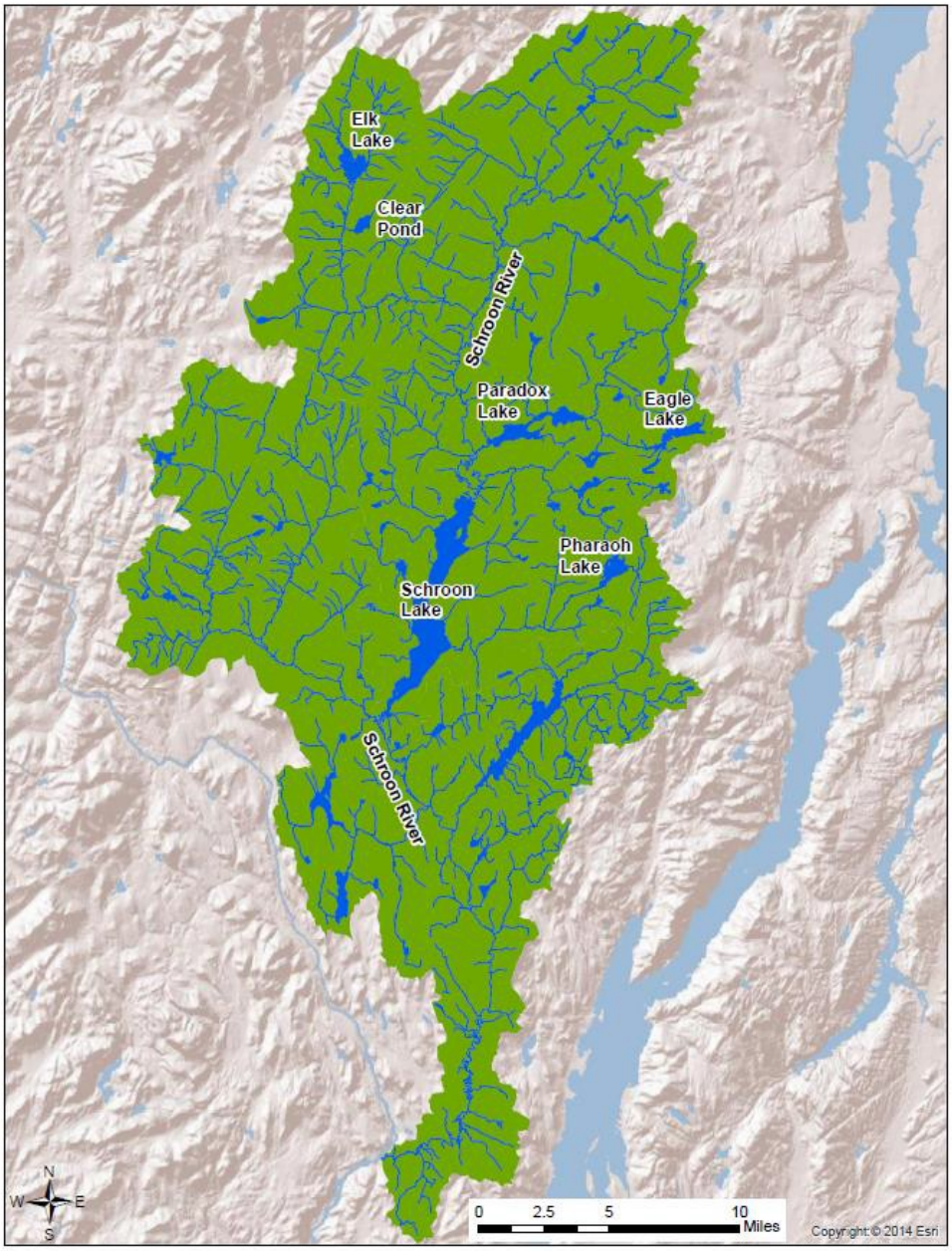


Figure 1 - Schroon Lake Watershed Map, Courtesy of Warren County Soil and Water Conservation District

Schroon River

The Schroon River is a 67.6-mile-long tributary to the Hudson River and the major tributary to Schroon Lake. The Schroon River begins at the confluence of Crowfoot Brook and New Pond Brook near Underwood, a hamlet located in the Town of North Hudson in Essex County. The river flows 15 miles before its outlet into Schroon Lake within the Town of Schroon. The portion of the river north of Schroon Lake is referred to as the Upper Schroon River. After flowing through Schroon Lake, the Lower Schroon River meanders an additional 27 miles to its confluence with the Hudson River in the Town of Warrensburg, Warren County. The Schroon River was historically used to transport logs to Glens Falls and beyond, and today the river is well known for a variety of recreational uses including fly fishing, tubing, and paddling.

Photo 4 - The Schroon River is used for a variety of recreational purposes.

The Upper Schroon River is defined as the portion of river from its headwaters in North Hudson to its mouth at the northern tip of Schroon Lake. The watershed of the Upper Schroon River consists of heavily forested area within the Adirondack Park.

The Upper Schroon River is a Class C waterbody, suitable for general recreational use and the support of aquatic life, but not as a water supply or for public bathing. The river is designated as a coldwater fishery supporting trout and landlocked salmon.

This portion of the river is largely compromised by sedimentation most likely caused by storm runoff, streambank erosion, and the application of sand for deicing activities. Sedimentation in the Upper Schroon River has the potential to impact recreational uses and water quality in both the river and the lake. Sedimentation flowing out of the Upper Schroon River has created a delta at the northern end of Schroon Lake with the potential to negatively impact fish habitat and fish population.[2] Critically eroding riverbanks on the Upper Schroon contribute significant sediment loads to the river. Stabilizing the riverbank near North Hudson by utilizing practices endorsed by the NYS Department of Environmental Conservation (NYSDEC) will reduce sedimentation into the river by an approximated 295 tons daily, improving the water quality and fish habitat in the river and all points downstream.

The Lower Schroon River is 27 miles long, stretching from Schroon Lake to the confluence of the Hudson River in the Town of Warrensburg, Warren County. The river here is classified as C(T), indicating its best use is for fishing and that it may be suitable habitat for trout. The lower portion of the Schroon River is a combination of long flatwater stretches and exciting Class III whitewater.

The NYSDEC Rotating Integrated Basin Studies (RIBS) monitoring in 2001 and 2002 revealed water quality in this stretch of river to be slightly impacted. Mercury levels are an area of concern with water column sampling revealing levels that are elevated above assessment criteria. Aquatic life is fully supported in this portion of the river; however, mercury levels suggest possible impacts on fish consumption.[3]

Paradox Lake

Paradox Lake is an 896 acre lake located in the Town of Schroon, northeast of Schroon Lake. Paradox Lake outflows into the Upper Schroon River at the western end of the lake near the Hamlet of Severance. The lake is nearly five miles long and one mile wide with a maximum depth of 55 feet.

Photo 5: Paradox Lake, Courtesy of Paradox Lake Association

Paradox Lake gets its name from a unique occurrence that happens during the spring-time snow melt – during the peak run-off seasons, the flow of the lake reverses until the water table returns to normal.

The Paradox Lake watershed is approximately 30,000 acres of primarily forested, undeveloped land. A large tract of land to the south of the lake makes up the 441 acre Pharaoh Lake Wilderness Area, and the 45,500 acre Hammond Pond Wild Forest stretches for miles north of Paradox Lake. The watershed contains about 31 miles of paved roadway.

Paradox Lake is classified as an AA(T) waterbody, suitable for drinking water, swimming and other recreation, and fishing, and provides suitable habitat for trout. The lake has no identified impairments and is classified as oligotrophic with high transparency, low algal abundance, low organic matter in the sediments, sparse aquatic plant growth, and abundant oxygen throughout the year and is likely to support coldwater fishery.[4]

The watershed's 31 miles of roadways contributes to the lake's elevated concentrations of sodium and chloride. Elevated levels of calcium were also reported in Paradox Lake. Calcium concentration is a good indicator of the overall habitat suitability for the zebra mussel, an invasive species spreading through North American lakes. Calcium concentrations in Paradox Lake in 2013 were found to range from 7.9 to 8.8 mg/L in the Upper Basin and 6.5 to 7.4 mg/L in the Lower Basin, these levels are approaching the threshold ranges that can support the zebra mussel. Although Zebra Mussels have yet to be identified in Paradox Lake, the species has spread rapidly across North American lakes and modes of transfer should be monitored closely in Paradox Lake.

Photo 6 - Zebra Mussels, Courtesy of adkinvasives.com

Zebra mussels are target species of concern for APIPP and while not currently present in Paradox Lake, modes of transfer should be monitored.

On shore development on Paradox Lake is sparse, consisting mostly of second homes. A NYSDEC campground is located on the eastern shore of the lake providing public access for motorized and nonmotorized boats. Public access is also provided for kayaks and canoes at the Paradox Creek dam.

The water level of Paradox Lake is stabilized by the Paradox Creek Dam. The dam was replaced in 2016 and is equipped with a fish ladder that allows fish to migrate between Paradox and Schroon Lakes. The dam is regulated by the NYSDEC.

New Priority Issues

The Schroon Lake Watershed Management Plan of 2010 identified key recommendations and strategies to address issues of concern around the lake. Since the publication of the plan, numerous strategies have been implemented by the municipalities and lake associations. As each project was completed, new projects and issues within the lake and watershed emerged. The purpose of this Addendum is to identify new issues and provide actionable recommendations and implementation strategies. New issues include terrestrial invasive species monitoring, fisheries management, and lake water level.

Terrestrial Invasive Species

Aquatic invasive species prevention and management was identified as a priority issue in the 2010 Schroon Lake Watershed Management Plan. Since the study area for this Addendum has been expanded to include more upland and onshore areas, it is important to also recognize the impacts of terrestrial invasive species on the watershed.

Terrestrial invasive species are the second leading factor in biodiversity loss in an ecosystem, and they can also have negative impacts on the local economy, and potentially, human health. Without natural predators, parasites, or population controls, terrestrial invasive species can rapidly dominate the landscape.

The Adirondack Park Invasive Plant Program (APIPP) is the regional partnership for invasive species management within the Adirondack Park and APIPP's service area includes the Schroon Lake watershed. APIPP's mission is to identify, address, control and prevent invasive species infestation and spread in the Adirondack Park. The following terrestrial invasive species have been identified by APIPP in the Schroon Lake Watershed:[5]

Purple loosestrife has been observed around the shores of Schroon Lake and Paradox Lake. This plant species spreads rapidly, choking out native plants and creating a monoculture. Purple loosestrife can severely disrupt the function of the critical ecosystems of marshes and bog lands. The species is spread primarily through seed dispersal and can be managed only by hand removal and selective herbicide treatment.

Knotweed spp., multiple closely related knotweeds have been identified in the area including Japanese, giant, and Bohemian knotweed. All are fast-growing, herbaceous perennial shrubs with jointed, hollow stems. A cascade of white flowers bloom in August and reddish-brown stems are visible in winter. Knotweed is found along forest edges, stream banks, and along roadways. It is difficult to control, however, a stem injection or foliar treatment with systemic herbicide can be effective.

Photos courtesy of adkinvasives.com

Common reed grass, also known as phragmite, is a tall, herbaceous perennial ranging in height from 3-15 feet. Phragmites are easily identified in the winter by its dead, standing stalks. Due to their rapid spread, the threat assessment score of nonnative phragmites is very high. Long-term management is necessary for control, cutting and treating stems and foliar spraying with systemic herbicides are the most effective methods.

Garlic mustard thrives in deciduous forests and partially shaded, moist habitats. Due to its ability to grow earlier in the season, garlic mustard can dominate over native plants on the forest floor. It also releases chemicals harmful to soil fungus that is important to native trees. Plants can be pulled or cut in late spring when flowers are in bloom. Selective herbicides can also be used for larger infestations.

Oriental bittersweet is a deciduous vine that can grown 60 feet tall and has dark brown striated bark with flowers that bloom in May and June yielding bright reddish-orange fruit in the fall. Oriental bittersweet grows most profusely in the sun but can tolerate the shade, it grows in disturbed woodlands, fields and roadsides. The vine causes damage to native trees by girdling. Where practical, individual vines should be pulled up by the roots by hand.

Autumn olive is a medium to large sized deciduous tree or shrub that can grow up to 20 feet high and 30 feet wide. Branches are covered with sharp thorns with white flowers that bloom in summer, ripening to small round, red berries by September. Commonly found on roadsides and on disturbed sites and riparian corridors. Seeds are often spread long distances by birds and other animals. Larger populations of autumn olive are best controlled by using an herbicide.

Photos courtesy of adkinvasives.com

Terrestrial invasive species management includes prevention, early detection and rapid response, monitoring, restoration and adaptation. Taking proactive steps is critical to minimize the impacts of terrestrial invasive species.

Fisheries Management

Schroon Lake has a very diverse fishery and can support coldwater, coolwater, and warmwater fisheries. Schroon Lake is stocked with Lake trout and salmon by the New York State Department of Environmental Conservation (NYSDEC) on an annual basis. Much of the lake's watershed is stocked with Brook trout and approximately 20,000 Landlocked salmon fry annually. The New York State Department of Health (NYSDOH) has issued fish consumption advisories for Yellow perch, Smallmouth bass, and Lake trout caught in Schroon Lake due to elevated mercury and PCB levels.[6]

Sedimentation in Schroon Lake caused by runoff in the Schroon River and shoreline erosion can be detrimental to fish habitat and fish populations in the lake. Fish ladders have been installed in the Starbuckville Dam and the Paradox Creek Dam to allow fish migration along those waterways.

Photo 7: Runoff on a Schroon Lake Beach

Schroon Lake is subject to a large amount of runoff, in part due to the lake's disproportionately large watershed. This runoff contributes to large variations in water level in the lake.

Water Level

Schroon Lake is subject to a large variation in water level that can impair lake access, destabilize shorelines, increase shoreline erosion, and damage lake-front property. The Starbuckville Dam is located 5.4 miles downriver from the outlet of the lake and is owned by the Schroon Lake Park District (SLPD). The goal of the dam is to maintain a constant 806 foot water level in the lake.

The dam's design and the 5 mile reach of river between the lake and the dam makes regulating lake levels a challenge. Two bridges and several high spots in the river between the lake and the dam add to this challenge. Runoff from Schroon Lake's substantial watershed combined with accumulated silt and debris in the southern end of the lake and the first half mile of the Lower Schroon River, makes effective and consistent control of lake levels difficult.

Lake level fluctuations can have a great impact on many species and their habitats and can lead to shoreline erosion and destabilization. Rapidly changing lake levels is a concern for waterfront homeowners because it can cause damage to docks and shoreline property. The Adirondack Park Agency (APA) urges homeowners to consider installing floating docks on properties on Schroon Lake and Schroon River to mitigate damage caused by fluctuating water levels.

Establishing a near real-time United States Geological Survey (USGS) water-elevation station can assist SLPD in future decision making while providing publicly accessible, up-to-date water elevation data. Long-term documentation of lake water levels will enable SLPD to understand how the lake's water levels change in response to varying watershed inputs and dam operations. This data may inform future designs or improvements of the dam and any potential dredging that may take place in the river around the dam. Collecting water level data over time will also build a better understanding of the role the five mile stretch of river between the lake outlet and the dam plays in controlling water levels in the lake.

Recommendations, Implementation Strategy and Schedule

In addition to the newly added priority issues, this Addendum also revisits priority issues from the 2010 Watershed Management Plan, including stormwater runoff mitigation, erosion control, aquatic invasive species management, water quality monitoring, wastewater, municipal operations, municipal regulations, and stewardship.

The goal of completing this Addendum is to continue evaluating and expanding upon the meaningful work that has been and continues to be done throughout the Schroon Lake watershed. To that end, a new series of recommendation tables have been created to outline objectives for continual water quality improvements and natural resource health within the watershed.

Photo 8 - Lake Stewards continue to be an integral part of outreach and education on Schroon Lake.

The following project implementation tables identify on-the-ground projects and programs for implementation within the next ten years. These initiatives were derived from a year-long, consensus-driven process with input from representatives of the Schroon Lake Association, East Shore Schroon Lake Association, Paradox Lake Association, Town of Chester, Town of Horicon, Town of Schroon, Schroon Lake Park District, LC-LG Regional Planning Board, Essex and Warren County Soil and Water Conservation Districts, and citizens and contractors that all have a vested interest in the health of Schroon Lake and its watershed.

Photo 9 - Continued monitoring and management of aquatic invasive species is critical for the health of the Study Area.

Stormwater Runoff				
Recommendation	**Involved Parties**	**Funding Requested**	**Source of Funding**	**Timeframe**
Schroon Lake				
Perform engineering assessment of East Shore Drive and its drainage network for road stabilization and stormwater runoff reduction.	Town of Horicon	$7,000	NYS, Town of Horicon, LCLGRPB	Short Term
Implement recommendations in East Shore Drive engineering assessment.	Town of Horicon	$75,000 - $100,000	NYS, Town of Horicon	Medium Term
Perform water quality testing on stream that runs through the Adirondack Lodges.	Adirondack Lodges, Warren Co. SWCD	$2,500	Adirondack Lodges, Lake Assns., Warren Co. SWCD	Short Term
Review stormwater management practices and runoff management system at Adirondack Lodges to determine if additional control measures are needed. Identify projects and create a maintenance plan for pollution reduction.	Adirondack Lodges, Warren Co. SWCD	$5,000	Adirondack Lodges, Lake Assns., Warren Co. SWCD	Short Term
Implement stormwater reduction recommendations on Adirondack Lodges property.	Adirondack Lodges, Warren Co. SWCD	Various	Adirondack Lodges, Lake Assns., Warren Co. SWCD	Medium Term
Dock Street – Perform engineering assessment and feasibility study, including ground penetrating radar, to determine what implementation will best reduce stormwater runoff.	Town of Schroon, SWCDs	$30,000	NYS, Town of Schroon	Short Term
Dock Street – Implement recommendations engineering assessment and feasibility study for maximum stormwater reduction.	Town of Schroon, SWCDs	$100,000 +	NYS, Town of Schroon	Medium Term
Fairfield Avenue – Complete stormwater reduction work on eastern portion of Fairfield Avenue.	Town of Schroon, SWCDs	$75,000 +	NYS, Town of Schroon	Short Term
Dock Street/State Route 9 – Install two double-stack drywells at the top of Dock Street, adjacent to Route 9.	Town of Schroon, NYSDOT, SWCDs	$25,000	NYS, Town of Schroon	Long Term
State Route 9 – Retrofit approximately 20 drop inlets between Charlie Hill Road and Rogers Brook with stormwater treatment and infiltration systems.	NYSDOT	$100,000 +	NYS	Long Term
State Route 9 – Assess infrastructure within the Hamlet of Schroon Lake to better identify opportunities for stormwater capture and infiltration. Install hydrodynamic separators, drywells, and/or catch basins where appropriate.	NYSDOT, Town of Schroon, SWCDs	$100,000 +	NYS, Town of Schroon	Long Term
Route 74 and Route 9 – Work with NYSDOT on improved stormwater infrastructure.	Town of Schroon, SWCDs	Various	NYS	Medium Term

Paradox Lake				
Perform a stormwater assessment to determine non-point source pollution inputs. Provide recommendations for pollution input controls.	Essex Co. SWCD	$5,000	NYS, Essex Co. SWCD, Lake Assns.	Short Term
Implement recommendations in Paradox Lake stormwater assessment.	Town of Schroon, Essex Co. SWCD, Paradox Lake Assoc.	Various	NYS, Town of Schroon, Essex Co. SWCD, Paradox Lake Assoc.	Medium – Long Term
Entire Watershed				
Reassess storm drain markers every 3 years. Install replacement markers if needed.	Lake Assns., SWCDs	$1000 - $2000	NYS, Lake Assns.	Every three years
Perform outfall reconnaissance to document all outfalls and their subwatersheds. Identify if outfalls have stormwater treatment or infiltration structures prior to surface water outlet. Produce plan with recommendations for remediation, if necessary.	SWCDs	$10,000	NYS, SWCDs, Lake Assns.	Short Term
Implement recommendations in outfall reconnaissance plan.	Towns, County DPWs, SWCDs, landowners	Various	NYS, SWCDs, Towns, Counties, Lake Assns., landowners	Short – Long Term
Work with owners of private roads to improve maintenance and reduce runoff and erosion.	Lake Assns., SWCDs, landowners	Various	Lake Assns., SWCDs, landowners	Short Term
Address road salt issues in the watershed through highway department education on improved techniques. Provide municipalities with improved equipment.	LCLGRPB, Towns, County DPWs, Lake Assns.	$50,000	NYS, Towns, Counties	Short Term
Perform salt brining demonstration project in interested municipalities.	LCLGRPB, Towns, County DPWs	$150,000	NYS, Towns, Counties	Medium Term
Incorporate stormwater capture and infiltration BMPs into designs and implementation of all new roadway and highway reconstruction projects (local, county and state).	Towns, Counties, NYSDOT, SWCDs	Various	NYS, Towns, Counties	Short Term

Erosion

Recommendation	Involved Parties	Funding Requested	Source of Funding	Timeframe
Schroon Lake				
Assess Trout Brook to determine source of sedimentation and produce action plan.	Essex Co. SWCD	$5,000	NYS, SWCDs, Lake Assns.	Short Term
Implement recommendations made in Trout Brook Sediment Reduction Assessment.	Town of Schroon, Essex Co. SWCD, landowners	Various	NYS, SWCD, Lake Assns., landowners	Medium Term
Stabilize ditches on Adirondack Road through rock lining, installation of sediment basins and vegetative measures.	Essex Co. DPW, Essex Co. SWCD, Schroon Highway Dept.	$5,000	NYS, County	Short Term
Perform a feasibility study for the installation of an in-stream sediment pond at the mouth of Roger's Brook. If not feasible, find alternative location.	Town of Schroon, NYSDOT, SWCDs	$35,000	NYS, Town of Schroon	Short Term
Implement recommendation of sediment pond on Rogers Brook.	Town of Schroon, NYSDOT, SWCDs	Various	NYS, Town of Schroon	Medium-Long Term
Schroon River				
Conduct a feasibility study on dredging several parts of the Schroon River/inlet and outlet to the lake.	Lake Association, SWCDs	$40,000	Lake Assns., SWCDs	Medium Term
Conduct a road crossing evaluation, including bridges, to determine choke points and areas of erosion. Create recommendations for remediation.	SWCDs	$10,000	NYS, Lake Assns., SWCDs	Short Term
Implement recommendations in road crossing evaluation.	Towns, County DPW, NYSDOT, SWCDs	Various	NYS, Towns, County DPWs, SWCDs	Medium – Long Term
Commission completion of a flow model in the upper river, through the lake, and to the lower river to better understand patterns of water movement.	Lake Associations	$25,000	Lake Assns.	Medium Term
Conduct feasibility study of restoration project for Upper Schroon River streambank in Town of North Hudson.	Towns, Lake Assns., LCLGRPB, TU, SWCDs, USFWS, ACOE	$100,000	NYS, Towns, Lake Assns., ACOE	Short Term
Implement Upper Schroon River streambank restoration project.	Towns, Lake Assns., LCLGRPB, TU, SWCDs, USFWS, ACOE	Unknown	NYS, Towns, Lake Assns., ACOE	Long Term
Replace culverts in the Upper Schroon River that have been identified as failing.	SWCD, LCLGRPB	Unknown	NYSDEC	Medium Term
Implement Pepper Hollow Road project.	Town of North Hudson, Essex Co. SWCD	$30,000	NYS, Town, SWCD	Medium Term
Implement Beach Street Project.	Town of North Hudson, Essex Co. SWCD	$30,000	NYS, Town, SWCD	Medium Term

Entire Watershed				
Perform shoreline and streambank erosion assessment to identify areas where erosion and sediment control implementation is needed.	SWCDs	$25,000	NYS, Towns, SWCDs	Short Term
Implement shoreline and streambank erosion reduction projects wherever feasible.	Towns, County DPWs, NYSDOT, SWCDs, Landowners	Various	NYS, Towns, County DPWs, SWCDs, landowners	Medium – Long Term
Implement remediation of roadside erosion sites as reported in the Upper Hudson River Watershed roadside erosion report.	Towns, County DPWs, SWCDs	$235,000	NYS, Towns, County DPWs, SWCDs	Short – Medium Term
Reduce mowing of ditch vegetation to encourage denser growth to increase stormwater nutrient uptake and improve pollution reduction.	Towns, County DPW	-	-	Short Term
Hydroseed all bare road ditches and banks.	Towns, County DPWs, NYSDOT, SWCDs	-	-	Annually

Invasive Species

Recommendation	**Involved Parties**	**Funding Requested**	**Source of Funding**	**Timeframe**
Schroon Lake				
Continue current maintenance plan for hand-harvesting Eurasian watermilfoil.	Lake Associations, Warren Co. SWCD, consultant	Various	Lake Assns., Towns	Annually
Continue current level of Milfoil Scout Program. Ensure all quadrants of lake are covered.	Lake Associations	-	-	Annually
Continue current level of boat wash decontamination efforts.	Lake Associations, Towns, NYS	$55,000 annually	Lake Assns., Towns, NYSDEC	Annually
Enlarge northern boat steward program to include coverage of additional hours and days.	Town of Schroon, SLA	$15,000 annually	SLA, Town, NYSDEC	Short Term
Conduct Asian clam surveys throughout the lake on an annual basis. Send any suspect shells to Darrin Freshwater Institute for verification.	Lake Associations	-	-	Annually
Conduct post milfoil harvesting monitoring of lake.	Lake Associations, Warren Co. SWCD, consultant	-	-	Annually
Perform aquatic plant survey every five years and create report. Correlate with older reports to establish changes in aquatic plant community.	Lake Associations, Warren Co. SWCD, consultant	$3,000	Lake Assns., Towns	Every five years

Paradox Lake				
Increase boat launch steward coverage.	Lake Association, Town	$20,000 annually	Lake Assn., Town	Short Term
Complete comprehensive aquatic plant survey every 5 years and create report.	Lake Association	$2,000	Lake Assn.	Every five years
Entire Watershed				
Conduct invasive species survey of all wetlands and inlet areas in the watershed and map infestations.	Lake Associations, APIPP, consultant	$10,000	NYSDEC, NYSDOS	Medium Term

Water Quality Monitoring

Recommendation	**Involved Parties**	**Funding Requested**	**Source of Funding**	**Timeframe**
Schroon Lake				
Continue current level of CSLAP efforts.	Lake Associations	$2,000	Lake Assns.	Annually
Continue efforts on bacterial assessments and monitoring.	Lake Associations, consultant	$8,000	Lake Assns.	Short Term
Conduct storm event tributary water quality sampling of Rogers Brook, Mill Brook, and Horseshoe Pond Brook.	Lake Associations, consultant	$5,000	Lake Assns., Towns	Short Term
Schroon River				
Work with SUNY Adirondack professor and students to establish a fluvial geomorphology study site on the Schroon River for annual assessments.	Lake Associations, SUNY Adirondack	-	-	Short Term
Paradox Lake				
Continue current level of CSLAP/ALAP efforts.	Lake Association	$1,000	Lake Assn.	Annually
Expand water quality monitoring program to include e-coli and/or other bacterial assessments.	Lake Association, consultant	$5,000	Lake Assn.	Short Term
Entire Watershed				
Work with SUNY Adirondack professor and students to establish an online database for all water quality data for the lake and river with interactive maps and charts.	Lake Associations, LCLGRPB, SWCDs, SUNY Adirondack	$5,000	Lake Assns.	Short Term
Monitor water quality around wastewater treatment plants discharge points.	Lake Associations	$5,000 annually	Lake Assns.	Short Term

Fisheries Management

Recommendation	Involved Parties	Funding Requested	Source of Funding	Timeframe
Work with DEC to determine impact of current stocking procedures and policies.	Lake Associations, NYSDEC, Trout Unlimited	-	-	Short Term
Conduct a lake-wide fishery survey in Schroon Lake.	NYSDEC, Trout Unlimited	-	-	Short Term
Confer with DEC on how to increase fish habitat areas.	Lake Associations, NYSDEC	-	-	Short Term
Encourage and become proactive with the angler volunteer survey program run by NYSDEC.	Lake Associations, NYSDEC	-	-	Short Term
Continue zooplankton monitoring program.	Lake Associations	$2000 Annually	Lake Associations	Short Term

Wastewater

Recommendation	Involved Parties	Funding Requested	Source of Funding	Timeframe
Develop neighborhood-wide septic pump-out programs.	Lake Associations	-	-	Short Term
Hire a consultant to conduct feasibility studies for private community septic systems.	Towns, Lake Associations	Various	NYSDEC, NYSDOS, USEDA	Medium Term
Better engage with Word of Life on about concerns with wastewater effluent.	Lake Associations	-	-	Short Term
Town of Schroon				
Determine if additional areas within the hamlet can be serviced by sewer.	Town of Schroon	$50,000	NYSDEC, NYSDOS, Town	Medium Term
Complete an asset management plan for wastewater plant and infrastructure.	Town of Schroon	$200,000	NYSDEC, NYSDOS, NYSEFC	Medium Term
Separate combined sewer system.	Town of Schroon	Various	NYSDEC, NYSDOS, NYSEFC, USDA, USEDA	Long Term
Complete a green infrastructure plan to determine how to best intercept stormwater before it enters into the combined sewer system.	LCLGRPB, Town of Schroon	$25,000	NYSDEC, NYSDOS	Short Term

Municipal Operations				
Recommendation	**Involved Parties**	**Funding Requested**	**Source of Funding**	**Timeframe**
Assess highway department facilities for potential stormwater runoff and erosion control projects.	SWCDs	-	-	Short Term
Actively seek funding to implement highway facility improvements.	Towns, SWCDs, LCLGRPB	Various	NYS, Towns	Medium - Long Term
Encourage highway departments to stop donating or making available road sands and ditching soil for unsuitable purposes. Determine a suitable disposal site for spoils.	Towns, SWCDs	-	-	Short Term
Improve asset management of highway department equipment. Create an inventory all equipment including make, model, year, expected lifespan and cost of replacement.	Towns, SWCDs, LCLGRPB	-	-	Short Term
Provide highway departments with training on BMPs for pollution prevention, erosion and sediment control, and winter road maintenance.	LCLGRPB, SWCDs	$2,000	Towns, SWCDs	Short Term
Town of Horicon				
Adopt an invasive species local law that provides lake stewards with the authority to require decontamination of a boat with visible aquatic invasive species on it.	Town of Horicon	-	-	Short Term
Adopt a local ordinance that requires a full septic system inspection by a qualified inspector upon sale or transfer of a property. As part of the requirement, the qualified inspectors report should be provided to the municipality and kept on file.	Town of Horicon	-	-	Medium Term
Town of Schroon				
Adopt a local ordinance that requires a full septic system inspection by a qualified inspector upon sale or transfer of a property. As part of the requirement, the qualified inspectors report should be provided to the municipality and kept on file.	Town of Schroon	-	-	Medium Term
Consider adoption of illicit discharge stormwater regulations in the hamlet areas.	Town of Schroon	-	-	Medium Term

Entire Watershed				
Adopt a local law for timber harvesting activities that requires submission of a logging road layout, stream crossings, landings, and BMPs for erosion and sediment control.	Towns	-	-	Medium Term
Perform review of municipal land use plans and codes. Once updated, re-assess every five years.	Towns	$10,000	NYS, Towns	Short Term
Ensure Town Planning and Zoning Board members are receiving 4-hours of in-service credits per year and filing applicable paperwork with designated Town staff.	Towns	-	-	Short Term
Educate local government officials on the need of a NYSDEC permit and SWPPP for land disturbances over 1 acre. Planning Boards should require a copy of the SWPPP during the site plan approval process and require proof of DEC permit compliance prior to commencement of activities.	Towns	-	-	Short Term

Water Level

Recommendation	**Involved Parties**	**Funding Requested**	**Source of Funding**	**Timeframe**
Schroon Lake				
Install lake level monitoring system as a 2-year pilot with USGS.	Lake Associations, USGS	$18,000	NYS, Lake Associations, Towns	Short Term
Watershed Wide				
Establish rain gauges throughout the watershed to compile precipitation data.	Lake Associations, NYSDEC, SUNY Adirondack	Unknown	NYS, Lake Associations, Towns	Short Term
Recommend the installation of floating docks on Schroon Lake, Schroon River, and Paradox Lake.	Lake Associations, APA, Towns	-	-	Medium Term

Stewardship

Recommendation	**Involved Parties**	**Funding Requested**	**Source of Funding**	**Timeframe**
Update Homeowners Guide to a Healthy Lake.	LCLGRPB, Lake Associations	$1500	Lake Associations	Short Term
Create boat navigation map of the lake and river.	Lake Associations	$5000	BoatUS Foundation, Lake Associations	Medium Term
Create educational campaign that focuses on "Next Generation" landowners.	Lake Associations	$2500	Lake Associations, Towns	Short Term

Educate property owners on trash and yard waste management, pool water discharge, prescription medication disposal and any other pollutant loading activities.	Lake Associations	$1000	Lake Associations	Short Term
Develop an education and outreach program to target streamside property owners highlighting the benefits of vegetative buffers.	Lake Associations	$1000	Lake Associations	Short Term
Create an educational composting program.	Lake Associations, SWCDs	$1000	Lake Associations	Short Term
Create a "Locating Your Septic System" educational campaign.	Lake Associations	$1000	Lake Associations	Short Term
Develop a "Leave No Trace" campaign.	Lake Associations	$1500	Lake Associations, Towns	Short Term
Continue and expand the "Adopt-A-Highway" Program.	Lake Associations	-	-	Short Term
Create document that describes the responsibilities of various state and federal agencies pertaining to lake and watershed management.	Lake Associations, LCLGRPB	-	-	Short Term
Educate municipal officials and residents on state logging regulations.	Lake Associations, SWCDs	-	-	Short Term
Develop and hold a tire collection program.	Lake Associations, SWCDs	$10,000	Towns, SWCDs	As Needed
Work with Towns to hold a "Clean Sweep" Program.	Towns, SWCDs, Lake Associations	$10,000	NYS DEC, Towns, Lake Associations	As Needed

Appendix A. Acronyms

ACOE	Army Corps of Engineers
APA	Adirondack Park Agency
APIPP	Adirondack Park Invasive Plant Program
BMP	Best Management Practices
CSLAP	Citizens Statewide Lake Assessment Program
DPW	Department of Public Works
ESSLA	East Shore Schroon Lake Association
LCLGRPB	Lake Champlain – Lake George Regional Planning Board
LWRP	Local Waterfront Revitalization Program
NYSDEC	New York State Department of Environmental Conservation
NYSDOH	New York State Department of Health
NYSDOT	New York State Department of Transportation
NYSEFC	New York State Environmental Facilities Corporation
PCB	Polychlorinated Biphenyl
SLA	Schroon Lake Association
SLPD	Schroon Lake Park District
SWCD	Soil and Water Conservation District
SWPPP	Stormwater Pollution Prevention Plan
USDA	United States Department of Agriculture
USEDA	United States Economic Development Administration
USFWS	United States Fish and Wildlife Service
USGS	United States Geological Survey

Appendix B: References

[1] New York State Department of Environmental Conservation (2017) Citizen Statewide Lake Assessment Program (CSLAP) 2016 Lake Water Quality Summary: Schroon Lake. http://www.dec.ny.gov/docs/water_pdf/cslrpt17schroonln.pdf.

[2] New York State Department of Environmental Conservation, Upper Schroon River Watershed WI/PWL Fact Sheet. http://www.dec.ny.gov/docs/water_pdf/wiuphudsupschroon.pdf.

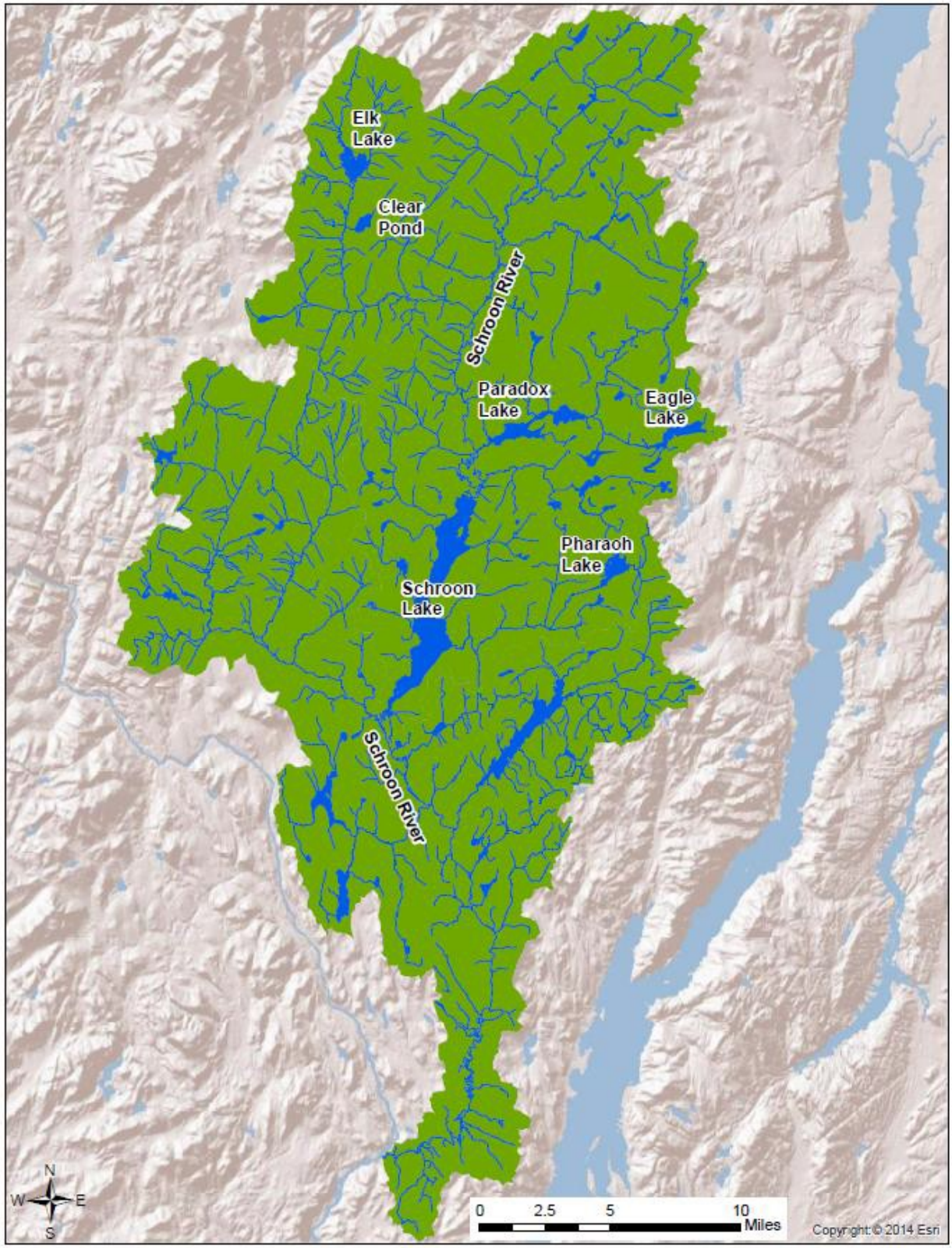
[3] New York State Department of Environmental Conservation, Upper Schroon River Watershed WI/PWL Fact Sheet. http://www.dec.ny.gov/docs/water_pdf/wiuphudsloschroon.pdf.

[4] Adirondack Watershed Institute (2014) Adirondack Lake Assessment Program (ALAP) 2014 Report: Paradox Lake. http://www.adkwatershed.org/files/paradox_lake.pdf

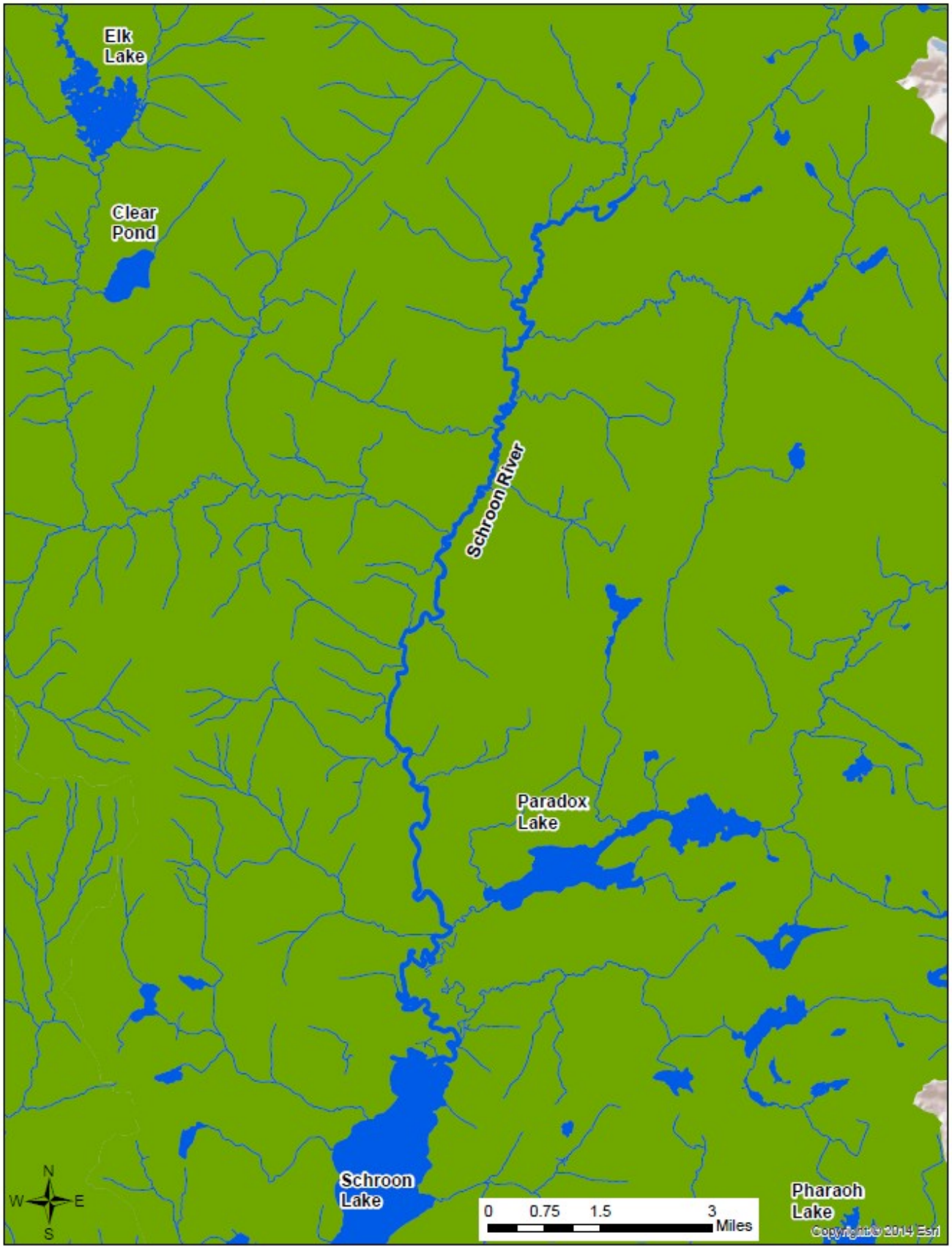
[5] Adirondack Park Invasive Plan Program (2019) Species of Concern: Terrestrial Target Species. http://adkinvasives.com/species_categories/terrestrial-target-species/

[6] New York State Department of Health (2019) Adirondack Region Fish Advisories. https://www.health.ny.gov/environmental/outdoors/fish/health_advisories/regional/adirondack.htm#table

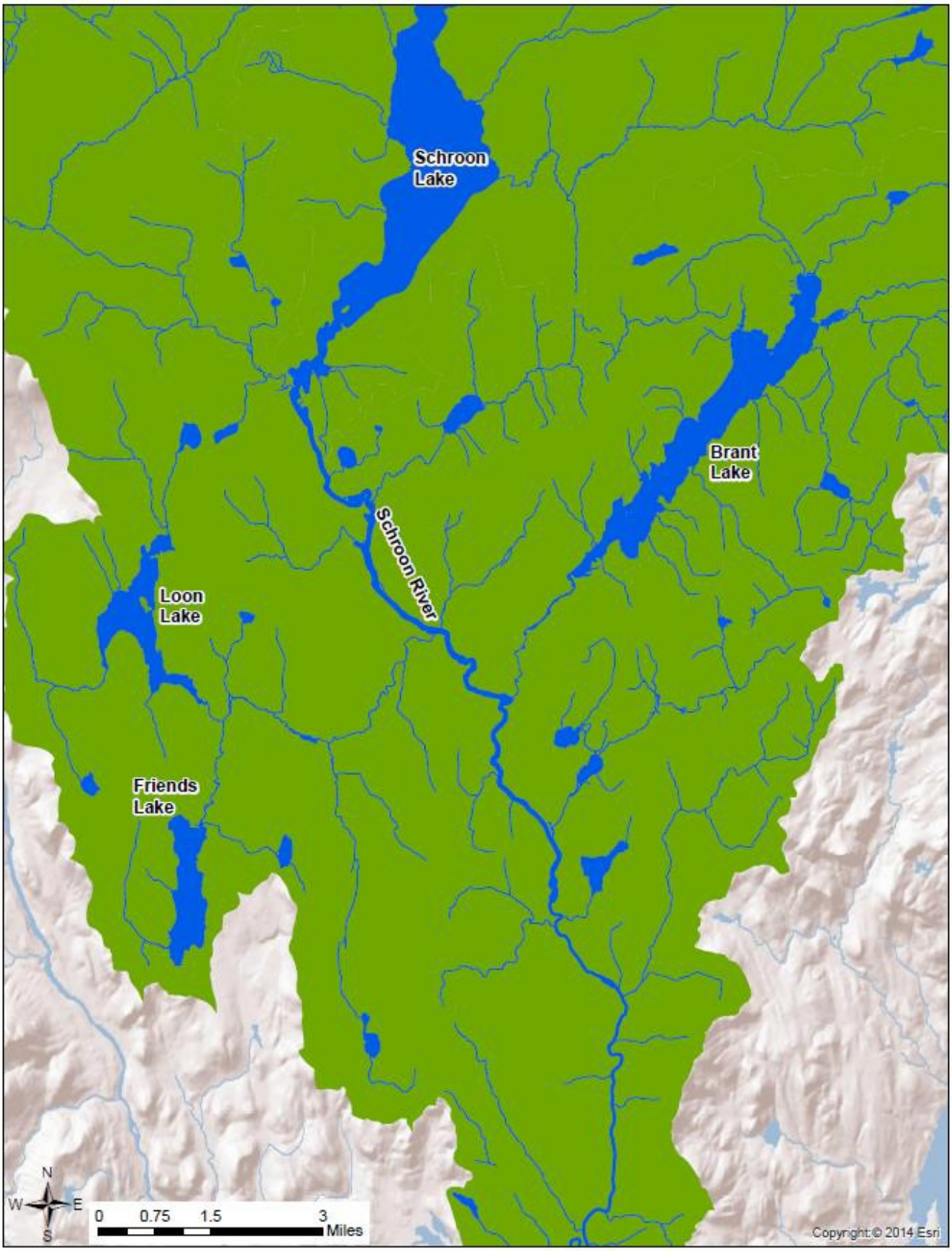
Appendix C: Maps



Map 1: Schroon Lake Watershed Management Plan Addendum Study Area Map, courtesy of Warren County Soil and Water Conservation District.



Map 2: Upper Schroon River from its headwaters in North Hudson in Essex County to the northern inlet of Schroon Lake, map courtesy of Warren County Soil and Water Conservation District.



Map 3: Lower Schroon River from the southern end of Schroon Lake to its confluence with the Hudson River in Warrensburg in Warren County, map courtesy of Warren County Soil and Water Conservation District.