Caring FOR OUR RIVERS & ROADS

A Homeowner's Guide to Erosion Control in the Adirondack Park

by The Au Sable River Association

SOURCE: NYS Adirondack Park Agency, Ray Brook, NY

ADIRONDACK Park

"I started out thinking of America as highways and state lines. As I got to know it better, I began to think of it as rivers…America is a great story, and there is a river on every page of it."

—Charles Kuralt, from *The Magic of Rivers*

Our rivers and roads are among the Adirondack Park's most visible and valuable resources. There are over 30,000 miles of rivers and streams and some 5,000 miles of roads within the Park. Erosion and sedimentation, both naturally occurring and as a result of runoff from development, pose a serious challenge to water quality and road maintenance.

This booklet is intended to be a handy source of information and serve as a guide to the Park's residents and homeowners on what they can do to protect their property and help insure our rivers and roads are cared for properly.

Caring
FOR OUR RIVERS & ROADS

This guide is the product of a cooperative effort of the Au Sable River Association (ASRA) and the NYS Adirondack Park Agency. It was made possible by a grant to the Agency from the NYS Scenic Byways Program through the Federal Highway Administration and the Transportation Equity Act for the 21st Century of 1998, administered by the NYS Department of Transportation. Additional funding support was provided by the Lake Champlain Basin Program.

The ASRA would like to thank Robin Ulmer of the Boquet River Association for her time, suggestions, and support, and Carol Treadwell-Steitz for her work on the Little Porter Watershed Project which served as an inspiration for this guide.

Thanks are also due to Vermont Local Roads for use of their illustrations.

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A HOMEOWNERS

Guide...

TO EROSION CONTROL

Do you know where the water comes from that flows across your driveway and road and out to the drainage ditches? Where does the runoff go after that? You may think that these questions do not directly affect you as a homeowner, but they do.

WHY SHOULD YOU THINK ABOUT runoff & drainage?

Your property is one small part of a big picture. Collectively, with other homes in your area, it represents a significant source of surface runoff. When rain falls or snow melts the water is either absorbed into the ground and becomes subsurface flow, or it travels over the ground as surface flow, which is runoff. As more houses, roads, driveways, and parking areas are constructed, there is an increase in the amount of ground covered by impermeable surfaces. These impermeable surfaces reduce the amount of available ground to absorb water. The result can be a significant increase in runoff. This runoff can damage driveways, roadways, and wash pollutants into rivers and streams.

This problem exists throughout the Adirondack Park. Here in the Au Sable River Watershed, one example involves a number of houses constructed on a small mountainside. Roads leading to these houses have experienced a number of failures during rain events and snow melts. These repeated failures cost taxpayers significant amounts of money. The Au Sable River Association, in cooperation with others at the local level, has examined these problems.

The results of this examination are similar to recommendations presented in the Little Porter Watershed Study, namely:

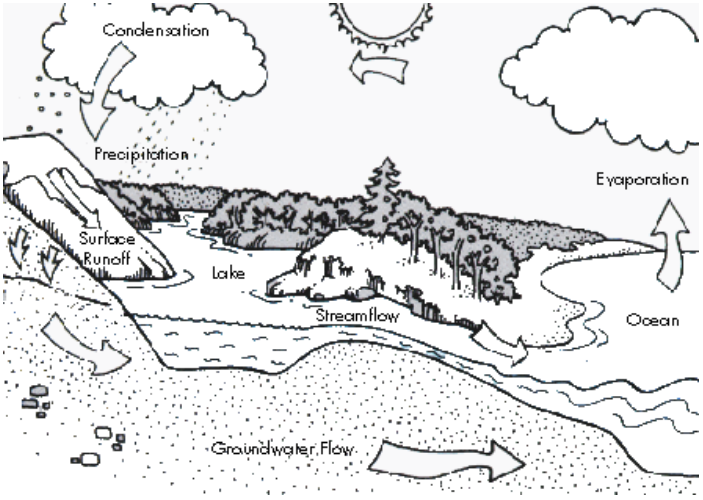


Figure 1.

1. Look at how natural drainage patterns have been changed or disturbed and try to restore them.
2. Divert man-made drainage flows onto flat areas where it can spread out and soak into the ground.
3. Slow water flow in ditches by using vegetation, stone, or by constructing check dams.
4. Slope roads to drain water off the roads and onto stable slopes.
5. Retain as much vegetation as possible.

THE HYDROLOGIC CYCLE

How water moves through the watershed
Where does your water come from? Where does it go?

As development continues, both new and existing homeowners need to understand how they can help reduce surface water runoff problems. Reducing runoff will save tax payers a significant amount of money over the long term. Consider over 8,000 residential structures were built in the Adirondack Park during the period 1989 to 1999.[1] These new homes and driveways, plus new and expanded commercial structures and parking lots, represent a large change in the amount of impermeable surfaces, ultimately contributing to increased runoff. By implementing recommended stormwater runoff management, you will reduce the impacts of your project.

[1]*Growth in the Adirondack Park*, Residents Committee to Protect the Adirondacks (2001).

WHY IS SURFACE RUNOFF A

problem?

1. *It creates erosion.* Erosion is visually unattractive and creates financial and water quality problems. As a raindrop hits bare earth it kicks up and lets loose particles of dirt, which are then picked up and carried away. As more dirt is taken away, the erosion becomes unsightly and the dirt, or sediment, is deposited and builds up somewhere else, oftentimes in our rivers and along our roads.

2. *It becomes a financial problem for property owners and taxpayers:* Every year damage from surface runoff costs homeowners, highway departments and taxpayers large amounts of money. The velocity of runoff creates flooding, undermines roads and bridges and the soil and sediment carried in the runoff covers roads, and clogs culverts. Highway crews must rebuild roads, remove the sediment from ditches and culverts, and shore up undermined roads and bridges.

3. *It creates a serious water quality problem:* When surface runoff picks up dirt it is eventually deposited somewhere else as sediment. The sediment travels with the surface runoff, down to a stream; as the velocity of the water slows the sediment is deposited in the stream bed. As the sediment builds up it fills in between the gravel and cobble. This reduces habitat available to trout and salmon to spawn and to the insects which they need as a food source.

Sediment also carries the nutrient phosphorus. Phosphorus promotes the rapid growth of algae and plants. If the sediment reaches a pond it will support the growth of algae which reduces the amount of available oxygen, alters fish and wildlife habitat, reduces recreational appeal, and impairs water supplies. Also, sediment provides an important mode of transportation for chemical pollutants. Oil, de-icing solutions and other toxins leach into the soil, which the runoff carries into the water. The U.S. Environmental Protection Agency has determined that one gallon of oil can contaminate over one million gallons of drinking water.

WHAT CAN

You do?

There are a number of things that homeowners can do that are simple and in the end will be very cost effective:

1. Become familiar with the natural drainage patterns of your property. Try not to alter them. Proper site design will help you avoid costly erosion control measures.
2. Contact your town office for any necessary permits and applications. Also contact the NYS Department of Environmental Conservation and the NYS Adirondack Park Agency to find out if permits will be needed from them.
3. Plan to preserve existing vegetation as much as possible.Vegetation will naturally take up water, trap sediment, curb erosion, and improve the appearance and the value of your property. Mark the trees and shrubs that you want to protect. Remember that heavy machinery must be kept well away from trees to avoid compacting their roots.
4. Discuss all aspects of the job with your contractor including what erosion control measures will be used. This is very important because there are laws concerning non-point source pollution and sediment is considered a non-point source pollutant.
5. Plan earth moving activities early in the year so that you can revegetate the site by September 15. Plan to mulch dis-

turbed sites if construction is delayed past September 1. This will protect bare soil during the winter and from spring runoff.

6. Machinery must not be allowed to cross streams.
7. Roads and driveways:
   Be sure your road and driveway are graded properly *(see Figure 2)*.
8. Ditches.
   All roads and some driveways need drainage ditches.
   (a) Be sure they are properly shaped. Parabolic or flat bottomed ditches, rather than V-shaped, will prevent erosion.
   (b) Be sure the ditch is properly sized for the volume it must carry. Go out during a heavy rain or snow melt event to be sure that the ditch can handle the amount of water it must carry. The presence of muddy/silty water, and/or overtopping the banks of the ditch indicate that it is not properly sized.
   (c) Ditch sides should be shaped to have a maximum 2 horizontal:1 vertical slope ratio.
   (d) Water in a ditch should not come closer than one foot to the edge of the road.
   (e) Line the ditch with vegetation - for ditches sloped less than 5% *(see Figure 3)*. Line the ditch with flat stone -

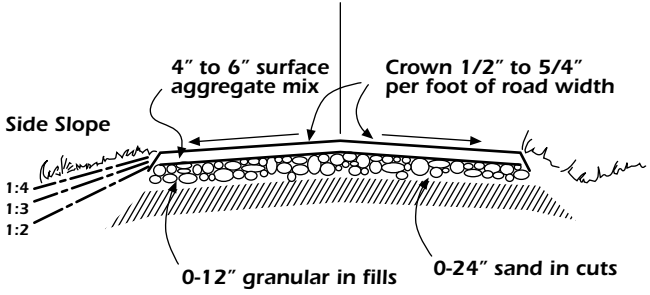


Figure 2.

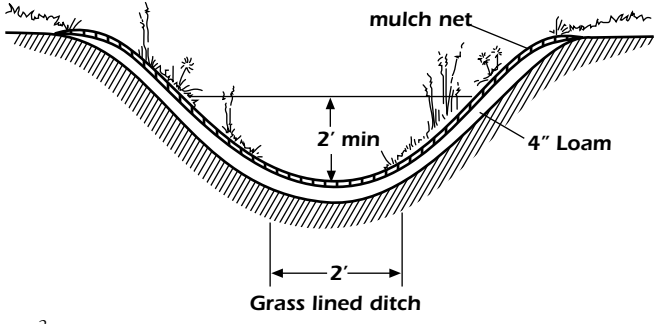


Figure 3.

for ditches sloped more than 5%–do not use rounded stone *(see Figure 4)*.

(f) Use turnouts. Channel the water out of the ditch into a grassed or wooded area.

This will:

1. Return the water to subsurface flow.
2. Possibly eliminate the use of culverts, saving money.
3. Allow natural filters to trap the sediment and filter out toxins before the water enters a stream or lake.
4. Prevent water from gaining velocity and decrease volume.

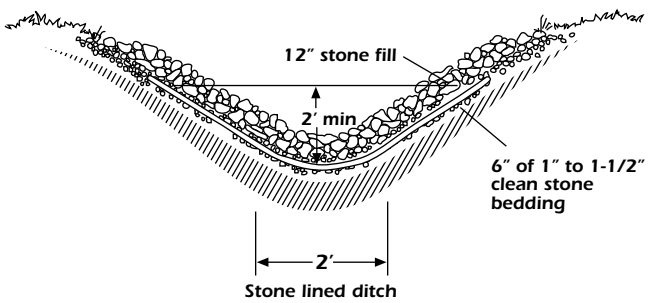


Figure 4.

Inspect your ditch during a heavy rainstorm.

1. Mark off a distance of 10 feet or so.
2. Place a cork or other floating object in the water.
3. Time how long it takes the object to move the distance measured.

Example: The cork travels 10 feet in 5 seconds, velocity = 2 feet per second (fps).

A PROPERLY LINED DITCH

If Velocity (fps) is	**Use**
up to 2.0	vegetation
2.5	vegetation or stone 1" - 2" mixed
3.5	stone 1" - 4" mixed
4.0	stone 2" - 7" mixed
4.5	stone 3" - 6" mixed
5.0	stone 4" - 8" mixed
6.0	stone 4" - 10" mixed

(g) Use check dams if turnouts are not possible. These are small dams made from rock or logs placed across a swale or ditch to reduce the velocity of the flow. They will also trap some sediment behind them so they must be cleaned out periodically. Check dams need to be sized and spaced out properly. Please contact your county Soil & Water Conservation District Office for assistance *(see Figure 5)*.

9. Culverts *(see Figure 6):*
   (a) Should be used:
      1. When a stream, brook, or seasonal runoff intersects a road. Please see A Simple Guide to Culvert Size.
      2. When surface or subsurface flows can not be contained in a ditch.
   (b) To install a culvert properly, there are many factors to consider including: headers, base, slope, pitch, length, depth, and cover. Please contact your county Soil & Water Conservation District Office for assistance.
10. Lawns

    Grass and vegetation help curb erosion. The contribution of water pollutants from your property may be small, however,

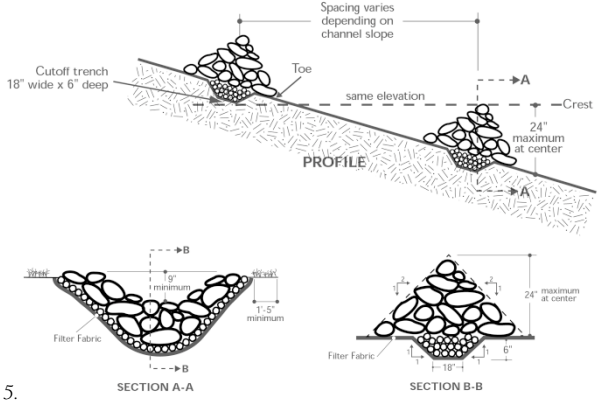


Figure 5.

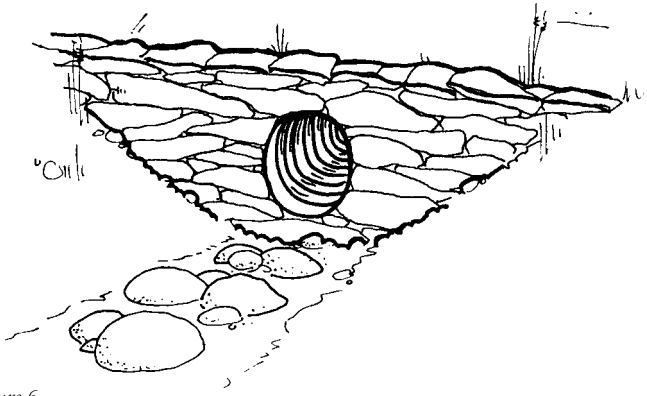


Figure 6.

A SIMPLE GUIDE TO CULVERT SIZE

for Small Drainage Ditches

Width	Depth	Culvert Size
6"	6"	16"
9"	6"	16"
12"	6"	18"
9"	9"	19"
12”	9"	22"
12"	12”	25"
18"	9"	27"

Figure 7.

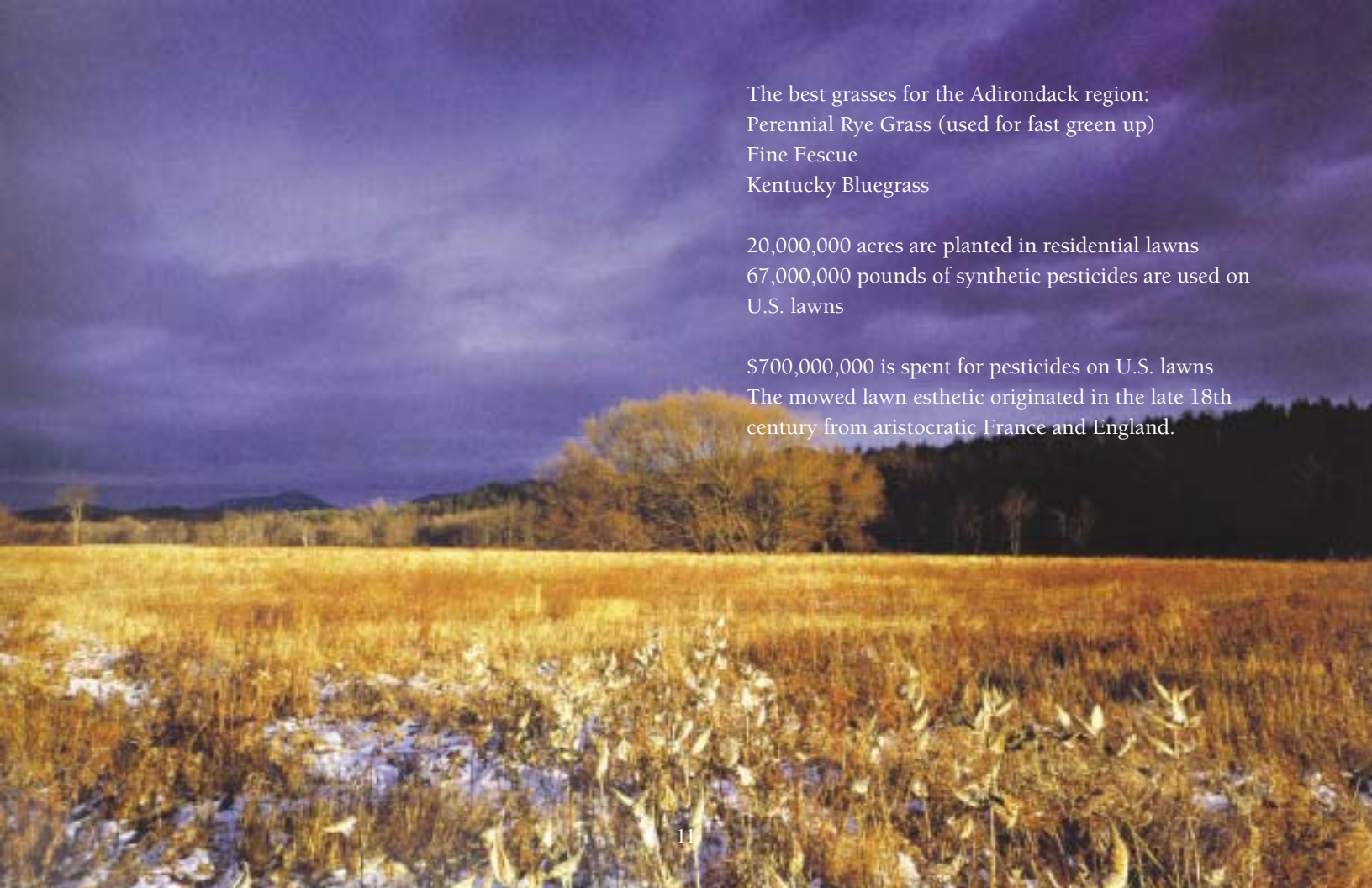
when hundreds of small inputs are added together or aimed at sensitive areas, the impact is significant. Soil eroded from your property will carry any contaminants from your property to surface water. Contaminants may include fertilizers, pesticides, and petroleum based products.

The root systems of grasses, shrubs, and trees help keep sloped surfaces in place. Less erosion will occur on a vegetated hillside than on one without vegetation. This decreases the amount of erosion, which decreases the amount of sediment and contaminants which will enter the surface water. This is extremely important near water. A

vegetated buffer area can stabilize streambanks and be a last line of defense to absorb pollutants before they reach a river or lake. An ideal buffer area is 25 to 50 feet of uncut grasses shrubs and trees, but even a smaller strip can be beneficial.

Healthy grass is important to prevent erosion, but too much fertilizer is also a problem.

The nutrients in fertilizers, phosphorus and nitrogen, in high concentrations can wash through the soil and degrade water quality. The problems with phosphorus were described on page 4. Nitrogen is water soluble and moves with surface water. High nitrogen levels in ground water and surface water can lead to the ingestion of nitrogen in its nitrate (NO3) form, which can cause health problems in humans and livestock.



The best grasses for the Adirondack region:
Perennial Rye Grass (used for fast green up)
Fine Fescue
Kentucky Bluegrass

20,000,000 acres are planted in residential lawns
67,000,000 pounds of synthetic pesticides are used on U.S. lawns

$700,000,000 is spent for pesticides on U.S. lawns
The mowed lawn esthetic originated in the late 18th century from aristocratic France and England.

WHERE CAN I GET ADDITIONAL

information?

GENERAL INFORMATION

The Au Sable River Association
P.O. Box 217
Elizabethtown, NY 12932
518-873-3752
mmurphy@co.essex.ny.us
www.ausableriver.org

NYS Adirondack Park Agency
P.O. Box 99
Ray Brook, NY 12977
518-891-4050
www.northnet.org/adirondackparkagency/

NYS Department of
Environmental Conservation
P.O. Box 296
Ray Brook, NY 12977
518-897-1200
www.dec.state.ny.us/

Lake Champlain Basin Program
54 West Shore Road
Grande Isle, VT 05458
1-800-468-5227
802-372-3213
www.lcbp.org

Cornell Cooperative Extension
Essex County
67 Sisco Street
P.O. Box 388
Westport, NY 12993-0388
Phone: (518) 962-4810
Fax: (518) 962-8241
Email: essex@cornell.edu
www.cce.cornell.edu/essex/

Cornell Cooperative Extension
Clinton County
6064 Route 22, Suite 5
Plattsburgh, NY 12901-9601
Phone: (518) 561-7450
Fax: (518) 561-0183
Email: clinton@cornell.edu
www.cce.cornell.edu/clinton/

Essex County Soil and
Water Conservation District
P.O. Box 407
67 Sisco Street
Westport, NY 12993
518-962-8225
essesswcd@westelcom.com

Clinton County Soil and
Water Conservation District
6064 Route 22
Plattsburgh, NY 12901
518-561-7373 ext. 3

Cornell Local Roads Program
416 Riley-Robb Hall
Cornell University
Ithaca, NY 14853-5701
607-255-8033
www.clrp.cornell.edu

SPECIFIC INFORMATION

Environmental Protection Agency,
Office of Water
www.epa.gov/ow
For information on protecting water quality and on non-point source pollution.

NYS Department of Transportation
www.dot.state.ny.us
For a list of DOT approved materials for road building and maintenance.

www.ruralhometech.com/fr/ditch.php
For information on gravel road maintenance and erosion control.

forestryindex.net/Management/Forest_Roads/
For information on management of forest roads.

Cornell University
www.gardening.cornell.edu/lawn/index.html
For information on vegetation and lawns.

Ernst Conservation Seeds
9006 Mercer Pike, Meadville, PA 16335
(814) 336-2404
(800) 873-3321
FAX (814) 336-5191
www.ernstseed.com
For information on vegetation and lawns.

ErosionSeed.com
www.erosionseed.com
For information on vegetation and lawns.

www.abag.ca.gov/bayarea/enviro/erosion/erosion.html
On protecting your property from erosion.

USDA Forest Service
Rocky Mountain Research Station
Forestry Sciences Laboratory - Moscow, Idaho
forest.moscowfsl.wsu.edu/4702/roadpubs.html
For information on erosion.

soilerosion.net/
For information on soil erosion.

www.gcrio.org/geo/toc.html
For information on erosion and sediment.

www.aqd.nps.gov/grd/usgsnps/rxmin/sediment.html
www.glc.org/projects/sediment/causes.html
For information on sediment.

nemo.uconn.edu/
For information on nonpoint pollution for municipal officials.

The Internet Watershed Information Tool (InterWET)
www.interwet.psu.edu/
For information on nonpoint education for municipal officials.

AU SABLE RIVER

Association

The Au Sable River Association was formed in August 1998 by residents of the watershed. The ASRA is a membership based organization which is working to improve the natural and cultural resources of the Au Sable River, its watershed, and the quality of life for residents. The ASRA brings together landowners, town governments, other non-profits, and State and Federal Agencies to identify problems and needs and implement solutions. We are a resource for residents and towns, providing assistance and information on a range of issues from water quality to stream restoration. We view the watershed in its entirety and cooperate with all interested parties to improve the health of the watershed and the quality of life for the residents and visitors.

We have a growing membership of residents and friends of the watershed. Our members support us by volunteering time and resources. We have a volunteer Board of Directors and a paid part-time Director. For more information about the ASRA or to become a member please contact us:

Au Sable River Association
P.O. Box 217
Elizabethtown, NY 12932
518-873-3752
www.ausableriver.org

AU SABLE RIVER

Watershed

The Au Sable River begins as an East Branch and a West Branch in the High Peaks of the Adirondacks. The East Branch travels 37 miles from Marcy Swamp to Au Sable Forks. Flowing from the bouldery upper reaches to the valley, it widens and slows to meander along the valley floor. The West Branch flows 35 miles from Heart Lake to Au Sable Forks. It takes a rocky decent to the River Road, where it flattens and slows, and then descends down through the bedrock of High Falls Gorge to the forks. When the two branches meet in Au Sable Forks they form the Main Stem, which then 22 miles to Lake Champlain. The river is fed by more than 70 small streams, plus the Chubb River and Black Brook, draining 516 square miles. The Au Sable is the second steepest river in New York State. The East Branch drops 1,450 feet over 30 miles, the West Branch drops 1,510 feet over 35 miles, and the Main Stem drops 455 feet from Au Sable Forks to Lake Champlain.

As early as 1765 the Au Sable River was explored from the mouth to the Chasm by William Gilliland. People settled along the Au Sable for the proximity to water and its power and the proximity to natural resources including timber, iron, and fertile soil for farming.

SOURCE: NYS Adirondack Park Agency, Ray Brook, NY