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Cleanup Review

News and information for participants in the Minnesota Adopt-a-River Program.

Education's Role In Preserving and Protecting Minnesota's Waters

April Rust, DNR Project WET Coordinator

Young students learn about the problems of non-point source pollution in Adopt-a-River's Crime Lab as part of the "Big River Journey." (Photo taken 5-12-04 by Paul Nordell)

Do you know where the water comes from when you turn on your tap? How about where it goes when it heads down the drain? You know your street address and your email address, but what's your watershed address? And the most important question: why should you care about knowing answers to any of the above questions?

We live on a water planet – all you need to do is look at a photo of Earth from space, to see how much of our environment is water. Seventy-one percent of the planet is covered with water. However, the abundance of water is misleading. Ninety-seven percent of the Earth's water is in the oceans, and is unavailable for most of our needs like drinking, cleaning, or irrigating plants. Although the remaining three percent of the planet's water is fresh, most of it (eighty percent) is frozen in the polar ice caps and a majority of the rest is polluted, trapped in rocks, or too far underground for us to use. That leaves us with less than half a percent of all the water on the planet that is fresh and available for all the plants, animals and people to survive. Water is a precious resource that, in the land of 10,000 lakes, we often take for granted. It's easy to do so when we see lakes and rivers and wetlands all around us and every time we need water for anything, all we need to do is turn the tap and we have immediate, clean water. The more we take for granted, don't know or understand our connection to water, the less likely it is that our children and grandchildren will have enough clean water to thrive.

One classic example is to imagine a picture of "water pollution." If you ask people to close their eyes, imagine a picture of water pollution, and describe that image, they often talk

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about a pipe dumping discolored or sludge-like liquid into a lake, river or ocean. That type of pollution does occur, but since the passing of the Clean Water Act in 1972, is much less common. "Point source" pollution, as this picture is described by those in the water resources field, used to be the main contributor to poor water quality. But over the past 30 years point source has been reduced and another form of pollution "non-point source" pollution, is now the most prominent problem. Non-point source pollution (NPS) "…is caused by rainfall or snowmelt moving over and through the ground. As the runoff moves, it picks up and carries away natural and human-made pollutants, finally depositing them into lakes, rivers, wetlands, coastal waters, and even our underground sources of drinking water." (US EPA) Non-point source pollution is now the major source of poor water quality. Common sources of NPS include:

- Fertilizers, herbicides, and insecticides from yards and agricultural lands;
- Leaves, grass clippings and yard waste;
- Oil, gasoline, and toxic chemicals from streets, driveways and parking lots;
- Sediment from construction sites, agricultural and forest lands;
- Bacteria and nutrients from livestock, pet wastes, and faulty septic systems;
- Road salt and sand.

If you were the only one fertilizing your lawn, a neighbor was the only one draining used oil in the driveway or gutter, or another neighbor was the only one raking leaves into the gutter, it wouldn't be a problem. The polluted runoff wouldn't add much to our rivers, lakes or ground water. Unfortunately, it's not the case of just one or two of us doing something to harm our water quality – it's the cumulative effect of all our actions that has created such a large problem. Although NPS pollution isn't as easy to pin down as point source pollution, the solution involves many small steps that everyone can take in their day-to-day lives. The one advantage of this problem is that we have the potential to solve it together on a community level, but how can a community solve this problem if they don't know or understand it exists?

Education is a key part of addressing this question and helping preserve and protect Minnesota's waters. Many Minnesota agencies, organizations, programs and individuals are working towards protecting and improving Minnesota's shared water resources. Water education is a primary tool that they use with individuals and communities in order to help them understand how issues like NPS pollution affect their personal, economic and environmental health.

When a resource is cheap and readily available, it becomes all too easy to forget our reliance upon it and what we need to do to care for it over time. Water education can provide Minnesotans with the knowledge of how they are connected to water, how water connects all life and systems on our planet, how water is being used and abused, their own impacts on water, ways water can be improved and the choices available to us to help protect our water. Water education can influence people's attitudes about our water resources. By understanding that there are problems with our water and caring about this shared resource, individuals can become empowered to take part in problem solving.

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Another key component that influences people's attitudes about water is personal experience. Experience is a basic building block to help people understand how our lakes, rivers, wetlands and water systems work. Education without a personal connection is not nearly as effective. Think about a time when you were growing up – a positive experience you had outdoors near water. Who was with you? What were you doing? Were you consciously out to learn or were you out to have fun? Chances are that you were with somebody that you looked up to and cared for, like a parent or grandparent and that you were having a fun time playing in, on or near water. Simply by having experiences like that at a young age, people tend to understand, care for and learn more about the natural world around them. Experiential learning is a major component of excellent water education.

In Minnesota, one of the programs that encourages this type of hands-on water education is Project WET (Water Education for Teachers) – just one of the many programs working towards building understanding in our citizens and improving our water resources. Project WET is based on several basic beliefs:

- Water moves through living and non-living systems and binds them together in a complex web of life.
- Water of sufficient quality and quantity is important for all water users (energy producers, farmers and ranchers, fish and wildlife, manufacturers, recreationists, rural and urban dwellers).
- Wise water management is crucial for providing tomorrow's children with social and economic stability in a healthy environment.
- Awareness of and respect for water resources can encourage a personal, life-long commitment of responsibility and positive community participation.
  (Project WET U.S.A.)

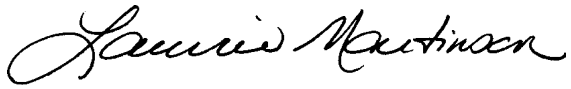
Project WET has created a national network of water educators, using a K-12 curriculum and activity guide and teacher trainings to help educators incorporate water concepts into their classrooms. Project WET bases its efforts on the above beliefs and works to provide the teachers of our next generation with the tools to help prepare them for key water issues they will face in their lifetimes.

There will always be water resource issues that people need to deal with and there will always be people suggesting educational efforts and methods to explain and solve them, but the bottom line is people need to know, care and act. Children who have a better understanding of the complexities involved in caring for our water will be better stewards of this precious resource tomorrow. Education is one step towards that goal.

For more information on what you can do to protect your watershed, please contact the Adopt-a-River Program or visit the following websites:
Project WET U.S.A. Home Page: www.projectwetusa.org
US EPA Website: www.epa.gov/owow/nps/whatudo.html

Director's Comments: "How much does it cost?"

Laurie Martinson, Director DNR Trails & Waterways Division



A high school student recently asked a member of my staff, "How much does it cost to clean Minnesota's waterways?" and "When did the cleanup begin?" Both of these questions are rather complex and require answers that take into account a wide range of factors.

The first question is difficult to answer because many of the costs associated with past cleanup efforts have been hard to track and other efforts did not show costs at all, but rather profits. The latter was the case in the 1880's, when Minneapolis flour millers discovered it made more sense to sell their flour by-product (wheat chaff) as animal feed rather than considering it a waste, which they had been flushing down the river. Recently, a costly effort in the Twin Cities was undertaken to finally separate the storm and sanitary sewer systems. This project has taken nearly 20 years and has cost hundreds of millions of dollars.

The sanitary sewer systems of the Twin Cities connect to a regional system comprised of roughly 550 miles of larger sewers that serve almost everyone in the seven-county metro area. The regional treatment plant and sewer system would cost about $3 billion to replace, and approximately $350 million are spent annually on maintenance and improvements. Each city in the system is also responsible for the costs of maintaining and improving their own systems. The replacement costs for the Minneapolis sewer system, for example, would be over $1 billion.

Some may ask if all of these costs are worth it. To help answer this, we could look at the disturbing conditions reported on the Mississippi River prior to building the first water treatment plant in 1938, or consider the bad smells emanating from the Saint Louis River near Duluth prior to a 1978 sewer correction there. Or, we could look at conditions in 1964, when the Twin Cities sewer system was over-loaded. In that year, Jack Skrypek (DNR Fisheries) surveyed the condition of Mississippi River fish in Saint Paul (Cleanup Quarterly Vol. 2., No. 2). He found a dead zone on the river below Pig's Eye Lake, and some of his fish samples actually came up with toilet paper wrapped in the nets. He also reported diminished levels of dissolved oxygen and ammonia levels so high they were toxic. Only the most pollution-tolerant organisms were able to survive such conditions.

Thankfully, Minnesota invested time and money towards cleaning up our public waters. I cannot imagine anyone wanting to relive any of those past horror stories. On your next Adopt-a-River cleanup, think about all of the hard work and expense that has already gone into cleaning the public waters and be grateful. Also, consider that many communities, including the Twin Cities, depend upon the river for their municipal water supplies.

Celebrating the Importance of Water

Historical Moment: February 25, 1870

Chippewa County Seat Moves Across the River

Paul E. Nordell, DNR Adopt-a-River Program Coordinator

On this date, the Minnesota Legislature, for the second time in as many years, enacted a law to create a new, temporary county seat for the newly created Chippewa County. The county had been established under law on March 5, 1868. The very next day, the state enacted another law to place the temporary county seat at Chippewa City, along the west bank flood plain of the Chippewa River, about a mile upstream from its junction with the Minnesota River. Then, just two years later, on February 25, 1870, a new law was enacted to move the county seat across the river, to the present site of Montevideo, the city so named because "of the wonderful view gained from the heights overlooking the interlocking valleys of the Minnesota and Chippewa Rivers at that point."

What need could provoke the necessity for a second temporary county seat? The urgency for the change is underscored in the language of the law of February 25, 1870. The law suggests prior action had already taken place to remove the county seat from Chippewa City. The law grants county officers the authority to KEEP several offices at the village of "Montevido" (the misspelling that originally appeared in the law). Why were the offices moved to the new location if they had already been authorized to be in Chippewa City?

Since few newspapers were in this part of the state at this time, it is difficult to conclusively solve this mystery but a likely explanation could be flooding. Flooding is certainly common at the juncture of these two rivers (as evidenced by "100-year" floods in 1997 and 2001). A great deal of circumstantial evidence exists that suggests this area experienced damaging floods in the spring and again in late summer of 1869. St. Paul flood records indicate a small amount of spring flooding as a result of snowmelt. Then August brought heavy rains to the Upper Minnesota River Valley above Mankato, causing the Minnesota River in Mankato to rise roughly 16 feet in the two weeks prior to September 17. Down stream in Saint Paul, the Mississippi finally crested over two feet above flood stage on September 24. (The only time in 137 years the Mississippi has overflowed its banks in September at Saint Paul).

If the Montevideo - Chippewa City area was indeed flooded in 1869, as the evidence suggests, the unprotected west bank where Chippewa City resided certainly would have felt the damages more severely than Montevideo, on the higher, east-bank of the river. Therefore it is easy to assume that Montevideo became the county seat, and Chippewa City died out shortly thereafter, because of their respective locations along the river.

* Primary Sources: U.S.G.S. "Peak Stream Flow for Minnesota" (website): MN Special Laws 1870*, Ch. XCV, p. 392*; MN Special Laws 1870*, Ch. CXIII, p. 403;* MN General *Laws* 1868*, Ch. CXIII, p. 161;* MN Special Laws 1868*, Ch. CXIII, p. 113;* Mankato Weekly Union*, August 20, 1869; August 27, 1869; September 10, 1869; September 17, 1869; MN Place Names, Warren Upham, 3rd ed. 2001.*

Wetlands: Wasted Space or Valuable Resource?

Shaun Lettau, MCC-DNR Adopt-a-River Program Assistant

Minnesotans have been draining wetlands since the first Europeans settled here in the mid-19th century. In fact, studies estimate that over half of Minnesota's pre-settlement wetlands have been drained; with a few counties in southern and western Minnesota reporting over 90% drainage. Although laws such as Minnesota's Wetland Conservation Act of 1991 have significantly reduced drainage rates, wetland drainage is still common today. To make an educated decision regarding whether or not wetlands should be drained, the benefits of draining them and the value of keeping them must both be examined.

Early settlers considered wetlands to be very aggravating. These low, flooded areas occupied valuable land and made it unsuitable for farming or development. For this reason, wetland drainage and filling were heralded as land improvement. Alexander Ramsey, the state's first governor, while discussing the "wetland problem" in 1861, stated, "From their nature and situation they [wetlands] are capable of easy reclamation. In a climate so dry as ours, we may naturally expect that lands of this class will eventually be the most valuable land in the state" (Minnesota Board of Water and Soil Resources website: www.bwsr.state.mn.us).

In addition to occupying valuable land, wetlands were considered a detriment to public health. Standing water makes ideal breeding ground for mosquitoes, which carry diseases such as yellow fever, malaria, and encephalitis. Improvements in medicine and insect repellant have drastically reduced the severity of these outbreaks, however.

A third reason wetlands were targeted for removal was their odor. Methane gas is naturally released from wetlands as organic matter decomposes, releasing the same odor that is typically associated with feedlots. The practice of pumping raw sewage into some of these "wasted" areas intensified this problem. The rationale was that the land was too wet for any other purposes, so it seemed to be a logical storage location for waste.

Because of the above reasons, the prevailing idea for most of the state's existence was to promote draining and filling all the state's wetlands. These views about wetlands started to change roughly 30 years ago, with the environmental movement of the 1970's. A key idea from this movement was that wetlands have more value than simply what the land is worth.

For starters, wetlands are tremendous natural buffers between people and "mother nature." Wetlands purify runoff by creating a barrier that slows down the water and reduces its impact against the shoreline. This reduces erosion while allowing various chemicals and sediments to settle out. Wetland plants then absorb many of these otherwise harmful chemicals, thus removing them from the water. For example, a study in Florida recently found that wetlands used as retention ponds near farm fields may remove up to 80% of phosphorous and other chemicals from storm water runoff ("Runoff Characteristics from Row Crop Farming in Florida," Betty Rushton, *Stormwater*, Vol. 5 No. 6, 2004).

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In addition to pollution control, wetlands have a sponge-like ability to retain water. The Federal Emergency Management Agency (FEMA) stated that Minnesota had ten floods that required a total of a half billion dollars in federal aid from 1993 - 2003 (taken from transcripts of Anthony S. Lowe's speech at FEMA's Minnesota Flood Summit, August 27, 2003). More wetlands could have significantly lowered this figure. The Environmental Protection Agency estimates it would cost $1.5 million annually to replace the flood relief found in every 5,000 acres of healthy wetlands (www.epa.gov/watertrain/wetlands).

Wetlands remove all sorts of man-made pollution from the water. (DNR File Photo)

The ability of wetlands to absorb water is also crucial during dry years. Wetlands are able to absorb up to 1.6 million gallons of water for every healthy acre of wetlands during wet times (Ramsar Convention on Wetlands: www.ramsar.org). This means they have water available to recharge groundwater supplies during dry periods, thus reducing the need for irrigation and well-drilling.

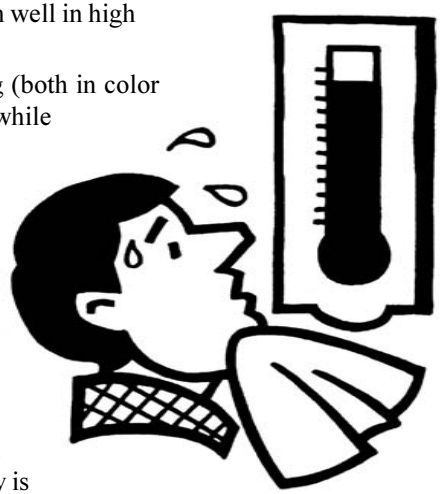
Of course, a wetland's value extends well beyond human benefits. Wetlands provide an abundance of food, water, and shelter to a very diverse wildlife population. An estimated 43% of all threatened or endangered species in the U.S. depend on wetlands for survival (DNR Wetland website: www.dnr.state.mn.us/wetlands). Wetlands are also important to wildlife for such natural uses as waterfowl production and fish spawning.

The values of wetlands are extensive and only a few have been mentioned here. Wetlands may also be utilized for such commercial ventures as cranberries, wild rice, and aquaculture (fish farms), not to mention the revenue generated through activities such as hunting, fishing, and bird watching. Finally, wetlands have been known to inspire works of art and are commonly used for a wide range of scientific studies.

The value of wetlands clearly outweighs any drawbacks associated with them. Also, their overall value may actually offset the benefits received from their drainage. For example, the Ramsar Convention examined all of the ways wetlands worldwide are valuable and estimated their total value at roughly $3.2 trillion dollars in the year 2000 alone (www.ramsar.org). How many "improvements" are that valuable?

More information regarding wetlands can be found by contacting the DNR (Waters Division), BWSR, your local soil and water conservation district, your local extension agent or any of the organizations listed in the article.

Top Ten Ways to "Beat the Heat"



1. **Slow down.** Your body can't perform well in high temperatures and humidity.
2. **Dress appropriately.** Light clothing (both in color and weight) reflects heat and sunlight while helping your body maintain its natural temperature.
3. **Eat right.** You should eat less food (while still maintaining a balanced diet) during hot days because the more you eat, the more heat your body produces, and the more water it loses.
4. **Drink plenty of water.** The more you perspire, the more water you loose. This water needs to be replaced. A minimum of six to eight glasses a day is required during the summer.
5. **Schedule activities accordingly.** Schedule physically demanding activities either in the morning or evening when temperatures are likely to be lower.
6. **Check the weather.** Don't be lulled into a false sense of security by an overcast day. Heat and humidity can still cause hot-weather medical emergencies.
7. **Cover up.** Sunburns are not only extremely painful, but can also make your body's dissipation of heat more difficult. Start with gradual exposure and always wear sunscreen.
8. **Relax.** At the first sign that heat is getting to you, take a breather in a cooler spot. Allow ten minutes of rest for every hour of hot weather activity.
9. **Think prevention.** Your body works hard to protect you from the damaging affects of heat and humidity, but it can only do so much. Also, remember everybody's limit is different.
10. **Medical attention** should be readily available if you notice yourself or anyone else experiencing the following hot-weather symptoms: cramps, extreme fatigue, headache, dizziness, nausea or vomiting.

*List based on "Hot Weather Survival Tips" published by Minnesota Conservation Corps in *Crews News and Views*, July 1996, p.6

Creature Feature

Moose: *Alces alces*

Bull Moose (DNR file graphic)

Not many Minnesotans have had the opportunity to observe the state's largest wild animal, the moose. Moose, the deer family's largest member, may stand 6 1/2 feet at the shoulders and weigh 1,400 pounds. This makes moose four to five times larger than its cousin, the whitetail deer. The body of an adult bull (male) moose can be ten feet long and can have antlers measuring over five feet from tip to tip. Moose cows (females) are antler-less and roughly 2/3 the size of bulls.

Moose have a few other distinct characteristics other than size and antlers, however. One trait is their long skinny legs, which allow them to run up to 35 miles per hour. These long legs also make it easier for them to feed in wetlands and leap over fallen logs when fleeing predation. Another distinguishing moose characteristic is a large flap of skin that hangs down under their jaw, called a bell or a dewlap. Biologists believe the bell has some purpose during courtship, since the bell on a bull is more pronounced than on a cow.

The mating season, known as "rut," typically occurs during the fall. A bull moose does not take a harem, but will look for another cow once mating has been completed. If mating is successful, a roughly 40-pound moose calf will be born in May or June. Moose calves are born without the spots present in other new-borns of the deer family.

Minnesota's moose herds are located in the extreme northeast and northwest corners of the state. Although moose populations are called herds, moose are solitary animals that tend to be in groups only during rut or harsh winters. Moose tend to live in forests near ponds, lakes, or wetlands, and they will eat a variety of plants. These plants range from trees such as aspen, maple, cherry, and balsam fir; to aquatic vegetation such as water lilies, pondweed, horsetails, bladderworts, and burreed.

Most of the time these giants are extremely shy creatures that make themselves very difficult for humans to spot. However, some precautions should be taken when venturing into their territories. Probably the most important precaution is to avoid crowding them. Moose have extremely poor eyesight and tend to stand and fight "unknown" enemies. For example, during rut, bulls have been known to charge automobiles by mistaking them for competing bulls or cows in heat. Also, if moose are infected with parasites, such as brain worms, they can become extremely disoriented. In this condition, moose have been known to wander for hundreds of miles and become extremely paranoid, kicking or charging anything in the area.

For more information on moose in Minnesota, contact the DNR or visit their website: www.dnr.state.mn.us.

The 2004 Adopt-a-River Calendar of Events.

As of July 30, 2004 * Call to verify times and locations.

August 26 - Septemeber 6: Minnesota State Fair. Come out and see the Adopt-a-River booth at this year's "Great Minnesota Get-Together." We will again have a "found objects" sculpture along with educational material on the problems facing our waterways. Contact Paul Nordell (651-297-5476, paul.nordell@dnr.state.mn.us) for more information.

August 27 and 28: Mankato Paddling and Outings Club River Cleanup. Join the Mankato Paddling and Outings Club as they clean up sections of the Le Sueur and Blue Earth Rivers (one each day). If you would like more information, contact Peggy Kreber at (507) 931-6419 or by e-mail at peggyk@hickorytech.net.

September 11: 4th Annual Eagle Cliff Campground and Lodging Cleanup. Help clean the Root River from Torkelson Creek to Eagle Cliff Campground. Volunteers will be cleaning from canoes provided by the campground and dinner will be provided Saturday evening. For more information contact Ivan Naber at (507) 467-2598.

September 18: Crow River Watershed Cleanup. The Crow River Organization of Water (C.R.O.W) is organizing a large cleanup involving many of the cities within the Crow River watershed. Communities involved with this cleanup include: Rockford, Delano, Hanover, Hutchinson, New London/Spicer, St. Michael, Buffalo and Howard Lake/Waverly. Contact Diane Sander, Crow River Watershed Coordinator at 763-682-1933 Ext.3 or by email at diane.sander@mn.nacdnet.net for more information.

September 18: International Coastal Cleanup/ Great Lakes Beach Sweep. The Great Lakes Aquarium is once again sponsoring the Great Lakes Beach Sweep in conjunction with the International Coastal Cleanup, a day when people from over 100 countries and 55 U.S. states and territories all clean their shorelines. Cleanups will take place at Gitchi Gummi Park, Lake Walk, and Park Point in the Duluth area. Supplies and refreshments will be provided. Volunteers can also participate in storm-drain stenciling. Contact the Great Lakes Aquarium's Sonia Mascarenhas at 218-740-3474 (ext.1027) for more information.

September 19: Rapids Riders Whitewater Kayak & Canoe Club Annual Vermillion River Cleanup. Meet at Falls Park on the side of the Vermillion River near U.S. Highway 61 and 19th Street in Hastings at 10:00 am. The cleanup will last until around 2:00 pm with lunch, including BBQ's, to be served afterwards. Contact Heather Kehn by phone at (763) 208-1391 or by e-mail at kehnh@parknicollet.com for more details.

October 2: CURE Annual River Revival. Join the event that brings fellowship to the river at the Granite Falls Memorial Park from 3:00 PM – midnight. A wide variety of activities are planned including a fishing contest, canoeing instruction, and live music. Tickets are $1.00 for 12 & under and $2.00 for adults. For camping information call the Granite Falls City Office, (320) 564-3011. Please call the CURE office (320) 269-2984 or toll free 1-877-269-2873 with addtional questions.

Adopt-a-River Notes & News

Back by popular demand: You may have noticed the Adopt-a-River Calendar page has returned (previous page). This was done in response to feedback we received wondering where the page went. We will continue to maintain an updated cleanup calendar on our website: www.dnr.state.mn.us/adoptriver. Please continue to let us know about your upcoming cleanups and ways we can continue improving the Adopt-a-River Program.

Volunteer Opportunities in the Adopt-a-River Program: The Adopt-a-River program has a variety of ways people concerned about waterways can volunteer their time. One way is by signing up for a 5-hour shift to help staff the Adopt-a-River booth at the State Fair. Another way is to assist us in teaching metro area 4th - 6th graders about urban watersheds in the "Adopt-a-River Crime Lab," our learning station for the Mississippi National River and Recreation Area's "Big River Journey (BRJ)." BRJ is a great opportunity for children to visit a variety of learning stations about the Mississippi River while aboard the riverboat *Harriet Bishop,* during sessions in May, September, and October. Finally, one can volunteer to help with other cleanups (for information on these cleanups see page 10 or visit our website www.dnr.state.mn.us/adoptriver). For more information on any of these oppurtunities please call either 651-297-5474 or 651-297-5476.

Purple Cards: Thank you to all of the groups that have reported cleanups this year. 2004 is shaping up to be another great cleanup season with 57 cleanups being reported (as of July 30) totaling over 54,000 pounds. Keep them coming! Hopefully we will be able to top 2003's totals of 125 cleanups, with 4,088 volunteers investing a total of 21,440 hours and picking up 363,732 pounds of garbage. To date, over 4.5 million pounds of garbage have been removed by Adopt-a-River volunteers. Thank you very much for your hard work!

Fall Cleanups: Fall is one of the most popular times of the year to do cleanups. The reasons for this include: less foliage cover, lower temperatures and humidity, lower water, and less insects. Please let us know when you would like to do your cleanups and how we can assist.

How-to Kit: The Adopt-a-River's "How-to" kit is now available online at www.dnr.state.mn.us/adoptriver/howtokit. Even if you are an established adopt group, you may still find it useful to review the information. We welcome any feedback you may give us.

Cleanup Review is published by the Minnesota Department of Natural Resources for the Adopt-a-River Program in the Trails & Waterways Division.

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