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

Cleanup Review

Fall Issue 2007 Vol. 16, NO. 2

The Life and Death of Lakes

Megan Godbold, Minnesota Conservation Corps/ DNR Adopt-a-River Assistant

You may have heard about the importance of first impressions. When we meet new people, our very first impression consists of how they look, and depending on proximity, how they smell. The same concept applies to surface waters. Our first impressions often dictate the type of relationship we will pursue with that body of water. A person is much more likely to decide to recreate on a body of water that is cool, clear, and free of strange unwanted debris, as opposed to a lake with water that looks murky, has the fragrant odor of blue-green algae, and even worse, is laden with garbage and dead fish.

We need to ask ourselves a very important question when faced with evaluating the health of our lakes. What should a lake look like? To some a lake should be a pool-like utopia, but in reality things are a bit more diverse. In nature there are four trophic lake categories based on the amount of nutrients present: hypereutrophic (nutrient rich), eutrophic, mesotrophic, and oligotrophic (nutrient poor).

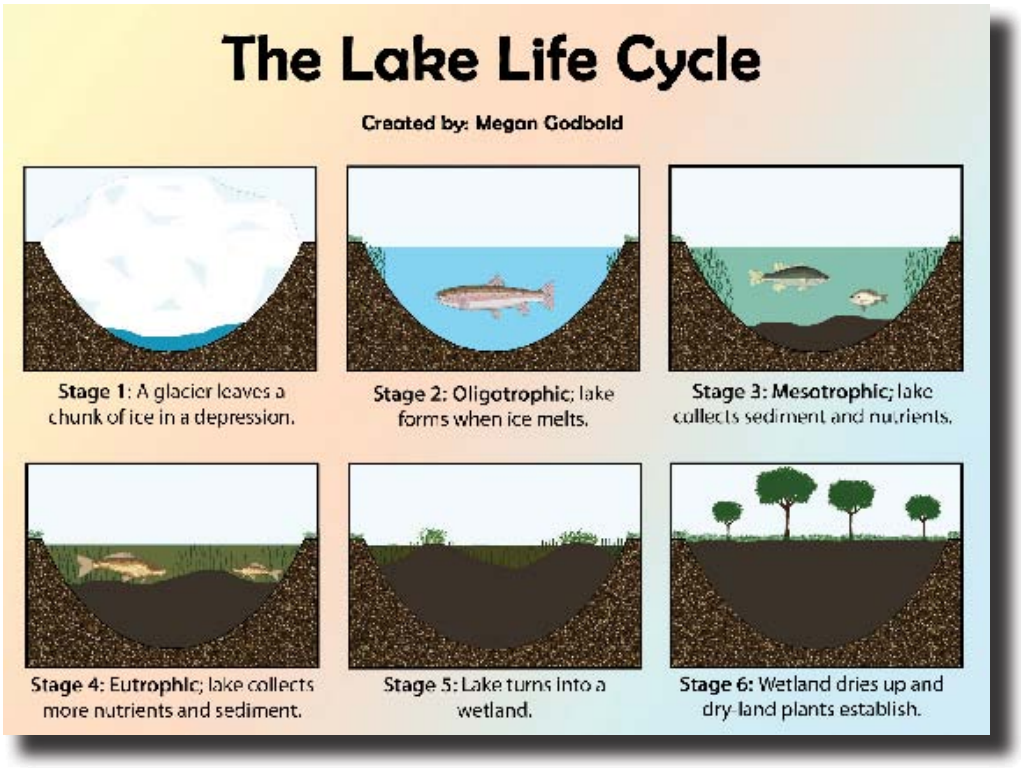
Most lakes in Minnesota were formed after the last ice age. These young lakes are clear, cool, sandy or stony bottomed, and there is little vegetation. Oligotrophic lakes contain cold-water fish species (e.g. trout), much like Lake Superior and other northern Minnesota lakes. Over time things begin to change. The water becomes opaque, aquatic plants become more prolific, and sediments start to collect on the bottom. Fish species like bass and walleye flourish, not unlike many mesotrophic lakes in central Minnesota. Further into the future plants and algae become more abundant, the bottom becomes mucky, and you start to notice more carp and other warm-water/ low-oxygen-tolerant species. The water itself looks murky, and you probably will not see people

swimming there. This is akin to eutrophic lakes in farmland areas in southern Minnesota where the land is fertile. Hypereutrophic is an extreme eutrophic state where the lake will have severe algal blooms and tend to be warmer. These lakes are found in nutrient rich land such as agricultural areas in southern Minnesota.

Though you can usually determine the trophic state of a lake with a few observations, there are ways to scientifically measure water quality. A Secchi disk is used to measure the clarity of the water. Clarity may be reduced because of the amount of suspended particles; it may also be reduced because the water is colored. In order to take a measurement, one lowers the disk into the water and takes note of the point in which it is no longer visible. The depth is then noted and compared to a table that categorizes measurement ranges into trophic categories. For example, a reading of roughly 16 feet or greater would be oligotrophic, 6.5 – 16 feet would be mesotrophic, and less than 6.5 feet would be considered eutrophic. There is a photo of a Secchi disk on the next page.

You may wonder how much of this transition is natural, and how much of it is caused by humans. Poor land management can accelerate the eutrophication process; however, even without humans, it would still occur, just on a longer timescale. The speed of the process would also depend on the geographical and geological features present. Lakes, like living creatures, have a life cycle. Death comes in the form of being filled up with sediment and decomposed material, resulting in the basin being completely covered by vegetation. Dave Wright of DNR's Ecological Services Division said,

"Most of us probably can't imagine or have never thought about Lake Calhoun, Mille Lacs, or Lake Superior ever filling up. Or that, because of our actions the lake might fill up in 5,000 years vs. 50,000 years."



Many human influences speed up eutrophication. Sedimentation from disturbed soils and erosion can make the lake shallower and release nutrients. Runoff from lawns can carry excess nutrients from pet waste and lawn fertilizer into the water, encouraging algal blooms. Failing septic tanks from nearby properties can leach human waste into the waters, also contributing to nutrient loading. Storm drains dump warm, low oxygen water and unsightly garbage into lakes and the rivers that feed into them. A lot of the things we do have a synergistic effect on lake eutrophication. The good news is that it can be corrected.

It is important to educate landowners about best-management practices concerning their yard and home. If they have a septic system, regular inspections are important to ensure that it is operating properly. The septic system should also be far enough away from the lake to prevent nutrient leaching. For those who use lawn fertilizers, it is important to limit their applications to only what is necessary and ensure the fertilizer is phosphorus free. Pet owners should make sure they scoop up their pet waste so that it does not make its way into surface water via water runoff. For people owning lakefront property, a buffer strip of deep-rooting vegetation that extends 10-15 feet from the shore can also help filter and trap runoff. In surrounding neighborhoods, planting rain gardens to capture runoff from roofs and driveways can reduce the amount of stormwater entering streams and lakes. It can also provide habitat for beneficial wildlife. These are only a few of the simple steps that can be taken to make a real impact.

In a best-case scenario the impaired lake will have inlets and outlets or a lot of groundwater recharging it. Streams help flush and renew the lake. Many lakes are also fed by groundwater. If the groundwater is pure, it will help dilute nutrient concentrations. If a lake does not have these vital veins and arteries, what it contains now will linger into the future, unless the nutrients and sediment are removed by physical or chemical means. A lack of streams does not make recovery impossible, it just makes the process slower and perhaps lessens the degree of reversal.

Secchi disk, Photograph from the DNR

Another factor that may stymie eutrophication reversal is the slow release of stored phosphorus within particles of sediment either floating or settled on the bottom of a lake. When fertilizer containing phosphorus is applied to soil, not all of it will be absorbed by plants. Some of the phosphorus becomes locked into the soil and unavailable to plants. When this soil gets eroded into surface waters, that phosphorus can be released into the water, which can cause severe algal blooms.

Beginning in the 1920's many lakes in the Twin Cities had pumps that would replenish lakes with fresh groundwater. This helped counter the impacts of eutrophication and made the lakes clearer. Nutrient concentration was lowered, making the lake seem more pristine and desirable for recreation. After realizing that our groundwater resources were being greatly depleted by this practice, it was restricted by legislation in 1989. Since then many people have complained about the deteriorating water quality of their lakes and the foul smell of blue-green algae. For more information see the Historical Moment.

Next time you look at a lake, think about it as a living thing, aging prematurely, by an unhealthy lifestyle that was forced upon it by the people closest to it. We cannot physically remove the algae, and pump in groundwater, but we can take care of the resource by becoming good stewards of the environment. So put on your gloves and boots, plant a rain garden, label some storm drains, put up a silt fence, and pick up your pet waste. While you are at it, do not forget to educate your neighbors, and sponsor a cleanup to show people that you care about the water we all enjoy.

Minnesota Department of Natural Resources

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Director's Comments

Forrest L. Boe, Director DNR Trails & Waterways Division

Studying Human Behavior

The Adopt-a-River program is all about rallying the community around a common challenge. The challenge is to remove garbage from our public waters and to attempt to prevent its future accumulation. When it accumulates it becomes an attractive nuisance, one that prompts a somewhat indifferent person to avoid finding a proper disposal spot. Such a person then pitches trash over the shoulder, without a second thought.

Over 200 active Adopt-a-River groups are, in effect, studying human behavior. They visit the same locations at repeated intervals, becoming the local experts on how conditions vary over time. They can observe, starting from a "picked-clean" condition, what the rate of accumulation is and what kind of trash is accumulating. One of the most powerful tools that has been devised to reduce illegal dumping is the vehicle barrier installed at chronic dumping areas. This barrier is designed to prevent serious dumping, or at least to expose it for what it is - disregard for the community.

Another way to lessen trash in our public waters is to have cleaner streets and cleaner areas through which water flows into the streets. This becomes a major issue at public gatherings, such as the state fair. In the past, Adopt-a-River volunteers have found state fair Styrofoam cups on the riverbank in downtown Saint Paul. These cups washed through the storm drains and down the river for miles before arriving in the Mississippi River. Fortunately, the state fair cup is now seldom found on the riverbank. In some places, storm water can be better managed by slowing the rate of its travel to the river, thus relieving it of its trashy load.

The highly effective methods used at the state fair to clean the streets and grounds have made all the difference for the riverbank. The fairgrounds have been divided into 14 cleanup zones and service groups are hired to clean a square block of the grounds for a single day. What was once a heavy burden borne exclusively by state fair employees is now shared, with great success, by service groups who clean the grounds as a fundraiser. The most successful of these groups is the Saint Clair Athletic Backers of Saint Clair, Minnesota. On the first Sunday of the fair about 180 youth and adults take on the entire grounds. This project, with the cleaning of two barns thrown in for good measure, raises $6,500 annually for the town's school athletic programs.

Improving our public waters involves the efforts of many individuals in many places. Thanks to all of you who are contributing to a better quality of water in our lakes, streams and wetlands. Keep up the good work!

Celebrating the Importance of Water

HISTORICAL MOMENT: May 1, 1923

Lake Improvement in Ramsey County

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

Lake improvement was achieved by pumping well water, from underlying aquifers, into lakes for the purposes of regulating the water level, a process called "augmentation". Ramsey County Engineer Paul N. Coates carefully investigated this practice, begun as early as 1903 in Ramsey County, using two wells in a study he began May 1, 1923. This study offers a fascinating look at how water was viewed in 1923.

"The underground water supply is free for all who wish to make necessary provisions for its use." This statement makes clear that our aquifers were considered an abundant resource that was ripe for the picking. That point is made even more prominently further down the page where Coats purports,

> "To pump water into our lakes is not a process of robbing the underground reservoir, in its existing state, of water that rightfully belongs to it. In other words, pumping into the lakes to offset seepage will have the same effect on the water-table that sealing the bottoms of the lakes would have."

He may seem confident in the appropriateness of their lake improvement, but he also readily admits that the water-table is being impacted.

> "...the apparent lowering of the water-table [from pumping into the lakes] is more than offset by the fact that the City Water Works will no longer derive its main supply from the underground reservoir, but will pump directly from the Mississippi River in Fridley."

Prior to 1923, lake improvements had been conducted without any comprehensive study. This report, submitted to the Ramsey County Board of Commissioners, guided county lake improvement into the 1970's. After the cessation of ground water supplementation, people began to complain of a deterioration in water quality. Where water levels may only inconvenience dock owners and boaters, an increase in odors impacted everyone who recreated on the waters.

In more recent times, it is noteworthy that lake level augmentation was re-examined. A study funded by the Legislative Commission on Minnesota Resources in June 1998 produced a report entitled Lake-Ground Water Interaction Study at White Bear Lake, Minnesota. This study was done by the Minnesota DNR Division of Waters. It was determined that lake level augmentation by the use of wells was highly ineffective since eighty-six percent of the water pumped was lost to seepage (not including evaporation). Augmentation on White Bear Lake by this method took place intermittently from 1924-1977. Over this period of time, the total pumping equaled 58 feet of depth across the surface of the lake. The maximum pumped was in 1932, when 3.56 feet of water was incorporated. Surface water augmentation using groundwater is now regulated by Minnesota Statute 103G.271, subd. 5a.

Sources: Special Report on Lake Improvement, by Paul N. Coates, Ramsey County Engineer, 1924; Lake-Ground Water Interaction Study at White Bear Lake, Minnesota, Report to the Legislative Commission on Minnesota Resources, Minnesota DNR Division of Waters, June 1998.

Children on a diving platform at White Bear Lake.
Minnesota Historical Society Photograph Collection ca. 1935
Location no. GV3.62 p 47

Creature Feature

Largemouth Bass: Micropterus salmoides

Megan Godbold, Minnesota Conservation Corps/ DNR Adopt-a-River Assistant

The largemouth bass is a favorite of many anglers. This aggressive fish will strike and pursue a variety of lures and put up an invigorating fight when caught. Minnesota hosts a variety of bass tournaments during the summer and is becoming known for its ample bass fishing opportunities.

Some of my fondest fishing memories are of fishing for bass on a secluded rural lake near my childhood home. My father, myself, and typically a couple other people would set up on our boat with snacks and beverages and a mini-tournament would ensue. My favorite lure, stinky rubber worms, never let me down.

Though it could be easily confused with its cousin, the smallmouth bass, the easiest way to tell them apart is by the mouth. The mouth of a largemouth bass will extend past the eye while the mouth of a smallmouth bass will only come to the mid-eye area.

The bass does not rely soley on sight to locate prey, but on a "lateral line" which runs down the side of the fish that is able to sense vibrations in the water. Such an adaptation allows it to survive and thrive in murky waters. Bass can also be found in clearer mesotrophic water, but it prefers water that is above 80 degrees in the summer and can even tolerate waters in the mid 90's. The most important factor for survival is having enough dissolved oxygen present year-round.

As can be noted in the diagram below, the bass is prolific in mid-Minnesota. This is mostly due to the types of lakes found in the region. As you travel further north you will find more mesotrophic and oligotropic lakes, and as you travel south into the agricultural portions of the state you will see more eutrophic and hypereurtropic waters. Mesotrophic and eutrophic waters are commonly found in the central region of Minnesota, making it ideal for bass habitat. This region's proximity to the Twin Cities helps build tourism and commerce through bass fishing tournaments.

Bass is not known for having good flavor, but if you place the fish on ice immediately after being caught and continue to keep it cool until it is cooked, you will be pleasantly surprised by the taste. Bass, like most fish, quickly decompose if left in room-temperature air, which leads to an unpleasant flavor.

If you want to fish for bass, you need to follow some basic rules. First and foremost, acquire a fishing permit; this can be obtained through the DNR. Secondly, obey the catch limit of six fish with the bass size minimum of 12 inches in length. Some metro lakes have established more stringent guidelines, so do your homework before you fish.

For more information on fishing in Minnesota, visit http://www.dnr.state.mn.us/fishing.

Images and information from the
Minnesota Department of Natural Resources

On the Water

An American Inspiration

Featuring:

Chad Pregracke
and
Living Lands and
Waters

Every issue needs a good poster child to draw attention and awareness. Animal rights has PETA and Pamela Anderson, global warming has Al Gore, pop art had Andy Warhol, river adventure has Huck Finn, and river cleanups have Chad Pregracke and his Living Lands and Waters team.

During college, Pregracke, originally from Illinois, was driven to act after noticing increasing quantities of garbage accumulation while working during the summers as a commercial shell diver, barge hand, and commercial fisherman on the Illinois and Mississippi rivers. This inspired him to create a non-profit organization called Living Lands and Waters, in 1998.

The Living Lands and Waters barge at a 2004 cleanup in South Saint Paul.
Photo taken by Paul Nordell

Today Chad and the Living Lands and Waters team operate several boats and barges and has involved thousands of volunteers in their three programs: Community Cleanups, Forest Restoration, and Adopt-a-Mississippi Mile. So far with the help of volunteers, they have collected 3.5 million pounds of trash and 33 messages in a bottle. They have also educated countless children and adults with their Big River Educational Workshops. He has even been in the Twin Cities on several occasions working with Adopt-a-River.

Not only has Living Lands and Waters picked up tons of garbage from rivers, they have also drawn international recognition for their efforts. Their hard work has been covered in both print and television, most notably NBC's Today Show, PBS, CNN, National Geographic, and People Magazine. Chad himself has received countless awards and recognitions including an honorary doctorate from St. Ambrose University in Davenport, Iowa. Pregracke is practically a household name in the Quad Cities.

During a question and answer interview with Grist.org, an online environmental news magazine, Chad was asked about the ecological impact of his work, to which he replied,

"I believe that getting people involved hands-on by cleaning trash in the river environment gives them personal exposure to the river. Some of them are there for the first time - even though they live in river communities. They get excited about the river and I think they establish a connection to it and many of them feel that they have more of a stake in it after the cleanups. Also, it's grassroots - it's a sense of a community coming together to make a visible change. We've had about 15,000 volunteers over the years. I think that's 15,000 steps in the right direction. Maybe some volunteers will be inspired and will go home and report raw-sewage dumping or write to their congresspeople."

Chad in action at our 2004 River-boat Cleanup.
Photo by Stu Mathews

It is obvious that Pregracke does not see trash in a river as an environmental problem as much as he sees it as a cultural/ social problem. In other words, we should not aim to fix the ecological symptoms, but the root of the problem, which is human behavior that can only be changed by educating the public.

Chad has also made an impact in the Twin Cities. He joined Adopt-a-River for cleanups on the Mississippi river in 2002, 2003, and 2004, and cleaned up 343,286 lbs of trash and involved 1,946 volunteers. This year he and his team were in the Twin Cities for a visit and he contacted us before his arrival to see what was going on. Though we did not have time to organize a cleanup, he sent his brother, Brent Pregracke, and crewmember, Jenn Branstetter, over to help us collect the bags of trash left along the shore from our recent riverboat cleanup. Chad is not only a friend and an inspiration to the Adopt-a-River program; he is an inspiration to many Americans. He is also a reminder that you really can make a difference if you put your heart into what you are doing.

For more information on Chad or Living Lands and Waters,
go to http://www.livinglandsandwaters.org.

Welcome New 2007 Adopt Groups!

The Wright Family (aka Camp Redhead) - New Beginnings - University of Minnesota CSOM/CFANS Alumni - Friends of the Sunrise River - Minnesota Land Rover Club - First Covenant Church of Worthington - Longfellow Naturalists - The Bank of Elk River - Climax-Shelly River Watch Team - Larry Furo

Thank you for joining the Adopt-a-River family! We look forward to working with all of you for years to come.

digital photos!

Have you taken digital photos at your events? Do you have any graphic images of trash on a riverbank? If so, e-mail us your photos and they could be used in a future edition of the *Cleanup Review* or posted on the Adopt-a-River website! Send them to Megan.Godbold@dnr.state.mn.us!

New Format!

You have probably noticed that this issue looks a bit different. We decided to update and energize the cleanup review by increasing the surface area and adding a splash of color. This edition cost $4.00 less than our previous format.

We would like to know what you think of the *Cleanup Review*'s new look. So send us you comments, good or bad, to Megan.Godbold@dnr.state.mn.us!

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Megan Godbold 2007 Adopt-a-River Assistant.

Please direct your comments, questions, and suggestions to the editor of *Cleanup Review* at 651-259-5620 or to the Adopt-a-River Coordinator, Paul Nordell at 651-259-5630; FAX 651-297-5475; MN Toll Free: 1-888-646-6367; e-mail: paul.nordell@dnr.state.mn.us; or write to:
MN DNR, Trails and Waterways Division,
500 Lafayette Road, St. Paul MN 55115-4052

ple Cards

Thank you to all the groups that have sent in their purple cleanup report cards for their 2007 cleanups. As of August 7th, 2007, volunteers have reported (for 2007) 60 cleanups, spending over 242 hours cleaning up 35,797 pounds of trash from 145 miles of Minnesota shoreline. To date, Adopt-a-River volunteers have spent 243,298 hours removing over 4.9 million pounds of trash from Minnesota's public waters. Excellent work! Also, please remember that if you have completed a cleanup and not reported it, SEND IN YOUR PURPLE CARD. Results can also be emailed to Megan.Godbold@dnr.state.mn.us or called in to 651-259-5620.

The Minnesota Conservation Corps (MCC) provides the Adopt-a-River program with funding for the Adopt-a-River Assistant/Cleanup Review Editor. MCC is a non-profit 501(c)3 organization which provides hands-on environmental stewardship and service-learning opportunities to youth and young adults. MCC operates two programs: an eight week residential summer youth camp for ages 15-18 from mid-June to mid-August; and a 10.5 month non-residential Young Adult Program for ages 18-25 from February to December.

The Summer Youth Program is stationed at St. Croix State park where youth, including many who are deaf or hard of hearing, complete high-priority conservation projects around Minnesota. Each year the program exposes over 100 ethnic and socio-economically diverse youth to a variety of life-changing experiences.

The Young Adult Program provides a longer, more intensive training and service-learning experience to over 85 AmeriCorps volunteers each year. Young adult crews are located throughout the state and do a variety of conservation and emergency response work in Minnesota and around the nation.

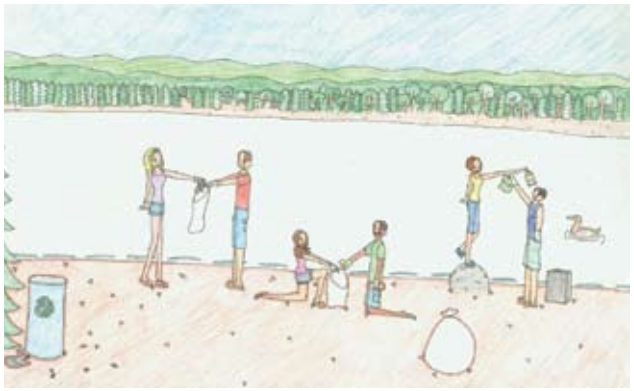
To find out more about these programs please visit the MCC website at conservationcorps.org!

September 15: Xcel Energy's Becker & Monticello plants along with the City of Becker & Monticello invite you to help clean the banks of the Mississippi River! Refreshments and rolls will be served. 9:00am to Noon at Ellison Park in Monticello. Register by calling Dan Orr 763-261-3155 (daniel.j.orr@xcelenergy.com) or Roslyn Steinert 763-261-3029 at Xcel Energy by September 1st!

September 15: 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. For information contact Diane Sander, Crow River Watershed Coordinator at (763)682-1933 ext. 3 or email at diane.sander@mn.nacdnet.net.

November 3: Annual Boston Scientific Cleanup. The Adopt-a-River program and Boston Scientific invite you to participate in the annual shoreline cleanup at the Pig's Eye Scientific and Natural Area near downtown St. Paul. Refreshments and t-shirts will be provided. Pre-registration is required. Please contact Curtis Griffy for more information at 651-582-3228 or via email at Curtis.Griffy@guidant.com

September 22: International Coastal Cleanup/Great Lakes Beach Sweep. The Great Lakes Aquarium is sponsoring a cleanup throughout the Duluth area with supplies and refreshments provided. Contact Sarah Towne at 218-740-3474 ext. 1020 or email stowne@glaquarium.org for more information.



2000 Big River Journey Art Contest Winner
Erin Boyle of Highland Catholic School, St. Paul.
https://cms.mwr.nps.gov/miss/forteachers/brjartcon.htm

An updated calendar of events can be viewed on the DNR's Internet Calendar of Events which can be reached through the Adopt-a-River's webpage:

If you have a change of address or no longer wish to receive the Cleanup Review, Please let us know. Your consideration saves both our time and postage.

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