

LWD Structures along the banks of Grass River: *An update on results*

By Fred Sittel

In spring 2013, a group called the Waterways Working Group was formed to plan for the installation of Large Woody Debris (LWD) structures made from whole trees at two sites along the banks of Grass River. The group was comprised of representatives from several local organizations including TLA, Grass River Natural Area, Friends of Clam Lake, Elk-Skegemog Lakes Association and Antrim Conservation District, under the direction of project leader Mark Stone, Antrim County Operator of Dams. A combined total of six structures were installed at two sites in October 2013, in accordance with a MDEQ permit.

The project was intended as a demonstration project to evaluate if LWD structures could improve aquatic habitat in a river heavy with sediment and improve navigability by deepening portions of the channel impacted by sediment build up. If proved successful, the technique might be applied at other places on the Chain of Lakes impacted by sediment.

Project participants that revisited the sites this past summer remarked that emergent vegetation between the individual log structures was more vibrant and extensive than in the past. Earlier in the season, before this vegetation emerged, aerial photos were taken which show darker colored organic matter accumulating downstream of each structure. This is consistent with the current

baffling effect the structures were intended to produce. Slowing the current in areas where erosion had widened the river channel over time allows sediment and organic matter to accumulate. In this environment vegetation is better able to take hold and better protected from waves and boat passage. Over time new plant growth may restore the eroded river bank, narrowing the available channel for water flow and thereby increasing current velocity. Eventually, peak seasonal velocities could reach levels sufficient to move heavier sediment from the main channel or at least prevent further accumulation. The sites were selected strategically so any sediment which was moved downstream would be defused in portions of the river that were either deeper or had stronger current. In that respect the structures act together as a system and more will be required upstream of the initial demonstration sites to achieve the desired impact on channel depth and river navigability.

It was hoped the structures might also have a more immediate effect because water that is forced to flow around them is instantly directed toward the navigable channel. Recently, water depth and current velocity in Grass River has been at the high end of historical levels



Measuring the river channel using a sight level

potentially magnifying the effect. Project participants wanted to quantify changes in channel form using scientific methods. At first that might seem to be an easy task of making depth readings from a boat or kayak in the area around the sites. However,
See LWD page 5



Photo taken Spring 2014

Sneak peek

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The mission of the Association is to provide leadership to preserve, protect, and improve the environmental quality of the Elk River Chain of Lakes Watershed for all generations with emphasis on Lake Bellaire, Clam Lake, Torch Lake and their tributaries.





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President's Message

Greetings to all,

Here we are, thinking again about what we have accomplished in the year just past, and about what lies ahead of us that we have yet to do. Do you have a wish list for 2015? A list of resolutions? Promises you've made to yourself? I know I do. Promises I've made to myself are about maintaining good health in all areas of my life: physical, spiritual, intellectual, professional, and familial. That turns out to be quite a lot of work. I'll bet you've found that to be true, too.

TLA has promises it has made to itself, too. All of our committee chairpersons are reviewing the accomplishments of their committees during this past year, and setting their goals for the coming year, always bearing in mind the mission of the TLA, and the "sub-mission," if you will, of their particular committees and how they fit into the mission as a whole. This exercise helps us to refresh our understanding of why we exist, and it strengthens our resolve as we wade through cold streams and gather bugs to evaluate and count. It buoys our spirits as we struggle sometimes with inclement weather, while striving to collect water samples for laboratory analysis. It gives us the fortitude to stay the course, when we must take a stance on a proposed project that we believe presents unacceptable hazards to the preservation and protection of our clean waters. Yes, this exercise is well worth our effort, tedious though it may sometimes be. At our January 2015 Board meeting, we will discuss the goals the committee chairs have planned for our consideration.

As you know, the Three Lakes Association sprang into life in 1966, because a few environmentally conscious citizens joined together to be good stewards of our precious waters. TLA remains a grassroots, volunteer organization, with an ethical stewardship mission to use good science to monitor and maintain the health of our lakes and their tributaries. We strive to bring science-based information to the people of our communities, and to provide sound environmental education to both young and old. We participate with Grass River Natural Area, Torch Lake Protection Alliance, Friends of Clam Lake, Elk-Skegemog Lakes Association, and Intermediate Lake Association, to provide two adult-level educational events each summer; we carry out a summer high school internship program of water science and discovery; and we grant monies, through our Science Education Outreach Program, to supplement the curricula of the science teachers in our local school districts. All of these activities depend on contributions from our membership, whether those contributions be volunteering of time and sharing of knowledge, or financial support – time, talent, or treasure.

If any of our activities are of interest to you, we would welcome your participation. Right now, we have a specific need to bring to your attention: we are seeking one more person to serve as Zone Director for Milton Township, a person to serve as a liaison between the people of your township and the leadership of TLA. If this is an area of your interest, please let us know. Either call us at (231-544-7221), or email us at info@3lakes.com, or visit our website (www.3lakes.com) and fill out the volunteer form. Again, if there is any area of TLA activity that you are interested in, please fill out the volunteer form and submit it – we can always use your help.

Happy New Year to all!

Tina

New Members

L. LOUIS AND ROSEMARY ANDREOPOULOS
BILL BORNO & PENNY WALLCE
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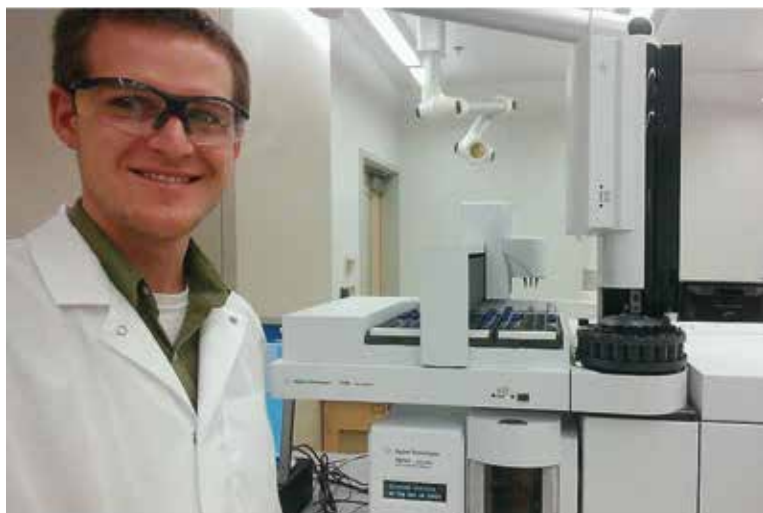
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SUSAN STEWART

Tracking the careers of TLA's 2005 Summer Interns: Samantha Fox and Derek Walton

| By Dean Branson



Samantha Fox collecting a soil sample from a contaminated site in Alaska to be analyzed for the amount of spilled petrochemical hydrocarbons in the sample.



Derek Walton standing in front of a gas chromatograph-mass spectrometer in Alaska's State Crime Lab where Derek is an analytical chemist in training.

[Author's Note: Samantha Fox (Sam) and Derek Walton were TLA Summer Interns from Elk Rapids High School in 2005. Sam received her BS degree from MIT in 2010 and a MS from Stanford in 2011. After working for an environmental consulting firm in Denver for a couple years, she accepted a position with another environmental consulting firm (Geosyntec) in Anchorage in April 2014.

Derek received his BS degree in Chemistry from the University of Michigan in 2010, he work at a pharmaceutical firm in Denver until 2014 when he accepted a position with a Crime Scene Investigation forensic lab in Anchorage. Derek and Sam are engaged to be married in October 2015.]

Sam's update:

I work for Geosyntec Consultants doing largely groundwater and soil remediation. My projects involve sites contaminated with chlorinated solvents or petroleum hydrocarbon, and some with heavy metal contamination as well. Some of these are federal/state Superfund sites from past contaminant releases. Occasionally there is a current site where an accidental release (fuel usually) needs to be addressed. Most of my projects are in the site investigation or data evaluation stages so I haven't personally done much on the active remediation side yet, but other projects use soil vapor extraction, bioremediation, pump and treat (granular activated carbon, air stripping, etc.). I really enjoy this job and I'm excited to learn more and develop my career in engineering and system design.

Derek's update:

I recently started with the Alaska State Crime Lab in Anchorage. I work in the crime lab as a forensic scientist in the controlled substances lab. I determine whether or not a substance is controlled drug. The Crime Lab is responsible for analyzing and testifying in criminal investigations involving controlled substances, nuclear DNA, latent print capture and comparison (fingerprints and shoeprints), firearm, and tool-mark analysis, fire debris (arson), breath/blood alcohol, and limited crime scene investigation. Because Alaska is such a large state, a large percentage of the crime scene processing is handled by the police departments themselves or the Alaska Bureau of Investigations.

Currently I am in training, which will last until approximately June 2015. My responsibilities at that time will include performing forensic analysis on controlled substances and traveling to various communities to testify in cases that go to trial. The nuance of this position comes in the analysis of unusual samples and/or cases where a defense attorney seeks to discredit the expert witnesses. Yes, our lab does analyze some designer drug substances such as all of the compounds that fall under "bath salts." We also look at some precursors to drug manufacturing, particularly those involved with illicit hashish oil and methamphetamine production.

Did you know

that the Elk River Chain of Lakes (ERCOL) is home to 14 lakes, 192 miles of shoreline, contains 34,764 acres and supplies 60% of the water to Grand Traverse Bay?

Riparian 101

Watershed:

An area or ridge of land that separates waters flowing to different rivers, basins, or seas.

Public road end:

The terminus at an inland lake or stream of a road that is lawfully open for use by the public.

Littoral:

A property that touches or has frontage on a lake.

Riparian:

Properties touching of having frontage on a flowing body of water, such as a river, creek or stream.

Retired Director reflects on Three Lakes Association

By Donna Gundle-Krieg

Three Lakes Association has accomplished many goals over the years in the eyes of Tim Hannert, Executive Director of TLA from 2003-2007.

TLA certainly flourished under Tim's leadership! For starters, Tim created the first TLA website with his son, Peter, and became the organization's first "webmaster."

He also created the TLA logo which is currently in use. In addition, Tim built the 3-D model of the plume, which has been used extensively in training the community about the issue.

Tim has the respect of many fellow TLA members. "I attribute most of my interest in seeking solutions to this (plume) problem to Tim," noted Dean Branson, one of the leaders of Antrim County United Through Ecology (ACUTE). Dean also stated that Tim had a remarkable strategy for engaging several townships in the initial grant application to the DEQ to build a predictive water quality model. The predictive water quality model is a tool for townships to use to measure the effect of land use issues relating to development projects and landscaping.

Tim is especially known for his special skills relating to the microscope, which he used to help TLA research water quality issues such as cladophora.

In addition, Dean notes that "although we did not document the way we satisfied our initial curiosity about the golden-brown benthic algae on the rocks around Torch Lake, it was by viewing the stuff through Tim's microscope about seven years ago."

Tim's love of his microscope has recently branched into a hobby he calls "microscopic photography." He recently photographed a snow flake, and his son's company bought the image, which became a best seller.

In his free time, Tim farms his 145 acres, growing veggies, apples, berries and sheep. He also builds and restores wooden boats for racing and pleasure. Tim has also served as a County Commissioner, Chair for the Bellaire District Fire Authority and Chairman of the Board of Review for Kearney Township.

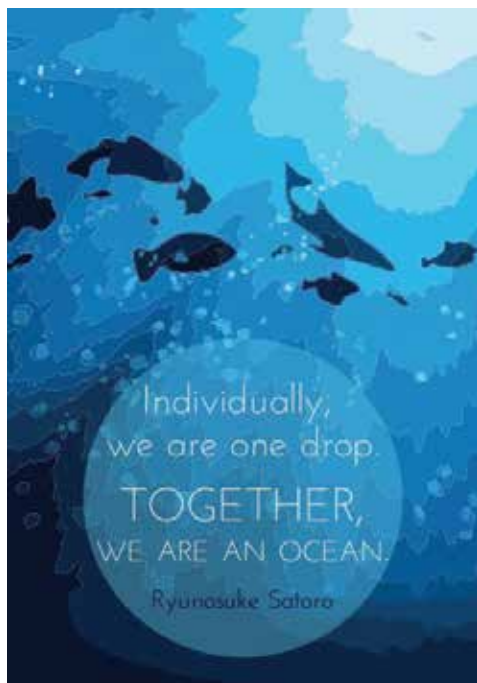
"We keep busy and love the community because everyone is honest, caring, and willing to help," he said. He has been happy to find many mentors, especially for his farming. Tim and his wife Sally moved to Kearney Township in 2001 after retiring from 31 years of teaching Biology at Macomb Community College. "We were convinced this is the place," he said, noting that they owned their property since 1967.

Tim started visiting Lake Bellaire Shanty Creek with his wife's family in 1964, when he was in college. He worked at Shanty Creek Resort as a bellhop and lifeguard.

Tim, who was raised in Detroit, attended Redford High School, Michigan State University for Zoology, and Wayne State University.

He met his wife of 49 years at 8:00 a.m. on his first day of school at Michigan State University. "She was in my Freshman English class and luckily they seated us alphabetically," he chuckled.

The Hannerts have two sons. Peter lives in Manhattan and Geoff lives in North Carolina. They have five grandkids, all under the age of 14.



LWD *continued from page 1*

measurements made many weeks or months apart indicating a greater water depth at a given point could be the result of changes in water levels, changes in channel form or both. Without a reliable elevation reference against which to measure, it would be impossible to distinguish between the two. Reflective markers were fixed to the main trunks of two trees near the rivers' edge at site number two. Once these reference points were established the vertical component of the distance between a reference marker and the channel bottom could be measured directly. Metal posts were driven into the bottom across the channel from the reference markers to indicate the start of the cross section to be measured. A rope marked in three foot increments was attached to the posts and used to determine where measurements would be made along the cross section. A surveyors' sight level was set up on shore. This instrument is essentially a high magnification rifle scope which is adjusted on its tripod to sweep in the same horizontal plane no matter which direction it is pointed. A long staff marked like a carpenters ruler starting at its lower tip, was rested on the river bottom and held vertically at each measurement point. When the cross hairs of the sight level were focused on the graduations of the staff, the vertical distance between the river bottom and the horizontal plane of the sight level could be read precisely and recorded. To complete the procedure, a measurement was made of the vertical distance from the horizontal plane to the reference marker by focusing on the tree trunk while a conventional ruler was held up to the marker.

Measurements were made for both cross sections at site number two before the structures were installed and then again last summer, approximately ten months later. A plot of the measurements for one of these cross sections is shown. The measurements end ninety feet from the metal stake, before the deepest point of the channel, because that was the total length of the rope. The plot suggests the anticipated effect may actually be occurring. Sediment appears to have accumulated everywhere the bottom was shielded from current by the structure. At the tip of the structure, where the baffling effect should create the largest velocity gradient, the new channel form drops off rapidly by up to one foot. Beyond that point, measurements

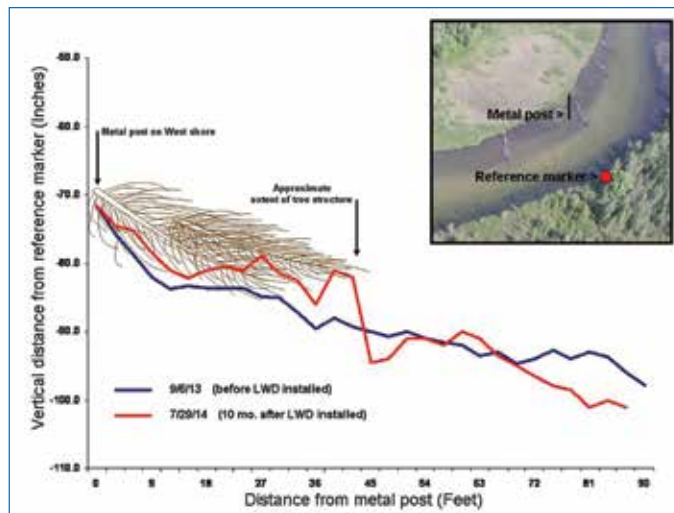
trend toward the channel having become deeper.

While both casual observations and measurements from one of the cross sections indicate a positive result, caution must be exercised when interpreting the data. The random measurement error of this procedure has not yet been determined. Every measurement procedure has a certain amount of error and it has to be very small compared with the magnitude of change being measured for the procedure to be valid. The accuracy of locating the exact point on the channel bottom after many months, even though a metal stake and rope were used as a guide, may have contributed significantly to measurement error.

The observations and measured data from last summer do support continued investigation of LWD structures and follow up using similar procedures. A permit application has been submitted to install up to ten additional LWD structures this coming summer, upstream of the initial sites and extending to the confluence with Cold Creek. In these regions the navigable channel is shallower than at sites one or two. With the structures installed previously helping to keep sediment moving,

additional LWD structures in shallower reaches of the river pose less risk of creating problems downstream. Placing the structures in shallower reaches may also help offset some measurement error because a larger effect is expected where there has been more sediment build up.

In addition to determining the amount of error in the channel form measurement procedure, several changes have been suggested. Most focus on improving the ability to repeatedly locate the same point on the channel bottom. The biggest problems in the field were bowing of the rope due to the current, especially as more rope was played out and having to periodically retract the rope to allow for pleasure boat passage. A smaller diameter steel cable that reaches all the way across the channel, stronger posts and some sort of tensioning system which can be released quickly are being considered. Other possibilities include using a sonar unit with geo-positioning satellite capability to make the measurements. Look for updates about the LWD project in future issues of TLA Quarterly and visit the TLA website to learn more or to get involved directly by volunteering your time and talents!



2014 SEOP Grant Recipients

“Our seventh graders attend Camp Hayo-Went-Ha every spring...where the students are steeped in nature... observe insects in the creek, learn about forest ecology and how our resources were used by the first settlers to this area.”

Kim Clark, Bellaire Public Schools

“We have used the microscopes from the grant in all of my science classes. In Biology we have looked at cells, phases of the cell cycle and cells found in nature. I look forward to further glimpsing some bacteria stains in biology.”

Matt Lonn, Kalkaska High School

New Year's Reflections

At this time of the year, many of us take stock of the previous year and look forward to the New Year. Similarly, we thought it would be helpful for us to review our mission, 2014 accomplishments, 2015 goals, and plans for 2015. This helps remind us of how much we have been able to accomplish and how TLA continues to support projects which have a positive impact on our beautiful lakes.

TLA MISSION STATEMENT

The mission of the Association is to provide leadership to preserve, protect, and improve the environmental quality of the Elk River Chain of Lakes Watershed for all generations with emphasis on Lake Bellaire, Clam Lake, Torch Lake and their tributaries.

2014 Accomplishments

Supported by our membership, donations, and countless hours of volunteer time, TLA was able to successfully participate in and complete a variety of projects in 2014:

- **Science Education Outreach Program**
Since TLA's SEOP was started in 2008, we have made awards to local schools of almost \$60,000. In addition to Dockside's generous 3-year pledge, this year our membership pledged over \$4000. Six teacher grants and four class trips on the Schoolship were awarded this year.
- **Water Awareness Day**
This community educational event included a variety of exhibits, including fish shelters, invasive species, and local pollution issues. Proceeds support the TLA Science Education Outreach Program. Mark your calendar for July 25, 2015 at Alden Depot.
- **Summer Interns**
Since 2004, TLA has sponsored a high school summer internship program. In 2014, our four interns served as the research team for the Maury Creek Management Plan. Further, the students created a user friendly manual for our most coveted piece of equipment, the Hydrolab, which is used for key water quality measurements.
- **Fish Shelters**
TLA continued its collaboration with Elk-Skegemog, Friends of Clam and Intermediate Associations to install fish shelters in our collective lakes, bringing the total to 62 sites. Interactive maps, with coordinates, are available on our website and paper copies at local marinas.
- **Maury Creek Management Plan**
Maury Creek outlets into Lake Bellaire just north of Grass River. In order to apply for grant funding for improvements, we are collecting the data needed to develop a plan. Under the direction of a steering committee representing Summit Village Association, Antrim County, Antrim Conservation District, Grass River Natural Area, Shanty Creek Resort, TLA and adjacent property owners, the Plan is being funded, in part by a bequest from the Hildorf Foundation. The plan is expected to be completed this winter.
- **Grass River Sedimentation**
The demonstration project, Large Woody Debris (LWD) on Grass River, a collaboration between Antrim County, area businesses, lake associations, conservation groups and individual volunteers resulted in the installation of seven tree revetment structures or LWD. Designed to deflect



the flow of water and to closely imitate naturally fallen trees, LWD's goal is to strategically place and reverse sediment buildup and restore channel depth as well as provide aquatic habitat. Permits have been submitted for additional LWD.

- **Educational Events**
TLA provided environmental education to over 2000 visitors at several single day events.
- **Natural Shorelines**
TLA volunteers performed maintenance work on the demonstration installations at Butch's Tackle and Marine and the Summit Village Beach Club.
- **Water Quality**
During 2014, TLA continued its ongoing water quality monitoring activities, including:
 - Again finding our lakes exceptionally clean through our participation in the Cooperative Lake Monitoring Program.
 - Monitoring E.coli at 27 locations.
 - Continued Eurasian water milfoil surveillance.
 - Participating with Elk River Chain of Lakes-Watershed Plan Implementation Team which included a grant application to research control methods for Eurasian water milfoil.

2015 Standing Goals

- These goals help the TLA board focus on how to best use our resources and to decide which projects to support. These goals are:
- Build partnerships with likeminded advocacy groups, governmental agencies and institutions of higher education while advocating mission-matching issues.
- Promote and enhance environmental education in our ERCOL service area.
- Sustain and foster an active and financially supporting membership base.
- Promote and support water quality and safety in our ERCOL service area.
- Promote a strong committee based organizational structure.

2015 Plans

In addition to our ongoing projects, new projects include:

- Expansion of the LWD project in Grass River.
- Studying the golden brown algae or "yellow crud" that has been proliferating in Torch Lake.
- In conjunction with Torch Lake Protection Alliance, a work plan to study the "human chemistry" of the Torch Lake Sandbar has been established and the study will take place July 4, 2015 weekend.

As you look over our accomplishment and plans, please consider how you might like to help us. We can always use additional volunteers to help us with our activities.

You can always find more information on our website: 3lakes.com.

What is Paddle Antrim?

Paddle Antrim is a 501(c) 3 non-profit created to support efforts to maintain water quality in the rivers, lakes, and streams in Antrim County Michigan supporting investments in water trail infrastructures, education that facilitate public access to the waterways.

Paddle Antrim has recently hired Deana Jerdee as the executive director of the organization. Deana comes with a wealth of water resources experience as well as non-profit management.

Paddle Antrim will present the first Paddle Antrim Festival on September 18 & 19, 2015. The Paddle Antrim Festival includes a 40-plus mile, two-day kayak paddle through the Chain of Lakes. The first day begins in Ellsworth and continues to Bellaire. The second day will continue from Bellaire, ending in Elk Rapids.

Short's Brewing Company is a major sponsor of the Paddle Antrim Festival which will conclude with a celebration at Short's Production Facility in Elk Rapids. For five years (2009-2013), Short's hosted a similar paddle from Bellaire to Elk Rapids known as the Short's to Short's Paddle. Short's COO Matt Drake stated, "Short's is proud to support the Paddle Antrim Festival. Though it became impractical for us to continue to hold a major paddling event, we were thrilled that our community rallied behind the concept and that it will live on by supporting Paddle Antrim's effort to bring awareness to the waterways in Northern Michigan."

More information on Paddle Antrim and the Festival is available at www.paddleantrim.com.

Editor's Note: Safety boats will be needed on September 19. Please contact Leslie if you are interested in volunteering.



- Membership counts! -

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* * * * *

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Lorraine Rafferty Memorial

Three Lakes Association received a special gift from Earl Rafferty in memory of his wife of 57 years with the expressed purpose of supporting TLA's Science Education Outreach Program (SEOP). Lorraine Rafferty majored in Education at Eastern Michigan University. This \$1,000 memorial responds to Docksides challenge grant, and it honors Lorraine's interest in education, art, and her love of nature and Torch Lake. Her watercolor painting of fall colors over a lake underscores her appreciation for the beauty of this area. She and Earl acquired their home on Torch Lake in 1988. This memorial will be used to provide environmental science supplies and field trips, as wished for by the science teachers in public schools within the watersheds of Bellaire, Clam, and Torch Lakes.

Editor's note:

Help match Docksides Torch Lake's challenge & assure that SEOP is funded for 2015 and beyond. Donate online at 3lakes.com/donate or send a check!