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Michigan State University

W.K. Kellogg Biological Station

2006—2007 Annual Report

Education

Community

Outreach

Research



MICHIGAN STATE
UNIVERSITY



**W.K. Kellogg
Biological Station**
Michigan State University

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Sharon Jenness
Robert Karam
Dr. Michael Klug
Dr. George Lauff
Dr. John Luchsinger
Dr. Russell Mawby
Sharin Noall

Dear Friends:

I am delighted to share with you our annual report for the W.K. Kellogg Biological Station. Because this is our first annual report, we have included an overview of the Station and its history, as well as more recent accomplishments.

We highlighted activities in Education, Community, Outreach and Research during 2006-2007 that reflect our increasing engagement with local communities and maintain our tradition of excellence in research and education.

KBS is a complex organization with many roles and constituencies. Do we serve some better than others? One purpose of this report is to encourage your responses to this question.

Although we receive generous support from the University and our faculty is very successful in obtaining grants for research and educational activities, contributions from individuals are increasingly important to our work.

Your financial contributions serve two purposes. They allow us to offer new programming and student scholarships and to enhance our facilities. Your contributions also demonstrate your support for what we do at KBS, which is a strong and encouraging message to those who have worked in this field for many years.

We hope you will continue to support the Kellogg Biological Station, both through your financial contributions and involvement in programs. I look forward to hearing your responses to this report and what we do at the W.K. Kellogg Biological Station.

On behalf of all of us at KBS—Thank you!

Your neighbor and KBS Director



1925 Construction began on Gull Lake estate

1930 Gull Lake estate transferred to Kellogg Fdn., with a life lease to Mr. & Mrs. Kellogg

1944—1950 The estate was used as a veterans rehabilitation center by Percy Jones Hospital

1960s Conference Center established

1927 Kellogg Bird Sanctuary
1928 Kellogg Farm established

1942 Kelloggs vacated the estate to allow the U.S. Coast Guard to set up a training and induction camp

1952 W.K. Kellogg Foundation deeded the Gull Lake estate to MSU (the final component of the Kellogg Gull Lake Biological Station for research and training)

A H I S T O R I C

Today's Generous Contributions Ensure the KBS Tradition Tomorrow

We would like to thank the following KBS supporters for contributing to quality education and research—your gift sustains stewardship through scientific discovery.

Estate Gifts

Dave Dvorak
George Lauff

\$10,000 and Up

Anonymous

\$5,000 - \$9,999

Dave Dvorak
John and Sharon Garside
Tom and Carol Harding
Chub and Sharon LaVene

\$1,000 - \$4,999

Woody and Sharon Boudeman
Elizabeth Dapson
John and Laura Davis
Ron and Nannette Elenbaas
Blake and Mary Jo Hawk
Katharine Miller
M.G. Parfett
Jane Scott
Ronald Sexton
Sally Williams

\$500 - \$999

David and Diane Bishop
Katharine Boudeman
Kay Gross and Gary Mittelbach
John and Lorelee Fisher
James and Sharon Jenness
Karl and Sally Kleistch
John Luchsinger
David and Michelle Mackay
Todd Nitz
Preston and Barbara Parish
Stephen and Wendy Robbins
Bo and Mel VanPeenan

\$250 - \$499

Richard and Marilyn Augustine
James and Julie Garside
Bob and Val Karam
Mike and Carol Klug
Ruth Lee
Russell and Lou Ann Mawby
Ron and Gail McDermott
Alice Warner-Mehlhorn
Tom and Sharin Noall
Susan and Peter Ordway

\$100 - \$249

James and Marguerite Alden
Michael and Martha Anderson
Rob and Barb Baker
Harry and Janet Boesch
Fred Buckley
Marvin Cooley
Jim and Alice Fish
Earl and Laurie Flegler, Jr.
Morris and Kristin French
Gordon and Mary Guyer
Donald Hall
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Yasuko and Akira Otsuki
Harry and Joyce Parker
Daniel and Kay Rackiewicz
John and Lynda Reilly
Gregory Smith
Randolph and Brenda Teegardin
Roger and Jeanne Turner, Jr.
Ruth Ann and Bill Uggen
Bob and Claudia Vaccaro
John and Cathy VanderSalm
Vera Wallach
David and Leila Weiss
John and Katie Welser
William and Judy Weston
James and Martha Wiersema
Bruce and Jean Williams
Corina Willis
David Wilson and Ann Clark
Jack and Shirley Wood
Thomas and Nancy Woodworth
Robert and Marsha Zick

Up to \$99

Anonymous
Rod and Char Adams
Don and Judith Baldwin
Phil and Bonita Barry
William and Molly Beardsley
James and Sheila Bridenstine
Barbara Campbell
Emilia Canciani
Scott and Jacque Carter
Steve and Cindy Charnley
John and Barbara Chrisman
Thomas and Heather Comer
Thomas Cooley
Shawn and Lisa Craft
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Sue Gooch
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Mark and Jane Herbert
Everett and Margie Hiestand
David and Beth Hoppe
Becky Horrigan
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Edward Ihling
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Carroll and Lorraine Jansen
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David and Cynthia Jickling
David and Susan Johnson
Norman and Nancy Kellogg
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Mary Maley
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Therese Nowakowski
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Ben and Sharon Smith
Terry and Bessie Smith
Donald and Joyce Snow
Marilyn Stump
Chris and Michelle Tracey
Laura Trombley
Eleanor Van Streaun
Norman and Jackie Walters
David and Cynthia Wilcox
Shaun and Corrina Willis
Rene Wilson

Businesses and Foundations

Arnesby-Mawby Fund
Boris Realtors
Robert M. and Susan C. Brown Foundation
Corners Limited
Molitor Family Foundation
Chapter EZ of the PEO Sisterhood
Gull Lake Quality Organization, Inc.
Kalamazoo Community Foundation
Kalamazoo Nature Center
Kellogg Company
Ocean Reef Foundation
Donald and Ann Parfett Family Foundation
Parks Foundation of Kalamazoo County
Stovall Products
Woodruff Coal Company



KBS Volunteers

Volunteers are an integral part of KBS, and we are grateful for the many hours of dedication and talents they share with us.

We value your contribution. If there is a mistake with the list, please contact us so we can make the correction.

Ecological Impacts of Zebra Mussels in Michigan

In summer 1996, KBS researchers were intrigued by a thick blue-green algal scum that appeared on the surfaces of Gull and Gun Lakes. Closer inspection showed it to be *Microcystis*, a noxious and potentially toxic blue-green alga that is normally associated with high nutrient inputs to lakes. Yet no such elevated inputs could be identified. One thing these lakes shared in common was recent colonization by zebra mussels.

Zebra mussels were accidentally introduced into the Great Lakes near Detroit in the late 1980s, presumably by ballast water discharges from an ocean-going vessel. The rapid spread through the Great Lakes began appearing in Michigan inland lakes in the early 1990s—most likely through the transport of recreational boats. Gull Lake was one of the first in the region to be infested. The algal scum on Gull Lake indicated the mussels were likely going to have major impacts on lake ecosystems. Zebra mussels now occur in many inland lakes and is probably the cause for increased *Microcystis*.

This observation launched a KBS-based research program, led by Dr. Steve Hamilton of KBS and Dr. Orlando Sarnelle of MSU's Fisheries and Wildlife Department, on the linkages between zebra mussels and toxic algae that continues today. Their research is funded by grants from the Environmental Protection Agency (EPA) Sea Grant and Kalamazoo Community Foundation.

Lakes across Michigan were surveyed, and *Microcystis* was found to be three times more abundant in lakes with mussels than uninvaded lakes. Higher levels of the toxin were also produced by these algae in lakes with zebra mussels.

Experiments to test this relationship have been conducted the past three summers from a floating platform set up on Gull Lake, off the KBS shoreline. The results confirm the hypothesis that zebra mussels cause increases in the abundance of *Microcystis*, but interestingly, this response only occurs over a rather limited range of phosphorus concentrations. Unfortunately, about seventy-five percent of Michigan's lakes fall in this range.

When visible, surface algae scums occur on lakes, you should minimize ingestion of the water (especially children) to avoid ingesting the toxins. This often means avoiding shorelines, as this is where algal scums can blow in and accumulate. Open water in the middle of the lake is safer – at least from the algae!



Floating zebra mussel research platform on Gull Lake

Information on zebra mussels can be found on the Great Lakes Information Network website at <http://www.great-lakes.net/envt/flora-fauna/invasive/zebra.html>.



Zebra Mussels

KBS Mission

The KBS mission is to seek a comprehensive understanding of the interdependence of natural and managed ecosystems; to develop solutions for conserving natural resources; and to involve and educate the community in the process. Helping people create a better future for themselves and their environment, is a KBS tradition that started with W.K. Kellogg.

"It is my hope that the property that kind Providence has brought me may be helpful to many others, and that I may be found a faithful steward."

W.K. Kellogg

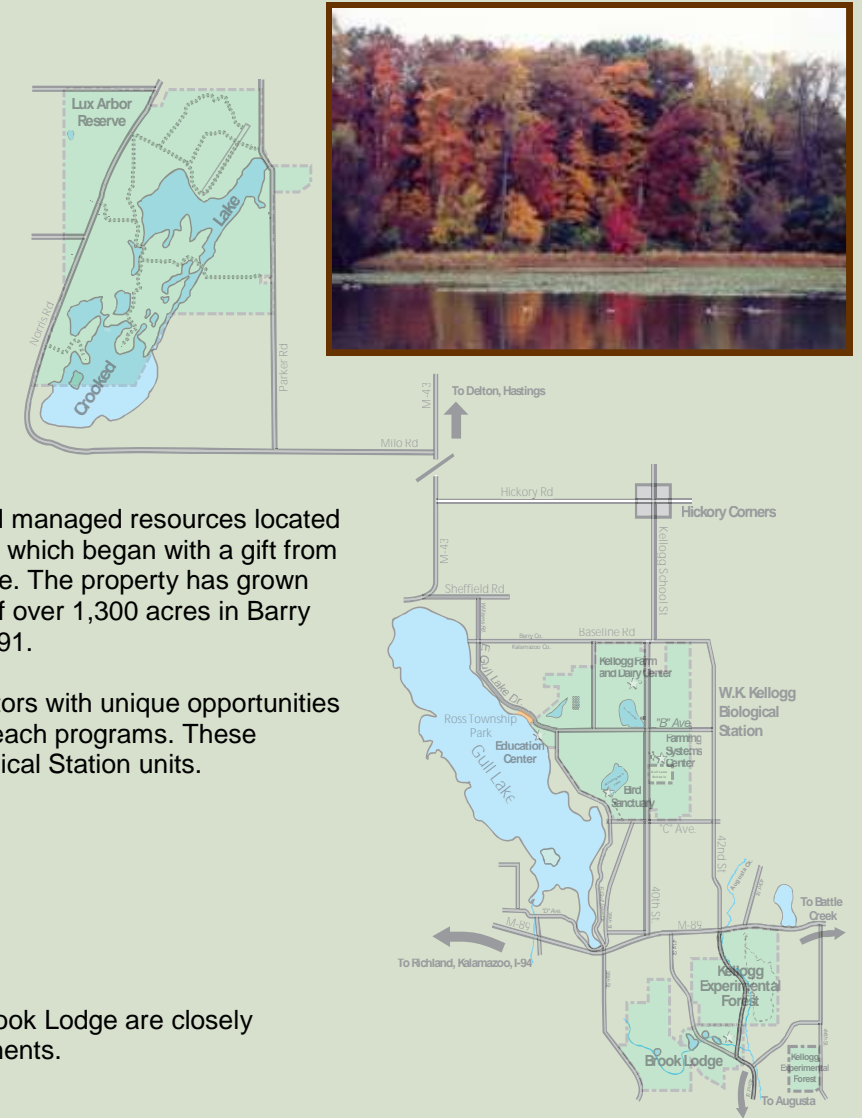
The Landscape

The KBS landscape is over 4,000 acres of natural and managed resources located in Kalamazoo and Barry counties. The main KBS site, which began with a gift from W.K. Kellogg to MSU, is located on and near Gull Lake. The property has grown over the past 80 years with the most recent addition of over 1,300 acres in Barry County, gifted by Dr. Richard and Irmgard Light, in 1991.

This landscape provides KBS researchers and educators with unique opportunities for innovative research, hands-on education and outreach programs. These opportunities are found at the following Kellogg Biological Station units.

- ◆ Kellogg Bird Sanctuary
- ◆ Kellogg Farm and Dairy
- ◆ Kellogg Biological Laboratories
- ◆ KBS Education and Conference Center
- ◆ KBS Extension Land and Water Program

The nearby W.K. Kellogg Experimental Forest and Brook Lodge are closely affiliated with KBS, but are managed by MSU departments.



1988 Long-Term Ecological Research (LTER) established

1998—2000 W. K. Kellogg Manor House and Carriage House restored

P E R S P E C T I V E

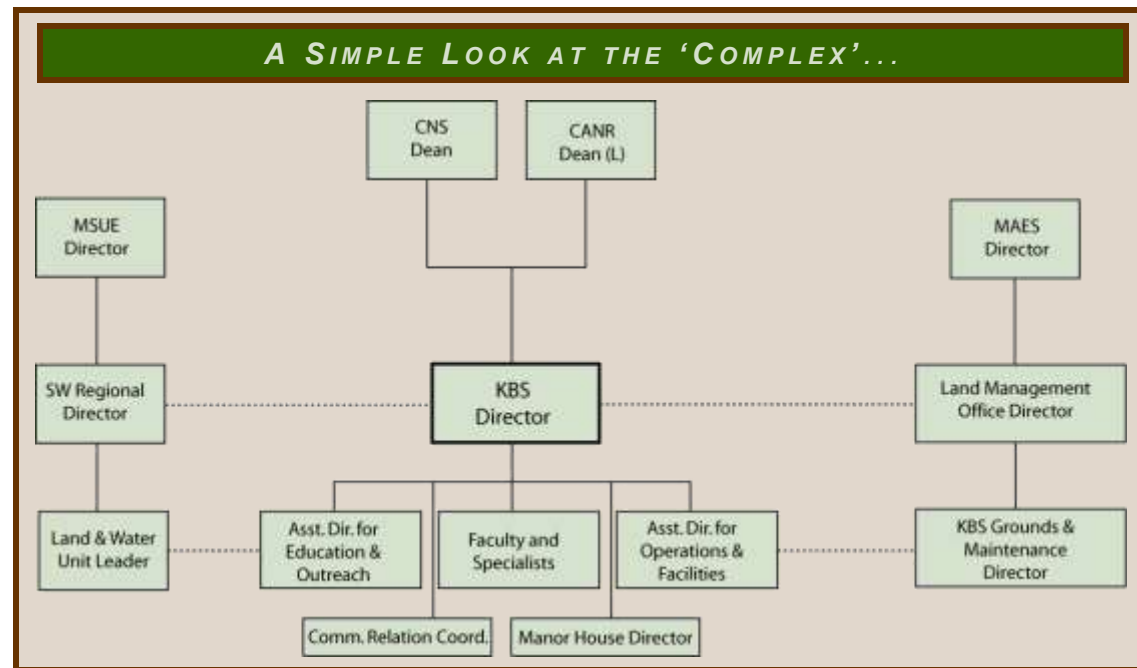
1980s Land & Water Program began

1991 Lux Arbor Reserve donated to MSU by Dr. and Mrs. Richard Light

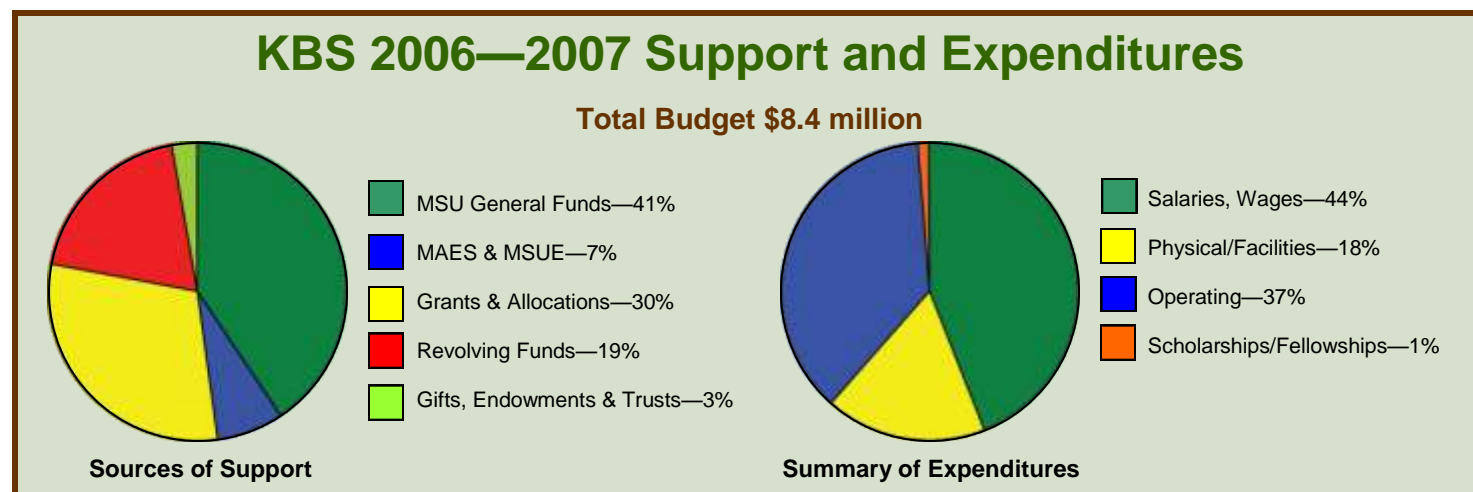
2007 KBS Conservation Legacy Fund established

W.K. Kellogg Biological Station

MSU's Largest Off-Campus Education Complex & One of North America's Premier Inland Field Stations



- ◆ The Station is jointly administered by the **College of Agriculture and Natural Resources (CANR)** and the **College of Natural Science (CNS)**.
- ◆ KBS is part of a fifteen campus laboratories and off-campus field research facilities network that makes up the **Michigan Agricultural Experiment Stations (MAES)**. MAES supports MSU research with five KBS scientists who work to develop innovations in agricultural production methods and create healthy and safe environments in Michigan's communities.
- ◆ **MSU Extension (MSUE)** extends the University's educational resources to all Michigan citizens. Extension meets community learning needs through a variety of educational strategies, technologies, and collaborative arrangements. The **KBS Land and Water Program** is a part of MSUE.



Sustaining Stewardship Through Science

KBS research is supported by a variety of federal and state agencies and private foundations

The Kellogg Biological Station is home to eleven MSU faculty in residence year-round who conduct much of their research in the local area. Faculty and their students are known nationally and internationally for research in ecology and evolutionary biology in both natural and managed systems. Our outstanding facilities and unique natural landscape attract researchers from around the world as visiting scholars.

KBS is one of twenty-four Long Term Ecological Research (LTER) facilities supported by a grant from the National Science Foundation (NSF) and other agencies. The LTER site focuses on sustainable row-crop agricultural practices. Research in sustainable agriculture and natural resources conservation is expanding at KBS, and in the coming years will include a focus on pasture-based dairy systems and the sustainability of alternative biofuels. These new research initiatives are at the heart of MSU efforts to sustain and revitalize rural Michigan communities.

Expertise Acknowledged

Twenty-three grants, totaling more than \$3.2 million, were awarded to KBS faculty/staff in 2006—2007. Highlights of grants received this year:

- ◆ Batelle Corporation
- ◆ Electric Power and Research Institute
- ◆ Environmental Protection Agency
- ◆ James S. McDonnell Foundation
- ◆ A.W. Mellon Foundation
- ◆ National Science Foundation
- ◆ The Rodale Institute
- ◆ United States Department of Agriculture
- ◆ W.K. Kellogg Foundation



Seining for blue gill in Gull Lake



Scientists and practitioners from around the Midwest gather for the LTER all scientists meeting.

Sharing Expertise

Outreach Efforts

Throughout the year, KBS faculty, graduate students, staff, and volunteers provide more than 100 presentations to professional and community groups. These presentations allow KBS to share scientific expertise with diverse audiences. Audiences and settings for presentations include community forums, governmental organizations, Rotary and Kiwanis Clubs, various philanthropic groups, and national and international workshops and conferences.

Confronting Challenges as a Community

Community Partnerships

KBS works with local, regional, and national organizations to create partnerships that contribute to communities locally and beyond. Focused on managed and natural ecosystems, these partnerships develop environmental protection strategies, educational/resource materials, hands-on field training and research, professional development, and multi-agency information sharing. The following list highlights some of the community partnerships.



MCTI student planting shrubs

Cooperative States Research Extension and Education Service (CSREES)

KBS Land & Water Program provided organizational leadership for Lake Allegan/Kalamazoo watershed.

Kanoe the Kazoo—Gull Lake

KBS Land & Water Program assisted the Four Township Water Resources with a community event focused on shoreline management and restoration education.

Management Plan for Eastern Tundra Swan

KBS Bird Sanctuary staff participated in an ad-hoc committee of biologists, spanning from Alaska to North Carolina, to revise and update a plan for the swans.

Michigan Career Technical Institute (MCTI)

MCTI students partner with KBS Conference Center and Grounds units to learn hospitality and landscaping skills.

Richland Gravel Pit

KBS faculty and staff provided technical data for community presentations regarding the impact of a proposed gravel mining operation in Richland.

New Agriculture Network

MSU, Purdue University, and University of Illinois joined resources to provide advice to field crop and vegetable growers interested in organic agriculture through an on-line newsletter.

Sandhill Crane Survey

KBS Bird Sanctuary participated in a multi-state survey that tallied 800 cranes near Hickory Corners.

Michigan Department of Natural Resources

KBS faculty member, Steve Hamilton, provided research to analyze a proposed weir at the connection of Upper and Lower Crooked Lakes in Barry County.

Michigan Goose Coalition

KBS Bird Sanctuary staff worked with a state-wide coalition to minimize human-goose conflict.



A Kellogg Manor fireplace decorated for annual Holiday Walk

Community Events

Manor House & Conference Center

The KBS Conference Center and Manor House provide a way for community groups and individuals to visit the Station and learn about KBS educational and outreach activities.

Manor House tours, teas, weddings, and private meetings attracted 6,600 visitors—providing an opportunity for the community to enjoy the summer home as the Kellogg family did in the 1920s.

More than 13,000 visitors and guests enjoyed the KBS Conference Center services, thus generating a gross income of \$735,000. To accommodate the high volume of visitors, upgrades to the housing units, dining hall, and main auditorium were also made to the facilities.



Share the Harvest—More than 500 visitors attend the 2006 Share the Harvest event. Free to the public, this annual family outing provides tours and demonstrations throughout KBS. Visitors' donations of non-perishable food items provided over 700 lbs. of food for the local food bank.

Continuing the Legacy

A \$3 Million Endowment Established

The W.K. Kellogg Biological Station Conservation Legacy Fund, a \$3 million endowment gifted by David G. Dvorak, M.D., will provide overarching support for all areas of KBS. It will support educational and outreach programs, student scholarships, and grounds and facility upkeep, including the W.K. Kellogg Manor House and the Kellogg Bird Sanctuary. In discussing the importance of the Fund, Dr. Dvorak commented:

“It is vital KBS have the resources necessary to thrive and grow into the future so that many other families and students can build lasting memories while continuing to learn about nature... KBS has been significant to me for many years, and because of that, I wanted to support MSU in this way.”

Dr. Dvorak first visited the Kellogg Bird Sanctuary in 1964 while doing an internship at Bronson Methodist Hospital. Over the years, regular visits to the Sanctuary allowed him to create memories with his children and, now, with his four grandchildren. Dr. Dvorak and his families' memories of KBS have prompted him to make KBS and MSU beneficiaries of his estate.

Dr. Dvorak is more than an enthusiastic patron of KBS. His appreciation for the KBS mission was strengthened as he became a KBS volunteer and active member of the Director's Advisory Board. As a result of this participation, Dr. Dvorak observed the collective and individual efforts that make KBS an invaluable asset to the general public, as well as the scientific community.

“I have been very impressed by the enthusiasm and dedication of everyone with whom I have worked at KBS. Dr. Kay Gross's passion and vision for increasing opportunities to build connections between KBS and the community was a major factor in my decision to make this bequest. These connections will continue to enhance the education and outreach efforts of MSU.”

We encourage all KBS supporters to take a more active role in securing opportunities for those at KBS to promote the legacy of environmental stewardship and education. This endowment will present you, as well as others, a chance to experience KBS as Dr. Dvorak and his family have over the past four decades.



Dr. Dvorak is a graduate of the University of Michigan Medical School and served in the U.S. Army Medical Corps. After returning from service in Vietnam, he completed an Ophthalmology Residency at Indiana University. He then started his ophthalmology practice in Kalamazoo in 1970.

Dr. Dvorak was also an assistant clinical professor of surgery for MSU's College of Human Medicine for more than 25 years. Following his retirement from ophthalmology in 2002, he began volunteering at KBS. Since March of 2005, he has been an active member of the KBS Director's Advisory Board.

Dr. Dvorak has lived within two blocks of the Kellogg Biological Station since 1973.

Investing in the Future

Opportunities for Learning at KBS

- ◆ **Residential Opportunities at the Kellogg Station (ROKS)** is a semester-long, study away program for university undergraduates. In 2006, six undergraduates participated in natural and social science course work, mentored internships, and seminars and discussions with leading scientists. Students worked with community groups on real problems in areas such as water quality, lakescaping, and sustainable agriculture.
- ◆ The **KBS Grades K-12 Program (GK-12)** teams KBS graduate students with K-12 science teachers in rural districts near KBS. The goal is to enrich K-12 science instruction by promoting inquiry-based science teaching in participating school districts. At the same time, the program provides graduate students the opportunity to improve their teaching and science communication skills. Currently, the program involves eight graduate students and 60 teachers in eleven local school districts.



Madgle L. Johnson Memorial Barn Owl Exhibit

The newest addition to the Bird Sanctuary. This exhibit is made possible through generous donations from Mrs. Johnson's family and friends.



ROKS Students Fall 2006



GK-12 Teacher Workshop

KBS Tours

Educational tours are an integral part of the educational opportunities at KBS. During 2006—2007, approximately 5,000 visitors toured the KBS Bird Sanctuary, Kellogg Farm and Dairy Center, Manor House, and other sites around KBS, including the Shoreline Management Demonstration Area and KBS Cover Crop Program Research Studies.



Plant Succession Trail Tour

Cultivating Future Stewards

Students Engaged in Hands-on Experiences

- ◆ **Summer Camp** is a program for children ages five to 12 years-old that offers exploration of diverse habitats throughout KBS and interaction with KBS staff, graduate students, and faculty. This past year, 60 students learned about their connection to the environment and the importance of protecting it.
- ◆ **Research and Educational Internships** are available for undergraduate students to work and study at KBS throughout the year. Students get hands-on research and educational experiences in careers related to natural resource conservation and management, sustainable agriculture and a variety of ecological disciplines. More advanced students may choose to conduct independent research at KBS, supported by fellowships and grants. Five students participated in KBS internships and fellowships.
- ◆ **MSU Freshman Seminar**, a 2006 pilot program, gave fourteen incoming Spartans an opportunity to study issues in conservation ecology and live at the Station before beginning their studies at MSU. Students and parents agreed it was a tremendous introduction to MSU.



Summer Science Camp Stream Walk

Help us honor one man's outstanding dedication to wildlife conservation!



The Joe Johnson Fellowship Fund

Joe Johnson worked as a wildlife biologist at the KBS Bird Sanctuary for more than 40 years. Established upon his retirement this summer, the Joe Johnson Fellowship Fund will provide financial support for students who want to study and work with wildlife conservation and habitat preservation or restoration at KBS.

In honor of Joe's retirement and many years of service, more than \$60,000 has been collected for this scholarship.

Making Science Accessible

Community Lectures & Workshops

- ◆ **Dessert with Discussion** – This free program gives Gull Lake area residents opportunities to gather, learn, and discuss a variety of ecological and environmental issues. Presentations by MSU faculty and delicious desserts combine for an interesting and enjoyable evening.
- ◆ **Wild Wednesdays** – More than 275 children of all ages, enjoyed the Bird Sanctuary's Wild Wednesday summer programs. The six family events included topics that ranged from *Tricky Tracks* to *Incredible Insects*.
- ◆ **Native Landscape series** – Interest from homeowners on how to use native plantings in their gardens was supported by the Bird Sanctuary's landscaping series.



The KBS shoreline includes a native landscaping demonstration area that is used for outreach.