



2010-11 PRIORITIES



We excel in basic and applied research and the application of technologies to improve people’s lives throughout Nevada and the world. We implement this mission by fostering scientific and engineering talent. We apply scientific understanding to the effective management of natural resources while meeting Nevada’s needs for economic diversification and science-based educational opportunities.

Letter from the President	1
Division of Hydrological Sciences	
Lake Tahoe’s Nearshore Water Clarity	2
Weighing Lysimeter Project	4
Division of Earth and Ecosystem Sciences	
Frits Went Laboratory	6
FieldSpec 3 Remote Sensing	8
DRI Graduate Program	10
Division of Atmospheric Sciences	
Hygroscopic Tandem Differential Mobility Analyzer	12
Storm Peak Laboratory	14
Drive6 Virtual Environment	16
Financials	18
Letter from the Chairman	20



"WE DO NOT INHERIT THE EARTH FROM OUR ANCESTORS,
WE BORROW IT FROM OUR CHILDREN."

- NATIVE AMERICAN PROVERB

Our 50th anniversary was a banner year for DRI. In spite of economic conditions that challenged us, we have not been sidetracked in our mission to advance our science, innovate our technology, improve Nevada's financial health, and to apply our research in the benefit of society.

During the last year, DRI completed a master-plan for the Dandini Research Park. It is not only a milestone for the park, but it dramatically expands the potential for research and economic development in Northern Nevada. In addition, DRI scientists provided the Department of Defense (DoD) with a wide range of science-based information in support of military objectives; including improving technology to detect and defeat Improvised Explosive Devices (IEDs) to evaluating the suitability of DoD military testing and training installations as realistic analogs for deployment areas in Iraq and Afghanistan. Nearly \$6 million was secured through Senator Harry Reid's office for renewable-energy research that will flow through DRI in partnership with other Nevada System of Higher Education Institutions.

Going forward, DRI hired Dr. Terry Surles as Executive Vice President for Research. Dr. Surles has a distinguished background in energy development and research. Dr. Surles' career will significantly help to position DRI as a leader in alternative energy, hydrological research, climate-change research, and analyses of ecological changes and impacts.

To meet this goal, we've created "Priorities 2010-11" to highlight many of the significant research programs at DRI, including supporting four critical research facilities:

- During the past year, I made multiple trips to our Storm Peak Laboratory, high above Steamboat Springs, Colo., where I am proud to report we have made critical infrastructure improvements for our scientists who spend weeks at a time on top of the mountain conducting important atmospheric research. Although the laboratory has been in existence in various forms for more than 25 years, the new facility is the latest stage of an evolutionary process of providing a practical, easily accessible facility for researchers, teachers and students of all ages and abilities. The U.S. Department of Energy has started a project at Storm Peak because of its reputation as a premiere cloud and aerosol research facility.
- Our underground laboratory in Boulder City, Nev., is helping us to understand the interactions of water and plant life in extreme desert environments. The scientists are working to establish baseline information that climate scientists and other researchers can use to understand how fast and far and under what conditions precipitation from rain and snow travels through the subsurface. This is of use to researchers who study climate change and water availability, and the results can be used by water planners.
- We are working to enhance the knowledge of ecosystems functioning under changing environmental conditions. In Reno, we have received international attention for climate-change research in the Ecologically Controlled Enclosed Lysimeter Laboratories. The EcoCELL facility houses several 12-ton prairie-grass plots from Oklahoma that are growing in a controlled environment that creates repeated and identical years of natural Oklahoma climate. The four-year study found that after simulating one abnormally warm year in the EcoCELLs, the amount of carbon dioxide (CO₂) taken up by the grassland ecosystems decreased for up to two years, limiting the role of grasslands as a sink for atmospheric CO₂. The amount of CO₂ absorbed from the atmosphere was effectively reduced three-fold during the course of the four-year study.
- Unique to the western United States is DRIVE6, DRI's six-sided virtual-reality computer environment. We have completed a monumental year both celebrating our heritage and advancing our mission in the recently completed Computational Research and Visualization Building (CRVB) in Reno, which houses the DRIVE6 program. Equally impressive, the CRVB exceeded expectations by receiving LEED Gold status.

I am proud to represent DRI's brilliant and hard-working faculty, support staff, and students. I urge you to consider supporting DRI's mission to apply science in the benefit of humankind, the key priorities highlighted in this publication, and our faculty as they tackle many of the most important environmental-research issues facing our planet.



Dr. Stephen Wells
President

NEARSHORE WATER CLARITY AT LAKE TAHOE

Invasive clams. Air pollution. Polluted and sediment-choked runoff. All of these and more threaten the beauty of Lake Tahoe's famed clear waters. If you swim, kayak, or just stroll along the beach at Lake Tahoe, you're enjoying the clear blue waters of Lake Tahoe's nearshore zone. In this part of the lake, the water quality is particularly volatile—changing from crystal-clear to murky and dark in no time at all. When this occurs it not only reduces the lake's recreational appeal, but can also negatively affect native fish, aquatic plant populations, and other lake inhabitants.



The clear blue waters of Lake Tahoe are especially vulnerable in the nearshore zone.



Scientists Alan Heyvaert, Ph.D., and Jim Thomas, Ph.D. (above) work in Rosewood Creek (Incline Village, Nev.), which contains pollution and sediments that threaten Lake Tahoe's clarity (below).



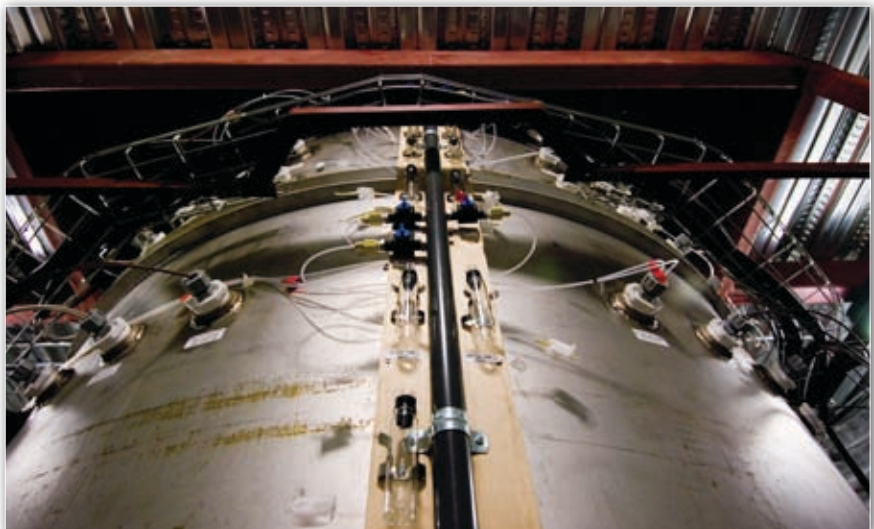
DRI scientists in the Division of Hydrological Sciences (DHS) have a plan to establish a monitoring program for Lake Tahoe's nearshore waters. Funds are needed to purchase and operate two nearshore water-quality buoys capable of providing real-time water-quality measurements, to maintain DRI's Research Vessel (R/V) *Mt. Rose*, and to compensate personnel who measure conditions in the lake. By obtaining funding for these critical instruments and the researchers who run and monitor them, this program will benefit all who come to enjoy one of the most beautiful places in the world—Lake Tahoe.

WEIGHING LYSIMETER PROJECT

Nevada is the driest state in the U.S. Complex interactions occur every day between plants, soil, and the precious water that is needed to sustain life in the harsh desert environment. What better place is there to study the effects of climate and disturbance on desert ecosystems? In Boulder City, Nev., DRI faculty in the Division of Hydrological Sciences (DHS), using National Science Foundation (NSF) grant money, have designed and built four huge weighing lysimeters that can measure even very small gains or losses of water in desert soils. Lysimeters are huge steel containers filled with soil that rest on scales with a series of built-in monitors to track movement of water or other substances through the soil as well as plant root growth.



Scientist Michael Young, Ph.D., demonstrates the capabilities of the weighing lysimeters.



Currently three lysimeters filled with desert soils are being monitored to gather baseline data about how these soils react to the local climate conditions in Boulder City. Obtaining financial support to hire new faculty members to conduct experiments using the lysimeters is a key goal for this facility. With enough support, DRI faculty will also be able to mentor student projects, which will provide valuable knowledge about desert soils, plants, and how water moves in these ecosystems, and will also ensure the stability of this research in the future.



Kumud Acharya, Ph.D., hunting for invasive species in Lake Mead, an integral resource to Southern Nevadans and the entire southwest U.S.

FRITS WENT LABORATORY

Every day, we take for granted the ease by which we can control our own personal climate. For example, when it's cold outside, we can turn up the heat inside our homes and offices. On a larger scale, however, it's simply not as easy to control climate effects. So when DRI scientists in the Division of Earth and Ecosystem Sciences (DEES) wanted to understand the effects of climate on plants and soils on that larger scale, they designed EcoCELLs (Ecologically Controlled Enclosed Lysimeter Laboratories). The EcoCELLs, located on the Reno campus, control climate conditions by moving an entire ecosystem of plants and soils inside. DRI scientists then can change variables such as temperature, humidity, precipitation, and even the amount of carbon dioxide in the air to see how plants and soil are affected.



Jay Arnone, Ph.D., uses a minirhizotron camera to take close-up pictures of plant-root production and mortality, which are important components of any ecosystem's carbon budget.



The EcoCELLs are a one-of-a-kind facility. The results of the studies conducted using the EcoCELLs have been published in some of the most prestigious science journals in the world and were even featured on the cover of *Nature*. Because the EcoCELLs are so large, they can be used for experiments that cannot be conducted in regular greenhouses. DRI needs your support to continue to maintain the EcoCELLs and begin new, important experiments in this facility. Climate-science research is critical to DRI's mission, and the EcoCELLs will be ready for the next set of experiments testing what changes in Earth's climate will do to plant and soil ecosystems.



Frits Went Laboratory.



Paul Verburg, Ph.D., is using a data logger connected to a sensor to measure CO₂ emissions from soils.

REMOTE SENSING: MORE THAN MEETS THE EYE

The FieldSpec 3 is a rugged, efficient, portable field device that provides unusual measurements for DRI researchers, measurements you might expect to find in science-fiction novels. Want to know if a plant in the field is suffering from stress? Aim the FieldSpec 3 at the plant, record the near-infrared radiation, and you can tell by the readings if the plant is having to expend more energy to cope with its surroundings. The FieldSpec 3 reads radiation spectra from other surfaces, aiding in projects in the Division of Earth and Ecosystem Sciences (DEES) ranging from characterizing archaeological sites to prospecting for clean energy in the form of geothermal resources.



Tim Minor, Ph.D., uses a FieldSpec to take plant and soils measurements.



A sixteen-year-old version of the FieldSpec is currently being used by DRI scientists to measure information about plants and soil in the field. The FieldSpec 3 is lighter, more portable, and compatible with current computer systems. It is also more durable, which should extend its usage for years to come, and is much faster than the current FieldSpec as well. By obtaining funding for the FieldSpec 3, DRI faculty can cover more ground, obtain more measurements, and paint a more accurate picture of field sites for many DEES projects.



Red Rock Canyon, near Las Vegas.

The graduate program at DRI is a critical pillar of the institute's foundation. It not only serves as a means of enhancing the overall intellectual environment of the institute, but it also contributes to the powerful potential of its research. The outstanding graduate students commit many hours of their time to research projects within DRI's three divisions: The Division of Atmospheric Sciences, The Division of Earth and Ecosystems Sciences and the Division of Hydrologic Sciences (DAS, DEES, and DHS). In doing so, the students aid their faculty adviser by extending their adviser's collaborative connections and communication with other researchers outside of their division. In essence, the students become extensions of their faculty adviser, allowing research at DRI to take place with efficiency and effectiveness.

Through donations, grad students at DRI are given the chance to jump directly into research that impacts communities around the world by working in the field and in the lab. The outstanding grad students at DRI arrive at the institute ready to learn and ready to contribute.

A strong base of grad students at DRI is directly linked to the institute's capacity to sustain cutting-edge research. DRI grad students form strong, professional bonds with one another and with their faculty advisers through their years of research. This experience ultimately gives these students a fundamental connection to DRI and its mission—a connection that ensures progress for the institute.

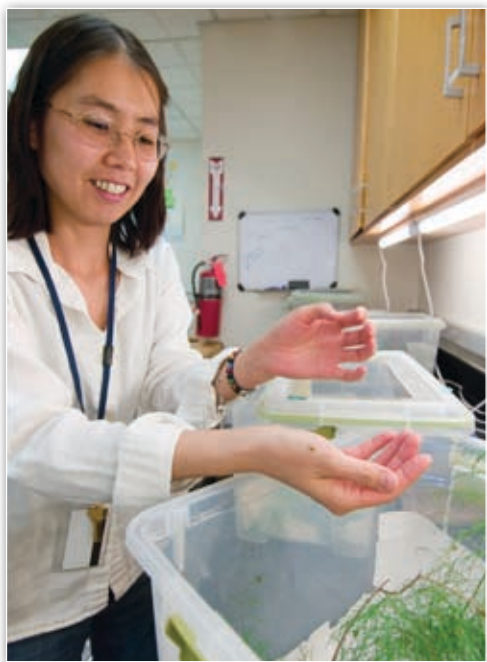


Duane Moser, Ph.D., and Patricia Montgomery take samples from the Las Vegas Wash, which carries water to Lake Mead.



Marion Bisiaux, Ph.D. student at DRI's Ultra Trace Laboratory.

DRI is committed to enhancing the diversity of professionals across all three divisions. As part of this ongoing commitment, DRI wishes to focus this investment of donations raised toward the support of outstanding graduate students from underrepresented groups (i.e., women and ethnic minorities). Preference will also be given to attracting outstanding doctoral students who might be encouraged to consider a professional career at DRI. This progression from



Sachiko Sueki, Staff Lab Scientist studying invasive species.

doctoral student to post-doctoral fellow and then onto a potential research professorship is a powerful pathway of recruiting outstanding individuals from underrepresented groups.

Donations will be distributed equitably to all three DRI divisions with each division providing a dollar-for-dollar match, thereby demonstrating their commitment to this shared goal of attracting outstanding graduate students to DRI.



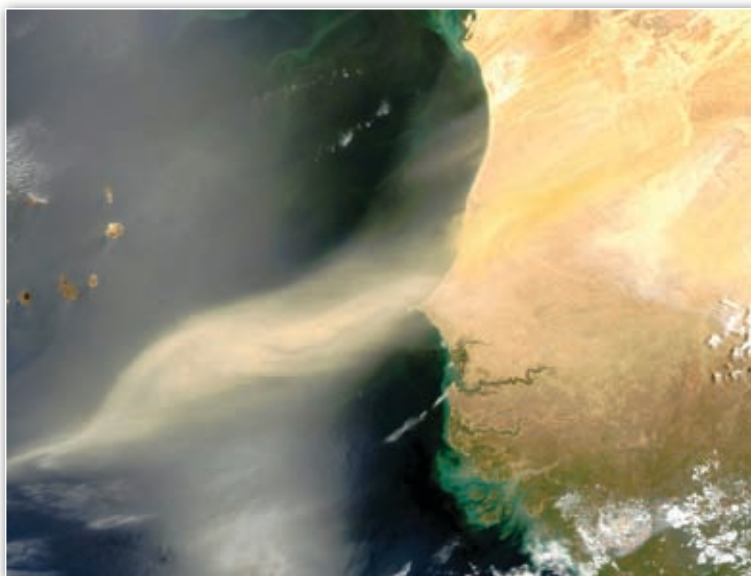
David Smith, Graduate Student, in the field.

HYGROSCOPIC TANDEM DIFFERENTIAL MOBILITY ANALYZER

What in the world is a Hygroscopic Tandem Differential Mobility Analyzer (HTDMA)? In a nutshell, the HTDMA is an instrument that is designed to measure a form of air pollution, called aerosols, and how humidity affects these tiny particles. Aerosols are very small particles that are suspended in the atmosphere, and are responsible for violations of air-quality standards, create hazy days, and affect our health by lodging deep within our lungs.



Sandstorm engulfing U.S. Army base near Bagdad, Iraq. Photo provided by the U.S. Army.



Satellite image of sandstorm off of the coast of Africa (Cape Verde Islands). Photo provided by NASA.

DRI has a very strong history of atmospheric research, and obtaining the HTDMA will allow faculty in the Division of Atmospheric Sciences (DAS) to figure out yet another key factor in how aerosols work in the atmosphere. The HTDMA measures the size, range, and distribution of aerosols and how these change with differences in humidity. This is an important factor to account for since, for example, aerosols creating haze over the Grand Canyon might react differently in the desert atmosphere as compared to aerosols in the more humid air over the Blue Ridge Mountains. Solving the puzzle of how water affects these tiny particles in our air will lead to better ways to help clear up the air we breathe.



DRI's Organic Analytical Laboratory (OAL) in Reno, Nev., provides high-quality, cost-effective collection and analysis of trace organic contaminants and hazardous air pollutants in ambient air.



Anna Cunningham, Analytical Lab Coordinator.

STORM PEAK LABORATORY

In Steamboat Springs, Colo., DRI's Division of Atmospheric Sciences (DAS) maintains a research laboratory at the top of Steamboat Springs Ski Resort. This facility allows scientists to conduct atmospheric studies with their heads literally in the clouds, because Storm Peak Laboratory (SPL) sits at an elevation of 10,500 feet. The lab in the sky not only hosts international researchers, but students as well, all of whom come to learn the basics of atmospheric-science research.



DRI's Storm Peak Laboratory in Steamboat Springs, Colo., allows the study of air pollutants on snowfall.



SPL researchers study airborne pollution and particles and how these factors relate to snowfall amounts in the western U.S. Other long-term research focuses on interactions of sunlight, clouds, and tiny particles in the atmosphere. Recently, SPL has become a major student learning center in atmospheric sciences, hosting numerous field classes as well as providing research and learning experiences for women and minority students. To maintain SPL as a world-class research and teaching facility, support is needed to keep instruments up to date and to keep the building maintained given its location in such a harsh environment. SPL is a unique part of DRI and helps in both climate-science studies as well as in the training of our next generation of researchers, who will continue the study of Earth's atmosphere and changes in climate.



Nightfall at Storm Peak Laboratory.



Gannet Hallar, Ph.D., Director of Storm Peak Laboratory, using a medium-volume filter sampler for the measurement of organic aerosol.

DRIVE6: DRI'S SIX-SIDED VIRTUAL ENVIRONMENT

Located on DRI's Reno campus is an incredible, six-sided room called the DRIVE6. Within this room, virtual environments are created to transport participants into almost any world imaginable. With amazing detail, a user in the DRIVE6 can see a landscape, simulate a fire sweeping through that landscape, and alter variables such as wind speed to see how the fire might behave under different environmental conditions. Possibly the most amazing feature of this facility is the ability to interact with the virtual environment, where the user can manipulate images to zoom in and around virtual 3D objects to see levels of detail that may be hidden in standard 2D images.

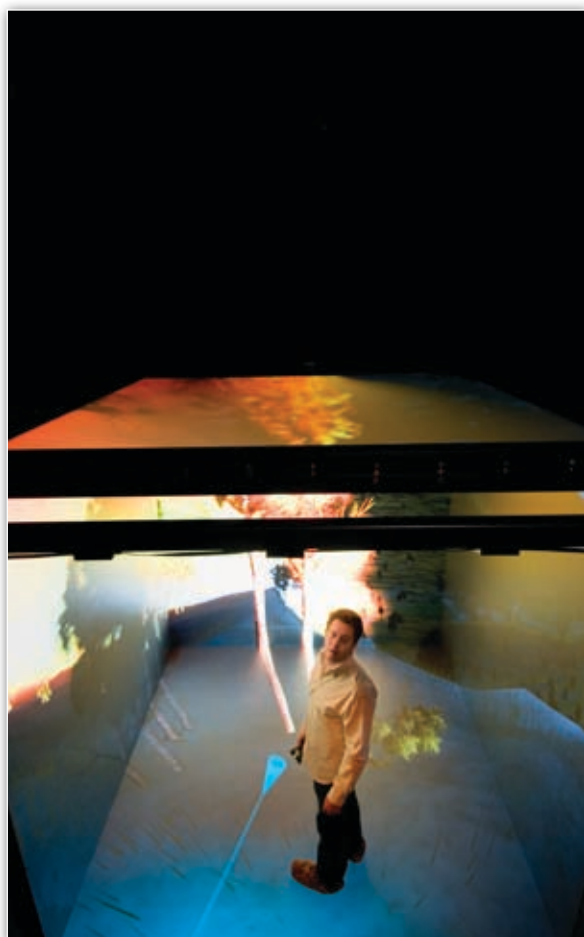


Graduate Student Matt Sgambati demonstrating his master's degree project.



Daniel Coming, Ph.D., and Tim Brown, Ph.D., use the wildfire-simulation program and "spot fire" creation to show the range of the facility.

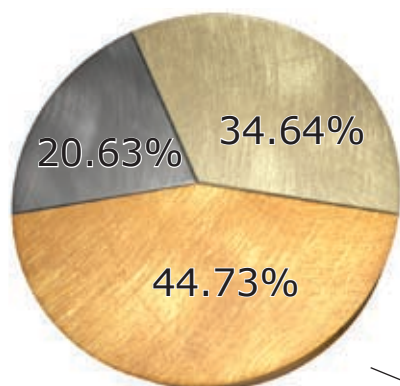
Other uses of this facility include virtual dissections and medical imaging, prototype design testing, tracking pollution and wind dispersal—the possibilities are endless. The DRIVE6 is an integral part of The Center for Advanced Visualization, Computation and Modeling (CAVCaM), one of several interdisciplinary science centers within DRI. Support is needed to maintain the infrastructure and the faculty who create and understand the advanced levels of programming that make these virtual realities happen. With your support, DRIVE6 can be used for simulations in scientific, public, and commercial areas, thereby enhancing the work and results of each division.



Scientist Daniel Coming, Ph.D., taking DRIVE6 for a test drive.

TOTAL NET ASSETS - \$105,528,000

- TOTAL LIABILITIES - \$19,916,000
- TOTAL ASSETS - \$125,444,000



TOTAL REVENUE - \$76,189,000

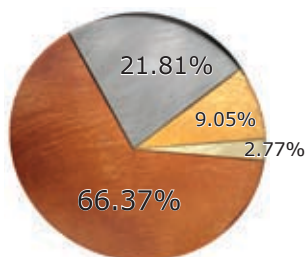
- GRANTS & CONTRACTS - \$34,082,000
- STATE APPROPRIATIONS - \$15,715,000
- OTHER REVENUE - \$26,392,000

OTHER REVENUE - \$26,392,000

- ADDITIONAL TO ENDOWMENT - \$18,564,000
- GIFTS - \$433,000
- OTHER OPERATING INCOME - \$5,965,000
- NON-OPERATING INCOME - \$1,430,000

GRANTS & CONTRACT REVENUE BY SOURCE - \$34,082,000

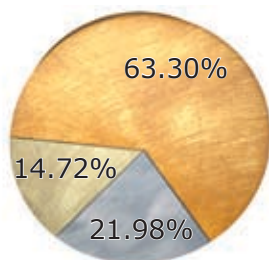
- FEDERAL - \$30,370,000
- PRIVATE - \$1,737,000
- STATE AND LOCAL - \$963,000
- OTHER - \$1,012,000



TOTAL OPERATING EXPENSES \$46,581,000

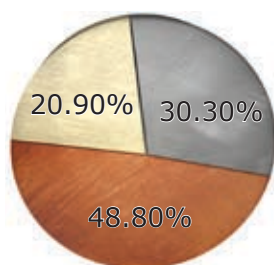
- EMPLOYEE COMPENSATION & BENEFITS - \$30,917,000
- SUPPLIES & SERVICES - \$10,161,000
- DEPRECIATION - \$4,214,000
- UTILITIES - \$1,289,000

DRI FOUNDATION



TOTAL REVENUE - \$1,060,000

- GIFTS & CONTRIBUTIONS - \$671,000
- DRI SUPPORT - \$233,000
- SPECIAL EVENTS & OTHER OPERATING REVENUE - \$156,000

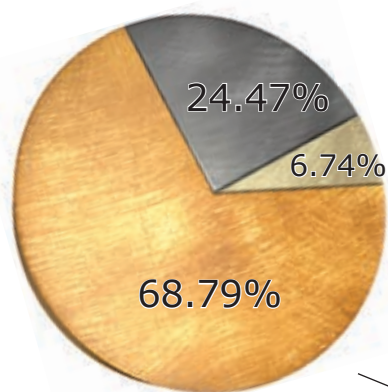


TOTAL OPERATING EXPENSES - \$1,043,000

- CONTRIBUTED SALARIES & WAGES - \$218,000
- SUPPLIES & SERVICES - \$316,000
- PAYMENTS TO DRI - \$509,000

TOTAL NET ASSETS - \$103,692,000

- TOTAL LIABILITIES - \$19,243,000
- TOTAL ASSETS - \$122,935,000



TOTAL REVENUE - \$48,058,000

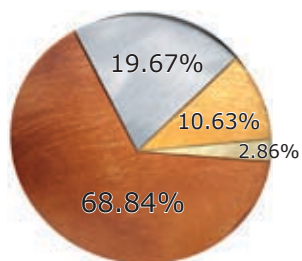
- GRANTS & CONTRACTS - \$33,055,000
- STATE APPROPRIATIONS - \$11,762,000
- OTHER REVENUE - \$3,241,000

OTHER REVENUE - \$3,241,000

- ADDITIONAL TO ENDOWMENT - (\$80,000)
- GIFTS - \$305,000
- OTHER OPERATING INCOME - \$7,697,000
- NON-OPERATING INCOME - (\$4,681,000)

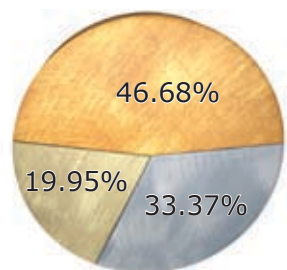
GRANTS & CONTRACT REVENUE BY SOURCE - \$33,055,000

- FEDERAL - \$29,487,000
- PRIVATE - \$2,191,000
- STATE AND LOCAL - \$780,000
- OTHER - \$597,000



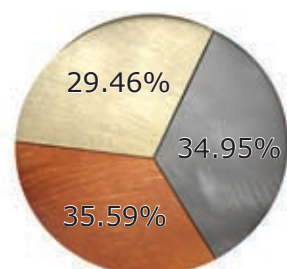
TOTAL OPERATING EXPENSES \$48,862,000

- EMPLOYEE COMPENSATION & BENEFITS - \$32,658,000
- SUPPLIES & SERVICES - \$9,611,000
- DEPRECIATION - \$5,195,000
- UTILITIES - \$1,398,000



TOTAL REVENUE - \$872,000

- GIFTS & CONTRIBUTIONS - \$407,000
- DRI SUPPORT - \$291,000
- SPECIAL EVENTS & OTHER OPERATING REVENUE - \$174,000



TOTAL OPERATING EXPENSES - \$947,000

- CONTRIBUTED SALARIES & WAGES - \$279,000
- SUPPLIES & SERVICES - \$331,000
- PAYMENTS TO DRI - \$337,000



What a great year we've experienced celebrating 50 years of DRI.

The DRI Foundation is proud to support this organization that brings incredibly talented people to our state from around the world. While we like to talk about the impact our 500 employees have on Nevada's economy, I can't put a value on the impact that our faculty has on the communities they live in throughout Nevada. Not only do these fine men and women hold the highest degrees from many of the most prestigious universities in the world, they also have a profound impact in their neighborhoods and in our children's schools.

We began the year by kicking off our 50th anniversary with the Nevada Medal dinner featuring Dr. Francis Collins, who is known worldwide as the leader of the project to map the human genome, one of the more profound scientific endeavors to forever affect mankind. Collins was then appointed by President Obama to lead the National Institutes of Health. One year later, we ended the 50th Anniversary celebration with Dr. Robert Ballard receiving the prestigious Nevada Medal. Dr. Ballard is best known for his discovery of the Titanic, deep-sea hydrothermal vents

("black smokers"), and the Jason Project. He inspired the kids at George Dilworth Middle School in Sparks and Sandy S. Miller Elementary in Las Vegas with the possibilities of how a math and science education could evolve. Both of our Nevada Medalists are world-class and worthy of our golden anniversary.

Along the way, we used the 50th anniversary to highlight the research that goes on in Boulder City; Lake Tahoe; Steamboat Springs, Colo.; Las Vegas; and Reno. Our faculty helped us understand their important work and in letting us know how we can support them in their efforts to address global environmental issues.

It has been a privilege to be the chairman of the DRI Foundation for the past three years, but I must admit that this past year was especially rewarding. We have turned the corner on so many initiatives we've put in place. I appreciate the generous support we've received from so many of our trustees and friends, including Mary and Nazir Ansari, whose \$100,000 contribution will continue to enhance the work of our scientists. Scientists who, in turn, share their work through lectures on both ends of the state.

Another triumph this year was the additional support we received from NV Energy and Jeff Ceccarelli. Through this generous gift, we have revamped our GreenPower program to focus on teacher training. In just over a year, we have doubled the number of participating GreenPower schools in the state to 50. We have also been able to provide enough financial support to bring our GreenPower manager position to full-time. As a result, Fayth Ross, our GreenPower administrator, will now also be able to restart our science box program that has been dormant for the past three years. Through the generous support of the Robert S. & Dorothy J. Keyser Foundation, we will rename the program Green Boxes, to share renewable-energy curriculum with schools throughout Nevada.

Thank you for taking the time to catch up on what DRI and the DRI Foundation have been doing ... and what our priorities are for the future. The DRI Foundation has grown and matured by a continued focus on creating relevant support for the ongoing efforts of DRI and its scientists. I truly hope you enjoy this document.

Mike Benjamin
Chairman of the Board of Trustees
DRI Foundation

SPONSOR A DRI GRADUATE STUDENT

It takes a lot to pursue a Master's Degree or Ph.D. As you can see below, it's quite a financial undertaking, so please consider assisting one or more future scientists with tuition, employment, and healthcare coverage during their pursuit of education... and excellence.

ONE MONTH'S SALARY

MASTER'S | \$3,850
PH.D. | \$4,500

ONE SEMESTER'S TUITION

MASTER'S | \$8,700
PH.D. | \$9,800

SUMMER PART-TIME

MASTER'S | \$5,800
PH.D. | \$6,500

SUMMER FULL-TIME

MASTER'S | \$11,600
PH.D. | \$13,000

ENTIRE YEAR, INCLUDING SUMMER

MASTER'S | \$29,000
PH.D. | \$32,500

Through donations, grad students at DRI are given the chance to jump directly into research that impacts communities around the world by working in the field and in the lab. The outstanding grad students at DRI arrive at the institute ready to learn and ready to contribute.

Donations will be distributed equitably to all three DRI divisions with each division providing a dollar-for-dollar match, thereby demonstrating their commitment to this shared goal of attracting outstanding graduate students to DRI.

"DRI has made me who I am as a researcher. I started off washing dishes, and now I give professional talks and am a lead author on reports that are linked to the institute's goals."
- *Clint Davis, doctoral student (DEES)*

"All of my opportunities stemmed directly from my work in your lab...the knowledge and skills I gained during that research continue to serve me well."
- *Karen Levey, former DEES student, accepted to Dartmouth Medical School, January 2010.*

"DRI has a professional, cutting-edge feel. My faculty advisor has published high visibility publications—publications that have gained media attention, and that's exciting for both my lab group and me—seeing that our work is making a difference."
- *Dan Pasteris, doctoral student (DHS)*

"DRI has amazing facilities, research-based connections, and faculty advisors. All of which has created a tremendous amount of opportunity for me."
- *K.C. King, master's student (DAS), past-president of GRAD (Graduate Research Assistants at DRI)*

"Within one year of starting my research, DRI faculty have already helped me establish professional contacts with state and federal agencies that will help make my academic and career goals possible. Overall, the collaboration of the DRI and UNR creates a rich academic environment making the Program of Hydrological Sciences one of the best in the country."
- *David Smith, master's student (DHS)*

"At DRI, I have gathered important skills by participating in a variety of research projects and have enjoyed the opportunity to collaborate with encouraging and supportive faculty and staff."
- *Margaret Shanafield, doctoral student (DHS)*



2215 Raggio Parkway
Reno, Nevada 89512
(775) 673-7300

755 East Flamingo Road
Las Vegas, Nevada 89119
(702) 862-5400

www.dri.edu