# DRI

**Joint Interim Standing Committee on Natural Resources**

**January 29, 2024**

# Nevada System of Higher Education

- **DRI is part of the Nevada System of Higher Education, reporting to the NSHE system office, which reports to the Chancellor, who is overseen by the Board of Regents.**

- **NSHE is comprised of:**
  - **Three universities:  UNR, UNLV, and Nevada State University.**
  - **Four community colleges:  CSN, TMCC, GBC, and WNC**
  - **DRI is the only stand-alone research institution.**

# WHO WE ARE

- One of eight institutions within the Nevada System of Higher Education
- Two main campuses in Las Vegas and Reno
- Over 60 years of environmental research and discovery
- More than 600 scientists, engineers, students, and support staff
- More than 140 PhDs in more than 40 disciplines
- $47M in sponsored research grants and contracts annually

# DRI

- **DRI conducts a wide range of environmental research, but is especially well known for research in the areas of:**
  - **Air**
  - **Water**
  - **People**
  - **Earth**
  - **Fire**

  **DRI is investigating the human impacts on the environment and the environment's impact on humans.**

# PRIVATE DRINKING WATER WELLS

- **More than 170 household wells in Northern Nevada around Reno, Carson City and Fallon were analyzed for arsenic and other metals.**
- **Arsenic most commonly exceeded EPA guidelines, followed by Uranium.**
- **Water treatments reduced metal concentrations, though exceedances were still observed.**

# PROVIDING IMPACTFUL DATA FOR LOCAL AND REGIONAL DECISION MAKING

- **DRI is proud to be home to the Western Regional Climate Center.**
- **It's one of six national climate centers tasked with delivering climate services, products, and knowledge to the public at the local, regional, and national level.**
- **The Western Regional Climate Center provides data for eleven Western states: Nevada, California, Oregon, Washington, Alaska, Hawaii, Utah, Idaho, Montana, Arizona, and New Mexico.**

# WEATHER MODELING

- **DRI researchers are experts in weather modeling.**
  - **NSHE Rising Researcher recipient, Dr. Christine Albano is a leading scientist on improving our understanding of how atmospheric rivers impact water storage and flood risk in the Sierra Nevada and Great Basin River regions.**

  - **DRI scientist Dave Simeral is one of the eleven climatologists across the country who author the U.S. Drought Monitor, which is an important tool for water managers, those who respond to wildfires, and is a trusted resource for news reports.**

# HURRICANE HILARY FLOOD AT KYLE CANYON

- **In August 2023, Hurricane Hilary hit the Las Vegas region resulting in extreme flooding and debris flow, severely disrupting the Mt. Charleston community.**

- **DRI scientists are partnering with the Clark County Regional Recovery Organization to determine why some areas, like Kyle Canyon, experienced more severe impacts than others nearby.**

# ARkStorm2.0 @ Sierra Front

- **One current project that is especially relevant to this body is the "ARkStorm" project.**

- **ARkStorm is a hypothetical scenario created by imagining what the impacts would be if a series of storms, similar to historic storms that hit in California in the 1860s, occurred today here in Nevada.**

- **Our scientists are using climate change data, new modeling, and lessons learned from the original study that the USGS did more than a decade ago.**

# Geoengineering

- **DRI is studying ways to potential climate intervention strategies that could reduce the impact of global warming.**

- **This project relies on computer simulations and data analysis, rather than real-world experiments, and is expected to wrap up by September 2024.**

- **The research includes climate intervention strategies that operate at different scales, from increasing the reflectivity of rooftops to cool urban communities, to the potential for thinning cirrus clouds in the polar regions to decrease temperatures globally.**

# PREDICTIVE WILDFIRE & SMOKE MODELS

- **As the climate warms, wildfires in the Sierra Nevada are happening at unprecedented sizes and intensities, threatening communities and resources throughout Nevada and California.**

- **NV Energy Foundation provided a $150,000 grant to support DRI's development of a Weather and Research Forecast advanced modeling tool that simulates weather, fire, and smoke for firefighting and prescribed fire operations.**

- **Forecasts and simulations produced by this model will be available to NV Energy's fire mitigation team, and other professionals in Nevada and California.**

# THE NEVADA WATER RESOURCES INITIATIVE

- **DRI scientists are working with the State of Nevada State Engineer and the USGS on a water resources initiative.**

- **DRI will provide data and guidance for systematic statewide updates for:**
  - **Agricultural Consumptive Use Inventory and Database**
  - **Groundwater Discharge Area and ET Database**
  - **Meteorological and Hydrologic Monitoring**
  - **Recharge and Water Availability**

# OPENET: FILLING THE BIGGEST DATA GAP IN WATER MANAGEMENT

- **In arid Western states, managing water resources has often been made more difficult by the lack of available data on evapotranspiration (ET) – the amount of water that returns to the atmosphere via transpiration from plants and evaporation from land and water surfaces.**

- **DRI and partners from the Environmental Defense Fund, NASA, Google and others launched OpenET, an online resource that uses satellite and gridded weather data to estimate water consumed by crops and other plants.**

- **This free tool is available to users such as water managers, farmers, and other decision-makers and provides ET information down to the quarter-acre for 17 western states using best available science. This is an important tool for water conservation.**

# CLOUD SEEDING

- **Cloud Seeding is one of longest running programs at DRI.**
- **The West's historic drought and growing population have renewed interest in cloud seeding.**
- **Most studies suggest cloud seeding increases the seasonal snowpack by up to 10 percent – depending on the atmospheric conditions.**
- **This winter, DRI conducted cloud seeding in service to Nevada in the Sierra Nevada mountains, Spring Mountains, and in Eastern Nevada, as well as areas of Colorado to enhance the Colorado River streamflow.**
- **DRI received $1.2 million from the legislature in the 2023 legislative session.**

# ARCHAEOLOGY

- **Since 1969, DRI anthropologists and archaeologists have worked to understand how culture and environmental conditions impact people's decisions.**

- **DRI anthropologists study modern peoples while archaeologists study the materials left by past peoples.**

- **Beginning in 2016, DRI added architectural history to our services.**

# SOLAR

- **At DRI we are engaged in observations and analysis on regional climate change and the implications for renewable energy.**
- **Increasing amounts of solar energy is great for climate but creates engineering challenges for the electricity grid.**
- **Environmental sensing and prediction can be applied to address these engineering challenges.**

# MICROPLASTICS

- **Our Microplastics and Environmental Chemistry Research team focuses on studying human and environment interactions.**

- **Studies of surface water, groundwater, drinking water and seasonal snow are just a few areas our team is working on to understand human impact on our water systems.**

- **Citizen Science programs developed in conjunction with the League to Save Lake Tahoe, are engaging the community in microplastic research, education, and mitigation. These programs include citizen collected water samples to support microplastic monitoring efforts; and engaging the community to test the efficacy of microplastic collection.**

# PROTECTING NATIONAL PARK SCENERY

- **DRI scientists have been working with the National Park Service and the EPA since 1987 to measure, understand, and reverse the effects of atmospheric pollutants on visibility.**

- **The project is led by two of DRI's renowned air quality experts: Judith Chow, Sc.D., who serves on the EPA's Clean Air Scientific Advisory Committee; and John Watson, Ph.D., who has served on panels for the National Academy of Sciences.**

- **Their Environmental Analysis Facility at DRI established baseline air quality conditions at more than 150 sites and tracked visibility improvement for nearly four decades.**

# Southern Nevada Heat Resilience Lab Goals

Increase the capacity for Southern Nevada to address climate change and implement effective and just adaptation.

- Ask the human questions
  - Existing knowledge
  - What do frontline communities need?

- Develop meaningful community engagement

- Co-create heat resilience solutions with frontline communities and practitioners

# INTEGRATED TERRAIN ANALYSIS PROGRAM (ITAP)

- **ITAP applies the “soil-landform approach” as a conceptual model to improve remote predictions of dust emission characteristics, vehicle mobility, and countermine/counter IED detection, among others.**

- **DRI Support for the Cold Regions Research and Engineering Laboratory (CRREL), U.S. Army Yuma Proving Ground (YPG), and U.S. Army ERDC Coastal Hydraulics Laboratory (CHL).**

# NEVADA NATIONAL SECURITY SITE

- Engineering & Hydrologic Science Support
- National Security Program Support
- Environmental Monitoring & CEMP
- Cultural Resources & Historical Preservation
- Supports the NNSA/NFO in government-to-government interactions with Native American tribes
- Develop, evaluate & implement methods, models & processes for soils sites to better understand the transport of contaminants
- Defense Nuclear Nonproliferation Program Support

# STEM EDUCATION PROGRAMS

- **DRI's STEM education program includes lending libraries, teacher trainings, and community outreach activities to promote STEM education for K-12 students and teachers in Nevada.**

- **We provide resources for teachers, including robotics kits and "Green Box" STEM education kits that Nevada teachers can check out for use in their classrooms.**

- **DRI also provides free teacher trainings for Nevada teachers.**

# SUPPORTING STUDENTS

- **DRI supports students across NSHE institutions by employing grad students who work alongside our research faculty**

- **We also have an Undergraduate Research Immersion Internship Program, a 16-week program that is brings diverse students from community colleges and NSU, to DRI and experience science with our scientists through a paid internship.**

- **Through this program, we hope to increase diversity in science by inspiring students to get involved, and eventually build careers in science research and education.**

# COMMUNITY OUTREACH AND ENGAGEMENT

- **DRI hosts a range of community outreach events designed to share our science with the communities throughout the state. These include our May the Science Be With You event in Las Vegas and our open house event in Reno.**

- **DRI also offers adult science education training through our Science Distilled program in Reno and our new DRI Science at the Springs in Las Vegas.**

- **We also offer STEM educator training throughout the year, including training in our new STEM Co-Lab in Las Vegas.**

# NATIONAL SCIENCE FOUNDATION RANKING

- **We are honored to be in the top 9% of awardees of federal research funds as listed by the National Science Foundation for the umbrella topic of geosciences, and in the top 6% for atmospheric science, and the top 3% for geological and earth sciences.**

# ECONOMIC IMPACT & RETURN ON STATE INVESTMENT

- **DRI also provides economic impact to Nevada.**

- **For every dollar that DRI receives from the state, we earn $4.95 in grants and contracts.  That's money that is brought into the state.**

- **The combined direct, indirect, and induced economic impact is more than $8 for every dollar that we receive from the state.**

# THANK YOU

- **DRI: Researching the human impact on the environment and the environment’s impact on humans.**