Scientific Research Staff

Economic Geology
Stephen B. Castor, Research Geologist - mineral deposits & mineralogy
Joseph V. Tingley, Research Geologist - metals & mining history

Engineering Geology and Geophysics
John W. Bell, Research Engineering Geologist - Quaternary stratigraphy & urban geology
Geoffrey Blewitt, Research Professor - geodesy & geodynamics
David Lavallée, Postdoctoral Researcher - geodesy & geodynamics
Craig M. dePolo, Research Geologist - earthquake geology & neotectonics
Alan R. Ramelli, Research Geologist - neotectonics & Quaternary stratigraphy

Environmental Geology and Hydrogeology
P. Kyle House, Research Geologist - fluvial geomorphology & paleohydrology
Paul J. Lechler, Chief Chemist/Geochemist - analytical geochemistry & precious metals
Lisa Shevenell, Research Hydrogeologist - hydrogeology & geothermal resources

Geologic Mapping and Regional Geology
James E. Faulds, Research Geologist - structural geology, tectonics, & paleomagnetism
Larry J. Garside, Research Geologist - volcanic stratigraphy & energy resources
Christopher D. Henry, Research Geologist - volcanic stratigraphy & geochronology

Science Education
Daphne D. LaPointe, Research Geologist - science education & mineral deposits

Support Staff

Administration and Publication Sales
Terri M. Garside, Executive Assistant - finance, contract management, & administration
Cheryl Steed, Administrative Assistant - administration & publication sales backup
Charlotte Stock, Sales Manager - publication sales & administrative support

Analytical Laboratory, Sample Curation, and Geologic Information
David Davis, Geologic Information Specialist - Nevada geology & mining history
Mario Desilets, Chemist and Quality Assurance Officer - analytical geochemistry
Bret Pecoraro, Laboratory Assistant - technical support on analytical & geodetic equipment

Cartography, Publication Support, Geographic Information Systems (GIS), and Databases
Robert Chaney, Information Systems Specialist - cartography & GIS
Ron Hess, Information Systems Specialist & GIS Supervisor - GIS, remote sensing, & systems administration
Gary Johnson, Information Systems Specialist - GIS & systems administration
Richard O. Meeuwig, Editor - editing, publication design, & Web-site management
Susan L. Tingley, Publication Manager & Chief Cartographer - cartography & publishing
Kris R. Pizarro, Cartographic Supervisor - cartography, drafting, & publication design
Jack Hursh, Jr., Cartographer - drafting & publication design

For more information about NBMG, please check the Web (www.nbmg.unr.edu).
Biennial Report of the Nevada Bureau of Mines and Geology

2002

Jonathan G. Price
Director and State Geologist

PREPARED FOR

The Board of Regents of the
University and Community College System of Nevada
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Cover photographs:
Top: Ione Valley and the Shoshone Mountains near Berlin, photograph by Jack Hursh, from the cover of Traveling America's Loneliest Road, A Geologic and Natural History Tour through Nevada along U.S. Highway 50 (2000, NBMG Special Publication 26, 132 pages, written and designed by Joseph V. Tingley and Kris Ann Pizarro)

Biennial Report
of the
Nevada Bureau of Mines and Geology
2002

EXECUTIVE SUMMARY

The Nevada Bureau of Mines and Geology (NBMG) is a research and public service unit of the University of Nevada and is the State geological survey. Established by the Nevada Legislature as a department within the public service division of the University and Community College System of Nevada, NBMG is part of the Mackay School of Mines and one of the Statewide Programs at the University of Nevada, Reno. NBMG's mission, to provide the State's needs for geological and mineral-resource information and research, is defined in its enabling legislation. NBMG scientists conduct research and publish reports that focus on the economic development, public safety, and quality of life in urban and rural areas of Nevada.

NBMG Research Programs Addressing Critical Issues Facing Nevada

Urban Growth - Natural Hazards and Economic Stability
- Earthquakes
- Floods
- Subsidence and fissures due to groundwater withdrawal
- Swelling and collapsing soils, landslides, and other ground failures

Mineral, Energy, and Water Resources Vital to Economic Expansion
- Precious metals
- Base metals
- Industrial minerals, including construction raw materials
- Geothermal energy
- Petroleum and natural gas
- Groundwater resources

Environmental Concerns
- Future of pit-lake water quality and other aspects of modern mining
- Mercury and other chemical hazards from historical mining
- Groundwater quality
- Radon in air
- Nuclear waste

This report provides details on the activities of NBMG scientists and support staff during the past two years. The University of Nevada, Reno is strategically planning for the future, and this report incorporates key elements of NBMG's strategic plan for the next five to ten years. As indicated in the lists of publications, research grants, and other professional activity, NBMG has been highly productive and expects to be even more valuable to the State of Nevada in the future. In accordance with Nevada Revised Statute 514.070, which calls for a biennial report on NBMG activities, it is my pleasure to transmit this report on behalf of the NBMG staff.

Jonathan G. Price
Director and State Geologist
INTRODUCTION

NBMG scientists conduct research and publish reports on mineral and energy resources, engineering geology, environmental geology, earthquakes and other hazards, groundwater, and geologic mapping in Nevada. The maps and geologic reports produced by NBMG provide basic information used by a broad spectrum of individuals, including engineers involved in construction, conservationists, exploration geologists, miners, highway planners, urban planners, historians, students, professors and K-12 teachers, tourists, and Nevadans enjoying outdoor recreation.

In addition, NBMG provides special services in the areas of analytical geochemistry and assay standards, mineral and rock identification, sample curation, earth-science education and in-service teacher training, continuing education for professional geoscientists, geologic and geotechnical information, mineral- and energy-resource information, geographic information systems, electronic databases, and historical information, particularly regarding mining and natural hazards. NBMG works closely with many local, state, and federal agencies. Considerable information about NBMG can be found on the Web (www.nbmg.unr.edu).

Major research projects are being conducted throughout Nevada. Geologic maps are being produced to provide better understanding of natural hazards in areas that will be undergoing development, in areas where environmental concerns are most critical, and in areas where the potential is high for the development of mineral and water resources. It typically takes one to two person-years of effort to complete each 7.5- minute (1:24,000-scale) quadrangle. These maps provide the basis for nearly all geological research and for many engineering applications. Significant hazards in southern Nevada include flash floods, subsidence and related open cracks in the ground (fissures), swelling and collapsing soils, and earthquakes. In northwestern Nevada, earthquake, landslide, flood, and soil-condition hazards dominate, but other concerns, including locally high concentrations of naturally occurring radon and arsenic, are also best understood from a basis of geologic maps. Geologic mapping in the Humboldt River basin is contributing to knowledge about how the river has responded to past changes in climate and stream flow, which is important information in understanding how mine dewatering may affect the river and local ecology. Geologic mapping in northeastern Nevada is also revealing much about the origin of the gold deposits that have made Nevada the nation's foremost state in mineral production and the United States the second leading producer of gold in the world.

Research on land subsidence in Las Vegas Valley continues to provide valuable information about the rates of subsidence resulting from groundwater withdrawals and the development of fissures that can cause considerable damage to buildings. NBMG researchers, in collaboration with other experts, are using some of the most current technologies to attack this problem—geodetic measurements using the global positioning system (GPS) and interferometry using synthetic aperture radar (InSAR), a remote-sensing technique. NBMG is beginning to evaluate concerns regarding subsidence and fissures in other desert valleys, where groundwater is being pumped to supply the needs of expanding populations.

NBMG and Nevada Seismological Laboratory scientists assess earthquake hazards throughout the State. NBMG geologists evaluate the geologic record for evidence of prehistoric earthquakes. There is abundant evidence that nearly all parts of Nevada have experienced earthquakes with magnitudes in excess of 6.5 during the last several hundred thousand years. NBMG's research complements the work of the Nevada Seismological Laboratory, which monitors earthquakes ranging from magnitudes less than one to the largest earthquakes in the world. From historical and instrumental records, we know that Nevada experiences a magnitude 7.0 or greater earthquake about once every 30 years. The largest earthquakes yet recorded in the State, the magnitude 7.3 to 7.8 event in Pleasant Valley near Winnemucca, occurred in 1915. The last magnitude 7 earthquake was at Fairview Peak near Fallon in 1954.
Floods along major streams and flash floods along normally dry washes are all too common phenomena in Nevada. NBMG research is helping to understand the frequency and severity of past floods. Efforts are underway in southern, northwestern, and north-central Nevada to determine the timing, magnitude, and frequency of these events.

Geological aspects of waste disposal are being addressed with the aid of geologic maps, which are essential in understanding groundwater flow at and away from all sites, including landfills and radioactive waste sites. Other important considerations regarding nuclear waste issues that are being addressed by NBMG investigations include tectonic strain and related earthquake hazards and the potential for mineral-resource development.

Mineral-resource assessments are routinely needed by federal agencies with land-management responsibilities. NBMG scientists with expertise in economic geology have contributed to resource assessments by the Bureau of Land Management, Department of Defense, Department of Energy, and Fish and Wildlife Service. NBMG has also evaluated environmental concerns about mining, such as potential acid-mine drainage and associated release of potentially toxic elements from abandoned and inactive mines; mercury pollution from the early days of mining on the Comstock and elsewhere, when amalgamation was the preferred method of extracting gold and silver from the ores; and predicting the future chemistry of pit lakes when modern-day open pits fill with water after mining stops.

NBMG publishes many maps and reports that assist in the exploration for and environmentally sound development of mineral, energy, and water resources. NBMG publishes geologic maps that are produced not only by NBMG geologists but also by geologists from industry and at universities throughout the country. The maps and reports are reviewed by peers with knowledge about the local geology.

NBMG scientists also routinely publish in peer-reviewed, internationally recognized scientific journals. NBMG scientists have fine reputations within the scientific community, and several have won awards for their extraordinary contributions. NBMG’s research projects are led by teams with broad expertise in the geological sciences and geography. Their efforts are supported by an excellent staff in the areas of cartography, drafting, geographic information systems (GIS), editing, publication design, publication sales, information, technology, finance, and administration.

NBMG has leadership roles in several statewide efforts. NBMG, along with the Nevada Seismological Laboratory, provides operational support for the Nevada Earthquake Safety Council (with funding from a Federal Emergency Management Agency grant that is passed through the Nevada Division of Emergency Management). The Nevada Earthquake Safety Council facilitates public input, develops consensus about seismic issues within the public and private sectors, and is the public advisory body for State seismic policy and the Nevada Earthquake Risk Reduction Program of the Division of Emergency Management. The Board of Directors of the Council, which votes on policy recommendations, has 22 members, from both southern and northern Nevada, representing business and industry; city, county, and state agencies, including the Assembly and Senate; geosciences; engineering; community organizations; universities; building officials; insurance; and primary-secondary education. The Council has made significant progress in improving earthquake awareness and preparedness, largely through a number of activities supported by NBMG and the Seismological Laboratory.

The Director, Jon Price, chairs the State Mapping Advisory Committee (SMAC), and NBMG's Geographic Information Systems (GIS) Supervisor, Ron Hess, serves as its executive secretary. In the early 1980s the Governor named the NBMG Director as the chair of SMAC. SMAC provides input to the United States Geological Survey on issues related to updating topographic maps, digital map products used in GIS, and geologic mapping. The Geologic Mapping Subcommittee of SMAC helps set priorities for geologic mapping according to the National Cooperative Geologic Mapping Program. Membership in SMAC is open to Nevada representatives of local, state, and federal agencies, universities, and individuals from the private
sector with interests in mapping. SMAC’s efforts in coordinating requests to the U.S. Department of Interior have helped make many new digital products available, particularly in and near urban areas of southern and northern Nevada and in the Humboldt River basin.

An NBMG representative (currently the Director, Jon Price) serves on the State All Hazards Mitigation Advisory Committee, which advises the Division of Emergency Management on the allocation of funds set aside by the Federal Emergency Management Agency for mitigation of future disasters. Because NBMG has considerable expertise in geological hazards (particularly floods, earthquakes, landslides, subsidence, and other unstable ground conditions), NBMG has much to contribute to the efforts of reducing risks from natural disasters. Jon Price and Ron Hess are also serving on the State Hazard Mitigation Plan Steering Committee, which is advising the Division of Emergency Management and its consultants on writing a new plan as required for federal emergency assistance and funding to reduce the risks from future disasters.

Recognizing the importance of the mining industry to the State’s economy, the Nevada Attorney General, Frankie Sue Del Papa, formed the Nevada Mining Fraud Task Force to help prevent mining fraud and keep the reputation of the industry from being tarnished. The Task Force includes representatives from the Attorney General’s office, the Secretary of State’s Securities Division, the Consumer Affairs Division of the Department of Business and Industry, the Division of Minerals, NBMG, the Bureau of Land Management, the Nevada Mining Association, and the American Institute of Professional Geologists. Co-Chairs of the Task Force include the Attorney General, the Administrator of the Nevada Division of Minerals, Alan Coyner, and the NBMG Director, Jon Price. NBMG Special Publication 22 (Gold from Water and Other Mining Scams, by Paul Lechler, NBMG’s Chief Geochemist), which is available on the Web, concisely provides the public with information on typical scams. To raise the level of awareness about the issues, the Task Force sponsored a conference on mining fraud issues in Las Vegas in October of 2000.

The Nevada State Board on Geographic Names, which was established by the Legislature to coordinate and approve geographic names within the State for official recommendation by the United States Board on Geographic Names, is chaired by NBMG’s Publication Manager and Chief Cartographer, Susan Tingley. The State Board has representation from NBMG, faculty of the University of Nevada, Reno and the University of Nevada, Las Vegas, the State Library and Archives, State Department of Transportation, State Department of Conservation and Natural Resources, Nevada Historical Society, U.S. Bureau of Land Management, U.S. Forest Service, and the Inter-Tribal Council of Nevada, Inc. Officially recognized geographic names must be approved by both the State and United States Boards.
STATUTORY MANDATES

Please refer to Appendix B for the wording of NBMG's statutory mandates under NRS 514 (establishing NBMG and its mission), NRS 396 (concerning the analysis of ores, minerals, soil, and water submitted by residents of Nevada), NRS 327 (concerning the Nevada State Board on Geographic Names), NRS 519A (concerning fees collected by the Nevada Division of Environmental Protection to fund cooperative agreements between NBMG and the U.S. Geological Survey), NAC 522 (concerning responsibilities to archive samples and records from oil and gas wells), NAC 534A (concerning responsibilities to archive samples and records from geothermal wells), and 43 USC Sec. 31c (concerning requirements for participation in the National Cooperative Geologic Mapping Program).

Addressing Nevada's Critical Needs - Economic Development

Geologic maps and related reports on applied research are excellent incentives for economic development. As an example, geologic mapping and related interpretation of the regional geological structures were an integral part of the discovery of the Carlin gold deposit in 1961. In the last twenty years, mining companies in Nevada have produced tens of billions of dollars worth of gold and silver from deposits of this type and have directly and indirectly provided high-paying jobs for tens of thousands of Nevadans. There is still much mineral wealth to be found in Nevada, particularly buried under volcanic rocks and alluvium in basins between the mountain ranges. In 1988, we estimated that the undiscovered mineral resources in Nevada were likely to have a value in the range of $120 billion to $1.2 trillion, and those figures still provide a reasonable estimate of the untapped mineral wealth of Nevada. In early 2002 mines on the Carlin trend, a 5- by 40-mile mining district in Elko and Eureka Counties in northeastern Nevada, reached 50 million troy ounces of gold production, a remarkable achievement that places this district among the top three gold-mining areas in the world.

Geologic maps in urban areas help businesses avoid unstable areas (such as active faults and locations prone to liquefaction during earthquakes, flash floods, landslides, subsidence, and swelling soils) and help to protect valuable groundwater resources. Less than 20% of the State is geologically mapped at a scale that is adequate for most applications in mineral, energy, and water resources; hazards; and environmental protection. At our current rate of production, including NBMG programs that encourage more geologic mapping by individuals from the U.S. Geological Survey, universities, and the private sector, we have several decades of work ahead of us in geologic mapping alone. A fact sheet explaining the work in Nevada through the National Cooperative Geological Mapping Program is appended at the end of this report.

Another activity that relates to economic development is the storage of records and rock and ore samples from various locations throughout the state. These are exceptionally valuable, in some cases practically irreplaceable, samples needed in exploration for mineral, oil and gas, geothermal, and groundwater resources. Through regulations of the Commission on Minerals Resources and the Division of Minerals, NBMG stores cuttings, core, and paper records from oil and gas and geothermal wells drilled in Nevada. NBMG also stores selected, representative samples of ores and typical rocks from active and inactive metal and industrial mineral mines. Recognizing the need for low-cost storage space, thanks largely to the efforts of Steve Castor and Bret Pecoraro of the NBMG staff, NBMG acquired eight containers for storage of materials on University land at Stead. David Davis, NBMG Geologic Information Specialist, is overseeing the shipment of infrequently used samples to Stead. NBMG is merging its electronic database on samples with that of the W.M. Keck Museum at the Mackay School of Mines.
We are in the midst of the biggest gold-mining boom in American history. Nevada accounts for approximately 75% of current annual production. Value of mineral production in Nevada is annually about $3 billion. (Data from NBMG, the Nevada Division of Minerals, and the U.S. Geological Survey.)
Addressing Nevada's Critical Needs - Natural Hazards and Economic Stability

NBMG's urban-area geologic hazard investigations, particularly studies of earthquake hazards, land subsidence due to groundwater withdrawal, and flash-flood hazards, help all businesses be better prepared for natural disasters. Nevada's gaming economy would suffer greatly if we were not able to rapidly recover from a major disaster, such as an urban earthquake. NBMG goes well beyond the identification of geologic hazards on maps and in technical reports; we also publish planning scenarios for major disasters and a series of maps, pamphlets, brochures, and Web pages geared toward the general public. As an example, since its publication in 1996, NBMG Special Publication 20 (Planning Scenario for a Major Earthquake in Western Nevada) has been used repeatedly in emergency management, response, and recovery exercises by local, state, and federal officials. The probability of a magnitude 6 or greater earthquake occurring in the Reno-Carson City area within the next 50 years is significant - between 34 and 98%. Another major disaster for which we can be better prepared is flooding on alluvial fans. As Nevada's population has grown, much of the development has moved onto alluvial fans, unfortunately not always with full knowledge of the flash-flood hazards. Geologic mapping and careful evaluation of the frequencies and extents of past floods seen in the geologic record are critical to reducing the risks from these hazards.

Nevada's population will continue to rise. This will place demands on geological and other natural resources and heighten concerns regarding risks from natural hazards and environmental issues, particularly in urban areas. (Data are from the U.S. Census Bureau; the projection to 2010 is from the Nevada State Demographer.)
Addressing Nevada's Critical Needs - Education and Services for the Public

NBMG produces many scientific publications that are used in schools. A part-time, only partially State-funded effort at NBMG is dedicated to getting these materials in the hands of teachers. Sometimes the materials are translated to formats that are more useful in the classroom, including posting them on the Web. NBMG staff members have been involved in the writing of the Nevada and National Science Education Standards, and we are making efforts to produce standards-based content material that can be used in schools. NBMG staff members regularly participate in the highly effective and popular teacher-education workshops that are sponsored by the Nevada Mining Association and jointly supported by the Nevada Division of Minerals. In addition, NBMG staff members help coordinate field trips and other activities for the public and for K-12 teachers and students during Earth Science Week (second full week of October) and Earthquake Awareness and Preparedness Week (February or March), and staff scientists often judge science fairs. NBMG also produces some publications specifically for the general public, such as field guides on the geology and natural history of the Las Vegas, Reno-Carson City-Lake Tahoe regions, and U.S. Highway 50.

NBMG has direct contact with the public through several venues, including thousands of customers each year visiting its Publication Sales Office and its Information Office (open Monday through Friday), participation in the State Fair, home shows, Earth Science Week, Earthquake Awareness and Preparedness Week, and lectures at local schools and civic organizations. Frequently, professional staff members assist individual citizens with issues related to their personal property, such as location of groundwater wells, septic systems, faults, or soil stability. Increasingly, NBMG is reaching more of the public through its Web sites. Because many of the products that NBMG produces are heavily used by geological and engineering professionals, NBMG staff also make good efforts to participate in activities of the geological and professional organizations in the State, particularly the Geological Society of Nevada, Nevada Petroleum Society, Geothermal Resources Council, and local meetings of the Association of Engineering Geologists, American Institute of Professional Geologists, and Society for Mining, Metallurgy, and Exploration.

The following table provides some measures of workload in sales of publications (according to NRS 514.070), analytical services (according to NRS 396.600), and numbers of customers served by the NBMG Information Office and by NBMG scientists.

<table>
<thead>
<tr>
<th>Year</th>
<th>Publication Sales¹</th>
<th>Analytical Services</th>
<th>Information Office Customers Served</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>Walk-in</td>
</tr>
<tr>
<td>1993</td>
<td>$123,480</td>
<td>$ 7,005</td>
<td>921</td>
</tr>
<tr>
<td>1994</td>
<td>117,215</td>
<td>3,459</td>
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<tr>
<td>1996</td>
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<tr>
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<td>141,727</td>
<td>19,645</td>
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<tr>
<td>1999</td>
<td>141,959</td>
<td>14,929</td>
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</tr>
<tr>
<td>2000</td>
<td>157,149</td>
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</tr>
<tr>
<td>2001</td>
<td>156,008</td>
<td>44,661</td>
<td>1,002</td>
</tr>
</tbody>
</table>

¹ These figures include sales of NBMG maps, bulletins, reports, electronic files on discs, photocopies of open-file reports, topographic maps, and related items. Electronic files and photocopies were not included in the last report.
² Counts of walk-in customers and e-mail inquiries are kept; telephone inquiries are estimated to be about four for every three walk-in customers. Records of numbers of informational inquiries directed to individual scientists are not kept; these are estimated to be approximately 550 per year.

NBMG has developed a user-friendly site for sale of publications on the Web (at www.nbmg.unr.edu/sales.htm) and considerable amounts of Web information for teachers, the general public, and technical professionals. Several publications are available in their entirety on the Web. NBMG
does not make a profit on its publication sales; revenues generated from the sales go into a revolving fund that helps pay for the production, printing, and sales of future maps and reports.

**BUDGET**

The majority of the funds expended by NBMG come from the Legislature as part of the Statewide Program funding for UNR. The bulk of these funds covers salaries and fringe benefits for NBMG employees. The State does not provide a substantial amount of operating funds (only $42,357 per year), and the amount of money required to be returned for mandated salary savings is $36,856 for the current fiscal year. This results in very little operating funds at the beginning of any fiscal year, unless, as is rarely the case, someone is on sabbatical leave or there is a vacancy. In part because the workforce is quite stable and few employees leave before retirement, and because other employees cannot always fill in when vacancies do occur, this forces NBMG to seek external funds from a variety of grants and contracts to help pay for the essential work. Fortunately there are a number of opportunities for cost sharing with federal, state, and local agencies, such that generating sufficient external research funds has not been a large problem. Seeking grants and contracts does, however, consume a large amount of the time of the Director and of many of the senior staff.

<table>
<thead>
<tr>
<th>State-funded budget item Fiscal year 2001-2002 budget</th>
</tr>
</thead>
<tbody>
<tr>
<td>Professional</td>
</tr>
<tr>
<td>Classified</td>
</tr>
<tr>
<td>Graduate Assistants</td>
</tr>
<tr>
<td>Fringe Benefits</td>
</tr>
<tr>
<td>Operating</td>
</tr>
<tr>
<td>Subtotal</td>
</tr>
<tr>
<td>- Mandated Salary Savings</td>
</tr>
<tr>
<td>Total</td>
</tr>
</tbody>
</table>

**STAFFING LEVELS**

NBMG has 12.35 faculty full-time equivalent positions (FTE), 8.47 classified staff FTE, and two half-time graduate research assistants funded by the State. An additional 2.94 faculty FTE, one postdoctoral researcher, 3.53 classified staff FTE, and generally between 5 and 15 undergraduate and graduate student assistants are covered by various grants and contracts, mostly from federal and local agencies plus some from state agencies and the private sector. Wages are competitive with those at comparable universities, and we have been able to attract a staff with excellent national and international scientific reputations. Turnover has been at an acceptable level; some, but few, staff members have left before retirement.
A list of current NBMG staff, divided by major areas of responsibility and annotated with principal areas of expertise, is given below. Listed in parentheses are the amounts of State-funded FTE for each person. Individuals whose salaries come entirely from grants and contracts are listed with 0 FTE.

Jonathan G. Price, Director and State Geologist - management, mineral deposits & geochemistry (1.0 FTE)

**Scientific Research Staff**

**Economic Geology**
- Stephen B. Castor, Research Geologist - mineral deposits & mineralogy (1.0 FTE)
- Joseph V. Tingley, Research Geologist - metals & mining history (1.0 FTE)

**Engineering Geology and Geophysics**
- John W. Bell, Research Engineering Geologist - Quaternary stratigraphy & urban geology (1.0 FTE)
- Geoffrey Blewitt, Research Professor - geodesy & geodynamics (0.75 FTE)
- Craig M. dePol, Research Geologist - earthquake geology & neotectonics (0 FTE)
- Alan R. Ramelli, Research Geologist - neotectonics & Quaternary stratigraphy (0 FTE)

**Environmental Geology and Hydrogeology**
- P. Kyle House, Research Geologist - fluvial geomorphology & paleohydrology (1.0 FTE)
- Paul J. Lechler, Chief Chemist/Geochemist - analytical geochemistry & precious metals (1.0 FTE)
- Lisa Shevenell, Research Hydrogeologist - hydrogeology & geothermal resources (1.0 FTE)

**Geologic Mapping and Regional Geology**
- James E. Faulds, Research Geologist - structural geology, tectonics, & paleomagnetism (1.0 FTE)
- Larry J. Garside, Research Geologist - volcanic stratigraphy & energy resources (1.0 FTE)
- Christopher D. Henry, Research Geologist - volcanic stratigraphy & geochronology (1.0 FTE)

**Science Education**
- Daphne D. LaPointe, Research Geologist - science education & mineral deposits (0.31 FTE)

**Support Staff**

**Administration and Publication Sales**
- Terri M. Garside, Executive Assistant - finance, contract management, & administration (0.92 FTE)
- Cheryl Steed, Administrative Assistant - administration & publication sales backup (1.0 FTE)
- Charlotte Stock, Sales Manager - publication sales & administrative support (0.49 FTE)

**Analytical Laboratory, Sample Curation, Geologic Information**
- David Davis, Geologic Information Specialist - Nevada geology & mining history (1.0 FTE)
- Mario Desilets, Chemist and Quality Assurance Officer - analytical geochemistry (1.0 FTE)
- Bret Pecoraro, Laboratory Assistant - technical support on analytical & geodetic equipment (0 FTE)

**Cartography, Publication Support, Geographic Information Systems (GIS), and Databases**
- Robert Chaney, Information Systems Specialist - cartography & GIS (0 FTE)
- Ron Hess, GIS Supervisor - GIS, remote sensing, & systems administration (1.0 FTE)
- Gary Johnson, Information Systems Specialist - GIS & systems administration (0.53 FTE)
- Richard O. Meeuwig, Editor - editing, publication design, & Web-site management (1.0 FTE)
- Susan L. Tingley, Publication Manager & Chief Cartographer - cartography & publishing (1.0 FTE)
- Kris R. Pizarro, Cartographic Supervisor - cartography, drafting, & publication design (1.0 FTE)
- Jack Hursh, Jr., Cartographer - drafting & publication design (0.53 FTE)

**RELATIONS WITH OTHER AGENCIES**

There are no alternate providers of NBMG services. NBMG works closely with several other state agencies and with some federal and local agencies, but in all cases the programs of these agencies are complementary with those of NBMG and are not overlapping. The U.S. Geological Survey (USGS) also produces geologic maps, but their priorities are established by federal needs. NBMG works closely with the USGS through the State's Mining Cooperative Fund (see NRS 514.060 and NRS 519A.260) and through the National Cooperative Geologic Mapping Program (see 43 USC Sec. 31c).

NBMG also works closely with the Nevada Division of Minerals. The Division of Minerals regulates drilling operations of oil, gas, and geothermal wells; administers a program to identify, rank, and secure dangerous
conditions at abandoned mines; and manages the State reclamation performance bond pool. NBMG does none of these activities, but our programs are complementary. NBMG co-produces with the Division of Minerals annual mineral and energy production statistics, and we jointly support educational efforts regarding mineral and energy resources. We also have worked together on projects with the Western Governors Association regarding issues of abandoned mines. NBMG's role is in scientific research and related scientific data collection. NBMG also archives and makes available to the public records and samples collected from oil, gas, and geothermal wells regulated by the Division of Minerals (according to NAC 522 and NAC 534A).

NBMG's participation in several statewide bodies helps insure that there is no unnecessary duplication of services or efforts. The Nevada Earthquake Safety Council and the Nevada All Hazards Mitigation Advisory Committee include representatives from a wide range of state and local governmental agencies, nonprofit groups, and the private sector; NBMG's participation in these groups helps to coordinate efforts. In addition, NBMG has an advisory committee that includes representatives of several organizations with which we interact regularly.

NBMG works with the W.M. Keck Museum at the Mackay School of Mines (MSM) to further the collection of geological and mineralogical specimens and with the DeLaMare Library to improve the collection of published and unpublished information on the geology and mineral resources of the State (see NRS 514.040).

GOALS AND OBJECTIVES

From discussions that have been ongoing over the last two years, NBMG developed the following goals and objectives for the next five to ten years.

**Earth-Science Research**

Our goal is to improve the quality of life of Nevada citizens by conducting applied and basic earth-science research that encourages economic development; minimizes losses to lives, property, and businesses from natural disasters; and protects the environment. We strive to anticipate issues, such as new areas for urban growth and new waves of mineral exploration, before they arise. NBMG’s research productivity is measured in terms of publications and grants. Other measures include recognition from peers, such as honors and awards from scientific and professional organizations. In recent years, NBMG has become an important contributor to the University's grant and contract acquisition, mainly from governmental funds. We expect to contribute even more in this arena, and to develop additional research programs that are supported by private industry. In addition to applied research, NBMG recognizes the need for basic research in earth sciences, particularly in Nevada, and our research objectives include both types of work. Increased publication of research results by NBMG and in external media is part of this goal.

Specific objectives under this goal include the following:

1. Accelerate the construction and completion of fully reviewed, published geologic maps. Geologic maps at various scales are needed to support resource exploration and assessment, research on natural hazards, hydrogeologic investigations, environmental work, and fundamental science. With total costs to adequately map a quadrangle being on the order of $100,000 each, the task is enormous. Nonetheless, by setting priorities with the help of the State Mapping Advisory Committee and other governmental and private groups, our goal is to continue to map, and to support mapping by others, in the highest priority areas. The ultimate objective of our geologic mapping efforts is to cover the entire state with 1:24,000-scale geologic maps. Publishing five new geologic maps per year would be a laudable accomplishment for a geological survey of our size.
2. Expand programs to reduce risks from natural hazards, particularly earthquakes and floods, in urban and rural communities in Nevada. The compilation and public communication of information on geologic and environmental hazards in Nevada, particularly in metropolitan areas but also in small communities and rural areas, is an important responsibility. Although we have accomplished much, our goal is to do even more in the following areas: earthquake hazards, flood and landslide dangers, land subsidence and other engineering-construction problems, groundwater resources, and natural and human-induced geochemical hazards. Assistance in emergency planning and mitigation efforts in these areas is an important part of this responsibility. We expect to work closely with local governments in these efforts.

3. Expand programs in natural resources. As mandated by the Nevada Legislature, NBMG intends to continue to provide information on the natural resources needed to sustain a well-diversified State economy. This includes research in economic geology for assessment and environmentally sound development of metal and industrial mineral resources in Nevada. Mining of metals and industrial minerals has been, and will continue to be, important to Nevada. We also plan to expand programs in water quality and resources, particularly as related to geological factors, such as natural contamination from mineralized areas. We also expect to develop new programs in energy resources, with the intent of helping Nevada to be more secure in its production of electricity and other uses of energy. Opportunities exist for more NBMG involvement in assessing geothermal, wind, solar, uranium, oil, and gas resources and for conducting research on these resources. Our objective is to supply, in collaboration with other governmental agencies and industry, the information that is needed to develop these resources in environmentally and economically responsible ways. Participation in the development of wise land-use decisions involving natural resources is part of this objective.

4. Develop management structures for support staff that facilitate improved service to NBMG researchers and the public.

5. Develop project and program teams that facilitate building of NBMG research programs, creating opportunities for funding, and being prepared to respond to emerging issues.

Geological Information

Our goal is to make information regarding geological issues in Nevada available to the public via the Internet and other means. We want to assure that the State of Nevada is adequately integrating geographic and geologic information into policy decisions and government programs. To assist in this effort, our objective is to develop a digital information office and work closely with the UNR library, federal agencies, local and state agencies, and the Geographic Information Systems Subcommittee of the State Mapping Advisory Committee to provide easily accessible, publicly available digital products. Most of our current information office files are not in digital format. With available budgets, it will take us several years and considerable expense to capture the map and report data digitally. NBMG will also work closely with the W.M. Keck Museum at MSM to build and maintain useful sample collections, including samples from petroleum and geothermal wells (which we are required by State regulations to curate), mineral deposits, and characteristic altered and unaltered rocks from Nevada.

Earth-Science Education

Our goal is to have a public that understands geological issues well enough to make informed decisions regarding resources, hazards, and the environment. NBMG has had a long tradition of providing earth-science information to not only the geological and engineering communities but also to K-12 teachers, students, and the general public. In addition, we have participated with the UNR Department of Geological Sciences and external geoscience organizations in offering short courses for continuing education of professionals. The National Science Education Standards, which were published in 1996 by the National Research Council and are being integrated into Nevada curricula, call for placing earth sciences on equal
footing with chemistry, physics, and biology. Our objective is to expand our programs in educational outreach. We will continue to work with the W.M. Keck Museum at the Mackay School of Mines, the Nevada Mining Association, and the Geological Society of Nevada, the Nevada Earthquake Safety Council, and the American Geological Institute's Earth Science Week in our K-12 and general public outreach efforts.

STRATEGIES TO REACH THESE GOALS AND OBJECTIVES

Most of these objectives require adding new faculty and/or support staff in the classified ranks. We think it appropriate for the University to ask for some of these additions to come from State funds. Two new positions per biennium would be realistic.

NBMG's level of staffing is not adequate to meet all the demands that we have for geologic maps and applied geologic research. NBMG could more effectively carry out its mission with the addition of several new positions in both research faculty and support staff. Specifically, we have immediate needs for additional staff in the following technical (both scientific and support) areas:

- **earthquake geology and neotectonics (1 FTE or full-time-equivalent position)** - to assure continuity in NBMG's highly successful efforts in earthquake preparedness, including outreach to the public and non-geoscience professionals; this position would interface closely with the Nevada Seismological Laboratory; currently most of the activity in this area is supported by grants and contracts; more work is needed in both southern and northern Nevada;

- **geologic mapping, with an emphasis on Mesozoic and Paleozoic stratigraphy and structural geology (2 FTE)** - to cover much of southern and northeastern Nevada;

- **geologic mapping, with an emphasis on hydrothermal systems (1 FTE)** - to better assess mineral and geothermal resource potentials;

- **science education (0.69 FTE)** - to dedicate a full position to the important function of translating applied research for more immediate use by the public;

- **geologic mapping, with an emphasis on Quaternary and Tertiary stratigraphy (2 FTE)** - to stay ahead of expanding urban development, particularly in southern Nevada;

- **geological and geotechnical engineering (1 FTE)** - to deal with urban-area geological hazards;

- **geographic information systems (1.47 FTE)** - to build and link statewide databases and to assist in NBMG research;

- **remote sensing (1 FTE)** - to assist in the next generation of geologic, mineralogical, and lithologic mapping and in emerging technologies, such as interferometry using synthetic aperture radar;

- **hydrogeology, with an emphasis on transport modeling, evaporation, and recharge (1 FTE)** - to link with geological investigations that will help protect existing groundwater resources and find new ones;

- **geodesy (1.25 FTE)** - to further build expertise in the exciting area of space geodesy, which has wide applications in geological hazards and weather;

- **cartography (1 FTE)** - to stay just behind the cutting edge of technological developments in computer-aided drafting and map production; the current staff is highly productive but stretched to the limit;

- **marketing and publication sales (1.51 FTE)** - to better reach the public with NBMG's useful publications;

- **geophysics, with an emphasis on gravity and electromagnetic techniques (1 FTE)** - to better model the three-dimensional structures in Nevada's complicated geology;

- **geophysics, with an emphasis on reflection seismic techniques (1 FTE)** - to better image specific areas of interest, such as petroleum fields, major ore-deposit trends, and alluvial basins that supply most of the groundwater resources in the State;

- **geochronology, with emphasis on isotopic and paleontological approaches (2 FTE)** - to assist geologic mappers and other researchers with unraveling geological histories;

- **limnology (1 FTE)** - to study how the chemistry and habitat-supporting characteristics of natural lakes and man-made lakes (particularly pit lakes from mining) will change over time;

- **grants management (2 FTE)** - to free up time for scientists to devote to applied research rather than spending as much time as we currently do with research-proposal generation, budgeting, monitoring, and contract reporting.
Setting priorities for these positions and for filling of vacancies as they occur is an ongoing process with input from NBMG staff, the NBMG Advisory Committee, University administrators, and representatives of local, state, and federal agencies and the private sector who have good ideas regarding needs and opportunities for applied geological research. The full needs outlined above would add 21.92 FTE to NBMG's staff; this would about double the number of positions at NBMG. Ideally, many of the new positions would be located in Las Vegas, where issues of urban growth are creating large demands for geologic maps and applied research. Appropriate operational, travel, communications, and facilities costs would need to be added along with the increases in FTE.

NBMG currently has an efficient, flat supervisory structure. The Director directly supervises all of the scientists who are faculty members and many of the classified staff members. A significant expansion in staff would require the delegation of more supervisory responsibility to others.

The objective to develop a fully digital information office will require a one-time investment of funds to digitize existing information on maps and in paper reports. Our current estimate of cost is about $150,000 to accomplish this task, in which one-of-a-kind maps and reports would be copied digitally and on microfiche (still the best medium for long-term storage, given the rapidly evolving media for digital storage and the need to periodically transfer digital data from old to new media). We have not been able to attract grants to accomplish this important task and feel that it should be considered for a one-time need for additional State funds in the University's budget request.

We also recognize that major additions of research faculty and research-support staff are likely to come from soft money. An important strategy for increasing research funds is to keep attuned to opportunities for research funding from all major sources, including federal, state, and local agencies, industry, and private foundations. We will continue to do so.

**PERFORMANCE MEASURES FOR NBMG**

Reports, maps, and special publications produced by the Nevada Bureau of Mines and Geology, including articles published in scientific journals and elsewhere by the NBMG staff, serve as the best performance indicators. These publications are the chief products of research. Other measures that could be used, such as the numbers of presentations made about NBMG research or the number of research grants or dollars received for research grants and contracts, are proxies for research productivity. Yearly totals of numbers of publications are not necessarily an ideal measure, however, because with a small staff, the workload can vary considerably from year to year as large projects start and finish. Therefore, averages over a number of years are better measures.
### NBMG Publications Produced

<table>
<thead>
<tr>
<th>Year</th>
<th>Geologic Maps</th>
<th>Yearly Totals of past three years</th>
<th>Average of past three years</th>
<th>Number of scientists</th>
<th>Average number of NBMG publications per scientist per year</th>
</tr>
</thead>
<tbody>
<tr>
<td>1991</td>
<td>0</td>
<td>15</td>
<td>11</td>
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<td>1992</td>
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<td>11</td>
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<tr>
<td>1993</td>
<td>7</td>
<td>16</td>
<td>17</td>
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<td>2.8</td>
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<tr>
<td>2001</td>
<td>3³</td>
<td>17</td>
<td>27</td>
<td>11</td>
<td>2.5</td>
</tr>
</tbody>
</table>

1 Numbers of NBMG publications, including geologic maps, produced during that year.

2 NBMG has had three to four additional scientists supported on grants and contracts each year. In recent years the number of State-funded scientists has been steady at eleven.

3 In 2001, seven geologic maps were released as preliminary technical reports to the U.S. Geological Survey. These are listed under external publications. After review, these maps will be published by NBMG.

### External Publications Produced by NBMG Scientists

<table>
<thead>
<tr>
<th>Year</th>
<th>Yearly Totals of past three years</th>
<th>Number of scientists</th>
<th>Average number of external publications produced per scientist per year</th>
</tr>
</thead>
<tbody>
<tr>
<td>1991</td>
<td>52</td>
<td>11</td>
<td>4.6</td>
</tr>
<tr>
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<td>52</td>
<td>11</td>
<td>5.2</td>
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<td>1993</td>
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<td>11</td>
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<td>1995</td>
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<td>6.2</td>
</tr>
<tr>
<td>2001</td>
<td>56</td>
<td>11</td>
<td>6.2</td>
</tr>
</tbody>
</table>

### Overall Productivity (Total number of publications per State-funded scientist)

<table>
<thead>
<tr>
<th>Year</th>
<th>Average of past three years</th>
<th>Average number of publications (NBMG and external) produced per State-funded scientist per year</th>
</tr>
</thead>
<tbody>
<tr>
<td>1993</td>
<td>68</td>
<td>6.2</td>
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<tr>
<td>1994</td>
<td>74</td>
<td>6.7</td>
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<tr>
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<td>2000</td>
<td>110</td>
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</tr>
<tr>
<td>2001</td>
<td>95</td>
<td>8.6</td>
</tr>
</tbody>
</table>
With only 14 full-time scientists on the NBMG staff (only 11 of whom are funded by State appropriations and three of whom are funded by grants and contracts), NBMG has been highly productive. Measured on a per person basis, publication productivity is outstanding.

To collect new geological information and conduct geological research, operating money is needed. These funds pay for such expenses as fieldwork, base maps, aerial photographs, research equipment, and chemical analyses of rocks. Grants and contracts also pay salaries of additional researchers and support staff. NBMG also uses some grant funds and some donations to the UNR Foundation to pay geologists outside UNR to submit geologic maps to NBMG for review and publication. Grants and contracts bring new money into the Nevada economy, and they expand the State's research capabilities and increase knowledge about Nevada's geology; mineral, energy, and water resources; natural hazards; and environment. NBMG continues to provide many vital public services to the State with the help of these grants and contracts.

### Research and Non-Research Grants and Contracts Awarded

<table>
<thead>
<tr>
<th>Year</th>
<th>Number of Grants and Contracts</th>
<th>Total Awards</th>
<th>Average (of past three years)</th>
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<td>32,790</td>
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<tr>
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<td>1,215,298</td>
<td>1,120,050</td>
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<tr>
<td>1998</td>
<td>29</td>
<td>708,603</td>
<td>846,470</td>
</tr>
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</table>
Quality of the Research and Public Service Products

NBMG faculty and some classified staff members are recognized within the state, regionally, nationally, and internationally for their contributions to science and society. Many of these contributions are listed in Appendix A, which provides some details of the activities of the NBMG staff. As examples, in the past five years NBMG scientists have:

served on 17 advisory panels, task forces, and committees for the federal government;

served on four National Research Council - National Academy of Sciences study committees and one board;

tested four times before the U.S. Congress and three times before the Nevada Legislature on issues related to geology and mining;

served 16 times on advisory panels and committees for the Nevada state government;

served as officers, including elected presidents, in one international, two national, and three state scientific and technical organizations, (one was recently elected to serve as president of another international scientific society);

served on the editorial boards of two scientific journals and as editors of three special volumes published by scientific societies;

chaired 25 committees of international, national, regional, and state scientific organizations;

served 65 times as committee members, field trip leaders, technical session chairs, or in other capacities for national and international scientific organizations;

served 47 times as committee members, field trip leaders, workshop instructors, or other positions for state and regional scientific and professional organizations;

served 19 times as advisors, field-trip leaders, science-fair judges, or in other capacities for local governmental and educational organizations;

received three awards for scientific achievement and contributions to the profession from national and regional organizations; and

had their research featured on the covers of four internationally recognized scientific journals.

Because NBMG's primary mission is applied geologic research, most NBMG scientists focus on creating products needed by a broad base of users in the scientific, engineering, land-management/land-use planning, and regulatory professions. These products include peer-reviewed geologic maps and reports published by NBMG. In addition, NBMG scientists conduct fundamental scientific research and publish in internationally recognized journals. In the last two years, NBMG scientists have published in the many prestigious peer-reviewed journals, including *Earth, Planets, and Space; Economic Geology; Environmental Geology; Geological Society of America Bulletin; Geology; Geophysical Research Letters; Journal of Geochemical Exploration; Journal of Geophysical Research; Journal of Hydrology; Journal of Volcanology and*
their articles are cited frequently by other researchers (over 500 times for one article), and at least three of the NBMG faculty have strong international reputations as measured by citations in refereed journals (statistics from the Institute for Scientific Information, webosfscience.com). NBMG scientists also contribute regularly to news in professional and trade journals, including Mining Engineering, Geotimes, GSA Today, and The Professional Geologist.

In recent years NBMG has made a concerted effort to create special publications for the general public. In addition to several new items in the Educational Series for teachers and students, books and maps added in the last two years include:

- **Traveling America’s Loneliest Road, A Geologic and Natural History Tour through Nevada along U.S. Highway 50** (2000, NBMG Special Publication 26, 132 pages, written and designed by Joseph V. Tingley and Kris Ann Pizarro);
- **Lake Tahoe 3-D Shaded Relief Map** (2000, NBMG Special Publication 28, an 18x24-inch color map, with 3-D glasses, created by Gary L. Johnson and Kris Ann Pizarro);
- **Rocks, Gemstones, Minerals, and Fossils in Nevada** (2001, NBMG Special Publication 29, 1:1,000,000-scale map of Nevada with locations and pictures of classic minerals, gems, fossils, and rocks found in Nevada, prepared by Stephen B. Castor and Daphne D. LaPointe); and
- **Living with Earthquakes in Nevada, A Nevadan’s Guide to Preparing for, Surviving, and Recovering from an Earthquake** (2000, NBMG Special Publication 27, 36 pages, written and designed by Craig M. dePolo, Lucy M. Jones, Diane M. dePolo, and Susan Tingley);

Through agreements with the University of Nevada Press, Special Publications 16 and 26 are reaching users in bookstores throughout Nevada and other parts of the country. All publications can be ordered on line (www.nbmg.unr.edu), and selected publications, such as Special Publication 27, several Educational Series items, NBMG’s annual publication on the Nevada Mineral Industry, and the joint publication with the Nevada Division of Minerals on Major Mines of Nevada, are provided to the public for free on the Web. As costs for data storage continue to drop, and as more people gain access through the Web at home, businesses, schools, and libraries, NBMG expects to provide more maps and reports to the professional users and general public on the Web.

For more information about the Nevada Bureau of Mines and Geology, or about the geology, resources, and environmental issues in Nevada, please feel free to contact us.

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Reno, Nevada 89557-0088 Web: www.nbmg.unr.edu
APPENDIX A

Activities of NBMG in 2000 and 2001

This appendix includes citations of publications produced by NBMG and authored by NBMG scientists; grants awarded to principal investigators on the NBMG staff; invited lectures, public presentations, and other professional activities of the NBMG staff; and awards and honors during the past two years.

PUBLICATIONS—2000


Castor, S.B., and Garside, L.J., 2000, GSN road log 1, Interstate 80 eastbound, Reno to Fernley: Geological Society of Nevada Guidebooks for field trips 3, 4, 5, 6, 7, 8, and 9 (Geology and Ore Deposits 2000 Symposium), 9 p.


Dunford, L., Bell, J.W., and Johnson, G.L., 2000, Map showing expansive soil potential in Las Vegas Valley: Final Technical Report to the Clark County Building Department.


Henry, C.D., and Faulds, J.E., 2000, Geologic map of the Emigrant Pass Quadrangle, Nevada: Nevada Bureau of


LaPointe, D.D., 2000, Highways, hazards and hot springs, a geoscience day field trip for Traner Middle School students and the Committee on Women and Minorities of the Geological Society of America, Nov. 15, 2000, 4 p.


Shevenell, L., Garside, L.J., and Hess, R.H., 2000, Nevada geothermal resources, Nevada Bureau of Mines and Geology Map 126, 1:1,000,000 scale.


PUBLICATIONS—2001


dePolo, C.M., 2001, Field visit to trenches along the Guaje Mountain fault in the Chupaderos Canyon area, July 18, 2001: report to Los Alamos National Laboratory, 4 p.


dePolo, C.M., 2001, Quaternary active faults of Nevada: annual report to the National Earthquake Hazard Reduction Program, 2 p.


Dunford, L., Bell, J.W., and Johnson, G.L., 2001, Expansive soils in Las Vegas Valley: Published by the Clark County Building Department as the Clark County Expansive Soils Guidelines Map.


House, P.K., 2001, Preliminary Quaternary geologic map of the Yerington Quadrangle, Lyon County, Nevada, Nevada Bureau of Mines and Geology unpublished map (Statemap contract deliverable)


**ACTIVE RESEARCH GRANTS—2000 AND 2001**

Army Research Office, DEPSCoR program, Use of well hydrographs in shallow, fractured aquifers to determine specific yields and continuum transmissivities, 9/96–6/00, $119,299, L. Shevenell.

Clark County Regional Flood Control District, Paleoflood hydrology of upper Las Vegas wash, 10/01–12/01, $5000, P.K. House.

Desert Research Institute, Review and mineral management plan development, Nellis Test and Training Range, 10/99–9/01, $10,002, J.V. Tingley.


Federal Emergency Management Agency and Nevada Division of Emergency Management, Earthquake risk mitigation in Nevada, 10/00–9/01, $62,320, C.M. dePolo.


Geological Society of America, Travel grant to attend the International Geological Congress, Rio de Janeiro, Brazil, 8/00, $1475, L. Shevenell.

Hi-Desert Economic Development Authority, Great Basin Development Association, Hard dimension stone study, 11/00–11/01, $55,000, J.V. Tingley and S.B. Castor.

National Aeronautics and Space Administration through Jet Propulsion Laboratory, GPS software improvements, 2/00–12/00, $50,000, G. Blewitt.

National Aeronautics and Space Administration through State University of New York at Stony Brook, A self-consistent global velocity gradient tensor field model, 2/00–1/02, $94,274, G. Blewitt.

National Aeronautics and Space Administration, Development and transfer of InSAR and GPS applications to local government in Nevada, 1/02–12/04, $539,552, J.W. Bell and G. Blewitt.

National Environment Research Council, UK, Global geodetic investigation of widespread intra-plate deformation, 1/99–6/02, $200,000 to University of Newcastle, UK, where Blewitt holds a Visiting Professorship, G. Blewitt and P. Clarke.


National Science Foundation through UCAR, GPSVEL, GPS velocity synthesis project, 7/00–9/03, $82,309, G. Blewitt.


National Science Foundation, Aquifer deformation using GPS, 9/01–8/04, $97,131, ($32,173 awarded for year 1), G. Blewitt and J. Bell.


National Science Foundation, Aquifer deformation using GPS, 9/01–8/04, $97,131, ($32,173 awarded for year 1), G. Blewitt and J. Bell.


National Science Foundation, Four-dimensional evaluation of a major continental detachment fault: Structural, paleomagnetic, and thermochronologic constraints, 1/00–12/02, $49,959, J.E. Faulds.

National Science Foundation, Global geodetic science: Surface mass transport and solid earth mechanics, 12/01–10/04, $197,069, G. Blewitt.

National Science Foundation, Heavy metal pollution in the Rio Pilcomayo, Bolivia, 8/00–11/01, $22,016, P.J. Lechler.

National Science Foundation, Hydrological Sciences Program, Comparison of regional flood frequency responses to climatic variability in the western United States during the late Holocene using modern, historical, and prehistorical information, 1/98–12/00, $156,281, P.K. House, L.L. Ely, K.R. Redmond, and E.V. McDonald.


Nye County, Nevada, Geologic Mapping Project, 6/00–9/01, $72,000, C.M. dePolo and A.R. Ramelli.

State of Nevada, Geologic Mapping Project, 6/00–9/01, $72,000, C.M. dePolo and A.R. Ramelli.

Tubitak grant, PGEs in chromitites in Turkey, 2000, $1,500, P.J. Lechler.

U.S. Bureau of Land Management, GIS data capture, 11/00–9/01, $70,000, G.L. Johnson.

U.S. Bureau of Land Management, Minerals of Nevada, 10/98–9/00, $20,000, S. Castor.


U.S. Bureau of Reclamation, Formal peer-review of Folsom Dam/American River paleoflood studies, 10/01–1/02, $10,000, P.K. House.

U.S. Bureau of Reclamation, Participatory Peer-review Panel, Paleoflood study of the Big Lost River, Idaho Environmental and Engineering Laboratory (INEEL), 10/01–10/02, $6,500, P.K. House.


U.S. Bureau of Reclamation, The use of paleoflood hydrology to extend the flood record of the Carson River basin, 6/00–1/01, $10,000, P.K. House.


U.S. Geological Survey, National Earthquake Hazards Reduction Program, Quaternary active faults of Nevada, 8/01–7/02, $37,250, C.M. dePolo.


Geologic map of the western half of the Nixon Quadrangle, $15,623, J.W. Bell and P.K. House.


Geologic map of the west half of the Dogskin Mountain Quadrangle, Nevada, 5/01–8/02, $22,313, J.E. Faulds and C.M. dePolo.


Geologic map of the north half of the Horse Springs Quadrangle, 8/01–9/02, $19,949, A.R. Ramelli and C.M. dePolo.

Geologic map of the south half of the Horse Springs Quadrangle, 8/00–12/01, $15,829, A.R. Ramelli, C.M. dePolo, and J.W. Bell, and J.E. Faulds.

Geologic map of the Iceberg Canyon Quadrangle, 5/01–8/02, $18,102, J.E. Faulds and R. Brady.

Geologic map of the Last Chance Range Quadrangle, 8/01–9/02, $20,143, C.M. dePolo, and A.R. Ramelli.

Geologic map of the Minden Quadrangle, Nevada, 5/01–4/02, $40,199, L.J. Garside, C.M. dePolo, and A.R. Ramelli.

Geologic map of the Sixmile Spring Quadrangle, 8/00–12/01, $28,635, C.M. dePolo, A.R. Ramelli, J.W. Bell, and J.E. Faulds.

Geologic map of the Sutcliffe Quadrangle, 5/01–8/02, $29,242, J.E. Faulds and C.M. dePolo.

Geologic map of the north half of the Tule Peak and east half of Dogskin Mountain Quadrangles, 5/00–12/00, $24,750, J.E. Faulds and C.M. dePolo.

Geologic map of the south half of the Tule Peak Quadrangle, Nevada, 5/99–4/00, $12,140 proposed to and funded by the program, L. Garside and S. Castor.


Geologic map of the north half of the Virginia City Quadrangle, Nevada, 5/01–4/02, $20,008, L. Garside and S. Castor.

Geologic map of the south half of the Virginia City Quadrangle, Nevada, 5/00–8/01, $12,140 proposed to and funded by the program, L. Garside and S. Castor.
Geologic map of Yerington Quadrangle, 5/00–9/01, $19,668, P.K. House.
University of Newcastle, NSW, Australia, Visiting Research Grant, 7/01–11/01, $3,700, S. Castor.
University of Nevada, Reno, International Activities Grant, Collaborative research with the University of
Newcastle, UK, 7/00–6/01, $2,000, G. Blewitt.
Water Resources Research Institute, Lead and arsenic pollution in North Carolina, 2000–2001, $7,500, P.J.
Lechler.
Western Governors' Association support for NASA Remote Sensing Workshop for State and Local Government

OTHER PROFESSIONAL ACTIVITIES—2000 AND 2001

Bell, J.W.

2001
Institutional representative, Western North America InSAR Consortium.
Field trip co-leader, Active faulting in the Reno–Lake Tahoe region, for the National Research Council.
Invited participant, National Science Foundation-sponsored Plate Boundary Observatory Workshop on Geology
held at Caltech, Pasadena, California.
Consultant, technical expertise on faults and in fissures for the City of North Las Vegas.

Blewitt, G.

2000
Chair of Rotation Datum Sub-Group, International Earth Rotation Service Working Group on ITRF Datum.
Vice Chair, Global Strain Rate Map, International Lithosphere Program (under Int. Council for Science).
Vice Chair, Global Strain Rate Map, International Lithosphere Program (under Int. Council for Science).
Member, Steering Committee, University NAVSTAR Consortium.
Member, Governing Board, International Association of Geodesy Commission XIV: Crustal Deformation.
Member, Governing Board, International GPS Service.
Member, Governing Board, International Association of Geodesy Special Commission VI, Working Group of
European Geo-scientists for the Establishment of Networks for Earth-Science Research.

2001
Chairman of the Board, University NAVSTAR Consortium.
Chair of Rotation Datum Sub-Group, International Earth Rotation Service Working Group on ITRF Datum.
Vice Chair, Global Strain Rate Map, International Lithosphere Program (under Int. Council for Science).
Vice Chair, Global Strain Rate Map, International Lithosphere Program (under Int. Council for Science).
Member, Steering Committee, University NAVSTAR Consortium.

Member, Governing Board, International Association of Geodesy Commission XIV: Crustal Deformation.
Member, Governing Board, International GPS Service.
Member, Governing Board, International Association of Geodesy Special Commission VI, Working Group of
European Geo-scientists for the Establishment of Networks for Earth-Science Research.
Invited participant, National Science Foundation meeting on EarthScope, Snowbird, Utah.

Castor, S.B.

2000
Member, Geological Society of Nevada Education Committee.

2001
Judge/Leader, Regional Science Fair.
Co-Chair for the Industrial Minerals Forum 2003 organizing committee.
Member, Geological Society of Nevada Education Committee.
dePolo, C.M.

2000
Member, Geosciences Committee, Nevada Earthquake Safety Council.

2001
Chair, Basin and Range Province Committee of the Western States Seismic Policy Council.
Co-Chair of the Science Committee, Nevada Earthquake Safety Council.
Speaker, Regional Strategic Recovery Planning Workshop.
Member of the Geosciences Committee, Mitigation Committee, and the Strategic Planning Committee, Nevada Earthquake Safety Council.
Presenter, the western Nevada planning scenario, earthquake that was used as a disaster to focus on, and included information calculated by FEMA’s HAZUS program for the recovery effort.
Speaker, Nevada Earthquake Safety Council meetings, earthquake hazards of Nevada.
Developer, media workshops for scripts to be read following a major damaging earthquake in Nevada.

Desilets, M.

2000
Chair, Web Committee, Geological Society of Nevada.
Co-Chair, Facilities and Social committee, Geology and Ore Deposits 2000: The Great Basin and Beyond, Symposium, Geological Society of Nevada.
Judge, Western Regional Science Fair, Reno, Nevada.
Judge, Mamie Towles Elementary School Science Fair, Reno, Nevada.
Instructor, Laboratory for Analytical Methods and Instrumentation, Fall.

2001
Chair, Web Committee, Geological Society of Nevada.
Co-Chair, Facilities and Audio Visual Committee, 39th Forum on the Geology of Industrial Minerals.
Judge, Western Regional Science Fair, Reno, Nevada.

Faulds, J.E.

2000
Instructor, Summer 2000: Geology Summer Field Course (6 week field camp, Geol-451).
Field Trip Leader, Evolution of the Colorado River Conference.

2001
Instructor, Summer 2001: Geology Summer Field Course (6 week field camp, Geol-451).
Co-Convener, Colorado Plateau-Basin and Range transition conference (The Mackin Conference), Utah Geological Association and AAPG; co-chair of technical committee; co-editor of special volume.

Garside, L.J.

2000
Member, Potential Gas Committee, Institute for Energy Resource Studies, Colorado School of Mines.
Co-Chairman, Geology of Nevada Session for the Geological Society of Nevada 2000 meeting.
Member, Technical Program Committee for the Geological Society of Nevada GSN2000 meeting.

2001
Chair, Field Trips Committee, 39th Forum on the Geology of Industrial Minerals.
Member, Potential Gas Committee, Institute for Energy Resource Studies, Colorado School of Mines.
Presenter, PowerPoint presentation on the Geology of the Carson City area to the Friends of Silver Saddle Ranch
(BLM) and led a short field trip to Prison Hill. 
Leader, field trip to the Steamboat geothermal area for the Nevada Groundwater Protection Council. 

Hess, R.H.

2000
Executive Secretary, Nevada State Mapping Advisory Committee.
Executive Secretary, Geologic Mapping Subcommittee, Nevada State Mapping Advisory Committee.
Chairman, Ballot Committee, Nevada Petroleum Society.
Member, NASA project group, National States Geographic Information Council.
State of Nevada representative, Geographic Information Council, Western Governors’ Association.

2001
Executive Secretary, Nevada State Mapping Advisory Committee.
Executive Secretary, Geologic Mapping Subcommittee, Nevada State Mapping Advisory Committee.
Chairman, Ballot Committee, Nevada Petroleum Society.
Co-Chair, Facilities and Audio Visual Committee, 39th Forum on the Geology of Industrial Minerals.
Member, Board of Directors, Nevada Geographic Information Society.
State of Nevada representative, National States Geographic Information Council annual meeting, St. Louis, Missouri.
State of Nevada representative, National States Geographic Information Council annual meeting, Lake Tahoe, Nevada.
State of Nevada representative, Geographic Information Council, Western Governors’ Association.
Member, NASA project group, National States Geographic Information Council.

House, P.K.

2000
Member, Scientific Evaluation Panel, National Science Foundation-Nevada Science Teacher Education Project.
Member, Grand Canyon Monitoring and Research Center, Cultural Resource Program Research Protocol Evaluation Panel, Geomorphology Group.
Co-Convener, Pardee Session at the Geological Society of America Annual Meeting entitled: Causes and Consequences of Floods.
Co-Organizer, USGS/AZGS/NBMG Sponsored workshop on Sediments and Sedimentary processes along the lower Colorado River corridor, Flagstaff, Arizona.

2001
Instructor, Summer Geology Field Course, Department of Geological Sciences, University of Nevada, Reno.
Presenter, Alluvial Fan Flood Hazard Research Results to Nevada All Hazards Mitigation and Advisory Committee.
Field Trip Co-Leader, Nevada AHHMAC and Laughlin City Officials, Geology and Natural Hazards of the Laughlin, Nevada area.
Field Trip Leader, Field review of Quaternary geologic mapping along the middle Humboldt River.
Presenter, Laughlin Town Advisory Board, Flood Hazards on the Newberry Piedmont, Laughlin, Nevada.
Field Trip Leader, Buckbrush Flood Safety Coalition, Piedmont Flood Hazards in the Eastern Carson Valley.
Presenter, “What are Rivers For?” to Ms. Kathleen Hoff’s sixth grade science classes at Jerry Whitehead Elementary School, Sparks, Nevada.
Reviewer, ‘Conceptual Drainage Study’ prepared for flood and debris flow prone area near Genoa, Nevada, Mr. John S. Hennigsen and Genoa Town Council.
Hursh, J.P.

2001
Invited Speaker, slide show presentation featuring photos from NBMG SP26, Traveling America’s Loneliest Road, to Lattimer Art Club, Reno, Nevada, 47 people in attendance, sold 14 copies of SP26 on the spot.
Invited Guest Artist, Artist’s Co-op Gallery of Reno, March 1–31, 2001, month long photo display featuring NBMG SP26, of which 60 copies were sold at the gallery.

Johnson, G.L.

2000
Treasurer, Nevada Geographic Information Society.
Instructor, Introduction to GIS, University of Nevada, Reno, Spring Semester.
Instructor, Introduction to GIS, Truckee Meadows Community College, Spring Semester.

2001
Treasurer, Nevada Geographic Information Society.
Instructor, Advanced GIS, University of Nevada, Reno, Fall Semester.
Instructor, Introduction to GIS, University of Nevada, Reno, Spring Semester.

LaPointe, D.D.

2000
Advisor, Washoe County Great Basin Field Trip project.
Chair, Scholarship/Loan Committee, Nevada-Reno Section of the Women’s Auxiliary to the American Institute of Mining, Metallurgical and Petroleum Engineers.
Co-Chair, Geological Society of Nevada Education Committee.
Coordinator, Production of a video by Galena High School film class designed to address middle through high school Nevada State Science Standards dealing with topics on costs and benefits of mining and its effect on the environment.
Instructor, geology training session to Hug High School students participating in the Washoe County School District Outdoor Education Program, Clear Creek Youth Center, Carson City, Nevada.
Judge, Seismic Safety Poster Contest.
Leader, field trip, Nevada State Science Teachers Association annual meeting, Lovelock, Nevada.
Leader, field trips and curriculum, Kids University, University of Nevada.
Leader, field trips, Minerals Education Workshops, Nevada Mining Association and Nevada Division of Minerals, Las Vegas, and Carson City, Nevada.
Leader, Geoscience Day field trip in conjunction with the Geological Society of America Annual meeting and Committee on Women and Minorities, Reno, Nevada.
Leader, Geoscience Day field trip, Committee on Women and Minorities of the Geological Society of America.
Leader, Mackay School of Mines prospective student field trip to Marigold Gold Mine, Humboldt County Nevada.
Leader, Nevada Earth Science Week activities.
Member, Board of Directors, Geological Society of Nevada Foundation.
Member, Nevada Earthquake Education and Awareness Committee.
Member, Nevada Mining Association Education Committee
Member, Nye County Science and Technology Center steering committee participant.
Presenter, Minerals, Washoe County Library family explorations program.
Presenter, Radon in Nevada and radon-resistant construction techniques, International Congress of Building Officials meeting.
Presenter, Rocks, minerals, and fossils, Carson City Children’s Museum, Rock-Kickers Club.
Presenter, Truckee Meadows Community College Career Day.
2001
Activities and field trips coordinator, Washoe County School District Outdoor Education Program, Clear Creek Youth Center, Carson City.
Assistant, Partners in Science Outreach Program, University of Nevada, Reno, Medical School, designing hands-on Earth science activities for local at-risk elementary school classrooms.
Chair, Scholarship/Loan committee chairman, Nevada-Reno Section of the Women’s Auxiliary to the American Institute of Mining, Metallurgical and Petroleum Engineers.
Co-chair, Geological Society of Nevada Education Committee.
Co-Leader, field trips, Minerals Education Workshops, Mining Association and Nevada Division of Minerals, Las Vegas and Fallon, Nevada.
Instructor, Science Discovery in the Field, Washoe County Science graduate level geoscience education course.
Judge, Nevada Science Olympiad.
Leader, Earth Science Week field trips, 320 participants.
Leader, Earth science-related field trip, Truckee Meadows Babysitting Cooperative.
Leader, field trip, Nevada State Science Teachers Association annual meeting, Las Vegas, Nevada.
Leader, Mackay School of Mines prospective student field trip to Twin Creeks Gold Mine, Humboldt County, Nevada.
Member, Great Basin Adventure Mine Building Steering Committee.
Member, Great Basin Outdoor School Board of Directors.
Member, Nevada Earthquake Safety Council’s Earthquake Education and Awareness Committee.
Member, Nevada Mining Association Education Committee.
Presenter, minerals, rocks, maps, earthquakes, careers, and geology to K-12 teachers and classes from the following schools: Mendive and Traner middle schools, Huffaker, Peavine, Brown, Hidden Valley, Greenbrae, Westergard, Sun Valley, Lemmon Valley, Roger Corbett, Roger Mitchell, Bernice Martin Matthews, and Hunsberger elementary schools.

Lechler, P.J.

2000
Co-Editor, Mercury Special Issue of Environmental Geology.
Member, BLM Abandoned Mine Lands task force.
Member, Nevada Attorney General’s Mining Fraud Task Force.
Co-Chair, Technical Session for Geological Society of America Annual Meeting.
Co-Chair, Technical Session for Geological Society of Nevada.

2001
Co-Editor, Mercury Special Issue of Environmental Geology
Panelist, Caribbean Regional Conference on Environmental Management of Mine Sites, Le Meridien (Pegasus) Hotel, Georgetown, Guyana.

Price, J.G.

2000
President-Elect, Association of American State Geologists.
Chair, Board of Directors, Western States Seismic Policy Council.
Chair, Government Affairs Committee, Nevada Section, American Institute of Professional Geologists.
Chair, Government Affairs, Mineral and Energy Resources Section, National Association of State Universities and Land Grant Colleges.
Chair, Research Council, Society for Mining, Metallurgy, and Exploration.
Chair, Society for Mining, Metallurgy, and Exploration of AIME Research Council.
Chair, State Mapping Advisory Committee.
Vice-Chair, Committee on Technologies for the Mining Industries, National Research Council.
Co-Chair, Mining Fraud Task Force, with the Nevada Attorney General and Administrator of the Nevada Division of Minerals.
Co-Chair, Session on Great Science in the Great Basin, Geological Society of America.
Co-Chair, Technical Program Committee for the 2000 Symposium, (and co-editor of the proceedings volumes), Geological Society of Nevada.
Citationist, Pick and Gavel Award to Congressman Jim Gibbons, Association of American State Geologists.
Secretary, Nevada Earthquake Safety Council.
Field Trip Co-Leader, Geological Society of America Geoscience Day, Traner Middle School, Reno.
Field Trip Co-Leader, Nevada Mining Association Teachers Conference, Carson City to Rawhide.
Instructor, Nevada Mining Association Teachers Conferences, Las Vegas and Carson City.
Judge, Lois Allen Elementary School Science Fair.
Member, Committee on Earth Resources, National Research Council.
Member, Economic Geology Publishing Company.
Member, Editorial Board, Ore Geology Reviews.
Member, Executive Committee, Board on Earth Sciences and Resources, National Research Council.
Member, Investment Committee, Society for Mining, Metallurgy, and Exploration Foundation.
Member, Liaison Committee, Executive Committee, and Energy and Minerals Policy Committee, Association of American State Geologists.
Member, Mineral and Energy Resources Section, National Association of State Universities and Land Grant Colleges.
Member, Nevada All Hazard Mitigation Committee, State of Nevada.
Representative to the Member Society Council of the American Geological Institute for the Association of American State Geologists.
Trustee, Society of Economic Geologists Foundation.
Administrator, Mining Cooperative Fund, State of Nevada.

2001
President, Association of American State Geologists.
Chair, Board of Directors, Western States Seismic Policy Council.
Chair, Budget Committee, 39th Forum on the Geology of Industrial Minerals.
Chair, Government Affairs, Mineral and Energy Resources Section, National Association of State Universities and Land Grant Colleges.
Chair, Nominations Committee, Association of American State Geologists.
Chair, State Mapping Advisory Committee.
Vice-Chair, Committee on Technologies for the Mining Industries, National Research Council.
Vice-Chair, Joint American Institute of Professional Geologists—Association of Engineering Geologists Annual Meeting Organizing Committee for 2002.
Secretary, Nevada Earthquake Safety Council.
Field Trip Co-Leader, Nevada Mining Association Teachers Conference, Fallon area.
Field Trip Co-Leader, two Earth Science Week Field trips.
Instructor, Nevada Mining Association Teachers Conferences, Las Vegas and Fallon.
Member, Economic Geology Publishing Company.
Member, Executive Committee, Board on Earth Sciences and Resources, National Research Council.
Member, Executive Committee, Earth Science Education Committee, and Energy and Mineral Policy Committee, Association of American State Geologists.
Member, Investment Committee, Society for Mining, Metallurgy, and Exploration Foundation.
Member, Mineral and Energy Resources Section, National Association of State Universities and Land Grant Colleges.
Member, Nevada All Hazard Mitigation Committee, State of Nevada.
Trustee, Society for Mining, Metallurgy, and Exploration Foundation.
Trustee, Society of Economic Geologists Foundation.
Administrator, Mining Cooperative Fund, State of Nevada.
Ramelli, A.R.

2000
Leader, field trip, Historical surface faulting and paleoseismology of the central Nevada seismic belt, Geological Society of America Summit 2000.
Member, National/International review panel, National Earthquake Hazards Reduction Program.

2001
Leader, field trip, Geologic mapping studies in the Battle Mountain area: Nevada Bureau of Mines and Geology Field Review.
Leader, field trip, Spillover point of pluvial Lake Beckwourth into the Lahontan Basin, railroad tunnel portal on east side of Beckwourth Pass: Friends of the Pleistocene Pacific Cell Field Trip, Northern Walker Lane and Northeast Sierra Nevada.
Member, National/International review panel, National Earthquake Hazards Reduction Program.

Shevenell, L.

2000
Member, Interagency Abandoned Mine Lands Environmental Task Force.
Member, U.S. Army Corps of Engineers AML working group.
Member, Steering committee, Acid Drainage Technology Initiative, Metal Mining Sector; Chair, Committee on Pit Lakes, ADTI-MMS.
Member, NIWR-USGS National Competitive Grants Program Review Panel.
Member, Steering committee, Western State Pit Lake Conference.

2001
Member, Interagency Abandoned Mine Lands Environmental Task Force.
Member, U.S. Army Corps of Engineers AML working group.
Participant, American Association of State Geologists Liaison Committee meetings with funding agencies and congressional delegations, Washington, DC.
Member, Steering committee, Acid Drainage Technology Initiative, Metal Mining Sector; Chair, Committee on Pit Lakes, ADTI-MMS.
Member, NIWR-USGS National Competitive Grants Program Review Panel.

Tingley, J.V.

2000
Executive Secretary, Nevada State Board on Geographic Names.
Manuscript reviewer, A passion for gold by R.J. Roberts: University of Nevada Press.
Member, Nevada State Clearinghouse, Department of Administration.

2001
Leader, Walking tour and lecture on geology of Pyramid Lake and surrounding area, given to students from Pioneer High School (Carson City, Nevada), at Warrior Point, Pyramid Lake.
Executive Secretary, Nevada State Board on Geographic Names.
Member, Nevada State Clearinghouse, Department of Administration.

Tingley, S.L.

2000
Co-Leader, field trip, Steamboat Springs, Lake Tahoe, and the Comstock area: Association of Earth Science
INVITED PAPERS AND PRESENTATIONS—2000

Caster, S.B., 2000, Status of the inventory of Nevada minerals: Mineral Collectors' Workshop, Southern California Chapter of the Friends of Mineralogy, Barstow, California.
Faulds, J.E., 2000, Geology of the Laughlin area: State of Nevada All Hazards Committee Meeting, Las Vegas.


Lechler, P.J., 2000, Determination of platinum-group elements, gold, and silver in geologic materials by microwave digestion and ICP-HEX-MS: Geological Society of America Annual Meeting, Reno.

Lechler, P.J., 2000, Platinum-group element exploration and analysis: Why Turkey? Why now?: Cumhuriyet University, Sivas, Turkey.


Price, J.G., 2000, Hardrock mining on federal lands: testimony before the Nevada Legislative Committee on Public Lands.


INVITED PAPERS AND PRESENTATIONS—2001


Bell, J.W., 2001, Las Vegas has been sinking for 50 years—now is it going back up?: Fall opening meeting, Association of Engineering Geologists, Southwestern Section.


Castor, S.B., 2001, Geology of the Mountain Pass rare-earth deposit: Western Mining Corporation mining staff, Roxby Downs, Australia.


Shevenell, L., 2001, Geothermal resource location, exploration, and use: Guest lecturer, MSM course on Geology of Natural Resources.


Tingley, J.V., 2001, Along the loneliest road, a travelog: Western Association of Map Libraries Fall Conference, Reno, Nevada.


Tingley, S.L., 2001, Can and should Federal employees be voting members of State geographic names boards, or simply advisors?: State/Federal Roundtable Session, Council of Geographic Names Authorities.


HONORS AND AWARDS

Blewitt, G.


Elected Chairman of the Board, University NAVSTAR Consortium.

Price, J.G.


Elected President of the Society of Economic Geologists for the year 2003.
APPENDIX B

STATUTORY MANDATES OF THE NEVADA BUREAU OF MINES AND GEOLOGY

Nevada Revised Statutes related to the Nevada Bureau of Mines and Geology

CHAPTER 514 - BUREAU OF MINES AND GEOLOGY

NRS 514.002 Definitions. As used in this chapter, unless the context otherwise requires, the words and terms defined in NRS 514.005 and 514.007 have the meanings ascribed to them in those sections.

(Added to NRS by 1997, 2977)

NRS 514.005 "Professional geologist" defined. "Professional geologist" means a person who:
1. Possesses a baccalaureate or higher degree from an accredited college or university with at least 30 semester hours or 45 quarter hours of course work in the science of geology and has at least 5 years of experience in the science of geology, which may include no more than 2 years of postgraduate course work in the science of geology;
2. Has at least 12 years of experience in the science of geology, at least 3 years of which must have been completed under the supervision of a professional geologist; or
3. Is currently licensed or certified as a professional geologist:
   (a) In another state; or
   (b) By a national nonprofit geological organization with members in at least 10 states who are licensed or certified, if the requirements for his current licensure or certification included requirements at least equal to those set forth in either subsection 1 or 2.

(Added to NRS by 1997, 2978)

NRS 514.007 "Science of geology" defined. "Science of geology" means the:
1. General study of the earth, including its origin, processes and history;
2. Collection and investigation of specimens of the constituent rocks, minerals, fossils, solids, mineralizing fluids, gasses and other materials of the earth that are located from the center of the core of the earth to the surface of the earth; and
3. Application of the knowledge set forth in subsections 1 and 2 for the benefit of the general public and the general welfare of this state.

(Added to NRS by 1997, 2978)

NRS 514.010 Establishment. There is hereby established a bureau of mines and geology of the State of Nevada which shall be in the public service division of the University and Community College System of Nevada.


NRS 514.020 Compensation and expenses of board of regents. Members of the board of regents shall serve without compensation, but shall be reimbursed for the actual expenses incurred in the performance of their official duties.

[Part 1:127:1935; 1931 NCL § 4311.01]

NRS 514.030 Employment and compensation of director and other employees.
1. The board of regents of the University of Nevada shall appoint as director a competent scientist or engineer, to be known as the director of the bureau of mines and geology, who must be a:
   (a) Graduate of a recognized college or university with a degree in some branch of earth science or mineral engineering; and
   (b) Professional geologist with expertise in the science of geology.
2. Upon the director's nomination, the board of regents of the University of Nevada shall employ such assistants and employees as the board deems necessary.
3. The board of regents of the University of Nevada may also determine the compensation of all persons employed by the bureau of mines and geology and may remove them at will.

NRS 514.040 Duties. The bureau of mines and geology shall:
1. Serve as a bureau of information and exchange on Nevada mineral industry, mineral resources and geology.
2. By questionnaire, field investigations, laboratory studies or otherwise, conduct a thorough survey of the mineral resources and geology of the state.
3. Apply geologic engineering principles to problems of conservation, environment, construction, mineral industry and other scientific matters that may be of importance to the welfare of the state.
4. Make studies of mineral materials to determine the most economical and practical methods of concentrating and processing these resources and to promote their conservation.
5. Collect, in collaboration with the Mackay school of mines, a library and bibliography of all literature pertaining to Nevada mineral industry, geology and mineral resources.
6. Collect, in collaboration with the Mackay school of mines, typical geological and mineralogical specimens and models, drawings and descriptions of appliances used in the mineral industry and earth science. Collections of these materials may be maintained and displayed elsewhere within or without the state.
7. Provide for the dissemination of information on the mineral industry, geology and mineral resources of the state through lectures and publications.
8. Consult with, advise and assist state and local governmental agencies on geological problems of importance to the citizens of Nevada.
9. Consider such other kindred scientific and economic questions as in the judgment of the board of regents shall be deemed of value to the people of the state.

NRS 514.050 Cooperation of state departments. All departments of the state government shall render full cooperation to the bureau of mines and geology in the acquisition and compilation of all data required by NRS 514.040

NRS 514.060 Agreements with United States Geological Survey.
1. The director of the bureau of mines and geology, for and on behalf of the State of Nevada, with the approval of the governor, is authorized to enter into agreements with the United States Geological Survey for cooperation in investigating mineral and geological conditions within the state and in the topographic and geologic mapping of Nevada. The expenses of such work must be divided between the parties upon a basis whereby the State of Nevada will not pay more than 50 percent of such expenses.
2. Money necessary to carry out the provisions of this section must be provided pursuant to NRS 519A.260.
3. All claims against such money must be approved by the director of the bureau of mines and geology, and, when thereafter approved by the state board of examiners, must be paid in the same manner as other claims against the state.

NRS 514.070 Reports: Distribution and sale.
1. The board of regents shall cause to be prepared before September 1 of each even-numbered year a report covering the biennium ending June 30 of such year, showing the progress and condition of the bureau of mines and geology, together with such other information as the board may deem necessary or useful, or as the board may require.
2. The regular and special reports of the bureau of mines and geology shall be printed as the board of regents may direct, and the reports may be distributed or sold by the board as the interest of the state or science may demand. All moneys obtained by the sale of such reports shall be retained by the bureau of mines and geology to be used for costs of printing and distribution as the board of regents may direct.

NRS 514.080 Unlawful acts. It shall be unlawful for the director or any attaché of the bureau of mines and geology:
1. To receive a commission or to act as agent or broker of or for any purchaser, owner, or his or their agents, of a mining property.
2. To act in any other than a wholly impartial way while so employed.
CHAPTER 396 - UNIVERSITY AND COMMUNITY COLLEGE SYSTEM OF NEVADA

PUBLIC SERVICE DIVISION

In General
NRS 396.600 Composition. The public service division of the system consists of the following public service departments:

1. Agricultural extension.
2. Agricultural experiment station.
4. Such other departments as the board of regents may designate.

NRS 396.610 Rules and regulations. All rules and regulations necessary for the proper administration and enforcement of the public service division of the system must be made by the presidents, the chancellor and the board of regents.

BUREAU OF MINES AND GEOLOGY

NRS 396.620 Analyses of ores, minerals, soil and water: Submission of samples by residents of this state; fee; maintenance of records and samples.

1. Subject to the limitations specified in NRS 396.620 to 396.660, inclusive, the chancellor shall cause to be analyzed by an appropriate employee of the system any ores, minerals, soil or water taken from within the boundaries of the State of Nevada and sent by any resident of the state for that purpose. Persons sending samples from post offices in states bordering Nevada may be required to furnish evidence that their samples are taken in Nevada and that they are Nevada residents. Any resident of the state may send any such substance for analysis. The report of the results of the analysis must be mailed to him within 10 working days after it has been received if he has supplied the information for the maintenance of records as provided in this section. The report sent to him must also contain as nearly as possible an explanation of the uses and market value of the substance.

2. For each sample sent for analysis, the system shall charge a fee of $5 which must be used to defray the expense of conducting the analysis and storing the sample.

3. The system shall keep a record, open for inspection, under such rules as may be made by the board of regents, of all minerals, ores or other matters so sent, with a history of the minerals or other matters, stating the name and residence of the person from whom received, as nearly as possible the location from which the material was taken, including the district and county, and any other relevant information. This information for the records may be required to be filed with the system before any work is done on the material sent, and the 10-day limit for reports will count from the time the information is received by the system. Forms for providing the information must be printed by the state printing division of the department of administration and distributed at no charge.

4. A portion of the sample analyzed must be kept by the system for 3 months after the report is sent out, in case any question should arise in relation to the report or additional information be desired. After that time expires, samples may be destroyed or used for any desirable purpose.

NRS 396.630 Assay to be run when same material sent from same district. If the same general kind of matter for analysis is sent from the same district and previous analyses have shown its character and values, it shall not be necessary to analyze the same, but an assay shall be run to determine the value thereof, and shall be sent by mail to the person desiring the same.

NRS 396.640 Analyses of samples in order received. Samples for analysis shall be analyzed in the order received, as far as possible.

[3:84:1895; A 1933, 147; 1931 NCL § 7756]

NRS 396.650 Limitations on number of samples and quantitative analyses.
1. Gold and silver samples requiring assays and exact quantitative determinations are limited to two in any 30-day period; and of the so-called strategic or war minerals, such as antimony, arsenic, beryllium, manganese, magnesium, tungsten, molybdenum, quicksilver, zinc, lead, copper, tin, chromium, cadmium, or other strategic minerals for the assaying of which the average assay office is not equipped, there shall be run up to five assays or quantitative determinations for any single person or associated group of persons. Samples sent for ordinary rock and mineral determinations are limited to 10 in any 30-day period.
2. In order to save the state unnecessary expense, if preliminary examinations by microscope and qualitative tests indicate material of no economic value, exact quantitative analyses are not to be run on such samples, and reports on such material will indicate why such material has no commercial value.

[Part 4:84:1895; A 1897, 91; 1925, 29; 1931, 229; 1933, 147; 1943, 180; 1943 NCL § 7757]

NRS 396.660 Purpose and applicability of NRS 396.620 to 396.660 inclusive.
1. The main object of NRS 396.620 to 396.660, inclusive, as it relates to ore samples, is to aid the prospector in the discovery of new mineral deposits.
2. NRS 396.620 to 396.660, inclusive, shall not apply in the following cases:
   (a) To operating mines. The term "operating mines" as used in this subsection means those properties milling or shipping ore or being worked by hired labor.
   (b) To engineers sampling mines or prospects for purposes of valuation.
   (c) To so-called "control assays" to check other assayers on ore known to be of value.

[Part 4:84:1895; A 1897, 91; 1925, 29; 1931, 229; 1933, 147; 1943, 180; 1943 NCL § 7757]

CHAPTER 327 - NEVADA COORDINATE SYSTEM; GEOGRAPHIC NAMES

NRS 327.100 “Board” defined. As used in NRS 327.110 to 327.150, inclusive, unless the context otherwise requires, the term “board” means the Nevada state board on geographic names.
(Added to NRS by 1985, 588)

NRS 327.110 Nevada state board on geographic names: Creation; purpose. The Nevada state board on geographic names is hereby created to coordinate and approve geographic names within the state for official recommendation to the United States Board on Geographic Names.
(Added to NRS by 1985, 588)

NRS 327.120 Nevada state board on geographic names: Composition. The board consists of:
1. One representative of each of the following agencies or organizations:
   (a) **Bureau of mines and geology of the State of Nevada.**
   (b) Faculty of the University of Nevada, Reno.
   (c) Faculty of the University of Nevada, Las Vegas.
   (d) State library and archives.
   (e) Department of transportation of the state.
   (f) State department of conservation and natural resources.
   (g) Nevada historical society.
   (h) United States Bureau of Land Management.
   (i) United States Forest Service.
   (j) Inter-Tribal Council of Nevada, Inc.

Each agency or organization shall designate a representative and one alternative representative for this purpose.
2. An executive secretary who is a nonvoting member of the board. The state resident cartographer shall serve in this position. If there is not such a cartographer, the voting members of the board shall select the executive secretary.

(Added to NRS by 1985, 588; A 1993, 507)

NRS 327.130 Nevada state board on geographic names: Officers; rules; quorum; meetings; compensation.
1. The board shall designate from among its members a chairman and a vice chairman and shall adopt rules for its own management.
2. A majority of the voting members of the board constitutes a quorum for the transaction of business.
3. The board shall meet at such times and places as are specified by the chairman, but may not hold more than four meetings in any 1 year.
4. Members of the board shall serve without compensation, travel expenses or subsistence allowances except as they may be provided by the members’ respective agencies and organizations.

(Added to NRS by 1985, 588)

NRS 327.140 Nevada state board on geographic names: Powers and duties.
1. The board shall:
   (a) Receive and evaluate all proposals for changes in or additions to names of geographic features and places in the state to determine the most appropriate and acceptable names for use in maps and official documents of all levels of government.
   (b) Make official recommendations on behalf of the state with respect to each proposal.
   (c) Assist and cooperate with the United States Board on Geographic Names in matters relating to names of geographic features and places in Nevada.
   (d) Maintain a list of advisers who have special knowledge of or expertise in Nevada history, geography or culture and consult with those advisers on a regular basis in the course of its work.
2. The board may:
   (a) Adopt regulations to assist in carrying out the functions and duties assigned to it by law.
   (b) Initiate proposals for changes in or additions to geographic names in the state. Any proposal initiated by the board must be evaluated in accordance with the same procedures prescribed for the consideration of other proposals.

(Added to NRS by 1985, 588)

NRS 327.150 Changes in or additions of geographic names: Submission of proposal; preliminary consideration; final action and notice.
1. Any person, group or agency of federal, state or local government may propose a change in or the addition of any geographic name within the state by submitting it to the board for evaluation and recommendation.
2. Upon receipt of any such proposal, together with sufficient supporting information, the board shall:
   (a) Place the proposal on the agenda for preliminary consideration at its next meeting.
   (b) Give appropriate notice to persons and groups who are affected by the proposal or might have an interest in it.
   (c) Provide opportunities for public comment.
   (d) Conduct such research and field investigations as it deems necessary.
3. The board may not take final action on any proposal until it has been given preliminary consideration at one or more previous meetings.
4. Whenever the board takes final action on a proposal, it shall notify the person, group or agency who submitted the proposal and shall transmit the official recommendation to the United States Board on Geographic Names.

(Added to NRS by 1985, 589)
CHAPTER 519A - RECLAMATION OF LAND SUBJECT TO MINING OPERATIONS OR EXPLORATION PROJECTS (under the Division of Environmental Protection of the Department of Conservation and Natural Resources)

NRS 519A.260 Annual submission of reports and payment of fees by operator; disposition of money received.
1. Each operator shall, on or before April 15 of each year, submit to the administrator a report relating to the status and production of all mining operations and exploration projects in which he has engaged and identifying each acre of land affected and land reclaimed by that mining operation or exploration project through the preceding calendar year, and shall pay to the division a fee of:
   (a) One dollar and fifty cents for each acre of public land administered by a federal agency; and
   (b) Five dollars and fifty cents for each acre of privately owned land, which has been disturbed by mining operations or exploration projects engaged in by the operator and not reclaimed.
2. All money received by the state treasurer pursuant to paragraph (a) of subsection 1 together with three-elevenths of all money received by the state treasurer pursuant to paragraph (b) of subsection 1, up to a maximum of $100,000 annually, must be distributed directly to the bureau of mines and geology of the State of Nevada to be used to carry out the provisions of NRS 514.060. Any money in excess of the maximum and the balance collected pursuant to paragraph (b) of subsection 1 must be credited to the appropriate account for the division and used to administer the provisions of this chapter.
(Added to NRS by 1989, 1287; A 1991, 201)

Nevada Administrative Code related to the Nevada Bureau of Mines and Geology

CHAPTER 522 - OIL AND GAS (under the Division of Minerals, Commission on Mineral Resources)

NAC 522.215 Cuttings: Requirements for permit; availability and use; notification of shortage. The taking of cuttings and the filing thereof is a condition for approval of the drilling permit, and this condition will be stated on the permit. A minimum of two 15-milliliter sets of cuttings per sampling interval must be cleaned, dried and placed in sample envelopes, and the cuttings and a split of any core submitted to the bureau of mines and geology as soon as the drilling of the well is complete. The bureau shall remove a 15-milliliter set and place the set in permanent storage. The rest of the cuttings must be made available for public inspection and testing at that time or, if the records concerning the well are to be kept confidential pursuant to NAC 522.540, upon the expiration of the period of confidentiality. Destructive tests may be performed on the cuttings made available for public inspection and testing. The administrator of the division must be notified by the bureau of any sample envelopes containing less than 5 milliliters of cuttings.
[Div. of Mineral Res., § 204, eff. 12-20-79]—(NAC A by Dep’t of Minerals, 9-16-92)

NAC 522.510 Form 5: Well completion report.
1. Form 5, the well completion report, must be filed for all wells drilled in Nevada. In the case of a dry hole, this report may accompany Form 4. In the case of a well placed in commercial production, Form 5 must be filed with the division within 30 days after the well is placed in production. Only one Form 5 is required for each well. A second Form 5 is not required upon the abandonment of any producing well.
2. Two copies of all logging surveys run in the wellbore by the operator must be filed with the division. The division will file one of the sets with the bureau of mines and geology. The copy at the bureau will be available for public inspection when the records are no longer confidential.
[Div. of Mineral Res., § 707, eff. 12-20-79]—(NAC A by Dep’t of Minerals, 7-22-87)
NAC 522.540 Confidentiality of well records.
1. Records concerning a well will not be kept confidential by the division unless the owner of the well requests confidentiality in writing or marks “confidential” on the logs of an exploratory well. Upon receiving such a request or log, the division will keep the records confidential for 6 months after their receipt unless the owner provides a written authorization for an earlier release.

2. An operator who plans to drill a series of exploratory wells within a given region or area may apply to the division to have the records for all his exploratory wells kept confidential. Such an application must specifically describe the area to be explored and the number and location of exploratory wells contemplated. Upon approval of the application, the administrator will keep all records of the project confidential for 6 months after receipt of the record. The operator may amend the plan of the project with the written approval of the administrator.

(Added to NAC by Dep’t of Minerals, eff. 7-22-87)

CHAPTER 534A - GEOTHERMAL RESOURCES (under the Division of Minerals, Commission on Mineral Resources)

NAC 534A.310 Taking of cuttings is condition for approval; submission to bureau of mines and geology. The taking of cuttings at least every 30 feet, and filing thereof, is a condition for approval of the drilling permit. The cuttings must be cleaned, dried, marked for location and depth and placed in envelopes. The cuttings and a split of any core must be submitted to the bureau of mines and geology of the State of Nevada within 30 days after the well is completed.

(Added to NAC by Comm’n on Mineral Resources, eff. 11-12-85)

NAC 534A.550 Filing of report of completion and well logs.

1. Within 30 days after the completion of the construction of a well, the owner of the geothermal resource or the operator shall file with the division:
   (a) A report setting forth the manner in which the well was completed.
   (b) Two sets of all well logs.

2. The division shall file one set of the well logs with the bureau of mines and geology of the State of Nevada.

(Added to NAC by Comm’n on Mineral Resources, eff. 11-12-85; A 12-16-92)

NAC 534A.140 Hole logs: Subsurface information; confidentiality. Information about the subsurface obtained as a result of exploration drilling disclosed on hole logs as required by NAC 534A.130 must be filed with the state engineer within 30 days after it is acquired. Such information together with other information concerning the exploration appearing on the logs and the cards containing the notice of intent to drill is confidential for a period of 5 years from the date of filing the cards or logs and must not be disclosed during that time without the express written consent of the driller’s client.

[St. Engineer, Exploration Drilling Reg. Art. VIII, eff. 12-13-77]
United States Code (Federal Laws) related to the Nevada Bureau of Mines and Geology

43 USC Sec. 31c  01/26/98

TITLE 43 - PUBLIC LANDS

CHAPTER 2 - UNITED STATES GEOLOGICAL SURVEY

Sec. 31c. Geologic mapping program

STATUTE

(a) Establishment

(1) In general

There is established a national cooperative geologic mapping program between the United States Geological Survey and the State geological surveys, acting through the Association.

(2) Design, development, and administration

The cooperative geologic mapping program shall be -

(A) designed and administered to achieve the objectives set forth in subsection (c) of this section;

(B) developed in consultation with the advisory committee;

and

(C) administered through the Survey.

(b) Responsibilities of the Survey

(1) Lead agency

The Survey shall be the lead Federal agency responsible for planning, developing priorities, coordinating, and managing the geologic mapping program. In carrying out this paragraph, the Secretary, acting through the Director, shall -

(A) develop a geologic mapping program implementation plan in accordance with section 31e of this title, which plan shall be submitted to the Committee on Resources of the House of Representatives and the Committee on Energy and Natural Resources of the Senate within 300 days after August 5, 1997;

(B) appoint, with the advice and consultation of the Association, the advisory committee within 90 days after August 5, 1997, in accordance with section 31d of this title; and

(C) within 210 days after August 5, 1997, submit a report to the Committee on Energy and Natural Resources of the United States Senate and to the Committee on Resources of the House of Representatives identifying -

(i) how the Survey and the Association will coordinate the development and implementation of the geologic mapping program;

(ii) how the Survey and the Association will establish goals, mapping priorities, and target dates for implementation of the geologic mapping program; and

(iii) how long-term staffing plans for the various components of the geologic mapping program will lead to successful implementation of the geologic mapping program.

(2) Responsibilities of the Secretary

In addition to paragraph (1), the Secretary, acting through the Director, shall be responsible for developing, as soon as practicable -

(A) in cooperation with the Association, other Federal and State agencies, public and private sector organizations and academia, the geologic-map data base; and

(B) maps and mapping techniques which achieve the objectives specified in subsection (c) of this section.

(c) Program objectives

The objectives of the geologic mapping program shall include -

(1) determining the Nation's geologic framework through systematic development of geologic maps at scales appropriate to the geologic setting and the perceived applications, such maps to be contributed to the national geologic map (FOOTNOTE 1) database;

(FOOTNOTE 1) So in original. Probably should be “geologic-map.”

(2) development of a complementary national geophysical-map data base, geochemical-map data base, and a geochronologic and paleontologic data base that provide value-added descriptive and interpretative information to the geologic-map data base;
(3) application of cost-effective mapping techniques that assemble, produce, translate and disseminate geologic-map information and that render such information of greater application and benefit to the public; and

(4) development of public awareness of the role and application of geologic-map information to the resolution of national issues of land use management.

(d) Program components

The geologic mapping program shall include the following components:

(1) Federal component

A Federal geologic mapping component, whose objective shall be determining the geologic framework of areas determined to be vital to the economic, social, or scientific welfare of the Nation. Mapping priorities shall be based on -

(A) national requirements for geologic-map information in areas of multiple-issue need or areas of compelling single-issue need; and

(B) national requirements for geologic-map information in areas where mapping is required to solve critical earth-science problems.

(2) Support component

A geologic mapping support component, whose objective shall be providing interdisciplinary support for the Federal Geologic Mapping Component. Representative categories of interdisciplinary support shall include -

(A) establishment of a national geologic-map data base, established pursuant to section 31f of this title;

(B) studies that lead to the implementation of cost-effective digital methods for the acquisition, compilation, analysis, cartographic production, and dissemination of geologic-map information;

(C) paleontologic investigations that provide information critical to understanding the age and depositional environment of fossil-bearing geologic-map units, which investigations shall be contributed to a national paleontologic data base;

(D) geochronologic and isotopic investigations that -

(i) provide radiometric age dates for geologic-map units; and

(ii) fingerprint the geothermometry, geobarometry, and alteration history of geologic-map units, which investigations shall be contributed to a national geochronologic data base;

(E) geophysical investigations that assist in delineating and mapping the physical characteristics and three-dimensional distribution of geologic materials and geologic structures, which investigations shall be contributed to a national geophysical-map data base; and

(F) geochemical investigations and analytical operations that characterize the major- and minor-element composition of geologic-map units, and that lead to the recognition of stable and anomalous geochemical signatures for geologic terrains, which investigations shall be contributed to a national geochemical-map data base.

(3) State component

A State geologic mapping component, whose objective shall be determining the geologic framework of areas that the State geological surveys determine to be vital to the economic, social, or scientific welfare of individual States. Mapping priorities shall be determined by multirepresentational State panels and shall be integrated with national priorities. Federal funding for the State component shall be matched on a one-to-one basis with non-Federal funds.

(4) Education component

A geologic mapping education component -

(A) the objectives of which shall be -

(i) to develop the academic programs that teach earth-science students the fundamental principles of geologic mapping and field analysis; and

(ii) to provide for broad education in geologic mapping and field analysis through support of field studies;

(B) investigations under which shall be integrated with the other mapping components of the geologic mapping program and shall respond to priorities identified for those components; and

(C) Federal funding for which shall be matched by non-Federal sources on a 1-to-1 basis.

National Cooperative Geologic Mapping Program

NEVADA

STATEMAP Projects, 1993 through 2002

- Geologic Mapping
- Digital

Contact information

Nevada Bureau of Mines and Geology
State Geologist: Jonathan G. Price (775/784-6691 ext.126)
STATEMAP Contact: Christopher D. Henry (775/784-6691 ext.128)
http://www.nbmg.unr.edu

U.S.G.S. Geologic Mapping Program Office
Program Coordinator: Peter T. Lyttle (703/648-6943)
http://ncgmp.usgs.gov/
The STATEMAP part of the National Cooperative Geological Mapping Program has helped Nevadans by significantly increasing the geographic coverage of detailed maps produced by the Nevada Bureau of Mines and Geology. Geologic mapping in the Las Vegas and Reno urban areas is focused primarily on issues related to growth and land management, including earthquake and flood hazards, land subsidence due to ground-water withdrawal, collapsing and expanding soils, landslides, ground-water protection, air quality, and raw materials needed for construction. Mapping of the Humboldt River basin provides key information on the origin of its precious metal deposits, which make Nevada the leading gold and silver producer in the U.S., and on the environmental and economic impacts of mining and climatic change. Planners, scientists, engineers, managers, policy makers, teachers, students, and members of the general public who are interested in the world around them use geologic maps. Only about 15% of Nevada’s 1,980 7.5-minute quadrangles are adequately mapped with the detail that is needed for most applications.

**SUMMARY OF STATEMAP GEOLOGIC MAPPING PROGRAM IN NEVADA**

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<th>Las Vegas Area</th>
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<td><strong>New geologic maps of 7.5-minute quadrangles at 1:24,000 scale</strong></td>
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<td><strong>Digital versions of previously published 7.5-minute geologic quadrangle maps</strong></td>
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$1,452,318 $1,102,210 $2,554,528
Advisory Committee Members

Alan Coyner, Administrator, Nevada Division of Minerals, Chair of the Advisory Committee  
Kay Brothers, Director, Resources, Southern Nevada Water Authority  
Doug Cook, President, Cook Ventures Inc.  
Bill DuBois, DuBois & Company  
Russ Fields, President, Nevada Mining Association  
Shawn Gooch, Civil Engineer, City of Sparks  
Tom Leshendok, Assistant Director for Minerals, Nevada State Office,  
U.S. Bureau of Land Management  
Ron Lynn, Assistant Director, Clark County Building Department  
John Peck, Engineering Geology Consultant  
Debra Struhsacker, Environmental/Government Relations Consultant

Emeritus Faculty

Harold F. Bonham, Jr., Research Geologist - volcanic stratigraphy and metals  
John W. Erwin, Geophysicist - gravity & electromagnetic fields  
Liang-Chi Hsu, Research Mineralogist - mineralogy & experimental petrology  
Keith Papke, Industrial Minerals Geologist - industrial minerals

Adjunct Faculty

Donald C. Helm, Adjunct Research Scientist - subsidence and groundwater modeling

For more information about NBMG, please check the Web (www.nbmg.unr.edu) or contact us by mail, fax, or e-mail.

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