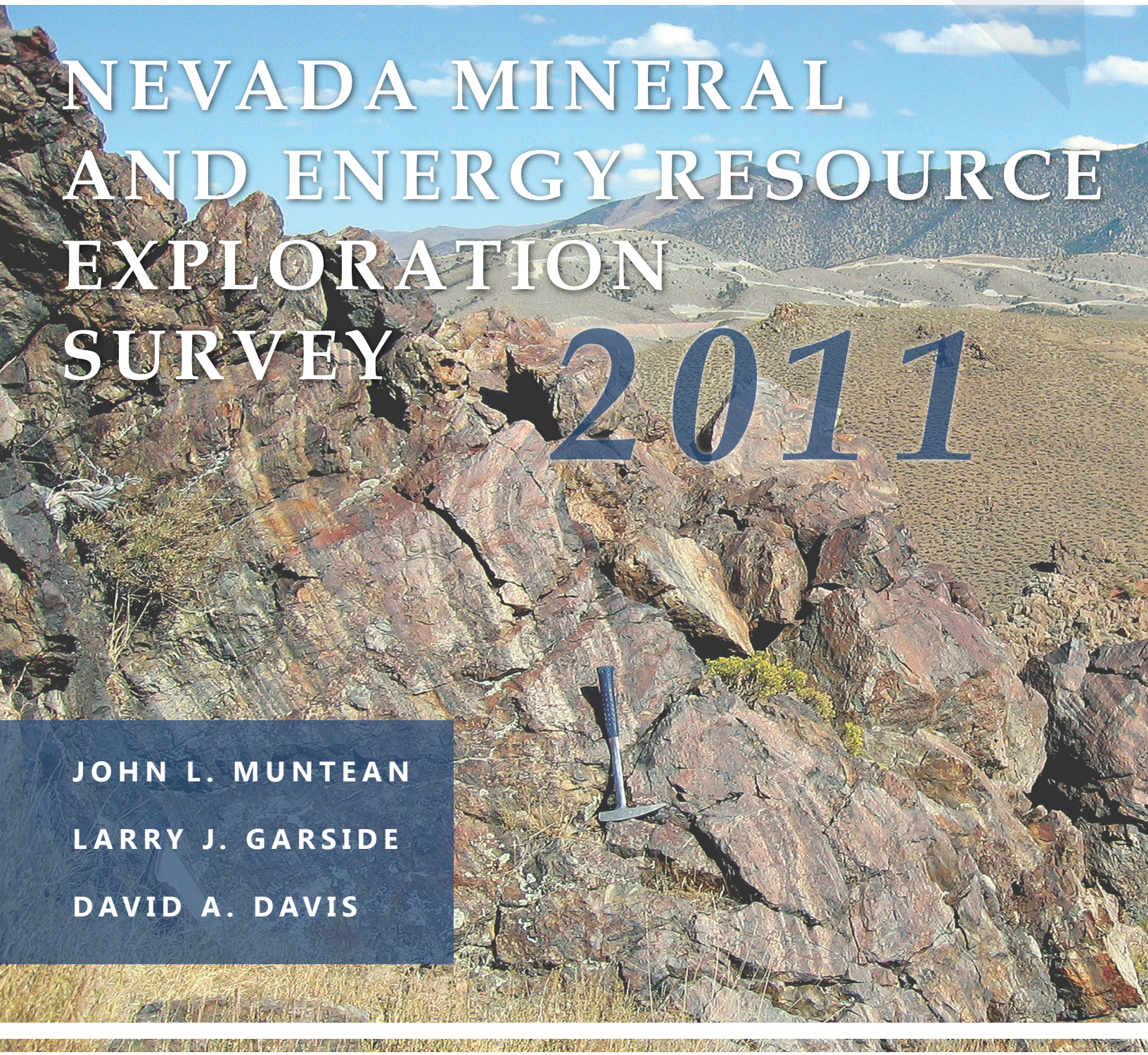
NEVADA BUREAU OF MINES AND GEOLOGY

NEVADA MINERAL AND ENERGY RESOURCE EXPLORATION SURVEY 2011



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Nevada Commission on Mineral Resources
Division of Minerals

Nevada Mineral and Energy Resource Exploration Survey 2011

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EXECUTIVE SUMMARY

The Nevada Bureau of Mines and Geology (NBMG) carried out a survey of companies exploring for metals, industrial minerals, geothermal energy, and oil and gas in Nevada. The Nevada Commission on Mineral Resources and the Nevada Division of Minerals commissioned and funded the survey. The impact of mineral and energy production on the Nevada economy is fairly well known; however, the impact of exploration is poorly understood due to limited data. A goal of the survey was to gather data to better assess the impact of exploration on Nevada's economy. The focus of the survey was to collect data on expenditures and the number employees involved in exploration in 2011, as well as projections for 2012. The survey also requested companies to break down their expenditures by category, as well as to rate the relative impact of various factors on their exploration programs. NBMG contacted 262 companies, of which 186 explore for metals (mainly gold), 33 for industrial minerals, 25 for geothermal energy, and 18 for oil and gas. Of those companies, 113 filled out the survey, and an additional 53 responded that they were no longer active in Nevada, for a total response rate of 63%. Additionally, NBMG researched the Internet to gather data on 2011 expenditures for 72 of the 96 companies that did not respond to the survey.

The results regarding expenditures and number of employees showed:

- A minimum of $674,691,094 was spent on exploration in Nevada in 2011. Exploration for metals accounted for 90% of the expenditures.
- Projected expenditures for 2012 are on a par with or slightly higher than 2011.
- Companies directly employed 1,040 people in 2011 to carry out exploration in Nevada.
- The number of employees in 2012 is projected to increase by 9.5%.

The breakdown of the 2011 expenditures shows:

- 69% of the expenditures was on actual exploration (mainly drilling), whereas 13% was spent on corporate overhead costs, 9% on permitting costs, 8% on land costs, and 1% on other costs.
- 68% of the expenditures was on exploration aimed at expanding existing mines, fields, or resources. The remaining 32% was spent on grassroots exploration away from existing operations or resources.

Responses to factors that impact exploration show:

- Nevada's favorable geology and access to public lands are the most important factors that attract companies to explore in Nevada.
- The time and cost of permitting are the most negative impacting factors.

INTRODUCTION

In 2012, NBMG conducted the 18th annual "Nevada Exploration Survey" of companies engaged in exploration projects or holding claims or leases in Nevada. As in previous years, the purpose of this survey was to determine the current and projected levels of exploration activity, and to determine what factors are influencing these levels. The rationale for doing this survey is to provide information to elected officials, government agencies, private companies, and citizens in general, so that they better understand the impact of exploration on the Nevada economy and the factors that influence exploration.

The previous 17 surveys were conducted by the Nevada Division of Minerals (NDOM). For this survey the Nevada Commission on Mineral Resources and NDOM commissioned and funded NBMG to conduct the survey. They charged NBMG with increasing the population size and the response rate of the survey. Also, in addition to companies exploring for metals and industrial minerals, NBMG was asked to send the survey to companies exploring for geothermal energy, as well as oil and gas. The survey form was simplified to emphasize actual expenditures by companies on exploration and the number of people employed by companies in exploration.

SURVEY METHODOLOGY

The survey form (Appendix A) requested information on (1) company exploration expenditures in Nevada, both estimated 2011 expenditures and projected expenditures for 2012; (2) the number of people they directly employed in Nevada exploration, both the estimated number in 2011 and the projected number in 2012; (3) an estimated percentage breakdown of the 2011 expenditures by category, including actual exploration (e.g., drilling, geology, geochemistry, geophysics), land holding costs, permitting and compliance, and corporate costs; (4) the percentage of expenditures dedicated to mine expansion versus grassroots efforts; and (5) the relative impact of factors that affect exploration in Nevada, including geology, recent discoveries, commodity prices, access to land to explore, time and cost of permitting, and uncertainty over U.S. mining laws.

NBMG emailed and sent by mail the survey to 362 companies from a compiled list. Over 90% of those companies were contacted two or more times to remind them to fill out the survey. In doing this we discovered that several companies had changed names, were subsidiaries of larger companies, or were no longer in business. From this we determined we effectively had contacted 262 different companies, of which 186 were exploring for metals, 33 for industrial minerals, 25 for geothermal energy, and 18 for oil and gas. Of the 262 companies that were contacted, 113 responded to the survey by answering most if not all the questions (89 for metals, 8 for industrial minerals, 9 for geothermal energy, and 7 for oil and gas). In addition, 53 companies responded indicating they had no activity in Nevada in 2011 and nothing planned for 2012. Therefore, the response rate was effectively 63% (166/262), or 53% (113/210) if the companies that reported no activity are excluded. By comparison, the "Nevada Exploration

Survey 2010" completed by NDOM had a response rate of 20% from a smaller sample size (17/85).

In addition, NBMG researched the Internet to estimate the 2011 exploration expenditures in Nevada for the 96 companies that did not respond to the survey. We gathered information on 72 of the 96 companies. For 42 of those 72 companies information on expenditures was gathered from company websites and securities exchange filings. For the other 30 companies we calculated claim-holding costs by determining the amount of claims the company held in 2011 using the Bureau of Land Management's LR2000 database and the fees they paid to hold the claims ($140/claim). The estimated expenditures for these 30 companies are therefore minimal. Fourteen of the 72 companies had estimated Nevada exploration expenditures of greater than five million dollars, adding considerably to the total exploration expenditures in 2011. In total, the Internet research increased the 2011 expenditures listed in the survey responses by 31%. The 2011 estimated expenditures discussed next will be a combination of expenditures listed in survey responses and those estimated from the Internet research.

2011 EXPENDITURES

The 2011 expenditures on Nevada exploration, totaled $674,691,094. This is a minimum estimate and is based on estimates from 169 companies. Figure 1 shows expenditures of each company in order of increasing amount, and figure 2 summarizes the expenditures as a histogram. The mean is $3.9 million and the median $0.5 million. Companies exploring for metals comprise 90% of the expenditures (128 companies) for a total of $609 million. Two companies exploring for metals were responsible for 32% of the total ($219 million). Companies exploring for geothermal energy accounted for 8% of the total ($54.3 million, 9 companies), and companies exploring for industrial minerals ($9.13 million, 18 companies) and oil and gas ($1.85 million, 4 companies) accounted for <2% of the 2011 expenditures (fig. 3).

PROJECTED 2012 EXPENDITURES

Projected 2012 expenditures on Nevada exploration total $504,577,302, based on 95 companies who responded to the survey. This does not necessarily represent a decrease from 2011, because, unlike 2011, no data from Internet research was included in the 2012 projections. Attempts to estimate projected 2012 expenditures based on Internet research and LR2000 were unsuccessful. Interestingly, the 2011 expenditures of at least $674,691,094 are 33% higher than the projected 2012 expenditures of $504,577,302, which are almost the same as the 31% that the Internet research added to the 2011 expenditures reported in the survey responses, suggesting the 2012 expenditures will be similar to 2011. Figure 4 shows projected expenditures of each company in order of increasing expenditures, and figure 5 summarizes the expenditures as a histogram. The mean is $5.3 million and the median $1.2 million. Companies exploring for

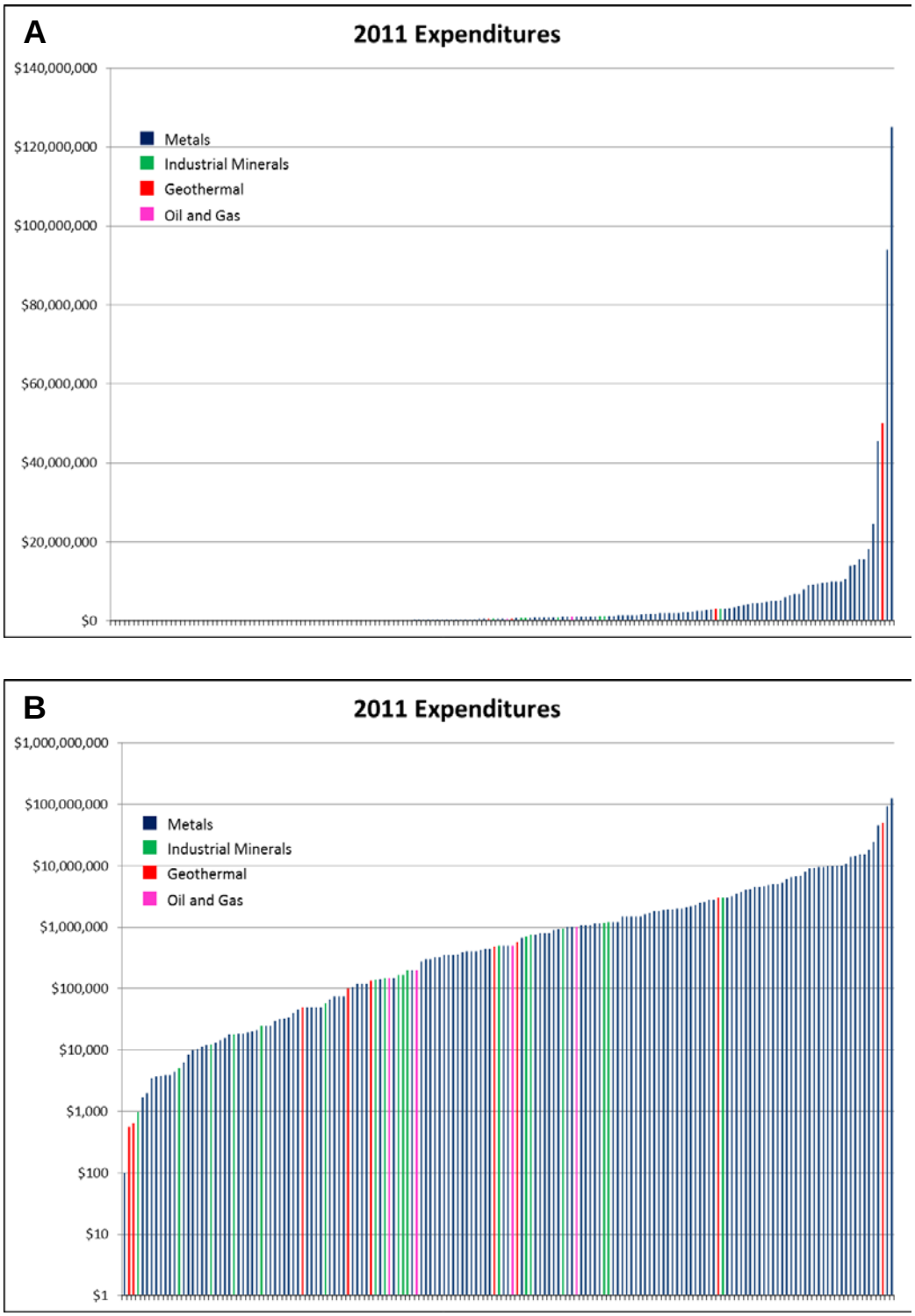


Figure 1. Bar graph of exploration expenditures in Nevada in 2011 for 169 companies based on survey responses and Internet research as explained in the text. Bars represent expenditures of individual companies and are arranged in order of increasing amount. They are color-coded by the type of resource the company was exploring for (metals, industrial minerals, geothermal energy, and oil and gas. A. Normal scale. B. Logarithmic scale.

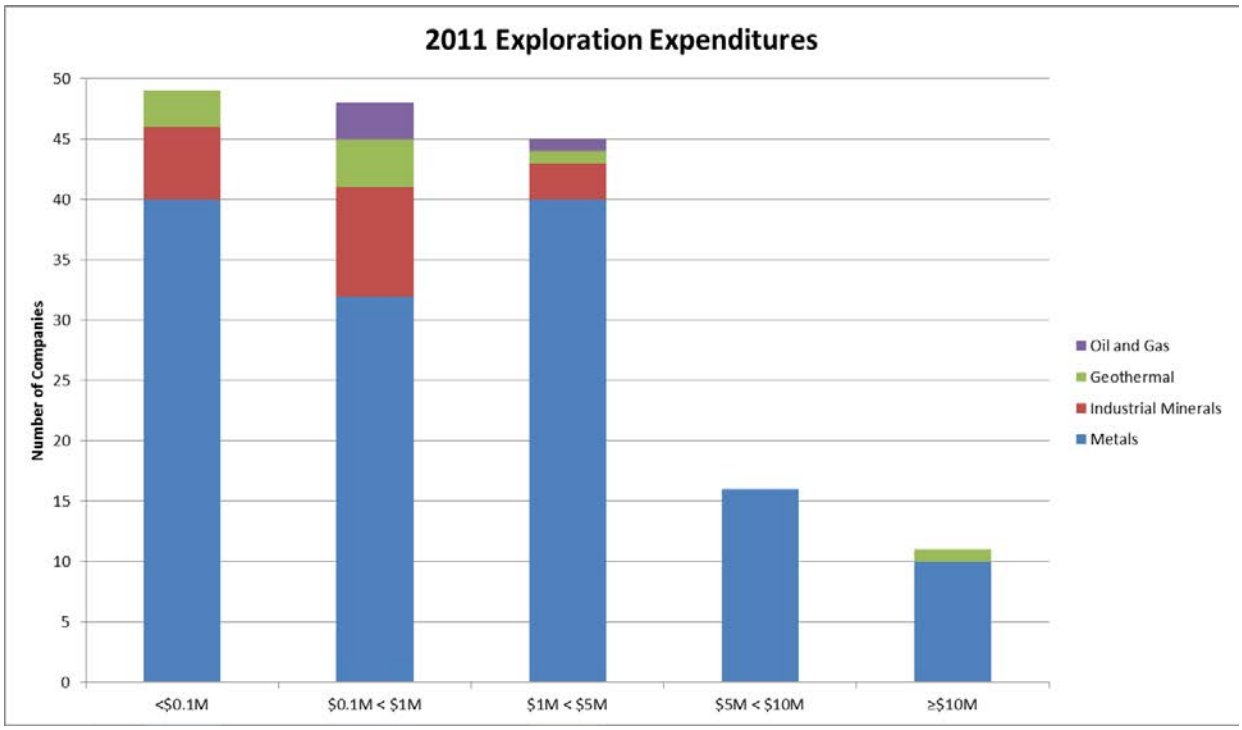


Figure 2. Histogram summarizing 2011 exploration expenditures in Nevada for 169 companies based on survey responses and Internet research as explained in the text. The histogram is color-coded by the type of resource the company was exploring for (metals, industrial minerals, geothermal energy, and oil and gas).

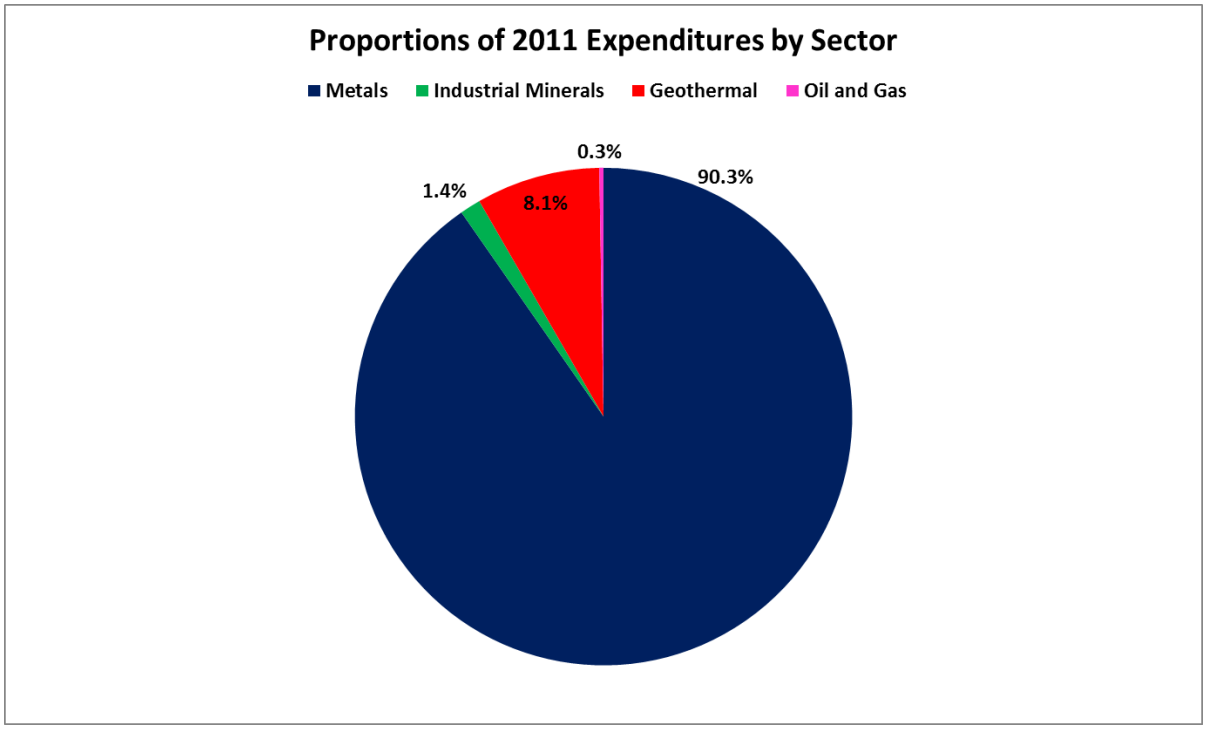


Figure 3. Pie chart showing proportions of 2011 exploration expenditures in Nevada by sector (metals, industrial minerals, geothermal energy, and oil and gas).

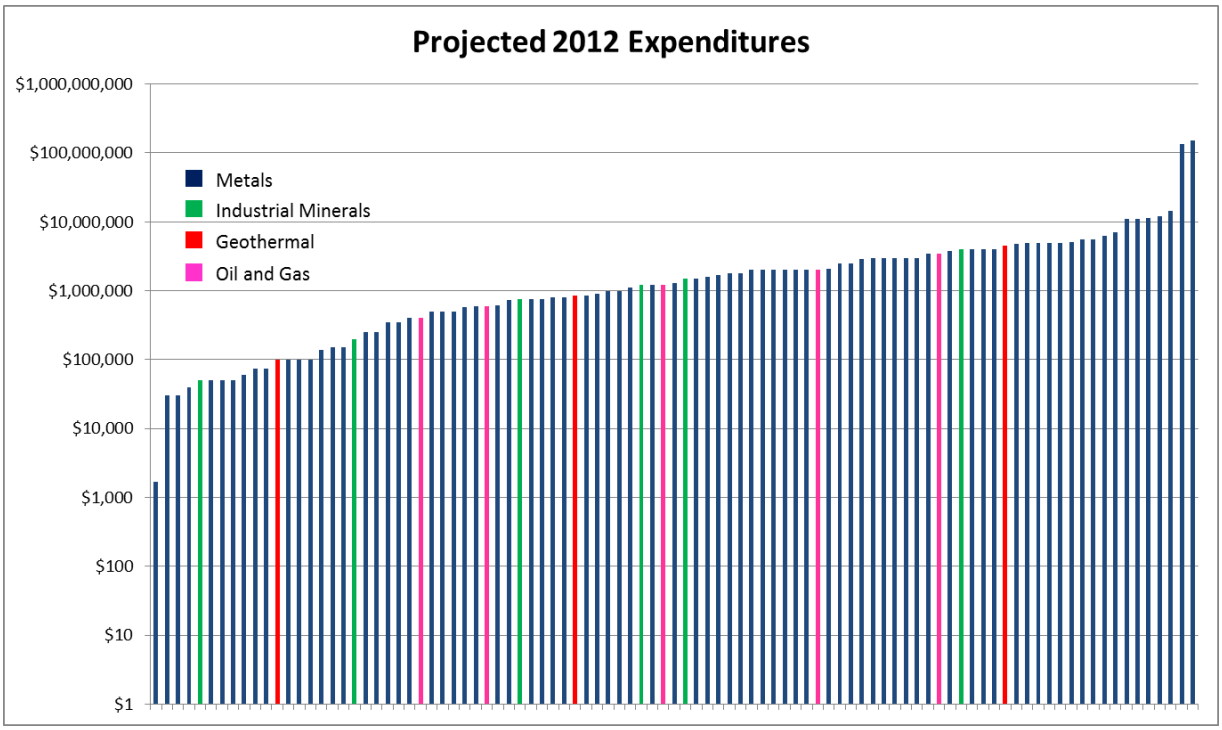


Figure 4. Bar graph of projected exploration expenditures in Nevada in 2012 based on 95 companies who responded to the survey. Bars represent expenditures of individual companies and are arranged in order of increasing expenditures (logarithmic scale). They are color-coded by the type of resource the company was exploring for (metals, industrial minerals, geothermal energy, and oil and gas).

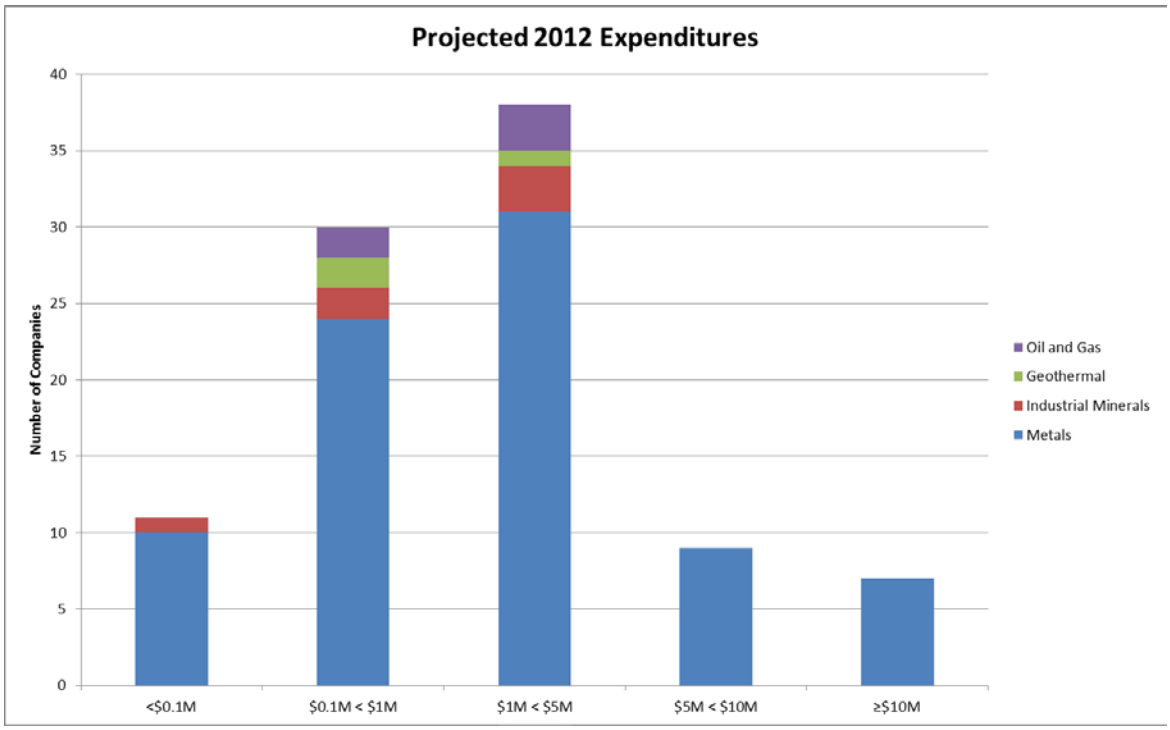


Figure 5. Histogram summarizing projected 2012 exploration expenditures in Nevada based on 95 companies who responded to the survey. The histogram is color-coded by the type of resource the company was exploring for (metals, industrial minerals, geothermal energy, and oil and gas).

metals comprise 96% of the projected expenditures (81 companies) for a total of $484 million. Two companies exploring for metals were responsible for 57% of the projected total ($288 million). Companies exploring for geothermal energy ($5.45 million, 3 companies), industrial minerals ($7.7 million, 6 companies) and oil and gas ($7.7 million, 5 companies) accounted for 4% of the projected 2012 expenditures (fig. 6). Figure 7 graphs projected 2012 expenditures against the 2011 expenditures reported in the survey responses. The graph suggests expenditures will be on a par with or slightly higher than expenditures in 2011.

2011 EMPLOYEES

In 2011, a minimum of 1,040 employees were employed in exploration in Nevada, based on 96 companies who responded to the survey. The number includes people the company employed directly in exploration (e.g., geologists, accountants, support staff), but does not include the employees of third party service companies (e.g., drilling companies, assaying companies, environmental consulting firms, legal firms, etc.). Figure 8 shows the number of 2011 employees for each company in order of increasing number of employees, and figure 9 summarizes the numbers of 2011 employees as a histogram. The mean was 11, the median 6, and the maximum 167. Only four companies employed more than 50 employees (3 companies exploring for metals, and 1 for geothermal energy). Companies exploring for metals comprise 84% of the exploration employees (873 employees, 79 companies). Companies exploring for geothermal energy employed 83 people (8%, 6 companies); exploration for industrial minerals employed 47 people (4.5%, 6 companies); and 37 people were involved in exploration for oil and gas (3.6%, 5 companies) (fig. 10). As one would expect, the number of employees correlates fairly well with the amount of expenditures (fig.11).

PROJECTED 2012 EMPLOYEES

The planned number of employees that will be involved in exploration in Nevada in 2012 is projected to be 9.5% higher than 2011. Based on 95 companies who responded to the survey, a minimum of 1,139 employees are projected for 2012. Figure 12 shows the number of 2012 employees plotted against the number of 2011 employees. Figure 13 shows the number of projected 2012 employees for each company in order of increasing number of employees, and figure 14 summarizes the numbers of projected 2012 employees as a histogram. The mean is 12, the median 6, and the maximum 175. As in 2011, only 4 companies plan to employ more than 50 people (3 companies exploring for metals, and 1 for geothermal energy). Similar to 2011, companies exploring for metals in 2012 comprise 84% of the projected exploration employees (873 employees, 79 companies). Companies exploring for geothermal energy plan to employ 76 people (6.7%, 5 companies); 41 employees for industrial minerals (3.6%, 6 companies); and 56 for oil and gas (4.9%, 6 companies) (fig. 15).

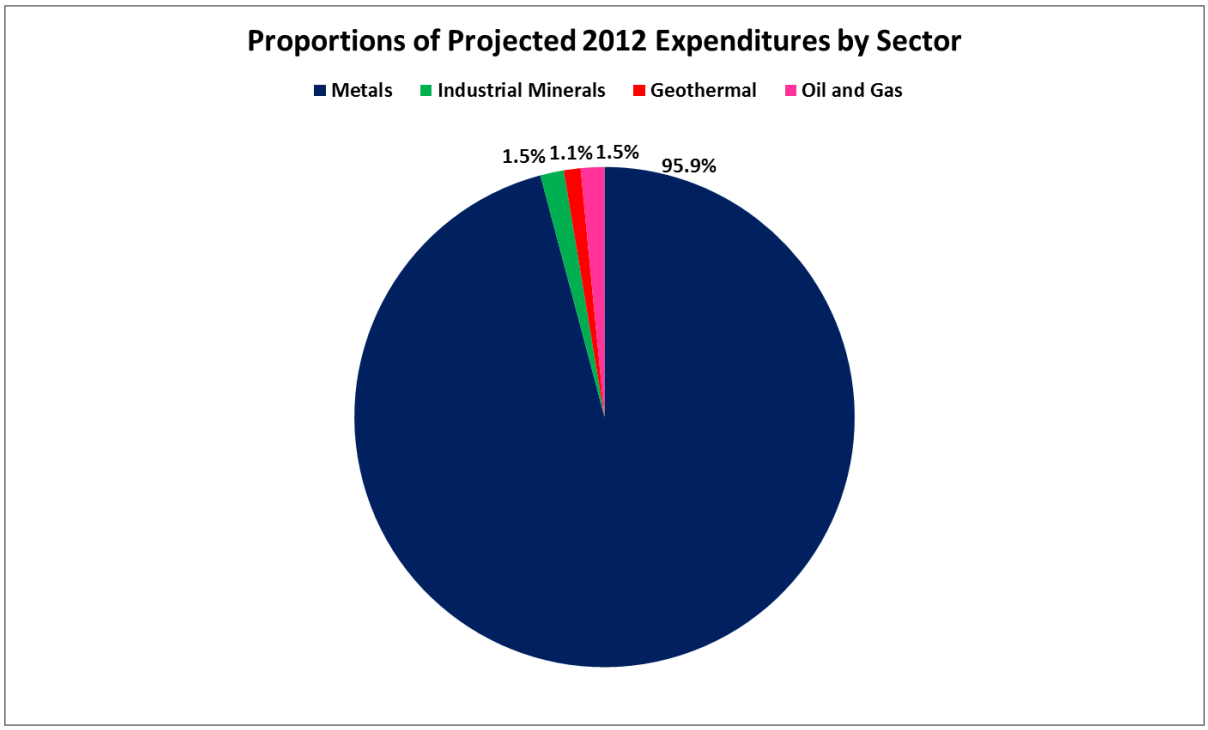


Figure 6. Pie chart showing proportions of projected 2012 exploration expenditures in Nevada by sector (metals, industrial minerals, geothermal energy, and oil and gas).

Figure 7. Graph of projected 2012 exploration expenditures versus 2011 exploration expenditures (logarithmic scale), based on 95 survey responses. Red line represents equal expenditures for 2011 and 2012. As discussed in the text, graph shows companies plan to spend in 2012 at similar levels as they did in 2011.

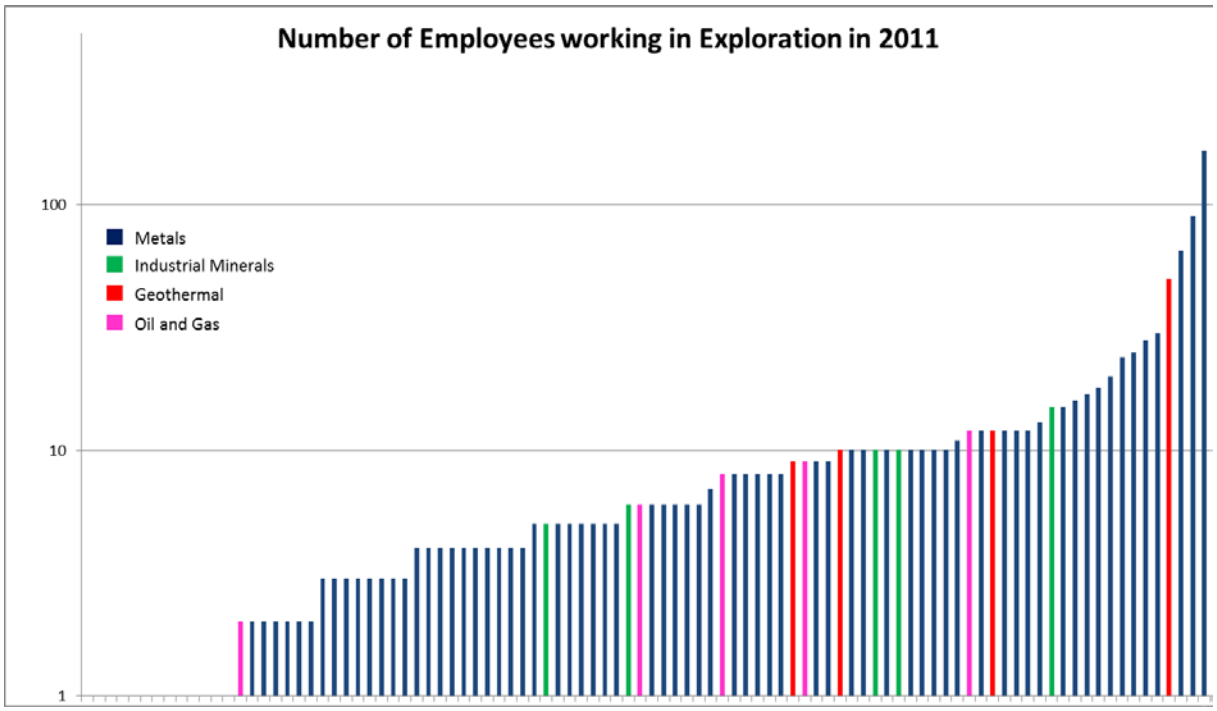


Figure 8. Bar graph of number of people directly employed in Nevada exploration in 2011 by 96 companies who responded to the survey. Bars represent expenditures of individual companies and are arranged in order of increasing number of employees (logarithmic scale). They are color-coded by the type of resource the company was exploring for (metals, industrial minerals, geothermal energy, and oil and gas). Companies with zero employees in Nevada do not show on a logarithmic scale.

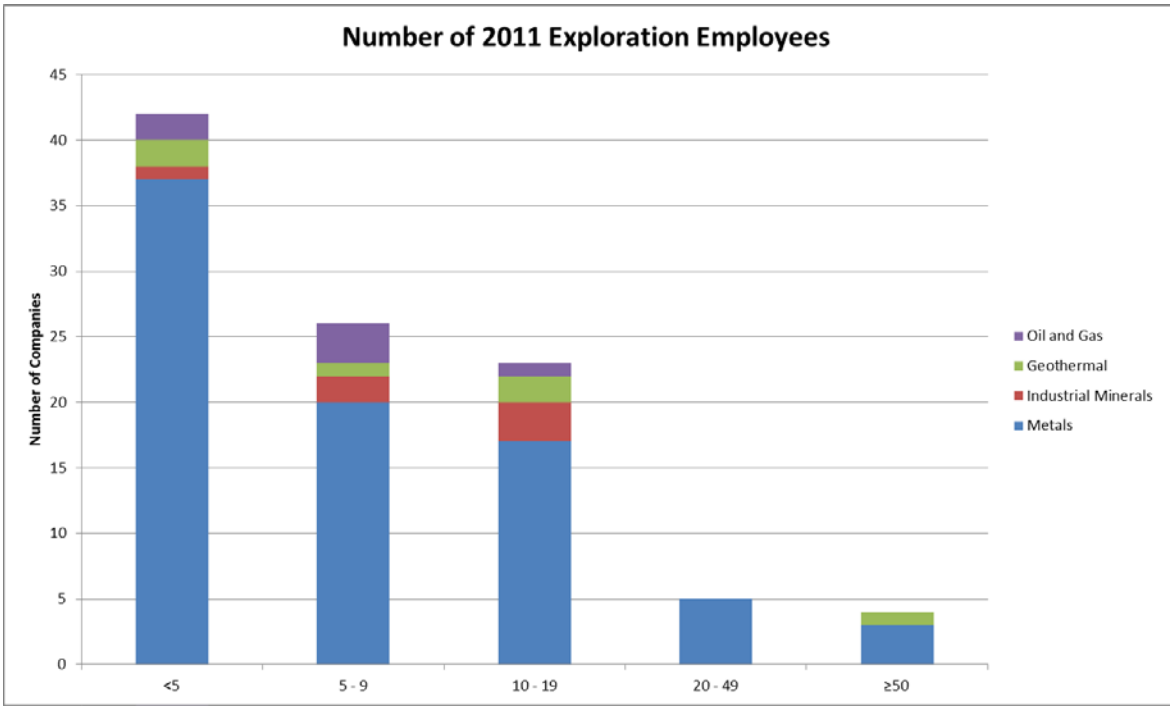


Figure 9. Histogram summarizing of number of people directly employed in Nevada exploration in 2011 by 96 companies who responded to the survey. The histogram is color-coded by the type of resource the company was exploring for (metals, industrial minerals, geothermal energy, and oil and gas).

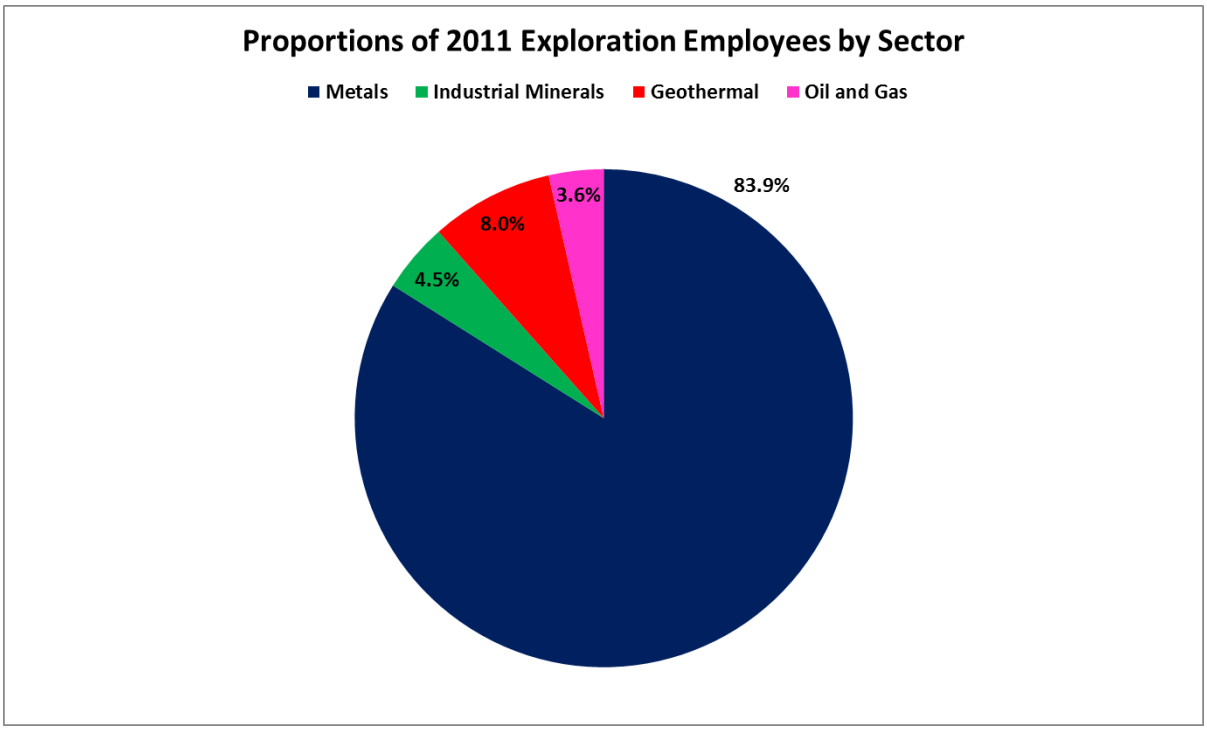


Figure 10. Pie chart showing proportions of employees directly employed in Nevada exploration in 2011 by sector (metals, industrial minerals, geothermal energy, and oil and gas).

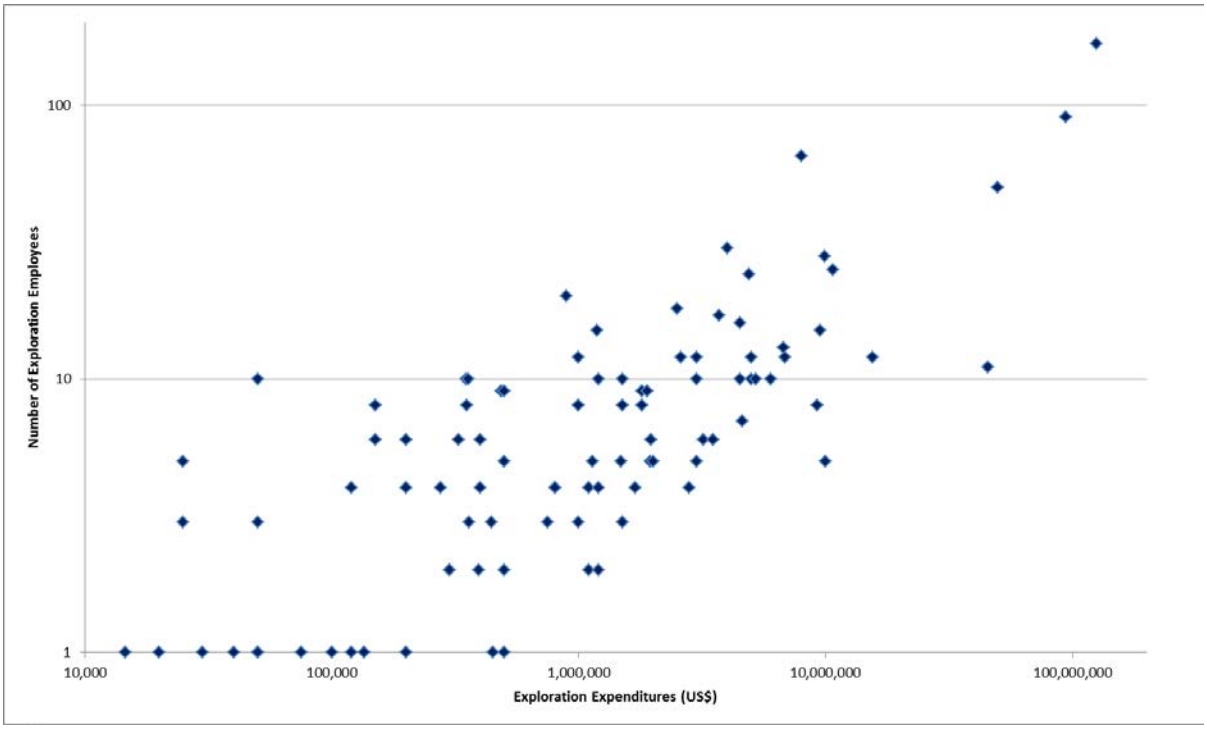


Figure 11. Graph of the number of employees involved in Nevada exploration in 2011 (logarithmic scale) versus amount of Nevada exploration expenditures in 2011 (logarithmic scale), based on survey responses of 96 companies. Shows expected correlation between expenditures and amount of employees.

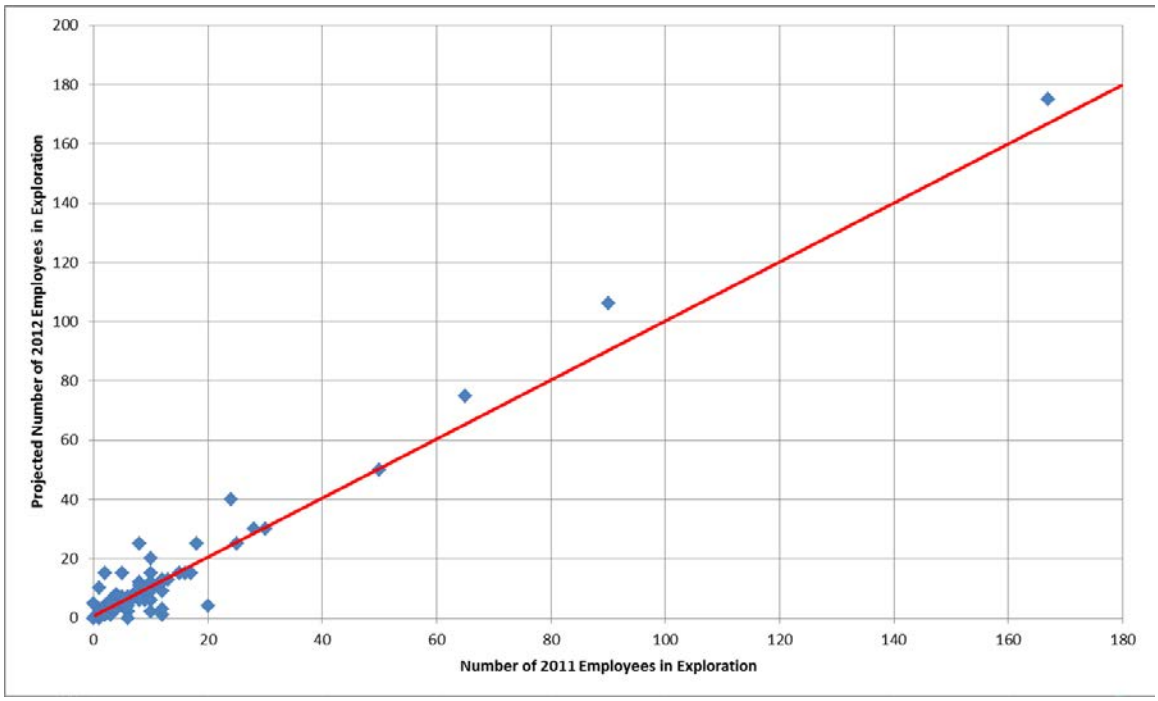


Figure 12. Graph of projected number of employees in 2012 versus number of 2011 employees based on survey responses of 95 companies. Red line represents equal number of employees for 2011 and 2012. It shows an expected increase in employees in 2012.

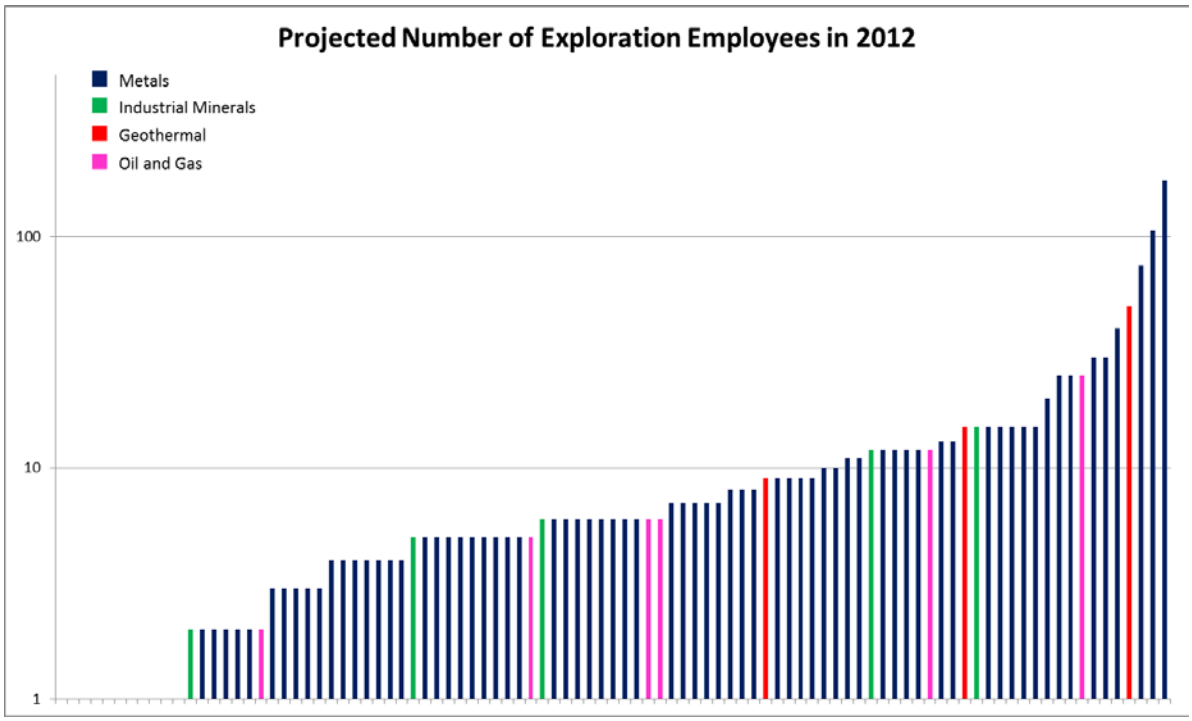


Figure 13. Bar graph of number of projected employees that will be involved in Nevada exploration in 2012 based on 95 companies who responded to the survey. Bars represent expenditures of individual companies and are arranged in order of increasing number of employees (logarithmic scale). They are color-coded by the type of resource the company was exploring for (metals, industrial minerals, geothermal energy, and oil and gas). Companies with zero employees in Nevada do not show on a logarithmic scale.

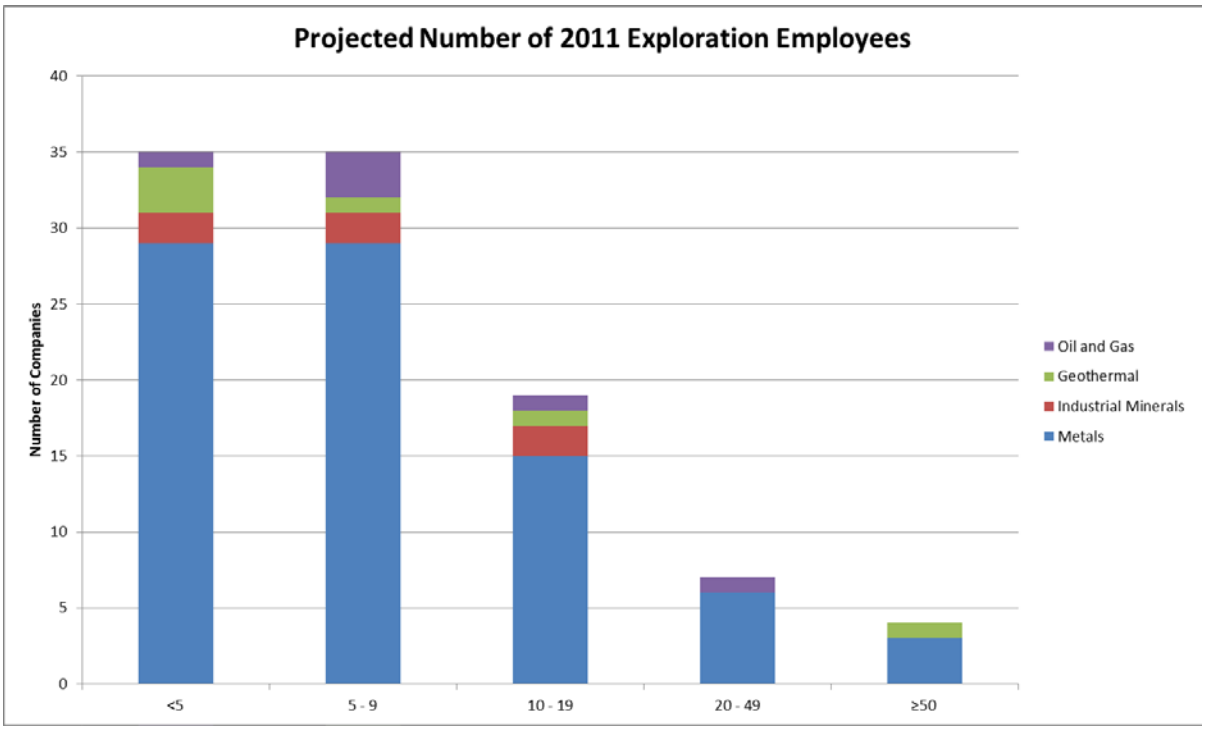


Figure 14. Histogram summarizing of projected number of people in 2012 that will be directly employed in Nevada exploration by 95 companies who responded to the survey. The histogram is color-coded by the type of resource the company was exploring for (metals, industrial minerals, geothermal energy, and oil and gas).

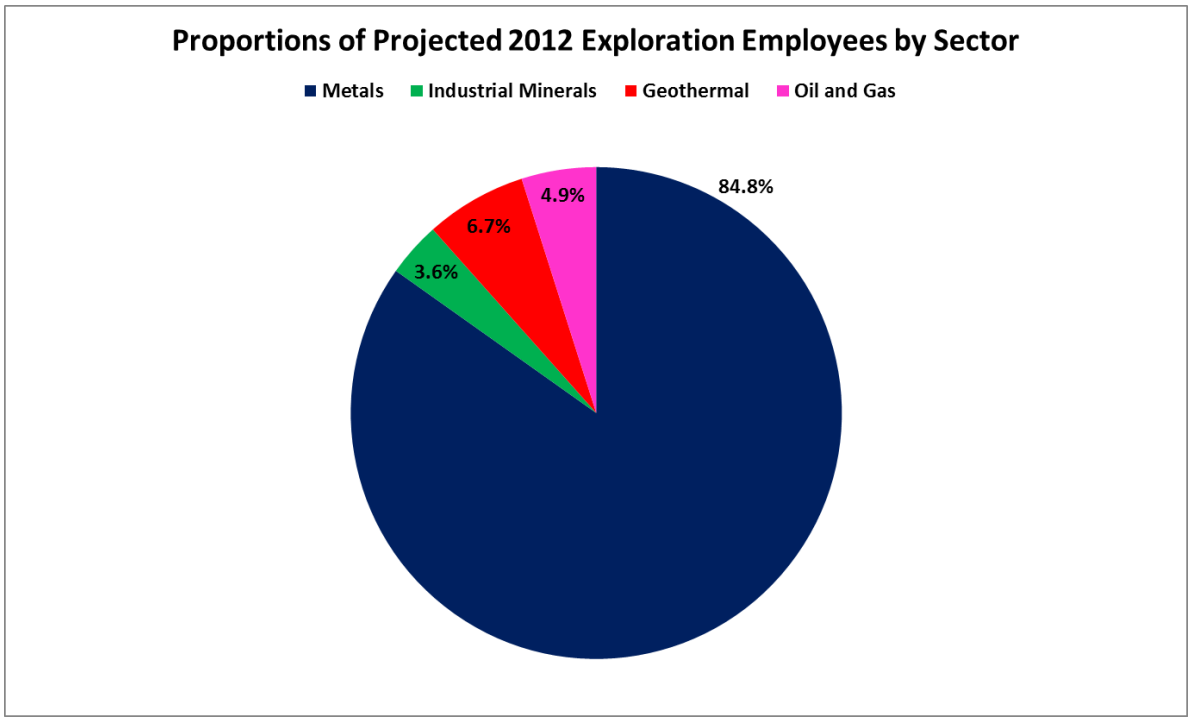


Figure 15. Pie chart showing proportions of projected employees that will be involved in Nevada exploration in 2012 by sector (metals, industrial minerals, geothermal energy, and oil and gas).

2011 Expenditures by Categories

For the survey, companies were requested to break down by percentages their total 2011 expenditures into the following categories: (1) actual exploration (drilling, geology, geochemistry, geophysics, etc.); (2) land costs (claim staking and maintenance, lease payments, etc.); (3) permitting and compliance (environmental studies, bonding, reclamation, etc.); (4) corporate overhead costs (overhead, legal, taxes, etc.); and (5) other costs. Eighty-nine companies responded, including 78 exploring for metals, three for industrial minerals, five for geothermal energy, and three for oil and gas. The averages of the percentages that the 89 companies provided were 54% on actual exploration, 22% on land, 9% on permitting and compliance, 14% on corporate overhead costs, and 1% on other costs (fig. 16). However, when the percentages are multiplied by the 2011 dollar expenditures that the companies provided, the averages are 69% on actual exploration, 8% on land, 9% on permitting costs, 8% on land costs, and 1% on other costs (fig.17). The increase in the percentage of total expenditures on actual exploration and the decrease in the percentage of total expenditures on land reflect the influence of companies that had large expenditures. Thirteen companies that spent $10 million or more on exploration (12 exploring for metals, 1 for geothermal) accounted for $447 million of expenditures, which is two-thirds of the total expenditures. This effect is further illustrated in figures 18 and 19. The likely explanation is that the area of projects measured by the amount of land holdings is not significantly different between companies with big budgets and companies with small budgets; thus, land holding costs are analogous to fixed overhead costs. The amount spent on actual exploration is analogous to discretionary spending. Most of the money that remains after required expenditures is spent on actual exploration, mainly on drilling. Land costs and any increased fees and regulations affect all companies' capacity to explore, but disproportionately affect companies with smaller budgets who are presumably under-capitalized or have no cash-flow from production.

Expansion versus Grassroots Exploration

When asked to estimate the percentage of 2011 expenditures on exploration aimed at expanding existing mines or resources versus grassroots exploration away from known mines, fields, and resources, 89 companies responded (75 exploring for metals, 5 for industrial minerals, 5 for geothermal energy, and 4 for oil and gas). The average percentages of the provided responses were 33% on expansion and 67% on grassroots (fig. 20). However, the percentages reverse themselves to 68% on expansion and 32% on grassroots when the percentages are multiplied by the 2011 dollar expenditures that the companies provided (fig 21). This effect is further illustrated in figure 22, which shows the percentage a company spends on grassroots exploration tends to increase with decreasing total expenditures. For example, none of the companies that spent greater than 50% on grassroots exploration had total expenditures greater than $10 million. This pattern suggests companies spend more money near existing mines and resources

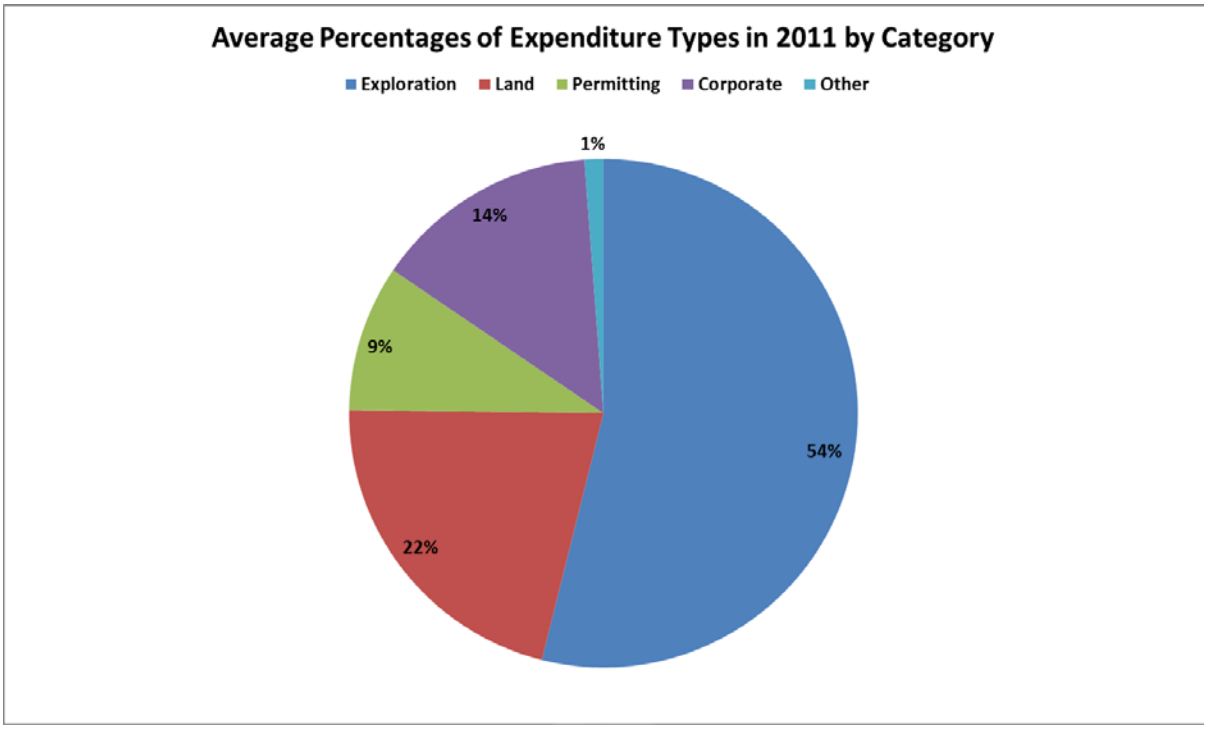


Figure 16. Pie chart showing the averages of the percentages from 89 survey responses that were spent on actual exploration, land, permitting and compliance, corporate overhead costs, and other costs.

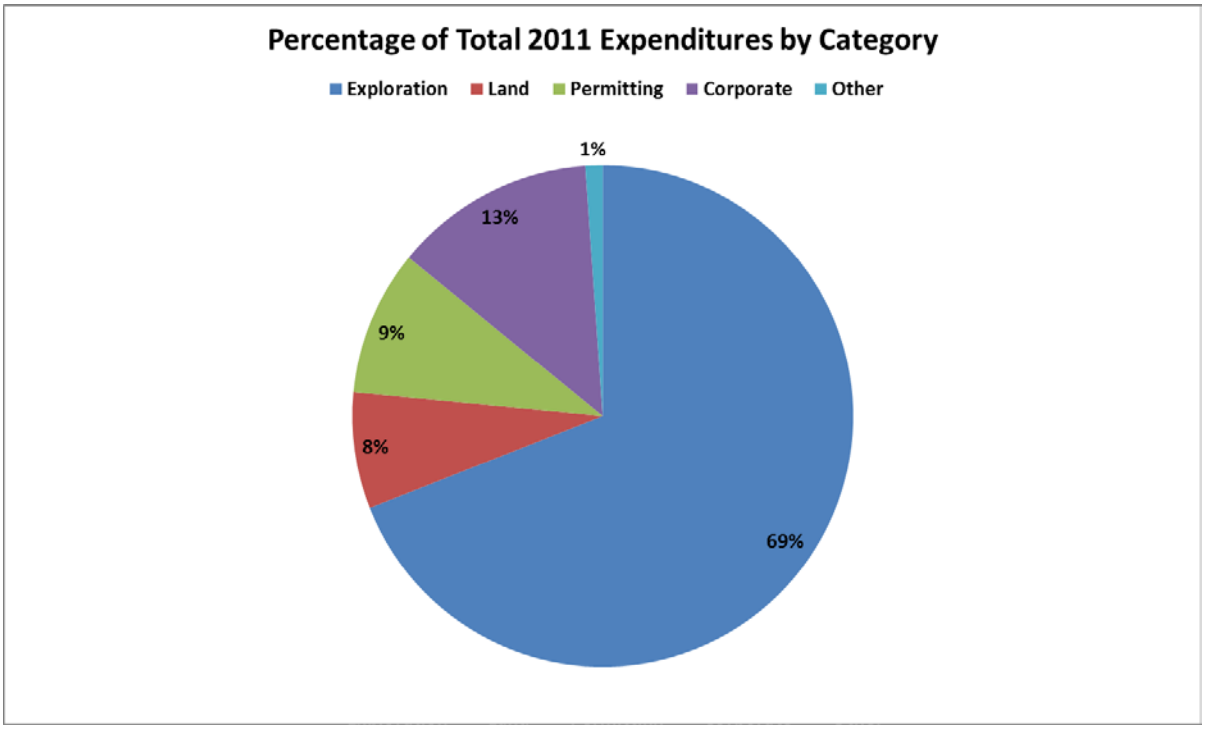


Figure 17. Pie chart showing the percentages of 2011 expenditures spent on actual exploration, land, permitting and compliance, corporate overhead costs, and other costs. Based on survey responses from 89 companies.

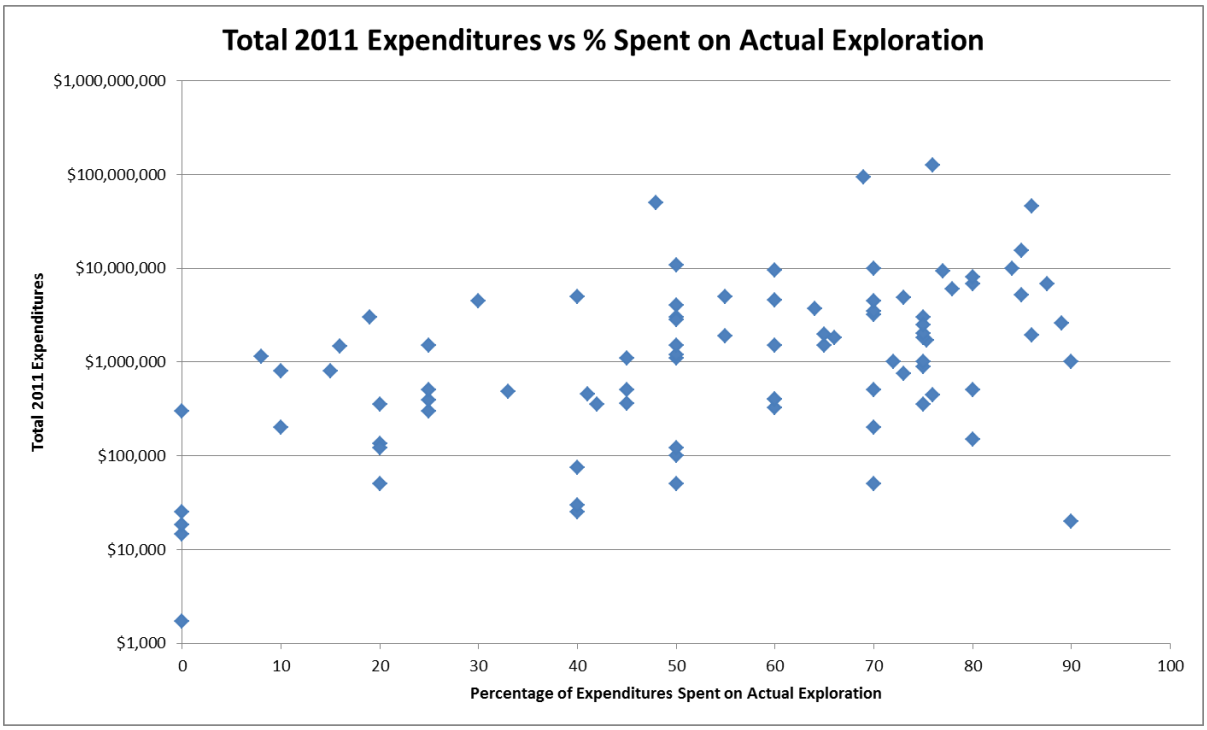


Figure 18. Graph of 2011exploration expenditures (logarithmic scale) versus the percentage of expenditures spent on actual exploration based on survey responses of 89 companies. Shows weak correlation between expenditures and percentages spent on actual exploration.

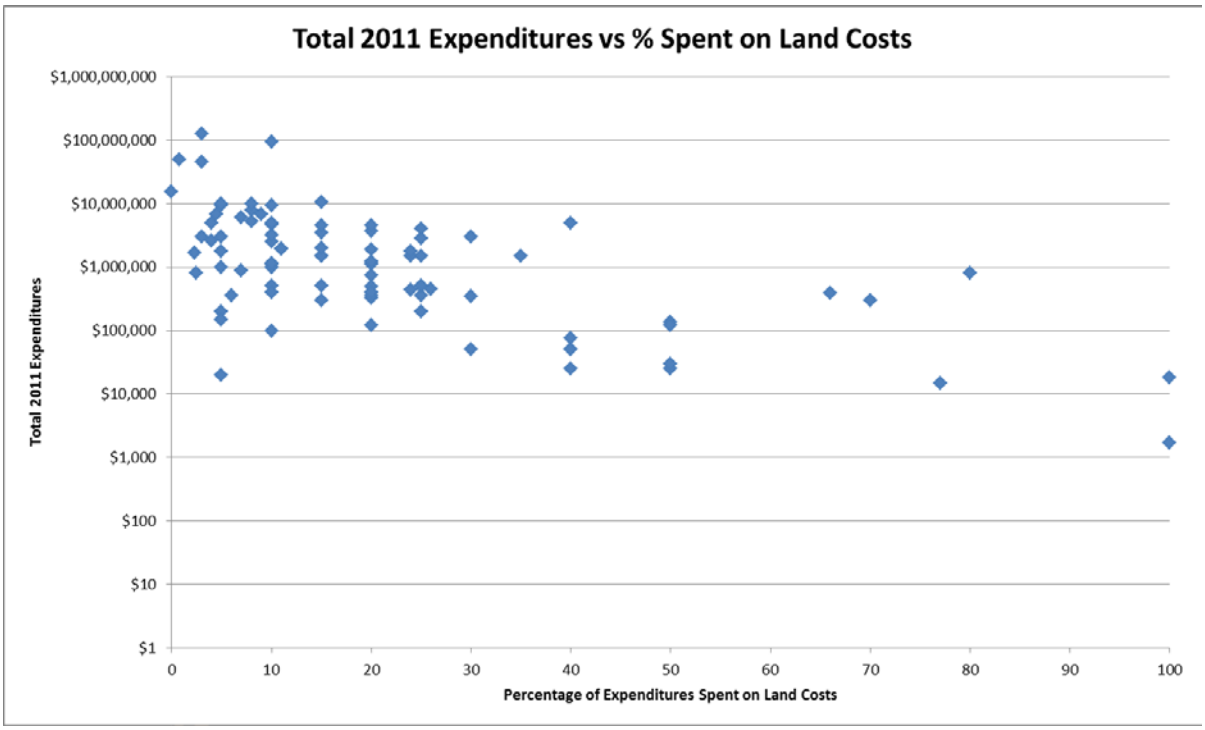


Figure 19. Graph of total 2011 exploration expenditures (logarithmic scale) versus the percentage of expenditures spent on land costs based on survey responses of 89 companies. Shows inverse correlation between expenditures and percentages spent on land costs.

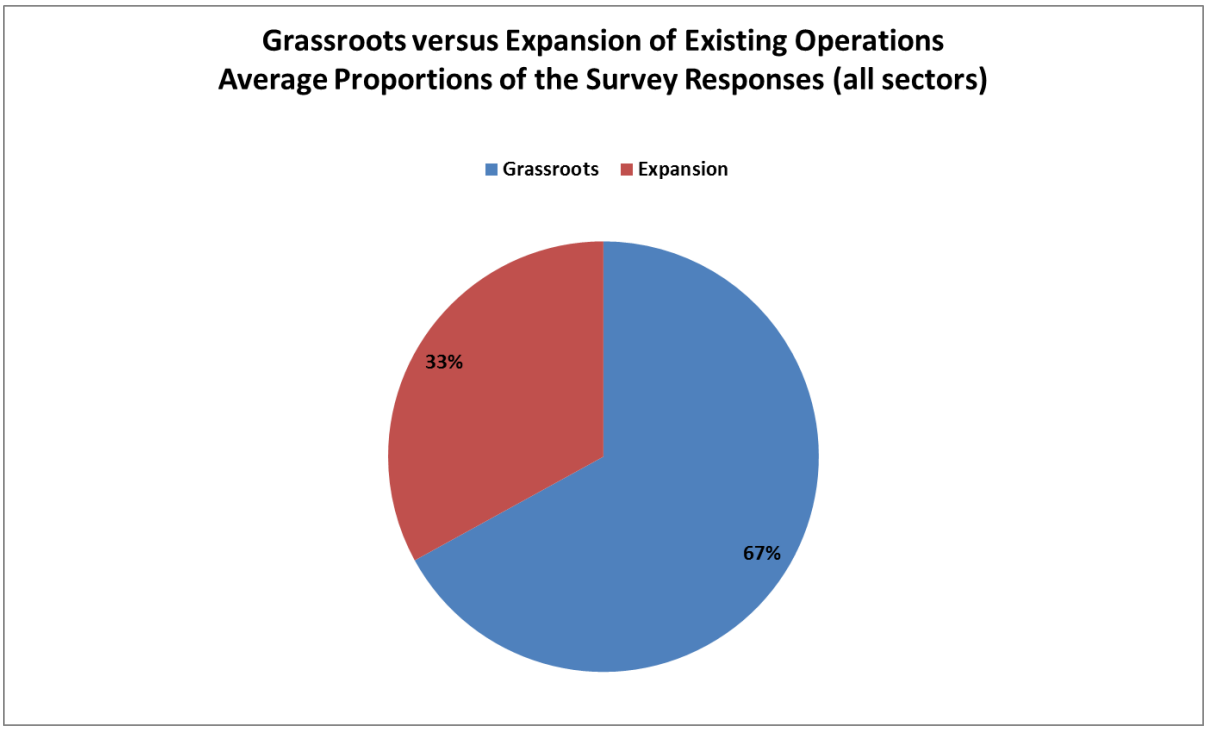


Figure 20. Pie chart showing the averages of the percentages from 89 survey responses that were spent on grassroots exploration and exploration aimed at expanding existing operations or resources.

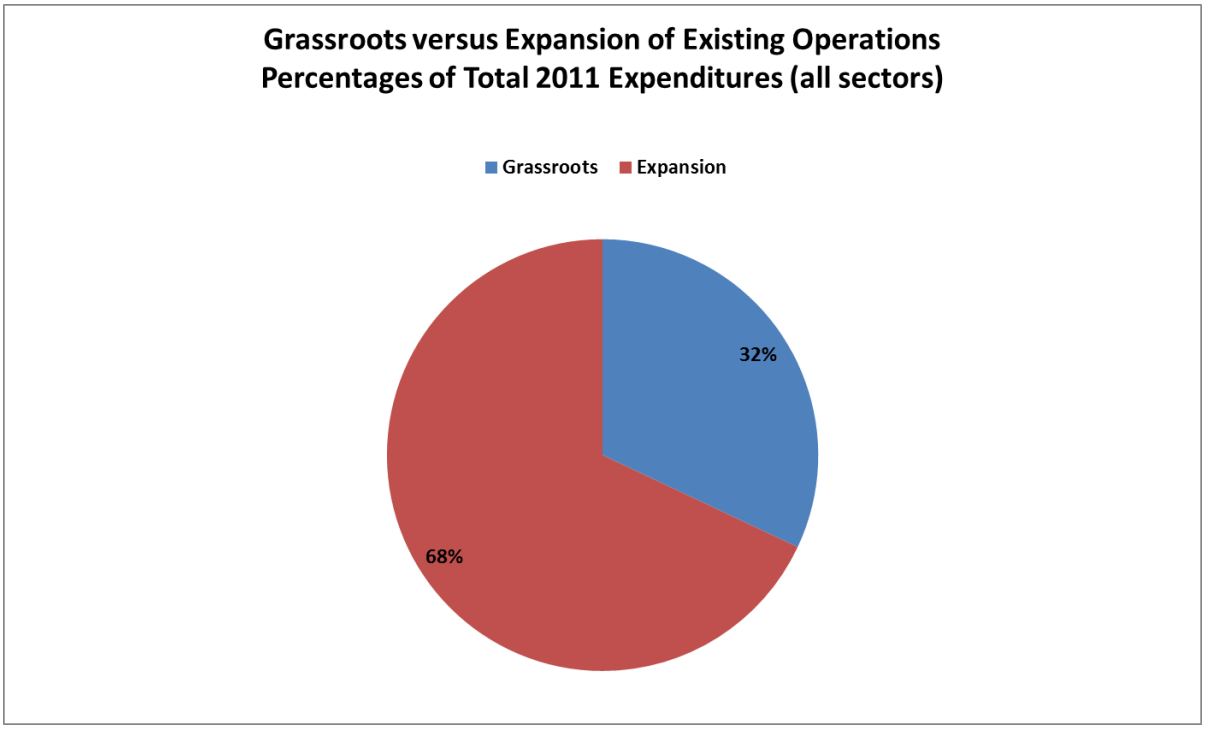


Figure 21. Pie chart showing the averages of the percentages of 2011 expenditures spent on grassroots exploration and exploration aimed at expanding existing operations or resources. Based on survey responses from 89 companies.

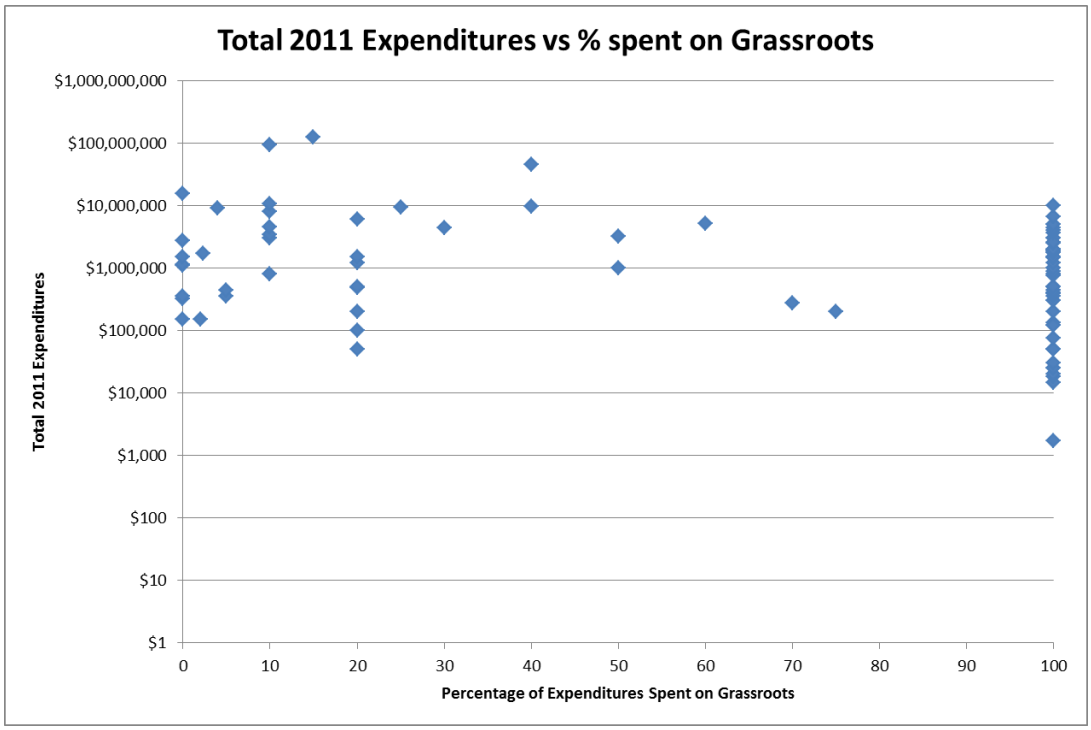
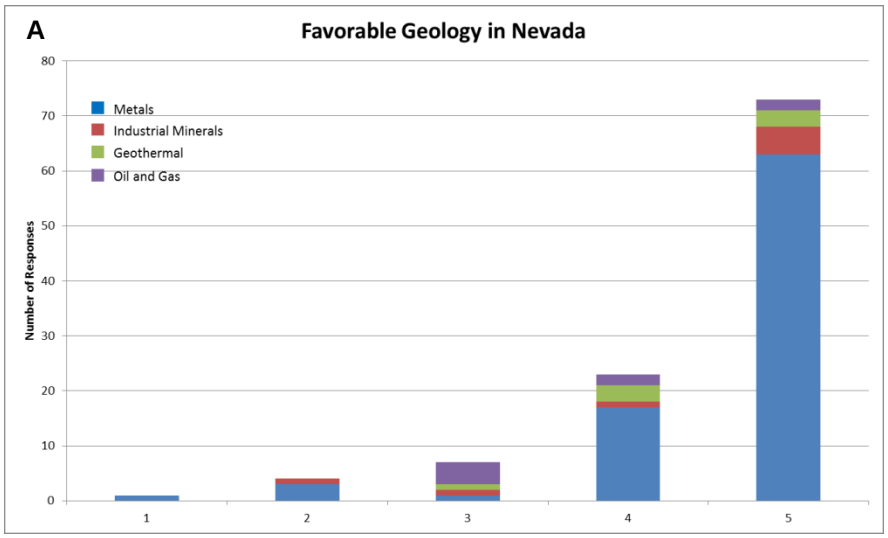


Figure 22. Graph of total 2011exploration expenditures (logarithmic scale) versus the percentage of expenditures spent on grassroots exploration based on survey responses of 89 companies. Shows weak, inverse correlation between expenditures and percentages spent on grassroots exploration.

because of the real or perceived better chance of finding more exploitable resources or, alternatively, they can raise capital more easily for such projects. Companies that focus on grassroots exploration have smaller budgets, presumably because of limited capital or lack of cash-flow from production. About $87 million (13% of the total 2011 expenditures) were spent by companies that spent more than 50% of their budgets on grassroots exploration.

FACTORS THAT IMPACT EXPLORATION

The survey asked companies to rate on a scale from 1 to 5 how seven factors impact their exploration. The averages for the 109 companies that responded were 4.5 for favorable geology in Nevada, 3.8 for the influence of new discoveries in Nevada, 4.0 for current or projected commodity prices, 4.3 for access to public lands in Nevada, 3.2 for claim or lease fees for public lands, 4.1 for the time and cost required to permit in Nevada, and 3.2 for uncertainty over possible reforms to U.S. mining laws (fig. 23). High ratings can mean either a positive impact or negative impact. In future surveys NBMG will use a rating scale of -2 to +2, where negative numbers indicate the factor negatively impacts exploration and positive numbers indicate the factor positively impacts exploration. Clearly, Nevada's geology with its huge endowment of gold deposits and access to Nevada's vast federally managed public lands continue to be important factors in attracting companies to explore in Nevada (figs. 23A, D). The time and cost of permitting is the largest negative impacting factor (fig. 23F), more so than claim fees or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Favorable Geology in Nevada
Number of Responses
Metals
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Geothermal
Oil and Gas
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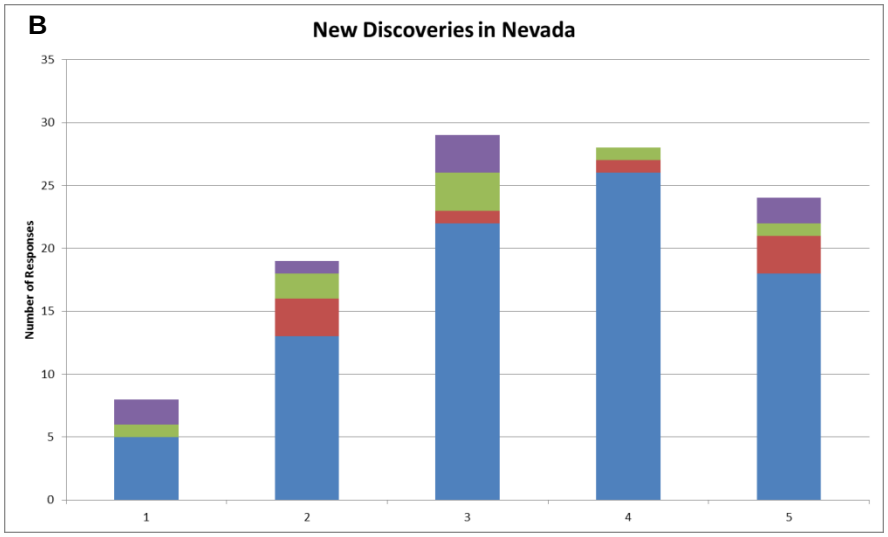
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New Discoveries in Nevada
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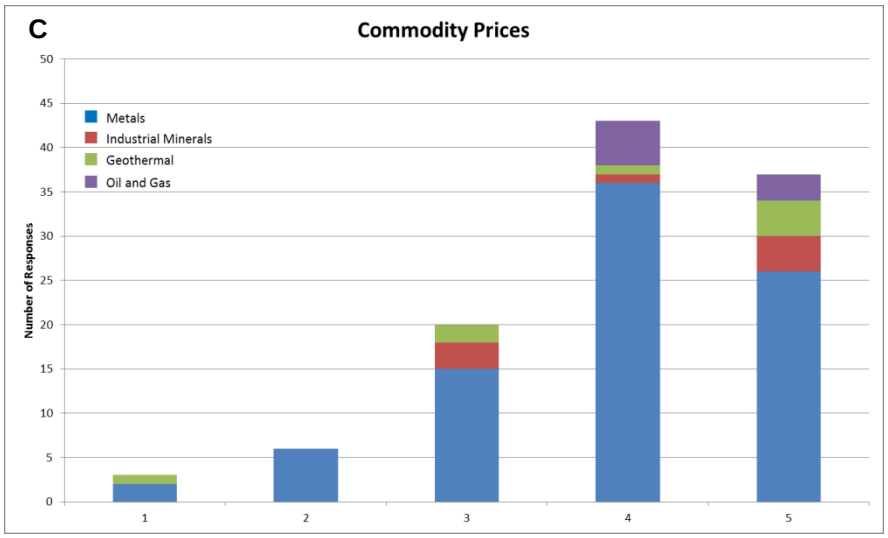
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Geothermal
Oil and Gas
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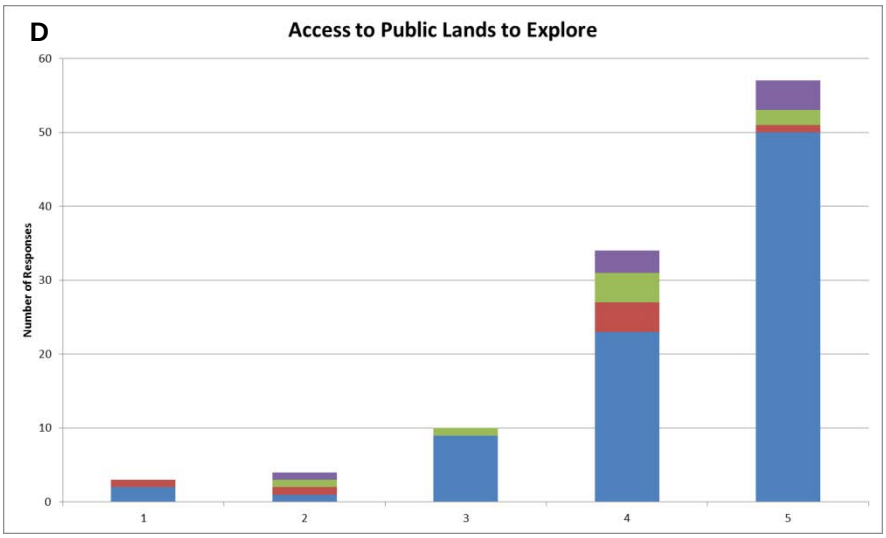
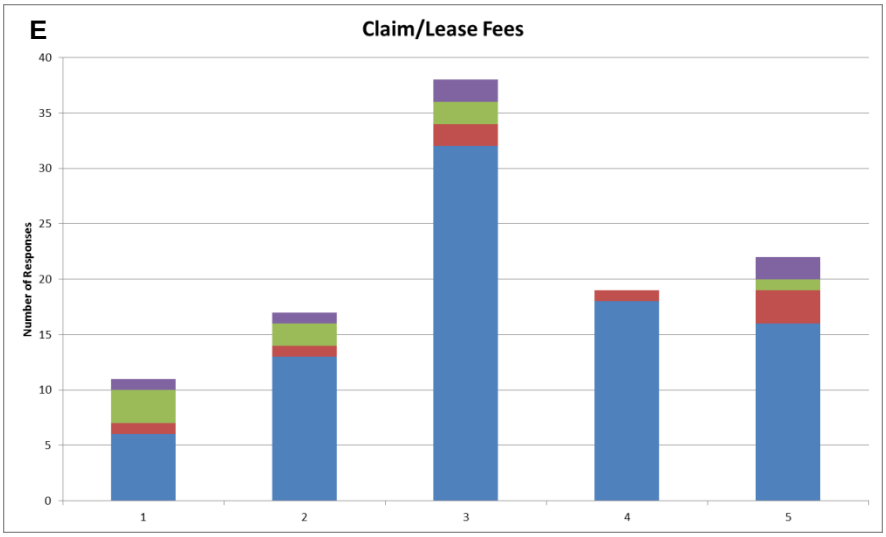
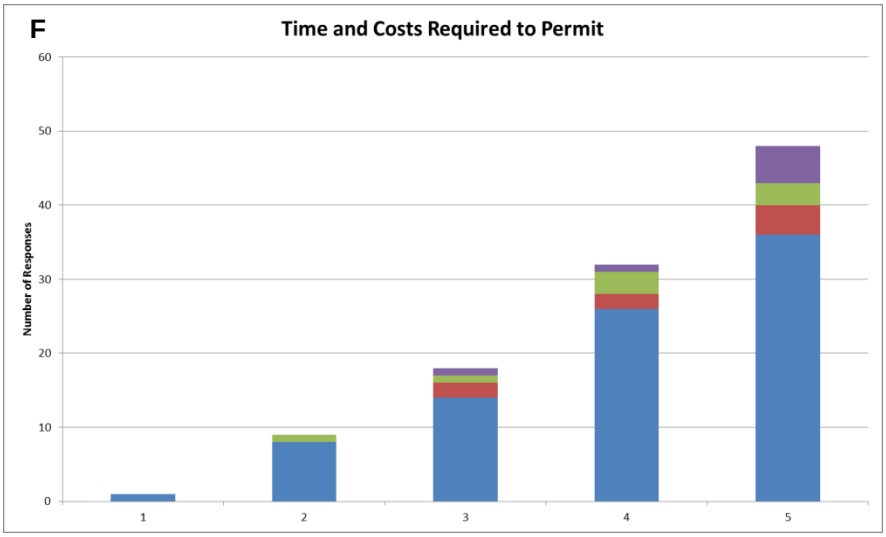
4
5


D
Access to Public Lands to Explore
Number of Responses
60
50
40
30
20
10
0
1
2
3
4
5


E
Claim/Lease Fees
Number of Responses
40
35
30
25
20
15
10
5
0
1
2
3
4
5


F
Time and Costs Required to Permit
Number of Responses
60
50
40
30
20
10
0
1
2
3
4
5

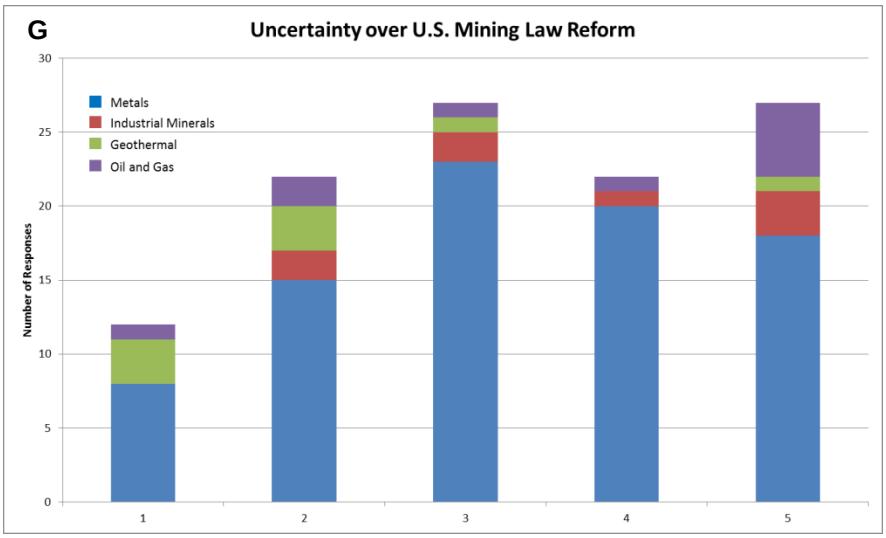


Figure 23. Histograms of survey responses from 109 companies that rated on a scale from 1 to 5 the impact of seven categories on their exploration programs. The seven categories are shown as separate graphs: A. Favorable geology in Nevada. B. Influence of new discoveries in Nevada. C. Current or projected commodity prices. D. Access to public lands in Nevada. E. Claim or lease fees for public lands. F. Time and costs required to permit exploration. G. Uncertainty over possible reforms to U.S. mining laws. The histograms are color-coded by the type of resource the company was exploring for (metals, industrial minerals, geothermal energy, and oil and gas).

uncertainty about future legislation (figs. 23E, G). Figure 23C indicates commodity prices have a significant impact on exploration for industrial minerals.

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Appendix A
Exploration Survey Form

Nevada Division of Minerals
Nevada Bureau of Mines and Geology
2012 Exploration Survey

Company Name: _____
Contact Person: _____
Email: _____
Phone: _____

1. **What were your company's exploration expenditures in Nevada in 2011, and how much does your company plan to spend in Nevada on exploration in 2012?**

2011 exploration expenditures in Nevada: $_____

2012 planned exploration expenditures in Nevada: $_____

2. **How many people did your company employ that were involved in exploration in Nevada in 2011, and how many does your company plan to employ in 2012? Include geologists and support staff, both company employees and individual contractors and consultants.**

2011 number of employees involved in Nevada exploration: _____

2012 planned number of employees involved in Nevada exploration: _____

3. **If you can, please ESTIMATE the percentages of your company's total Nevada expenditures that were spent in 2011 on the following categories, including salaries and benefits.**

Actual exploration (drilling, geology, geochemistry, geophysics, etc.): _____%

Land holding costs (claims staking and maintenance, lease payments, etc.): _____%

Permitting and compliance (environmental studies, bonding, reclamation, etc.): _____%

Corporate costs (overhead, legal, taxes, etc.): _____%

Other (please specify_____): _____%

4. **Please ESTIMATE the percentage of your Nevada exploration expenditures dedicated to expansion around existing operations and to grassroots efforts.**

Expansions: _____% Grass-root exploration: _____%

5. **Please rate how the following factors impact your Nevada exploration activity, with 1 being insignificant and 5 being very significant.**

Favorable geology in Nevada:	1	2	3	4	5
New discoveries in Nevada:	1	2	3	4	5
Commodity prices:	1	2	3	4	5
Access to public land to explore:	1	2	3	4	5
Claim fees:	1	2	3	4	5
Time and costs required to permit:	1	2	3	4	5
Uncertainty over U.S. mining law reform:	1	2	3	4	5
Other (please specify): _____	1	2	3	4	5

Please return this by email or mail to:

Nevada Bureau of Mines and Geology
c/o Larry Garside
Mail Stop 178
University of Nevada Reno
Reno, Nevada 89557-0178
Email: lgarside@unr.edu

Thank you. All individual responses will be held confidential.

Questions or comments? Please call Larry Garside at 784-6693 or email him at lgarside@unr.edu