Recruiting Geoscientists in Canada, the United States, the United Kingdom and Ireland

Demand for Geologists, Geochemists and Geophysicists in Calgary

Geologists, Geochemists and Geophysicists (collectively “geoscientists”) have been identified as a high-demand occupation in Calgary, based on the Calgary Labour Demand Forecast 2012. In 2010, there were an estimated 5,300 geoscientists in the Calgary labour force. Between 2010 and 2020, demand for these workers is expected to increase by more than 1,800 workers to a total of over 7,100 workers in 2020. Employers will likely face difficulties recruiting qualified workers for both newly-created jobs and existing positions that become vacant. During the global economic slowdown of 2007-2009, 56 per cent of Calgary’s geoscientist employers recruited new geoscientists and 29 per cent of employers that recruited experienced hiring difficulties. The combination of growing demand and limited supply are likely to result in shortages of geoscientists in Calgary over the next decade.

In order to meet high demand for geoscientists, Calgary employers may need to access labour markets outside of Calgary, including international labour markets, to meet a portion of their hiring needs. To facilitate targeted recruiting efforts, Calgary Economic Development (CED) has created this guide to identify the best cities and regions for recruiting workers in Canada, the United States, the United Kingdom and Ireland. Top cities and regions for recruiting are recommended based on the size of the geoscientist labour force and the likelihood that workers will migrate out of the area.

Top Locations for Recruiting in Canada

Outside of Calgary, the cities with the largest geoscientist labour force are Vancouver and Toronto with 935 workers and 860 workers respectively in 2010. Montréal is the third largest market with about 450 workers.

An out-migration probability index has been calculated based on analysis of data from the Labour Force Survey; the index indicates the likelihood that workers will move away from an area. St. John’s NL has the highest out-migration probability index score followed by Halifax and Québec City. Each of these cities has a geoscientist labour force of about 300 workers. Younger workers have a higher probability of relocating across long distances and St. John’s NL

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1 See Calgary Labour Demand Forecast 2012
2 See Alberta Wage and Salary Survey 2009
3 An out-migration probability index of workers is estimated based on a set of factors that are indicators of future migration. Factors include historical migration patterns, demographics of the occupational labour force, local economic conditions, median income, and the presence of foreign workers in the labour force.
has the youngest labour force, with workers under age 35 comprising over 50 per cent of the labour force; Québec City has the next youngest labour force with about 45 per cent of its geoscientist labour force under age 35, followed by Edmonton with 39 per cent.

People who have immigrated or previously moved across provincial boundaries are more likely to relocate in the future. International or inter-provincial migrants make up over a quarter (26 per cent) of the population of geoscientists in Greater Sudbury and are about 21 per cent of the geoscientist labour force in Victoria.

Average hourly pay for geoscientists in Calgary was $44.93 in 2011, which is higher than all top-recommended recruiting locations listed in Table 1. Geoscientists in Montréal are paid the lowest average hourly wage among top-recommended cities, at $20.64. Average hourly pay is also comparatively low in Halifax ($27.20 per hour) and Greater Sudbury ($30.74 per hour).

Table 1 Recruiting Indicators for Geoscientists in Canada, by CMA

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Vancouver</td>
<td>935</td>
<td>40.87</td>
<td>103</td>
<td>25%</td>
</tr>
<tr>
<td>2</td>
<td>Toronto</td>
<td>860</td>
<td>n.a.</td>
<td>103</td>
<td>15%</td>
</tr>
<tr>
<td>3</td>
<td>St. John’s, NL</td>
<td>334</td>
<td>n.a.</td>
<td>108</td>
<td>51%</td>
</tr>
<tr>
<td>4</td>
<td>Montréal</td>
<td>453</td>
<td>20.64</td>
<td>103</td>
<td>29%</td>
</tr>
<tr>
<td>5</td>
<td>Ottawa</td>
<td>432</td>
<td>n.a.</td>
<td>103</td>
<td>21%</td>
</tr>
<tr>
<td>6</td>
<td>Québec</td>
<td>309</td>
<td>n.a.</td>
<td>104</td>
<td>45%</td>
</tr>
<tr>
<td>7</td>
<td>Victoria</td>
<td>329</td>
<td>40.87</td>
<td>103</td>
<td>15%</td>
</tr>
<tr>
<td>8</td>
<td>Halifax</td>
<td>239</td>
<td>27.20</td>
<td>104</td>
<td>17%</td>
</tr>
<tr>
<td>9</td>
<td>Edmonton</td>
<td>372</td>
<td>44.93</td>
<td>103</td>
<td>39%</td>
</tr>
<tr>
<td>10</td>
<td>Greater Sudbury</td>
<td>220</td>
<td>30.74</td>
<td>103</td>
<td>29%</td>
</tr>
<tr>
<td></td>
<td>Calgary</td>
<td>5,342</td>
<td>44.93</td>
<td>103</td>
<td>22%</td>
</tr>
</tbody>
</table>

*See footnote 3 for additional information about the Emigration Probability Index. Note: Data is measured for Census Metropolitan Areas unless otherwise noted. Figures for Calgary may differ from information presented earlier in this report describing labour demand for the Calgary Economic Region. Sources: Labour Force Survey, 2006 Census of Canada, RDA Global, Labour Market Information - HRSDC WorkingInCanada.gc.ca

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4 Figures for employment in Calgary are for the Calgary Economic Region. Figures for other cities are for the census metropolitan area (CMA)
5 International and inter-provincial migration statistics are analyzed based on data collected in the 2001 and 2006 Census. The data required to analyze this migration pattern for the most recent 5 year period is not available at the time of this analysis.
Table 2 Wages for Geoscientists in Canada, by CMA

<table>
<thead>
<tr>
<th>Census Metro Area</th>
<th>Recent Wage Range (CAD)</th>
<th>Procedural Annual Wages or Salary, 2005*</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Low Wage</td>
<td>Average Wage</td>
</tr>
<tr>
<td>Vancouver</td>
<td>n.a.</td>
<td>40.87</td>
</tr>
<tr>
<td>Toronto</td>
<td>n.a.</td>
<td>n.a.</td>
</tr>
<tr>
<td>St. John’s, NL</td>
<td>n.a.</td>
<td>n.a.</td>
</tr>
<tr>
<td>Montréal</td>
<td>13.59</td>
<td>20.64</td>
</tr>
<tr>
<td>Ottawa</td>
<td>n.a.</td>
<td>n.a.</td>
</tr>
<tr>
<td>Québec</td>
<td>n.a.</td>
<td>n.a.</td>
</tr>
<tr>
<td>Victoria</td>
<td>40.87</td>
<td>n.a.</td>
</tr>
<tr>
<td>Halifax</td>
<td>18.50</td>
<td>27.20</td>
</tr>
<tr>
<td>Edmonton</td>
<td>37.44</td>
<td>44.93</td>
</tr>
<tr>
<td>Greater Sudbury</td>
<td>18.00</td>
<td>30.74</td>
</tr>
<tr>
<td>Calgary</td>
<td>37.44</td>
<td>44.93</td>
</tr>
</tbody>
</table>

Note: Data is measured for Census Metropolitan Areas unless otherwise noted. *Wage data reflects provincial average.
Sources: 2006 Census, Labour Market Information - HRSDC WorkingInCanada.gc.ca

Top Locations for Recruiting in the United States

In the United States, the occupation most closely aligns with NOC 2113 Geologists, Geochemists and Geophysicists is: SOC 19-2042: Geoscientists, Except Hydrologists and Geographers.

Table 3 presents statistics on the top-ten recommended cities for recruiting geoscientists in the US. The US geoscientist labour force is heavily concentrated in a few cities, four of which have a labour force of over 1,000 geoscientists: Houston, Denver, Dallas-Fort Worth, and Los Angeles (L.A.). Geoscientists in Seattle, Austin and Sacramento have the highest out-migration scores among the top-recommended US cities, but these markets are comparatively small with fewer than 800 workers in each.

Non-US citizens have a higher-than-average probability of making a long-distance move and they comprise 13 per cent of the geoscientist population in Houston. L.A. and Sacramento have the highest unemployment rates among the top-recommended cities at 10.7 per cent and 10.9 per cent, respectively, which may push some families and workers to seek employment outside of those cities.

The mean annual salary for geoscientists in Houston (the US city with the largest labour force) in 2010 was approximately USD $135,000 which is greater than that of geoscientists in Calgary with average annual base pay of just under CAD $115,000 in 2009. Mean annual pay for geoscientists in Dallas and Oklahoma City were also higher than the mean base pay in Calgary.

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6 Calgary median annual salary is calculated based on average hours worked per week and median hourly wage rate reported in the 2009 Alberta Wage and Salary Survey. The average annual salary is the actual figure from the survey. Annual figures for other cities in Table 2 are from HRSDC.
Mean annual salaries for geoscientists in L.A., Austin, Seattle, and Sacramento were all lower than USD $85,000 in 2010. Workers in these cities could potentially experience a 35 per cent to 50 per cent increase in earnings when relocating to Calgary.

### Table 3 Out-Migration Indicators of Geoscientists in Top 10 US Cities, 2010

<table>
<thead>
<tr>
<th>Rank</th>
<th>Metro Area</th>
<th>Number of Workers</th>
<th>Pct. of Workers who are Non-US Citizens</th>
<th>Mean Age</th>
<th>Pct. Of Workers Under Age 35</th>
<th>Out-Migration Probability Index*</th>
<th>Unemployment Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Houston-Brazoria, TX</td>
<td>5,170</td>
<td>13%</td>
<td>48</td>
<td>19%</td>
<td>113</td>
<td>7.6</td>
</tr>
<tr>
<td>2</td>
<td>Denver-Boulder, CO</td>
<td>1,420</td>
<td>2%</td>
<td>49</td>
<td>23%</td>
<td>114</td>
<td>7.9</td>
</tr>
<tr>
<td>3</td>
<td>Dallas-Fort Worth, TX</td>
<td>1,310</td>
<td>4%</td>
<td>46</td>
<td>27%</td>
<td>114</td>
<td>7.4</td>
</tr>
<tr>
<td>4</td>
<td>Los Angeles-Long Beach, CA</td>
<td>1,090</td>
<td>6%</td>
<td>46</td>
<td>22%</td>
<td>113</td>
<td>10.7</td>
</tr>
<tr>
<td>5</td>
<td>Austin, TX</td>
<td>710</td>
<td>2%</td>
<td>45</td>
<td>27%</td>
<td>116</td>
<td>6.6</td>
</tr>
<tr>
<td>6</td>
<td>Oklahoma City, OK</td>
<td>850</td>
<td>4%</td>
<td>49</td>
<td>15%</td>
<td>113</td>
<td>5.5</td>
</tr>
<tr>
<td>7</td>
<td>Seattle-Everett, WA</td>
<td>560</td>
<td>8%</td>
<td>42</td>
<td>36%</td>
<td>119</td>
<td>8</td>
</tr>
<tr>
<td>8</td>
<td>Sacramento, CA</td>
<td>630</td>
<td>4%</td>
<td>43</td>
<td>35%</td>
<td>115</td>
<td>10.9</td>
</tr>
<tr>
<td>9</td>
<td>Washington, DC/MD/VA</td>
<td>690</td>
<td>5%</td>
<td>46</td>
<td>22%</td>
<td>113</td>
<td>5.4</td>
</tr>
<tr>
<td>10</td>
<td>San Francisco-Oakland-Vallejo, CA</td>
<td>570</td>
<td>8%</td>
<td>45</td>
<td>25%</td>
<td>113</td>
<td>8.7</td>
</tr>
<tr>
<td></td>
<td>United States</td>
<td>30,830</td>
<td>6%</td>
<td>46</td>
<td>26%</td>
<td>114</td>
<td>8.2</td>
</tr>
</tbody>
</table>

*The Out-Migration Probability Index gives an indication of the number of workers in the target occupation in each metropolitan area that have made an interregional move in the past 5 years. The index also reflects factors that may affect worker migration, such as historical migration patterns, demographics of the occupational labour force, local economic conditions, median income, and the presence of foreign workers in the labour force. US Average Out-Migration Probability = 100 (for all US workers in all occupations).

### Table 4 Wages of Geoscientists in Top Ranked Cities for Recruiting in the United States, 2010

<table>
<thead>
<tr>
<th>Metropolitan Statistical Area</th>
<th>Workers</th>
<th>Mean Hourly Wage** (USD)</th>
<th>Mean Annual Salary** (USD)</th>
<th>Median Salary by Quartile (USD)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Lower 10%</td>
</tr>
<tr>
<td>Houston-Brazoria, TX</td>
<td>5,170</td>
<td>$65.13</td>
<td>$135,460</td>
<td>67,770</td>
</tr>
<tr>
<td>Denver-Boulder, CO</td>
<td>1,420</td>
<td>49.77</td>
<td>103,520</td>
<td>49,270</td>
</tr>
<tr>
<td>Dallas-Fort Worth, TX</td>
<td>1,310</td>
<td>58.01</td>
<td>120,650</td>
<td>63,200</td>
</tr>
<tr>
<td>Los Angeles-Long Beach, CA</td>
<td>1,090</td>
<td>39.48</td>
<td>82,120</td>
<td>40,160</td>
</tr>
<tr>
<td>Austin, TX</td>
<td>710</td>
<td>40.43</td>
<td>84,090</td>
<td>51,120</td>
</tr>
<tr>
<td>Oklahoma City, OK</td>
<td>850</td>
<td>70.22</td>
<td>146,050</td>
<td>78,180</td>
</tr>
<tr>
<td>Seattle-Everett, WA</td>
<td>560</td>
<td>40.07</td>
<td>83,350</td>
<td>45,550</td>
</tr>
<tr>
<td>Sacramento, CA</td>
<td>630</td>
<td>36.71</td>
<td>76,350</td>
<td>41,110</td>
</tr>
<tr>
<td>Washington, DC/MD/VA</td>
<td>690</td>
<td>48.05</td>
<td>99,940</td>
<td>47,030</td>
</tr>
<tr>
<td>San Francisco-Oakland-Vallejo, CA</td>
<td>570</td>
<td>46.76</td>
<td>97,260</td>
<td>54,280</td>
</tr>
<tr>
<td>United States</td>
<td>30,830</td>
<td>44.89</td>
<td>93,380</td>
<td>43,820</td>
</tr>
<tr>
<td>Calgary (in $ CAD)</td>
<td>5,342</td>
<td>$44.93</td>
<td>$114,852</td>
<td>n.a.</td>
</tr>
</tbody>
</table>

**Source for Calgary wage and salary figures is the 2009 Alberta Wage and Salary Survey. Results are updated every 2 years. At the time of this analysis 2011 figures were not yet published. US Data Sources: Bureau of Labour Statistics Occupational Employment Database, American Community Survey, US Census 2010. Analysis by RDA Global.
Top Locations for Recruiting in the United Kingdom and Ireland

In 2010, there were approximately 19,000 geoscientists in the UK labour force. Average annual income for geoscientists in the UK was about £47,000 in 2010 (approximately CAD $75,000). In the UK, the top regions for recruiting geoscientists are London and the West Midlands Region, which includes the cities Birmingham and Coventry. The labour force for geoscientists is well distributed across the UK, but historical out-migration levels are highest among geoscientists in London and the West Midlands Region, based on an analysis of the British Quarterly Labour Force Survey. London and the West Midlands Region have a high percentage of geoscientists under age 35, (approximately 64 per cent and 90 per cent of the work force respectively).

Foreign workers represent a growing share of people migrating out of the UK; as of 2010, non-British citizens represented 65 per cent of long-term migrants leaving the UK, up from 43 per cent in 2005. London and the Eastern Region (which includes Greater London, Cambridge, Norwich, Peterborough, and Ipswich) have the greatest percentage of non-British geoscientists.

Table 5 contains information on the size and characteristics of the UK labour force for geoscientists.

In 2010, there were approximately 1,300 geoscientists in the Irish labour force. Detailed wage information is limited for geoscientist occupations in Ireland; The Institute of Geologists of Ireland graduate geologist survey (2005) indicated an average salary of €20-30,000 for 57% of graduates, with 21% reporting a salary of €30-40,000 (this equates to a range between $27,300 CAD and $54,600 CAD). Private sector responses in this study were not confined to early-career geoscientists and showed an average salary of €50,900 (approximately CAD $69,490). Regional data is not available on the geoscientist labour force in Ireland but a national recruiting strategy in Ireland can be effective, due to the small geographic size of the country. Recruiting in Ireland may be effectively conducted from either Cork or Dublin, the two largest cities.

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8 Source: United Kingdom International Passenger Survey (IPS); Estimates of long-term international migration, rolling annual data to Q4 2010.
9 Conversion rate of €1=$1.3652 CAD.
<table>
<thead>
<tr>
<th>Rank</th>
<th>Region/ Country</th>
<th>Major Cities</th>
<th>Number of Workers</th>
<th>Percentage of Workers who are Non-National Citizens</th>
<th>Percentage of Workers who are Non-EU Citizens</th>
<th>Median Age*</th>
<th>Pct. Of Workers Under Age 35</th>
<th>Out-Migration Probability Index**</th>
<th>Median Annual Income 2010 (GBP)</th>
<th>Median Annual Income 2010 (CAD)</th>
<th>Mean Annual Income 2010 (GBP)</th>
<th>Mean Annual Income 2010 (CAD)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>London</td>
<td>Greater London</td>
<td>2,916</td>
<td>28%</td>
<td>8%</td>
<td>31</td>
<td>64%</td>
<td>122</td>
<td>n.a</td>
<td>n.a</td>
<td>n.a</td>
<td>n.a</td>
</tr>
<tr>
<td>2</td>
<td>West Midlands</td>
<td>Birmingham, Coventry</td>
<td>1,599</td>
<td>0%</td>
<td>0%</td>
<td>27</td>
<td>90%</td>
<td>120</td>
<td>n.a</td>
<td>n.a</td>
<td>n.a</td>
<td>n.a</td>
</tr>
<tr>
<td>3</td>
<td>South East</td>
<td>Brighton, Oxford, Portsmouth, Southampton</td>
<td>2,728</td>
<td>20%</td>
<td>13%</td>
<td>45</td>
<td>28%</td>
<td>109</td>
<td>n.a</td>
<td>n.a</td>
<td>£55,418</td>
<td>$88,163</td>
</tr>
<tr>
<td>4</td>
<td>South West</td>
<td>Bristol, Bournemouth, Plymouth</td>
<td>1,411</td>
<td>9%</td>
<td>5%</td>
<td>32.5</td>
<td>55%</td>
<td>114</td>
<td>£42,215</td>
<td>$67,159</td>
<td>48,723</td>
<td>77,512</td>
</tr>
<tr>
<td>5</td>
<td>Eastern</td>
<td>Greater London, Cambridge, Norwich, Peterborough, Ipswich</td>
<td>1,411</td>
<td>25%</td>
<td>5%</td>
<td>37</td>
<td>45%</td>
<td>112</td>
<td>40,002</td>
<td>63,638</td>
<td>40,243</td>
<td>64,021</td>
</tr>
<tr>
<td>6</td>
<td>Yorkshire &amp; Humberside</td>
<td>Leeds, Sheffield, Bradford, Wakefield, Hull</td>
<td>1,317</td>
<td>0%</td>
<td>0%</td>
<td>30</td>
<td>67%</td>
<td>111</td>
<td>n.a</td>
<td>n.a</td>
<td>n.a</td>
<td>n.a</td>
</tr>
<tr>
<td>7</td>
<td>North West</td>
<td>Manchester, Liverpool, Preston, Blackpool</td>
<td>1,129</td>
<td>8%</td>
<td>0%</td>
<td>39</td>
<td>31%</td>
<td>110</td>
<td>37,977</td>
<td>60,417</td>
<td>40,742</td>
<td>64,815</td>
</tr>
<tr>
<td>8</td>
<td>Wales</td>
<td>Cardiff, Swansea</td>
<td>1,223</td>
<td>0%</td>
<td>0%</td>
<td>40.5</td>
<td>25%</td>
<td>107</td>
<td>n.a</td>
<td>n.a</td>
<td>n.a</td>
<td>n.a</td>
</tr>
<tr>
<td>9</td>
<td>Scotland</td>
<td>Glasgow, Edinburgh, Aberdeen</td>
<td>1,599</td>
<td>20%</td>
<td>10%</td>
<td>38.5</td>
<td>20%</td>
<td>106</td>
<td>n.a</td>
<td>n.a</td>
<td>n.a</td>
<td>n.a</td>
</tr>
<tr>
<td>10</td>
<td>East Midlands</td>
<td>Nottingham-Derby, Leicester, Northampton</td>
<td>1,505</td>
<td>17%</td>
<td>0%</td>
<td>45.5</td>
<td>17%</td>
<td>105</td>
<td>39,226</td>
<td>62,404</td>
<td>41,083</td>
<td>65,358</td>
</tr>
<tr>
<td></td>
<td>Total UK</td>
<td></td>
<td>19,000</td>
<td>15%</td>
<td>5%</td>
<td>37</td>
<td>46%</td>
<td>112</td>
<td>£40,713</td>
<td>$64,770</td>
<td>£46,643</td>
<td>$74,203</td>
</tr>
<tr>
<td></td>
<td>Total Ireland</td>
<td></td>
<td>5,342</td>
<td>n.a.</td>
<td>22%</td>
<td>n.a.</td>
<td>n.a</td>
<td>n.a.</td>
<td>£50,900$</td>
<td>$69,490</td>
<td>n.a</td>
<td>n.a</td>
</tr>
</tbody>
</table>

*British data source reports median age figures, while Irish and US data sources report mean age figures. ** Out-Migration index scores for the UK are not directly comparable with those of cities in the US or Ireland. Sources: Quarterly British Labour Force Survey, Annual Survey of Hours and Earnings (UK, 2010), Central Statistics Office Ireland (2010), Analysis by RDA Global.

Foreign Credential Recognition

When recruiting geoscientists in the UK and Ireland, Alberta employers are advised to consult The Association of Professional Engineers, Geologists, and Geophysicists of Alberta (APEGGA) to determine which workers are most likely to meet the requirements for licensure in Alberta.

Information on foreign credential recognition for geoscientists in the UK and Ireland is available from the Alberta Department of Human Services at: