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“Natural Resource Management”

- Activities and employees that support and care for natural lands, air, freshwater and marine systems in Hawai‘i. This includes fieldwork, science, research, regulation, planning, protection, management, hazard mitigation, communications, outreach, decision-making, policy, education, training, and administrative support.

- Update to the 2012 Report
  - Additional survey questions
  - More (secondary) non-survey data sources
  - Heavier focus on NRM sector
  - Able to examine trends
Data Sources

• 11-question online NRM survey (SurveyMonkey)
  o UHERO, HMF and TNC generated a list of NRM agencies
  o Multiple follow-up efforts to maximize response rate

• How is this different from other green jobs/growth studies?
  o Focus on natural resource management
  o Respondents asked specifically about FTE and expenditures on NRM activities

• Secondary sources
  o Agriculture: USDA-NASS, DLIR, BLS, USDA-ERS
  o Energy: EIA, BLS
## 2014 NRM Employment

<table>
<thead>
<tr>
<th>Category</th>
<th>Respondents</th>
<th>Total</th>
<th>Mean</th>
<th>St. Dev.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Entire NRM sector</td>
<td>97</td>
<td>3,543.4</td>
<td>36.5</td>
<td>126.2</td>
</tr>
<tr>
<td>New Jobs Past 3-yr FTE Growth [%/year]</td>
<td>-</td>
<td>66.3 [0.38%]</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Expected 5-yr FTE Growth [%/year]</td>
<td>-</td>
<td>48.9 [0.28%]</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>State</td>
<td>6</td>
<td>1,138.0</td>
<td>189.7</td>
<td>308.1</td>
</tr>
<tr>
<td>Academic</td>
<td>15</td>
<td>1,105.5</td>
<td>73.7</td>
<td>234.2</td>
</tr>
<tr>
<td>Federal</td>
<td>18</td>
<td>744.0</td>
<td>43.8</td>
<td>52.6</td>
</tr>
<tr>
<td>Nonprofit</td>
<td>23</td>
<td>268.5</td>
<td>12.2</td>
<td>29.2</td>
</tr>
<tr>
<td>Partnership</td>
<td>14</td>
<td>137.8</td>
<td>9.8</td>
<td>7.0</td>
</tr>
<tr>
<td>Private</td>
<td>17</td>
<td>132.7</td>
<td>7.8</td>
<td>13.2</td>
</tr>
<tr>
<td>County</td>
<td>4</td>
<td>17.0</td>
<td>4.3</td>
<td>2.2</td>
</tr>
</tbody>
</table>
Job Types in the NRM Sector

The diagram illustrates the number of times each job type was indicated by respondents. The job types include Hunter, Construction, Lawyer, Lab Technician, Training, Tech/Info Systems, Fundraising, Government Policy, Bookkeeper, Accountant, Planner, Research/Analyst, Cultural Practitioner, GIS/Data Manager, Scientist, Natural Resource Manager, Field Technician, Communications/Outreach, Grants Management, and Administrative Support. The chart shows a range of job types with varying levels of indication by respondents.
Write-in Responses for “Other” Job Types

- Teacher/instructor
- Horticulturalist/arborist/botanist
- Engineer
- Climate change adaptation expert
- Wildlife rehabilitator
- Wildlife emergency response professional
- Project/program manager
- Entomologist
- PR consultant
- Permit specialist
- Archaeologist
- Architect
Desirable College Majors in the NRM Sector

- Physics
- Anthropology
- Chemistry
- Political Science
- Economics
- Accounting
- Business
- Geology
- Computer Science
- Oceanography
- Hydrology
- Soil Science
- Environmental Law
- Communications
- Marine Biology
- Geography
- Hawaiian Studies
- Botany
- Ecology
- Environmental Studies
- Biology
- Natural Resource

# of times checked
Average Starting Salary in the NRM Sector
# NRM Expenditures (Million 2014 Dollars)

<table>
<thead>
<tr>
<th>Category</th>
<th>Respondents</th>
<th>Total</th>
<th>Mean</th>
<th>Standard Deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Entire NRM sector</td>
<td>97</td>
<td>$540.5</td>
<td>8.4</td>
<td>21.0</td>
</tr>
<tr>
<td>State</td>
<td>6</td>
<td>$287.6</td>
<td>47.9</td>
<td>68.5</td>
</tr>
<tr>
<td>Federal</td>
<td>18</td>
<td>$88.6</td>
<td>5.5</td>
<td>5.8</td>
</tr>
<tr>
<td>County</td>
<td>4</td>
<td>$61.7</td>
<td>20.6</td>
<td>34.6</td>
</tr>
<tr>
<td>Academic</td>
<td>15</td>
<td>$56.2</td>
<td>3.7</td>
<td>9.9</td>
</tr>
<tr>
<td>Nonprofit</td>
<td>23</td>
<td>$29.8</td>
<td>1.4</td>
<td>3.0</td>
</tr>
<tr>
<td>Partnership</td>
<td>14</td>
<td>$10.6</td>
<td>0.8</td>
<td>0.4</td>
</tr>
<tr>
<td>Private</td>
<td>17</td>
<td>$6.2</td>
<td>0.4</td>
<td>0.6</td>
</tr>
</tbody>
</table>
Comparison with other Industries

- Motion Picture and Sound Recording: $498
- Performing Arts, Spectator Sports, and Related Industries: $538
- NRM: $541
- Passenger Car Rental and Leasing: $546
# Change in Expenditures and FTE

## Full Sample

<table>
<thead>
<tr>
<th></th>
<th>Respondents</th>
<th>Expenditures (Millions)</th>
<th>FTE</th>
</tr>
</thead>
<tbody>
<tr>
<td>FY2011</td>
<td>84</td>
<td>$465.6</td>
<td>3,278.7</td>
</tr>
<tr>
<td>FY2014</td>
<td>97</td>
<td>$540.5</td>
<td>3,543.4</td>
</tr>
<tr>
<td>Percentage Change</td>
<td>15%</td>
<td>16%</td>
<td>8%</td>
</tr>
</tbody>
</table>

## Panel*

<table>
<thead>
<tr>
<th></th>
<th>Respondents</th>
<th>Expenditures (Millions)</th>
<th>FTE</th>
</tr>
</thead>
<tbody>
<tr>
<td>FY2011</td>
<td>64</td>
<td>$387.6</td>
<td>2,429.6</td>
</tr>
<tr>
<td>FY2014</td>
<td>64</td>
<td>$452.0</td>
<td>2,161.5</td>
</tr>
<tr>
<td>Percentage Change</td>
<td>17%</td>
<td>-11%</td>
<td></td>
</tr>
</tbody>
</table>

*Note: much of the difference is due to a single state agency. When the outlier is removed, the change in expenditures and FTE become 26% and -3% respectively.*
Challenges and Recommendations

- A panel of survey participants is ideal for documenting trends in the NRM sector.
- Survey response rate was >50% but a higher rate would be even better.
- Answering questions about locally produced/consumed farm products requires collecting new data.
- Publicly available datasets do not define renewable energy as a sub-sector within the larger energy industry.
Interested in more applications of economic analysis to Hawaii’s priority environmental challenges? Check out [http://uhero.hawaii.edu/45/project-environment](http://uhero.hawaii.edu/45/project-environment)

And follow UHERO on Facebook: [https://www.facebook.com/UHERO.forum](https://www.facebook.com/UHERO.forum)