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## Characteristics of Ph.D. Environmental Scientists

Employment of environmental scientists grew more slowly than overall scientific employment during the 1977-87 decade.<sup>1</sup> The number of doctorate-level scientists across all fields increased by 46 percent, from 240,000 to 351,000. Employment in environmental science, however, increased by only 36 percent, from 13,000 in 1977 to 17,800 in 1987.

Growth in employment was uneven among the major environmental-science fields. Whereas employment of earth scientists rose by 40 percent (from 9,700 to 13,600) the number of atmospheric scientists increased by just 29 percent (from 1,700 to 2,200). Employment of oceanographers was up 25 percent (from 1,600 to 2,000).

The relatively strong growth in employment for earth scientists during the 1977-87 decade was concentrated in the industrial sector, where employment rose by 75 percent. That increase reflected, in part, the increased exploration and energy-development activities in the late 1970s and early 1980s.<sup>2</sup> The comparatively slow growth in the employment of atmospheric scientists and oceanographers, on the other hand, reflects below-average increases in R&D expenditures on those fields at colleges and universities.<sup>3</sup>

Earth scientists report employment in a wide range of specialties. Relatively large employment subsectors include geophysics (1,500), petroleum geology (1,000), geochemistry (900), stratigraphy (600), and economic geology (600).

Of the 2,200 atmospheric scientists, about 1,000 were employed in meteorology; about 900 cited atmospheric physics or chemistry as their field. Of the 2,000 oceanographers employed in 1987, about 1,300 cited employment in oceanography, with the remainder being classified under general marine sciences.

While environmental scientists are employed in all sectors of the economy, the greatest number work in four-year colleges and universities. In general, however, the relative importance of colleges and universities in providing employment opportunities varies considerably by field.

In 1987, 37 percent of the earth scientists were employed in academia, as were 48 percent of the atmospheric scientists and 64 percent of the oceanographers. In industry, only earth scientists were employed in significant numbers. In 1987, industry employed 4,700 of them.

Employment growth varied considerably among sectors during the 1977-87 decade. While industrial employment rose by 67 percent, the number of environmental scientists in four-year colleges and universities increased by only 21

percent. Because of these different growth patterns, industry's share of total employment increased from 24 percent to 29 percent, while academia's share declined from 47 percent to 42 percent.

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The work activities of environmental scientists vary by sectors of employment. (For example, about 34 percent of earth scientists cite R&D as their primary work activity, compared to 57 percent of oceanographers and 47 percent of atmospheric scientists.)

Within educational institutions, earth scientists were more likely than oceanographers or atmospheric scientists to report teaching as their primary assignment. Of the approximately 5,000 earth scientists in academic insti-

tutions in 1987, 56 percent cited teaching as their major activity. The comparable figures for oceanographers and atmospheric scientists were 23 percent and 16 percent. To some extent, the differences in the proportions reporting teaching reflect the fact that a significant number of undergraduate degrees are granted in the earth sciences, whereas almost all degrees offered in oceanography or the atmospheric sciences are at the graduate level.

The work activities reported by environmental scientists shifted during the 1977-87 decade. Although the number who reported teaching as their primary function was essentially unchanged between 1977 and 1987, the number of environmental scientists performing R&D rose by about 60 percent, while the number citing general management increased by about 50 percent.

The median annual salaries of environmental scientists are higher than those reported for doctoral scientists in general: \$50,000 versus \$47,800. Both earth scientists and atmospheric scientists reported median annual salaries in the \$50,000 range, whereas oceanographers reported yearly earnings of \$44,300.

### Selected Characteristics of Ph.D. Environmental Scientists, 1987

|                                     | Number | Percent |
|-------------------------------------|--------|---------|
| <b>Total Employed</b>               |        |         |
| Environmental scientists            | 17,800 | 100     |
| Earth scientists                    | 13,600 | 76      |
| Atmospheric scientists              | 2,200  | 12      |
| Oceanographers                      | 2,000  | 11      |
| <b>Sector of Employment</b>         |        |         |
| Four-year colleges and universities | 7,400  | 42      |
| Industry                            | 5,200  | 29      |
| Federal Government                  | 3,400  | 19      |
| Other sectors                       | 1,800  | 10      |
| <b>Primary Work Activities</b>      |        |         |
| Research and Development            | 7,700  | 43      |
| Applied research and development    | 4,100  | 23      |
| Basic research                      | 3,600  | 20      |
| Management                          | 3,600  | 20      |
| Of R&D                              | 1,900  | 11      |
| Of Other                            | 1,600  | 9       |
| Teaching                            | 3,400  | 19      |
| All other                           | 3,100  | 18      |

NOTE: Details may not add to totals because of rounding.  
SOURCE: National Science Foundation, SRS

<sup>1</sup>Since 1973, the National Science Foundation has collected information every two years on the demographic and employment characteristics of scientists and engineers holding doctoral degrees in the United States. Information in this summary, drawn from the 1987 *Survey of Doctorate Recipients*, includes those who received their doctorates during the 42-year period from 1944 through 1986. The survey is based on a sample of about 13 percent of that population.

<sup>2</sup>See, for example, U.S. Department of Commerce, 1987 *U.S. Industrial Outlook*, January 1987.

<sup>3</sup>See National Science Foundation, *Academic Science/Engineering: R&D Funds, Fiscal Year 1986*, NSF 88-312.