

**Understanding and Predicting Changes in the Workforce
For Ocean Sciences, Technology, & Operations:
Project Overview**

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Overview

Title Understanding and Predicting Changes in the Workforce for Ocean Sciences, Technology, & Operations

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Sponsor, Funding, Period

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Goals

1. Develop improved assessment of the ocean science, technology, and operations workforce
2. Anticipate future requirements for this workforce
3. Identify educational processes needed to develop this workforce

Project Site

www.marinetech.org/OSTOworkforcestudy/

Goals

- Produce a more complete description of the **present state** of the ocean science, technology, and operations (OSTO) workforce
- Anticipate **future developments** in this workforce
- Characterize the **educational programs** that will be needed to respond to those developments

Focus

1. Workforce for current and future **ocean observing systems (OOS)**
2. Related sectors of ocean economy with similar **knowledge and skill sets (KSS)**, such as:
 - a. Oil and gas industry
 - b. Telecommunications
 - c. Navigation
 - d. Hydrographic surveying
 - e. Ocean engineering
 - f. Basic and applied research

Sample Questions

1. What workforce will be needed to support the **expansion of OOS** (workforce size, composition, cost, etc.)?
2. What are the major factors that affect the **supply and demand** of OSTO workers?
3. For what hat OSTO occupations is it **hardest to find** qualified workers?
4. In what KSS are applicants for OSTO positions most **deficient**?
5. What **educational programs** are most effective at preparing students for the OSTO workforce?
6. What do we need to **do now** to help ensure that we have the OSTO, and especially the OOS, workforce we need in the future?

Expected results: Partial or preliminary answers to many questions --- and a much improved understanding of what the most critical questions are, and how to answer them.

Data and Methods

- 1. Existing workforce data sets and analyses**
- 2. Data sets and analyses developed in this project**
- 3. Data collection methods:**
 - a. Online workforce surveys**
 - b. Focus groups to define several key occupations in detail**
 - c. Workshops on:**
 - 1. present and future workforce**
 - 2. educational needs and best practices**
- 4. Workforce comparisons:**
 - a. OSTO and similar non-oceanic fields (e.g., other Earth observing systems, GIS)**
 - b. Comparisons →**
 - 1. Improved analysis and prediction of OSTO workforce**
 - 2. Identification of effective practices for OSTO education**
- 5. Coordination and collaboration with related efforts (DOL, GIS workforce studies, ORRAP, NOAA, Navy, etc.)**

Analyses

1. Identify major **characteristics and patterns** for present OSTO workforce, including:
 - a. Education and training
 - b. Knowledge and skill sets
 - c. Salary
 - d. Geographic distribution
 - e. Demographic patterns
 - f. Temporal evolution
 - g. Supply and demand for a range of positions
2. Assess major factors determining present and future **supply of and demand for workers**
3. Estimate **future evolution** of OSTO and its workforce
4. Assess existing **educational programs**

Prior Studies

Summary of Major Findings on U.S. Scientific and Technological Workforce

Major problems in educating, recruiting, and retaining U.S. workers for scientific, technological, and operational careers

Especially critical problems in rapidly evolving fields (e.g., ocean exploration, engineering, and the management and use of ocean resources)

Large uncertainties about future developments, especially supply of and demand for workers

Prior Studies

OOS Workforce Issues

1. **OOS workforce requires wide range of KSS, including: instrument and platform design, construction, and operation; data management and analysis; and scientific experimentation**
2. **OOS expansion → competition for workers with other OSTO employers and non-OSTO employers**

Prior Studies

Factors Affecting Supply of and Demand for OOS Workers

1. Inadequate / incorrect understanding of OOS occupations by educators and potential employees
2. Lack of classification of OSTO occupations by DOL
3. Poorly documented KSS
4. Less than optimal educational programs
5. Work conditions (e.g., time away from home, professional development opportunities, job security)
6. Alternative occupations
7. Macro factors
8. Funding for OOS
9. Financial status of industry competitors

Major Project Objectives

Objective 1: Characterize current workforce in support of OOS

→ OOS surveys

Objective 2: Characterize the current workforce in support of OSTO arenas that are similar to the OOS arena.

→ OSTO surveys, focus groups

Objective 3. Identify the types of information required to monitor the evolution of the OSTO workforce over the next two decades, identify most probable future workforce scenarios, and design initial workforce prediction systems.

→ OSTO workforce analysis and education workshop

Objective 4: Identify education and training objectives and practices that effectively address current and anticipated OSTO workforce needs.

→ OSTO workforce education workshop