Certification Program for Oceanographic Professionals: A Needs Assessment Study

Leslie Rosenfeld
Deidre Sullivan
Tom Murphree
Marine Advanced Technology Education (MATE) Center

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OUTLINE

- Background
- Other professional certifications programs
- Regional Coastal Ocean Observing System (RCOOS) members survey, Interviews, Professional society input
- Straw-man CPOP framework
- CPOP survey
- Cumulative results to date
<table>
<thead>
<tr>
<th><strong>Title</strong></th>
<th>Development of a Certification Program for Oceanographic Professionals (CPOP)</th>
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<tbody>
<tr>
<td><strong>PIs</strong></td>
<td>Deidre Sullivan, MATE Center</td>
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<tr>
<td><strong>Funding</strong></td>
<td>NOAA’s National Ocean Service + Office of Oceanic and Atmospheric Research, October 2006 – March 2009</td>
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<tr>
<td><strong>Project site</strong></td>
<td><a href="http://marinetech.org/cpop/">http://marinetech.org/cpop/</a></td>
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</table>
What Do We Mean By Certification?

Certification
“recognition by one’s colleagues and peers that an individual has demonstrated professional integrity and competence in their field” (ASPRS). Granted by non-governmental agencies, associations, and private sector companies. Certification is typically an optional credential.

Certificate
A document attesting to completion of a course of study not leading to a degree.

Accreditation
The process of evaluating the academic qualifications or standards of an institution or program of study in accordance with pre-established criteria (GISCI.org web page).

An individual is certified, an institution is accredited.

Licensure
Governmental agencies—federal, state, or local—grant licenses to individuals to practice a specific occupation, such as a medical license for doctors. State or federal laws or regulations define the standards that individuals must meet to become licensed. Licenses are typically mandatory. (https://www.cool.navy.mil/index.htm)
Motivation

Assessing oceanographers’ qualifications has become more difficult and more important due to:

- Increased complexity and multidisciplinary nature of oceanography
- Increase in operational oceanography activities
- Increased public attention to the ocean and ocean issues

Objectives

- Assess whether there is a need for a CPOP
- Prepare report on need for, and pros and cons of, a CPOP
- Develop overview plan for a CPOP, if warranted by assessment
Potential Benefits of a CPOP

To Employers
- Enhance confidence in the knowledge, skills and accomplishments of employees and perspective employees
- Strengthen technical proposals to customers
- Enhance professional development through continuing professional development requirements
- Improve ocean-related education and aid in development of ocean related workforce

To Customers
- Increase confidence in oceanographic products & services
- Make it easier to find qualified oceanographic professionals

To Certified Individuals
- May lead to performance awards and promotions
- Increase marketability and career opportunities
- Provide focus for professional development by defining a professional body of knowledge
- Give a personal sense of achievement

Some points in this slide are adapted from: www.abcep.org/documents/ABCEP-PPT2005.ppt
Data Sources and Collection Methods

- Environmental professional certification programs: websites plus phone and/or e-mail follow-up
- Supervisors at RCOOS member organizations: online survey (31), electronic survey (5 from SAIC), interviews (9)*
- Interviews with Navy METOC, NOS, and MMS supervisors*
- Professional society councils (AGU, AMS, TOS, MTS, IEEE Oceanic Engineering Society): presentations followed by discussion and questions
- Online survey of over 125 individuals

* Conducted jointly with OSTO Workforce Project.
### Examples of Professional Certifications in the Environmental Sciences

<table>
<thead>
<tr>
<th>Certification</th>
<th>Certifying organization</th>
</tr>
</thead>
<tbody>
<tr>
<td>Certified Ecologist</td>
<td>Ecological Society of America</td>
</tr>
<tr>
<td>Board Certified Environmental Engineer</td>
<td>American Acad. of Environmental Engineers</td>
</tr>
<tr>
<td>Certified Environmental Professional</td>
<td>Acad. of Board Certified Environmental Professionals</td>
</tr>
<tr>
<td>Qualified Environmental Professional</td>
<td>Inst. of Professional Environmental Practice</td>
</tr>
<tr>
<td>Fisheries Professional</td>
<td>American Fisheries Society</td>
</tr>
<tr>
<td>GIS Professional</td>
<td>GIS Certification Institute</td>
</tr>
<tr>
<td>ACSM-THSOA Certified Hydrographer</td>
<td>National Society of Professional Surveyors</td>
</tr>
<tr>
<td>Certified Lake Manager</td>
<td>North American Lake Management Society</td>
</tr>
<tr>
<td>Chartered Marine Scientist</td>
<td>Inst. of Marine Engineering, Science and Tech.</td>
</tr>
<tr>
<td>Chartered Meteorologist</td>
<td>Royal Meteorological Society</td>
</tr>
<tr>
<td>Certified Consulting Meteorologist</td>
<td>American Meteorological Society</td>
</tr>
<tr>
<td>Certified Photogrammetrist, Certified Mapping Scientist – Remote Sensing</td>
<td>American Society for Photogrammetry &amp; Remote Sensing</td>
</tr>
<tr>
<td>Professional Wetland Scientist</td>
<td>Society of Wetland Scientists</td>
</tr>
</tbody>
</table>
Summary of Information on 13 Environmental Professional Certification Programs

- Most are run by professional societies, but some are run by organizations created for that purpose.
- A variety of government agencies, courts, and companies recognize these certifications.
- The number of individuals with any given certification is fewer than 2000.
- For their main level of certification, most require a bachelor’s degree and \( \geq 5 \) years experience. Graduate degrees may be substituted for some of the years of experience.
- Most have a continuing professional development requirement.
- About half of them require an exam.
- Financially, they either break even, make a small profit, or have a small loss.
Do not underestimate the time, financial and human resources necessary to accomplish a certification. RESEARCH the need FIRST. You must have financial backing. You must have a core of committed, motivated, dedicated individuals convinced in the viability of your proposal. It must be credible. The most consuming task is the creation and maintenance of a valid exam.

Trust me, certification isn’t making anybody rich.

The most difficult part is deciding what types of skills and abilities are the most important to your field. There will never be agreement.

The results are worth it. People deserve to be recognized for their personal and professional achievement. They deserve to be set apart from those unwilling to work harder, contribute, reeducate, act ethically, etc.
Types of RCOOS Organizations that Responded to Online Workforce/Certification Survey

- Research/Education: 54%
- Business/Industry: 16%
- Other: 10%
- Community- or activist-based organization: 3%
- Government agency - military: 3%
- Government agency - non-military: 24%
- Public utility: 3%
Survey and interview responses

As an employer/supervisor, for which types of positions might a new certification program for ocean professionals be of value?

<table>
<thead>
<tr>
<th>Response</th>
<th># responses</th>
</tr>
</thead>
<tbody>
<tr>
<td>Technicians (marine, ocean observing, seagoing)</td>
<td>8</td>
</tr>
<tr>
<td>Data collection, analysis, QA/QC, forecasting</td>
<td>7</td>
</tr>
<tr>
<td>Marine electronics (wireless communication, ocean instrumentation)</td>
<td>3</td>
</tr>
<tr>
<td>Engineers (coastal, marine, all types)</td>
<td>3</td>
</tr>
<tr>
<td>Data visualization</td>
<td>2</td>
</tr>
<tr>
<td>Able-bodied seamen, engineering rates, shipboard technical positions</td>
<td>2</td>
</tr>
<tr>
<td>None</td>
<td>7</td>
</tr>
<tr>
<td>No response or no opinion (from surveys only)</td>
<td>11</td>
</tr>
</tbody>
</table>

Only responses that appeared more than once are listed above.
Survey and interview responses

- Almost half the respondents thought nationally standardized measures of employee competence, such as certification, would be, or might be, useful in marketing products or services to clients and users.

- Interest in a CPOP varied among department heads at different government agencies. NOS was most interested and supportive, NAVO/CNMOC was divided, MMS had little interest.

- **Benefits of certification**: prospective employee evaluation; QC employee advancement; continuing professional development; increase reliability of ocean observing systems; accreditation of marine science curricula or degree programs

- **Concerns about certification**: Field too diverse; certification too inflexible; certification procedures too specific; may not be applicable to federal government hiring
Based on our findings to this point, we developed a straw-man CPOP framework and an online survey.

The framework was included in an information document meant to promote discussion of the concept of certification for oceanographic professionals, and to provide a common basis for that discussion.

The information document and a request to fill out the survey, and pass the information and request on to others, was distributed by e-mail to over 100 people, including:

- Governing councils of professional societies
- ORRAP including education and industry sub-panels
- UNOLS R/V technicians board
- March 2008 Ocean Sciences OSTO session attendees
- SAMOS workshop attendees
- Many people at NOAA and in Navy METOC
- Directors or Oceanography Dept. chairs at Cape Fear CC, Florida Tech, Humboldt State, MLML
Sample Framework for a Certification Program for Oceanographic Professionals
Ocean Job Experience or Interests (respondents could choose >1)

Includes meteorology, engineering, hydrography etc.

126 people had responded as of 10/25/08. Who are they?

Age (yrs)

- >65
- 61-65
- 20-25
- 51-55
- 56-60
- 36-40
- 31-35
- 26-30
- 46-50
- No ans.

Highest oceanography-related degree

- Bachelor
- Master
- Doctorate
- No ans.
Types of organizations with which respondents are affiliated

- Educational
- Civilian govt.
- Business/industry
- Research Inst.
- NGO
- Military
- Consortia, joint inst.
- Other

Total = 145 since 13 people chose 2 types and 3 people chose 3.

Current connection to OSTO

- Supervisor*
- Data/info user only
- Student + employee, supervisor or educator
- Undergraduate student
- Graduate student
- Alumnus not employed in OSTO
- Educator
- Non-supervisory employee*

*in non-education job
Possess any professional certification?

- Yes: 23%
- No, but have investigated it: 21%
- No: 56%

Applying for a new OSTO job in next year?

- No: 48%
- Yes: 27%
- Not sure: 25%
As a supervisor, do you consider professional certifications in hiring, promoting or contracting? How would you consider using professional certification in ocean science/technology?

Respondents could choose multiple answers:

- Apply for it: 42%
- Deliberate hiring: 40%
- Promote services/products: 39%
- Look for it when seeking advice: 38%
- Evaluate ocean information: 37%
- Wouldn't make use of it: 25%
- Change courses or curricula: 23%
- Other: 14%
- Skipped question: 10%

# of Responses:

- Yes: 42%
- No: 33%
- Not a supervisor: 25%
- Didn't answer: 25%
37% of respondents thought there should be a CPOP

% of respondents who thought a CPOP would help:

<table>
<thead>
<tr>
<th>Benefit</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Identify qualified individuals by documenting experience and proficiency in a way that other measures do not</td>
<td>60</td>
</tr>
<tr>
<td>Promote career-long learning through continuing professional development requirements</td>
<td>55</td>
</tr>
<tr>
<td>Increase marketability and career opportunities</td>
<td>47</td>
</tr>
<tr>
<td>Define a common body of knowledge in the field</td>
<td>45</td>
</tr>
<tr>
<td>Provide a personal sense of achievement for those that attain the credential</td>
<td>41</td>
</tr>
<tr>
<td>Improve ocean-related education and aid in development of the ocean-related workforce</td>
<td>37</td>
</tr>
<tr>
<td>Increase confidence in oceanographic products/services</td>
<td>33</td>
</tr>
<tr>
<td>Increase visibility of marine-related professions</td>
<td>33</td>
</tr>
</tbody>
</table>
18% of respondents thought there should not be a CPOP

% of respondents who found a CPOP objectionable because:

<table>
<thead>
<tr>
<th>Reason</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>There is no way to define a certification program for a field as diverse as ocean science / technology.</td>
<td>31</td>
</tr>
<tr>
<td>It would be time-consuming and expensive to set up and run a CPOP.</td>
<td>27</td>
</tr>
<tr>
<td>There is no identified problem which a CPOP would fix.</td>
<td>26</td>
</tr>
<tr>
<td>Voluntary certification could lead to mandatory licensure in the future.</td>
<td>23</td>
</tr>
<tr>
<td>Certification would add an unnecessary hurdle to an individual's career path.</td>
<td>20</td>
</tr>
<tr>
<td>There is no acceptable way to objectively assess an individual's qualifications.</td>
<td>20</td>
</tr>
<tr>
<td>There are already professional certification programs in existence which meet this need</td>
<td>9</td>
</tr>
</tbody>
</table>
Other reasons listed for why there shouldn’t be a CPOP

- It would be a financial burden to students.
- Certification programs lend credibility to unethical consultants.
- It is a capitalistic driven program that needs to stay out of the sciences.
- Certification would deepen the rift between oceanographers in academia and industry.
- “certification process demeans the scientist”; “certification would only be used by people outside the field who have difficulty interpreting publications and grants into ability”
- Certification is necessary to protect the public from those who pretend to have the necessary qualifications in a field which the ordinary person has insufficient expertise to make a judgment. In these cases, government regulates the profession (e.g. Medicine, Engineering) to ensure that practitioners are qualified. This is completely unnecessary in oceanography, and would be a waste of time and needed money that could be put forward to something useful.
If there were to be a CPOP what should it look like?

Number of respondents who answered as shown

<table>
<thead>
<tr>
<th></th>
<th>Yes</th>
<th>No</th>
<th>No ans.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Multi-level approach</td>
<td>86</td>
<td>33</td>
<td>7</td>
</tr>
<tr>
<td>Require basic knowledge across all ocean science and technology</td>
<td>79</td>
<td>42</td>
<td>5</td>
</tr>
<tr>
<td>Demonstrate high level of competency in one oceanographic discipline AND one technology specialty</td>
<td>54</td>
<td>64*</td>
<td>8</td>
</tr>
</tbody>
</table>

*40 said competency in just a discipline would be adequate
24 said competency in just a specialty would be adequate
Who should certification be for?

Respondents thought certification should be aimed at people who hold this as their highest degree.

Respondents thought certification would be useful for these “tracks”.

Respondents could choose multiple answers to both questions.
Oceanographic disciplines or technology specialties, or combinations thereof, for which certification is especially needed

- Marine science technician (10)
- Numerical modeling/forecasting (9)
- Oceanographer
  - Physical (7)
  - Chemical (7)
  - Biological (5)
  - Geological (4)
- Acoustics (4)
- Operational oceanography (4)
- Engineering (4)
- Ocean observing systems (3)
- Deck safety / deck ops (3)
- Remote sensing, AUVs/ROVs, education, computational programming, taxonomy, electronics, experimental design, GIS
- Oceanography + computer science, economics, or policy
Other Comments From Surveys

ניוג甲醛 Minority participation

- Certification may promote recruitment of underrepresented groups by “validating” the field for those unfamiliar with ocean sciences as a career.
- I think that the concept has merit, but I am concerned that it can become a barrier for minorities and entry-level personnel

ניוג甲醛 The need for certification

- The key question in assessing the merits of this is “who wants this certification”? If it is individuals who want it, the primary use will be to inflate their capabilities. If institutions want it and will use it, there is merit in this effort.
- ANY CERTIFICATION EFFORT SHOULD BE ALIGNED WITH CLEARLY DEFINED NEEDS FROM THE WORK PLACE
- Make sure that there is strong buy-in from employers before proceeding.
- Our community is poised for growth in operational oceanography driven by societal needs. Society will need to have tangible reason to trust our operational results a priori, and certification in key areas can help engender that trust.
Other Comments From Surveys

- **Generally positive (1 of 6 in response to question 19)**
  - a certification for technical staff or those producing specified products (e.g., forecasts) would be useful

- **Generally negative (1 of 6 in response to question 19)**
  - Terrible idea! Just provides an excuse for substandard oceanographic education/training (e.g., "We don't have to worry about weeding out bad students; their inability to get certified will do that for us later, after they've "graduated"....").

- **Neutral or undecided (1 of 15 in response to question 19)**
  - I'm not convinced this is a good idea, but I'm also not convinced it is a bad idea.
Results to date

- Not a particularly high visibility issue. Professional certification does not carry the same cachet in the U.S. that it does in some other parts of the world.

- TOS and MTS have expressed interest in playing a role in a CPOP.

- Roughly twice as many people we’ve heard from are in favor of a CPOP (37%) as are against it (18%).

- Many people are neutral, and we have not been able to identify more than a few individuals who are strong proponents of a CPOP.

- Given that many people felt that strong industry support should be a requirement to go forward with a CPOP, we would like to get more input from industry.
The most popular reasons in support of a CPOP are:

- To help identify qualified individuals
- To promote career-long learning

The most negative things about CPOP:

- Difficult to define a certification program for a field as diverse as ocean science/technology
- Time-consuming and expensive to set up and run
- There is no identified problem which a CPOP would fix

If there were to be a CPOP

- It should have a multi-level approach and require basic knowledge across all ocean science and technology
- It should be aimed at marine technicians and ocean forecasters at the Associates to Masters level
What we hope to get from workshop

- Industry perspective
- Discussion with educators about whether they feel a CPOP would be a help or a hindrance in developing curricula
- Suggestions on how to engage policy makers and users of ocean information in the CPOP discussion
- Could government agencies get OPM to use certifications as one criteria? Would they want to?