The Ocean Enterprise:

A study of US business activity in ocean measurement, observation and forecasting

http://www.usworks.com/usioos/

Year One Report

Prepared by

ERISS Corporation

The Maritime Alliance

November 10, 2014

Foreword

"This end-of-the-initial-year report and the larger multi-year study undertaken by NOAA and the U.S. IOOS Program office represent a ground-breaking contribution to our understanding of the importance of the Blue Economy and BlueTech for the United States and, by extension, for countries around the world. At its core, the three year study is an investigation into the economic value of ocean observation for the U.S. economy. This first year report is based on a major effort to gather a comprehensive list of ocean observation focused companies across the nation, to categorize them, identify contact parties at each, and begin outreach to prepare for more extensive economic data gathering in the subsequent study years. An array of public and private organizations were enlisted to achieve the most encompassing census possible and the results presented in the following pages have exceeded initial expectations.

NOAA represents the "tip of the spear" for ocean observation in the U.S. and its efforts likely support directly and indirectly thousands of companies and millions of current Blue Jobs with the potential for far more Blue Jobs as the Blue Economy and BlueTech continue to expand. This study will begin to provide detail of the importance of this fundamental ocean observation work by NOAA and the national economic importance of the sector for the country. And as we extrapolate from this "ocean observation" focused study into other Blue Economy sectors (e.g. aquaculture, biomedicines from the sea, desalination, etc.) we can begin to understand the current and future importance of the oceans for the U.S. and the need – and the opportunity – for the U.S. to be a leader in helping develop sustainable, science-based ocean industries for use globally."

Michael B. Jones – President, The Maritime Alliance

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Background

The Ocean Enterprise study is sponsored by the United States Integrated Ocean Observing System (IOOS®) and the National Oceanic and Atmospheric Administration's (NOAA) National Ocean Service (NOS).   The long term goal is to determine the breadth and value of the Ocean Observation Enterprise. While there have been several studies that have looked at the weather enterprise[1] within the United States there have been no equivalent studies for the marine enterprise.   According to National Academies – *Fair Weather: Effective Partnerships in Weather and Climate Services (2003 – "*There are about 400 commercial weather companies and independent contractors in the United States, with revenues of about $500 million."   The most recent data on the private sector input is by David Spiegler, 2007, who identified $1.65 to $1.8 billion of activity associated with weather-based services.

The study spans three years; a baseline year and two option years. The goal of the baseline year is to provide a comprehensive inventory of companies, a mapping and analysis of industry function by NAICS codes or other classification methods, and a final methods report detailing the process. The following report fulfills the requirements for the third of three delivery timepoints for the baseline year.

Scope of the Ocean Enterprise: A study of US business activity in ocean measurement, observation and forecasting

To define what we mean by the Ocean Enterprise study we adapted a framework of IOOS stakeholders provided by Ralph Rayner for the US IOOS Summit in 2012 (Rayner, 2012) and the Society of Maritime Industries - Annual Review of UK Marine Scientific Industries that reviews business operating in the marine science and technology sector in the United Kingdom that evaluates business activity in terms for market sector, market size, business confidence both current and forecasts.

We define three categories of companies:

- ✓ Providers of observing system infrastructure;
- ✓ Intermediary companies who take ocean, coastal and Great Lakes observational and model information and tailor it for specific end-use.
- ✓ End-User Companies: Those activities, companies that benefit from ocean, coastal, Great Lake observing and model information in terms of better scientific understanding of the oceans, improved safety, economic efficiency gains or more effective environmental protection.

Providers of observing system infrastructure include manufacturers of sensors, instruments and platforms; those building, launching and operating satellite systems; providers of the cyber

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[1] The National Academies of Science defines the "enterprise" includes all entities in the public, private, non-profit, research, and academic sectors that provide information, services, and infrastructure in the areas of weather, water, and climate. The public sector includes the NWS as well as other weather-related line offices within NOAA, other federal agencies, and state and local governments. But most reports "enterprise" is often used as shorthand to refer to those enterprise elements outside NOAA that it can draw on in its mission. Within this, the private sector is present in two major areas: 1) services companies providing a broad range of data, forecasts, warnings, and value-added products to consumers and businesses, and 2) infrastructure companies providing systems such as satellites.

infrastructure that and organizations that develop and maintain the data management systems, software tools and models that are used to turn this data into useful information.
Intermediary companies are those that add value to ocean, coastal and Great Lakes observational and model information tailoring them for specific end- uses.

End-users are the ultimate beneficiaries of ocean, coastal and Great lakes information. They use value added products generated in whole or in part from this information as an input to their activities or businesses to derive specific scientific, societal or business benefits. An example for an end user would be a retail organization that makes buying decisions based on seasonal forecasts that depend in part on ocean information.

It is important to recognize that an organization can occupy multiple roles in this complex landscape. The delivery of end-user benefit is rarely a simple linear end to end service chain. More usually, benefits are delivered by multiple organizations merging and mashing different sources of data and information (most often not exclusively marine or exclusively derived from measurement or observation) to derive a product useful for a particular purpose. It is more like a jigsaw puzzle with multiple intermediaries adding value in complex and ever changing ways as they compete to provide more beneficial or more cost effective products and services. Intermediary companies integrate many different 'islands of information' from many different sources with data only being used if they know where to find it, are allowed to access it and can determine its fitness for purpose.

Study focus

For the purposes of this study we focus on the private sector (profit and non-profit) who are considered providers or intermediaries.
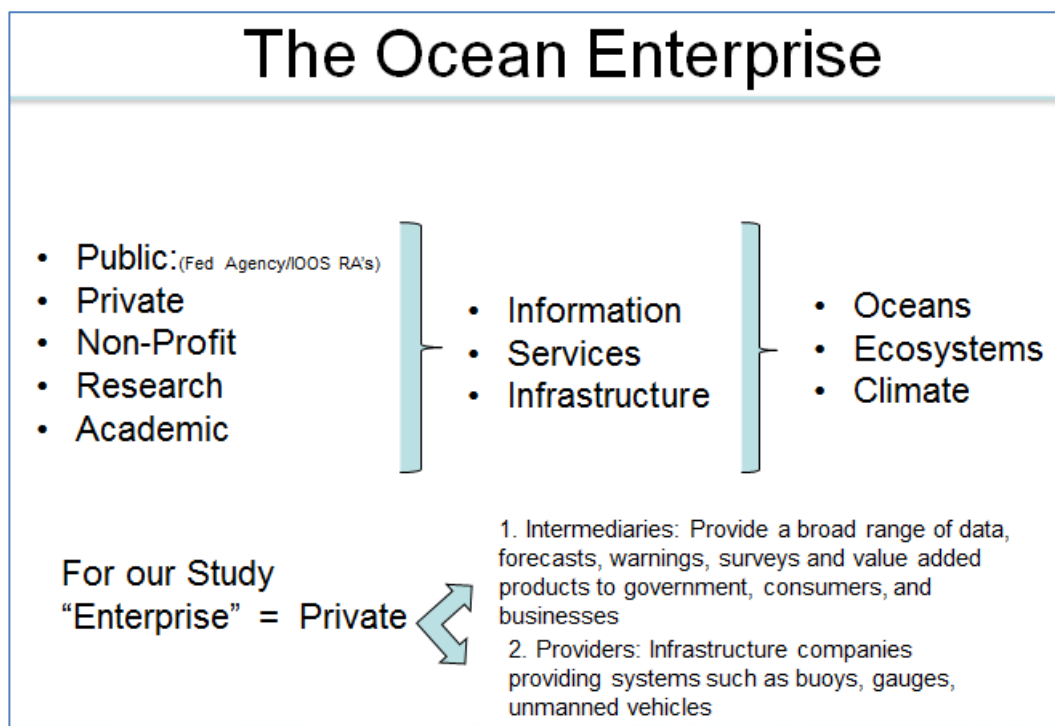
What do we mean by the marine technology sector within the ocean enterprise?

The San Diego Maritime Industry Report, 2012, provided a look across entire Blue Technology cluster in San Diego and found that the maritime industries showed a direct economic impact larger than any other sector besides defense. They found a total employment of 46,000 jobs and total revenues of &14 billion jobs (2011). Industry is characterized by the use of the North American Industrial Classification System (NAICS) but they do not fully identify ocean-related activities. The Maritime Alliance, http://themaritimealliance.org/,located in San Diego, has the mission of promoting Blue Technology and Blue Jobs. They have mapped out the San Diego Maritime Technology clusters into the following 14 areas:

- Aquaculture and Fishing
- BioMedicine
- Boat & Shipbuilding
- Cables and Connectors
- Defense and Security
- Desalination and Water Treatment
- Marine Recreation
- Ocean Energy & Minerals (potentially for the survey companies)
- Ocean Science and Observations
- Ports & Marine Transportation
- Robotics and Submarines
- Telecommunications
- Very large floating platforms
- Weather and Climate Science

The Ocean Enterprise Study companies provide information and services that support many of the Blue Economy Clusters listed above, and extends to the entire United States.

Initial Processes

The initial processes undertaken for the first and second deliverables for the baseline year of the project are depicted below in Figure 1. As shown, lists were obtained from partners, sponsors, and stakeholders, merged and duplicates removed, each company individually researched, and a uniform and cleaned initial inventory of companies produced. This initial inventory compiled during the baseline year will continue to be updated during option years 1 and 2.

Figure 1. Flow chart for initial process of creation of inventory of providers and intermediaries, baseline year.
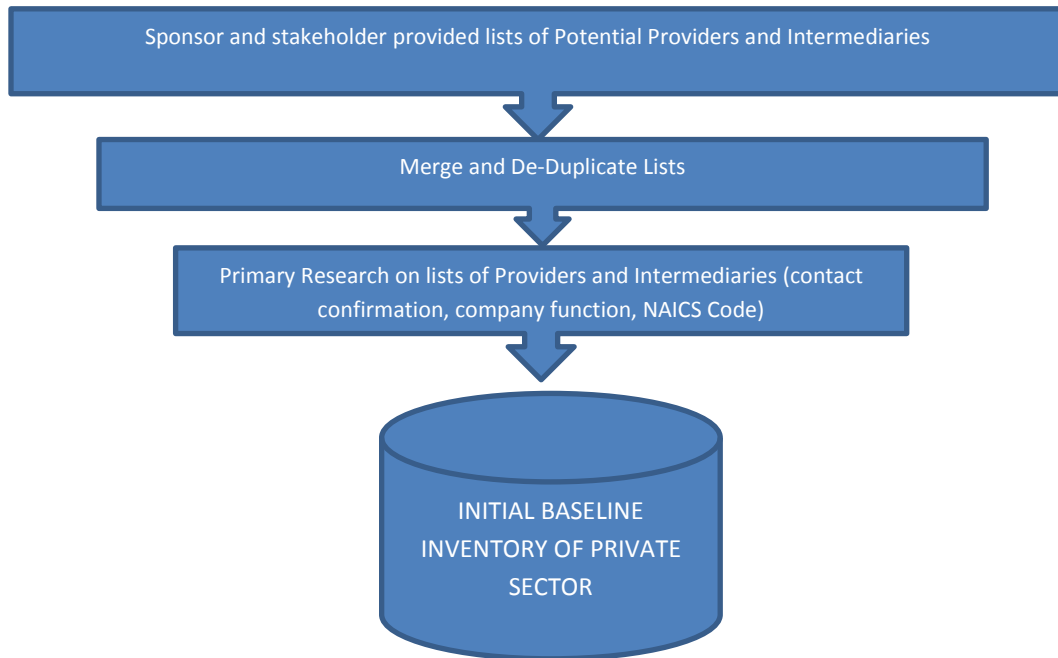
Provided Lists of Potential Providers and Intermediaries

Lists of companies who were either known or potential providers or intermediaries were obtained from a variety of sources. These include lists from professional organizations, industry specific email and contact lists, and lists gathered at professional and industry conferences and meetings. Each list was processed into a master database in Microsoft EXCEL format. The master database structure included fields to capture all relevant company information, regardless of whether the information was included with the original lists. After all lists for the time period had been merged into the master list, research was conducted on each individual record to attempt to obtain data fields that would be necessary in order to achieve the short and long term goals of the project. These included both accurate and up to date contact information as well as correct classification into the correct industry category using the North Americans Industry Classification System (NAICS Codes). For firms with multiple locations, only what was determined to be the main or headquarters location was retained in the database.

Research Process

Each list provided a variable amount of information ranging from only company name up to full contact information including a contact person, website URL, email, phone, address. No list contained information about the company products or industry classification using NAICS or any other system (e.g., the older SIC Code system), and this was added separately.

The research process was as follows:

1) If the company website was provided in the list, the researcher would first go to the site and confirm or collect the company address and other contact details.

2) After contact information was confirmed, existing NAICS Code assignment (as assigned by third party analysts or self-assigned by the employer) as well as other company information that may be available such as company size and revenue was obtained were possible using one of several industry research search engines. The most often used of these was www.manta.com. Company information was then added as available including company size, revenue, and NAICS code.

3) If no website URL was provided the company name was often the only piece of information that could be used as a starting point. In those cases the company name was entered into the industry research engine directly. The researcher then tried to confirm the company listed in the search results was the same as that listed in our database.   More often than not, typing the company name into an industry information search engine would result in multiple hits of companies with the same name. Confirming the company street address, or even the city, using a provided company URL (see Step 1) aided researchers in choosing the proper company from the search results when attempting to obtain information regarding industry classification. Additionally, the NAICS classification provided by industry information search engines is not always entirely descriptive of the true function or product of the company. Gathering information from the company website enabled researchers to collect a narrative description of the product or service provided, which served two functions: (1) aided in confirming the NAICS code provided by the industry research website, and (2) provided narrative information in plain language regarding the function of the company. This latter function will prove useful when analyzing the final company database and clustering with regard to function. This type of cluster analysis is not possible using the NAICS Code as it often proves too general (especially for the maritime industry).

Process for the assignment of NAICS Codes when an existing NAICS Code was not available:

Often, no NAICS code was provided by the industry search engines. In these cases the description of the product or service provided by the company from the website was used to research and assign a NAICS code. If the firm provided a function similar to that provided by multiple companies with known assigned NAICS Codes, then the most relevant NAICS Code was assigned to the company. If the company provided a unique service or one that had not yet been defined by other companies in the database, then research into the proper NAICS assignment was undertaken using resources including the website http://www.naics.com/search.htm. By entering the general function of the company into the search engine of this website, a variety of NAICS codes and general descriptions that would fit each code was provided. The researcher would then choose the most relevant code for assignment to that firm. An example of this process is provided in Figure 2. In this instance, the word "Sonar" was entered into the search field. The results provided a variety of NAICS code to choose, and keywords associated with the NAICS code. In this case, if the company was a manufacturer of Sonar equipment, NAICS

334511 would be assigned. Separate assignments were available for wholesale or repair and maintenance of Sonar equipment.

Figure 2. Sample of NAICS Code Assignment Research

Process for Confirmation of NAICS Codes Provided in the Industry Research Website

Researchers used the company function description obtained from the company website (when available) to confirm the existing NAICS code was the best possible. As mentioned, the NAICS system does not always align well with the Maritime Industry Cluster, and therefore even the best NAICS code assignment would often result in only a very general classification. However, if the NAICS code looked like it misrepresented the understood company function, the process outlined in Figure 2 above was used to find a potentially more accurate NAICS code option, and to substitute if needed.

Description of Process Evolution

As shown in Table 1, after combining all current lists, including those received and represented in reports 1 and 2, the Master file contained 749 individual companies. 114 of these were found to be of foreign ownership with no U.S. presence, 7 were further duplicates of existing businesses that were found after the initial un-duplicating process, 8 were determined to be no longer in business, and 6 were non-profit or educational institutions (out of scope of the project).

Of the remaining 614, 27 have been designated as needing further classification work. These are generally very large companies with many divisions. 16 remain as unresolved and are in a list of those requiring further research after gaining additional information from partners and stakeholders.

Table 1. Process Consort Table

Description	Number of Records
Current combined list of un-duplicated records	749
Foreign Companies with no US Office	114
Further duplicates	7
No longer in business	8
Non-profit/Educational	6
SUB TOTAL	**614**
Moved to 'unresolved' list for further work	16
Found but require further classification work	27
TOTAL RESOLVED WITH NAICS AND CONTACT	**571**

Future Action on the Delivered Database and Unresolved Records

To be included in the delivered database, a firm needed to have at least partial contact information and a NAICS code. Records in the delivered database will continue to be researched where needed in order to provide even more detail. Further research often determined that a company had been acquired or was a subsidiary of another company. In these cases the contact information for the two companies was often the same. If unique contact information was not obtained for a company, that company was not included in the list and the information for the parent company was used.

For some companies the process described above did not result in enough information to determine a NAICS Code. Usually this was due to inadequate, inaccurate or ambiguous information on the source list. For example, many company names are not unique to one company and without knowing other details such as address, it is impossible to determine which company is represented in the list, and thus what function they serve. Other times, companies may be very large and provide many products and services making it impossible to know which unique function or service they provide to the US IOOS System. These firms are retained in a file of 'unresolved' records which will be further researched in collaboration with partners, sponsors, and stakeholders. This iterative process is continued until all feasible records are resolved.

Initial Observations and Analyses

NAICS Codes Clustering: As show in Table 2, there were some noticeable trends in NAICS Codes for the initial database. Although 140 distinct NAICS codes were represented in the initial database, three NAICS codes alone accounted for almost 30% of all businesses for which NAICS codes were available. The complete NAICS count is provided in Appendix A.

Table 2. Top Three NAICS Codes

NAICS	NAICS Description	Number	Percent
334511	Search, Detection, Navigation, Guidance, Aeronautical, and Nautical System and Instrument Manufacturing	73	12.8%
334519	Other Measuring and Controlling Device Manufacturing	58	10.2%
541330	Engineering Services	39	6.8%

Company Size: The lists are highly represented by smaller companies, many of which contained between 1 and 4 employees. As shown in Table 3 below, almost 50% of companies in the database for which company size was available reportedly had fewer than 10 employees (48.2%). It should be noted that at the time of this report many of the larger firms are still not represented in this initial database. Larger firms tend to have many divisions and often take extra time to correctly determine appropriate contacts, divisions, services, and NAICS (if different than main). Additionally, this table represents information for only 390 of the 570 companies in the current inventory of companies as there was no company size information available for the other 180 firms.

Table 3. Number of Employees

Number of Employees	Number	Percent	Cumulative Percent
1-4	110	28.2%	28.2%
5-9	79	20.3%	48.5%
10-24	54	13.8%	62.3%
25-49	51	13.1%	75.4%
50-99	45	11.5%	86.9%
100-249	25	6.4%	93.3%
250-499	11	2.8%	96.2%
500-999	6	1.5%	97.7%
1000+	9	2.3%	100.0%
TOTAL	**390**		

Company Type: The list of companies will ultimately represent two general categories of businesses involved with the planning, construction, operation or use of observational and model data:

1. *Providers of observing system infrastructure:* Providers of observing system infrastructure include manufacturers of marine sensors, instruments and platforms; those building, launching and operating satellite systems; providers of the cyber infrastructure that interconnects, ; and organizations that develop and maintain data management systems, software tools and models.

2. *Intermediaries take observational and model data or information, and tailor it for a specific end-use:* They add value to the observational and model outputs tailoring them for specific end-uses.

As shown in Table 4, at present the great majority of the 571 companies represented in the list are classified as Providers (82.5%). About 9% were classified as Intermediaries, and 8% remain to be classified.

Table 4. Company Type

Company Type	Number	Percent	Cumulative Percent
Provider of Infrastructure or Services	471	82.5%	82.5%
Intermediaries	53	9.3%	91.8%
Undetermined	47	8.2%	100.0%
TOTAL	**571**		

Company Location: The following figure provides Geo-mapped locations for the companies in the current inventory for which sufficient location data was available.   As would be expected, firms are concentrated on the East and West Coasts of the Continental United States. 24% of firms were located in California, 17% in Texas, 9% in Massachusetts, 8% in Washington, and 7% in Florida. These five States account for 64% of all firms in the database (see Appendix 3 for complete list). Please note that for firms with multiple locations, only what was determined to be the main or headquarters location was mapped.

Figure 3. Geo-mapping of Company Locations
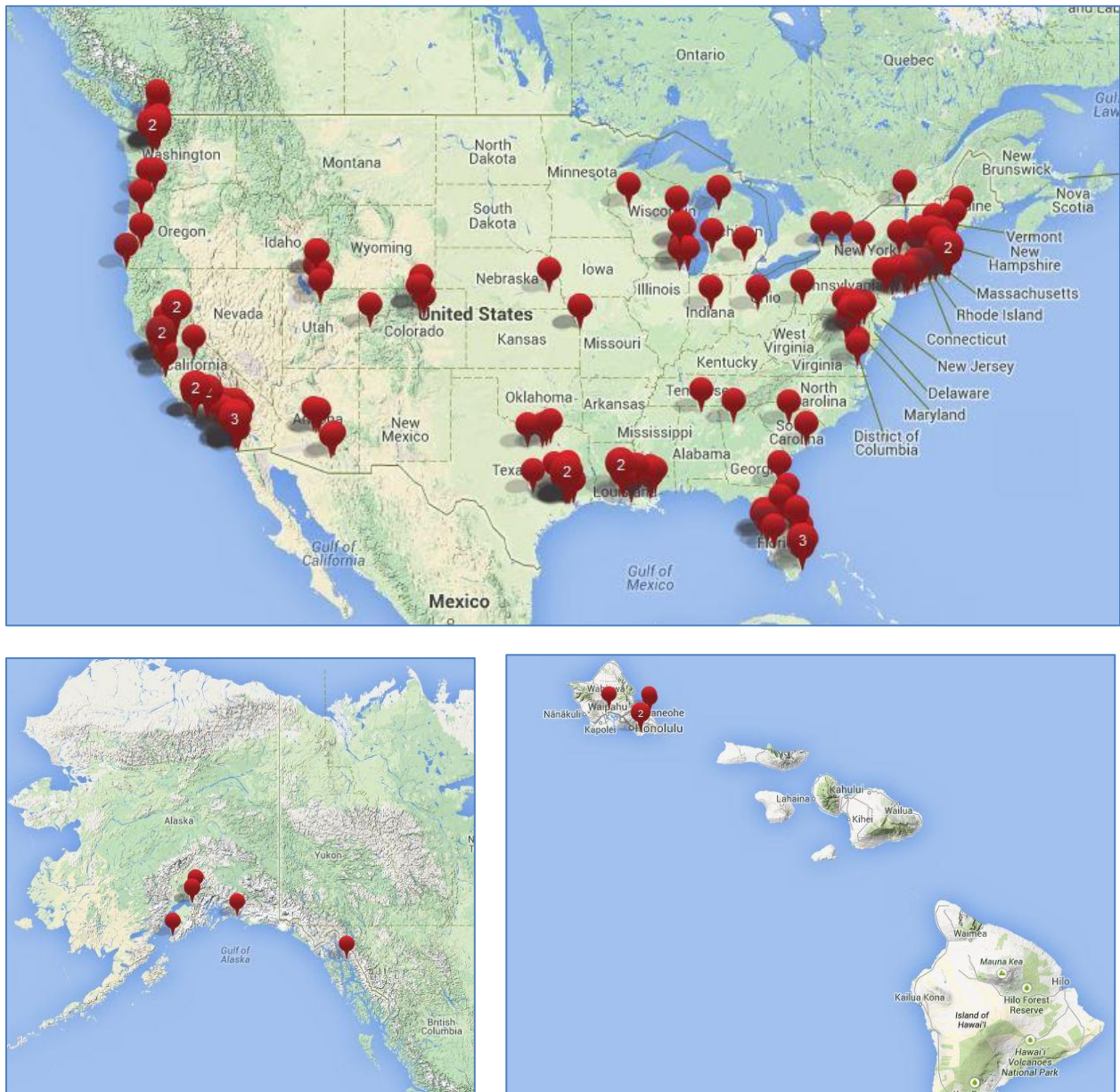
Status of Current Database

The main goal of the baseline year of the project was to develop and refine a master inventory of companies that are defined as Providers or Intermediaries, and to produce a final methods report detailing this process (this document). The initial plan was to obtain a small to moderate number of confirmed firms that fell into these categories and after researching NAICS Codes, to produce a NAICS mapping with the goal of purchasing records with these NAICS codes and adding them to the database. However, as detailed in report #1, the evolution of the project suggests a more efficient and accurate process. The main factor involved is the acquisition of information on many more companies than was initially projected (the lists provided by partners and sponsors). The initial lists have contained more

than 700 firms. This has resulted in a great deal of first-hand information on a very large proportion of the "universe" of providers and intermediaries. The initially proposed strategy of using a small number of provided companies (~100, all that was projected to be available at the time), and using their NAICS codes to purchase a commercial database (e.g., generalizing to the overall universe of employers) was an attempt to estimate this larger universe when it was not known how many we would be able to obtain using firsthand methods. The outstanding success of the partners, sponsors, and stakeholders in obtaining lists of companies has enabled us to start with such a large number of companies that the acquisition of a commercial database driven by NAICS codes and containing perhaps only a fraction of firms that are truly providers or intermediaries becomes a less desirable (and largely unneeded) strategy.

For example, purchasing all firms nationally with the NAICS Code 336611 (Ship Building and Repairing) would result in 1,000's of records, of which only a few could be classified as providers or intermediaries (e.g., manufacturers of submersibles used to inspect or maintain underwater systems).   In contrast, the direct acquisition (the lists provided by partners and sponsors represent) of information on a large number of firms who are known (or at least highly likely) to be providers or intermediaries means we no longer had to use telephone or email screening methods to sort through hundreds of companies for each one that should be included in the database. It is the expert opinion of our partners and sponsors that the comprehensive effort to obtain lists of companies from professional and industry organization lists, as well as through outreach and collection through the Project Info Site and Webform, has resulted in a large enough number of companies that they could be considered an appreciable proportion of the universe. This large of a sample of the overall theoretical universe of companies enables any estimates that generalize to the overall population to be very accurate. For example, in option year 2 (year 3 of the project) data will be collected using a questionnaire administered by web-survey that asks the companies about various ways they interact with the IOOS and how it affects their company. Because we will be sampling from an inventory of companies who are likely to be providers or intermediaries, and because we have such a large number of these firms in the inventory, estimates to the overall industry population using the survey data will be very accurate (given a sufficient response).

Next Steps

The master list will continue to be researched and updated throughout the life of the project. The master list will be the basis of both selection of companies to be interviewed for the qualitative interview portion of the project, and the web-survey; therefore, continuous updating of the lists through research and additions from our partners and stakeholders will be a necessary ongoing process.   The next deliverable of an updated database is scheduled for November of 2014 in conjunction with the qualitative interview summary report. During the time between this deliverable and the next delivery point, the following activities are proposed:

1) Addition of any new lists to the database and refinement of records in the current database, with an emphasis on Intermediate providers.
2) Research on unresolved records in order to add as many as efficiently possible.

References

1. National Research Council's report *Weather Services for the Nation: Becoming Second to None*.

2. Ralph Rayner, US IOOS summit white paper – "IOOS stakeholders and beneficiaries as part of the US IOOS" http://www.iooc.us/summit/white-paper-guidelines/community-white-paper-submissions/

3. San Diego Workforce Partnership, San Diego Regional Development Economic Development Corporation, The Maritime Alliance – San Diego Maritime Industry Report 2012, http://themaritimealliance.org/

4. Spiegler, D. B. 2007. Community: The Private Sector In Meteorology - An Update. *Bulletin of the American Meteorological Society* 88(8):1272-1275

Appendix 1: Complete Listings of NAICS Counts

NAICS	NAICS Description	Number	Percent	Cumulative Percent
334511	Search, Detection, Navigation, Guidance, Aeronautical, and Nautical System and Instrument Manufacturing	73	12.8%	12.8%
334519	Other Measuring and Controlling Device Manufacturing	58	10.2%	22.9%
541330	Engineering Services	28	4.9%	27.8%
541690	Other Scientific and Technical Consulting Services	16	2.8%	30.6%
334513	Instruments and Related Products Manufacturing for Measuring, Displaying, and Controlling Industrial Process Variables	14	2.5%	33.1%
423690	Other Electronic Parts and Equipment Merchant Wholesalers	13	2.3%	35.4%
541712	Research and Development in the Physical, Engineering, and Life Sciences (except Biotechnology)	13	2.3%	37.7%
423490	Other Professional Equipment and Supplies Merchant Wholesalers	12	2.1%	39.8%
541511	Custom Computer Programming Services	12	2.1%	41.9%
336612	Boat Building	11	1.9%	43.8%
423860	Transportation Equipment and Supplies (except Motor Vehicle) Merchant Wholesalers	10	1.8%	45.5%
541330	Engineering services	10	1.8%	47.3%
541370	Surveying and Mapping (except Geophysical) Services	8	1.4%	48.7%
213112	Support Activities for Oil and Gas Operations	7	1.2%	49.9%
333316	Photographic and Photocopying Equipment Manufacturing	7	1.2%	51.1%
334419	Other Electronic Component Manufacturing	7	1.2%	52.4%
541711	Research and Development in Biotechnology	7	1.2%	53.6%
333923	Overhead Traveling Crane, Hoist, and Monorail System Manufacturing	6	1.1%	54.6%
423610	Electrical Apparatus and Equipment, Wiring Supplies, and Related Equipment Merchant Wholesalers	6	1.1%	55.7%
541614	Process, Physical Distribution, and Logistics Consulting Services	6	1.1%	56.7%
335911	Storage Battery Manufacturing	5	0.9%	57.6%
335931	Current-Carrying Wiring Device Manufacturing	5	0.9%	58.5%
339920	Sporting and Athletic Goods Manufacturing	5	0.9%	59.4%
443142	Electronics Stores	5	0.9%	60.2%
518210	Data Processing, Hosting, and Related Services	5	0.9%	61.1%
541512	Computer Systems Design Services	5	0.9%	62.0%
561990	All Other Support Services	5	0.9%	62.9%
326150	Urethane and Other Foam Product (except Polystyrene) Manufacturing	4	0.7%	63.6%
334515	Instrument Manufacturing for Measuring and Testing Electricity and Electrical Signals	4	0.7%	64.3%

334516	Analytical Laboratory Instrument Manufacturing	4	0.7%	65.0%
335314	Relay and Industrial Control Manufacturing	4	0.7%	65.7%
339999	All Other Miscellaneous Manufacturing	4	0.7%	66.4%
423430	Computer and Computer Peripheral Equipment and Software Merchant Wholesalers	4	0.7%	67.1%
488330	Navigational Services to Shipping	4	0.7%	67.8%
541360	Geophysical Surveying and Mapping Services	4	0.7%	68.5%
541990	All Other Professional, Scientific, and Technical Services	4	0.7%	69.2%
238990	All Other Specialty Trade Contractors	3	0.5%	69.7%
314994	Rope, Cordage, Twine, Tire Cord, and Tire Fabric Mills	3	0.5%	70.2%
326199	All Other Plastics Product Manufacturing	3	0.5%	70.8%
333318	Other Commercial and Service Industry Machinery Manufacturing	3	0.5%	71.3%
333999	All Other Miscellaneous General Purpose Machinery Manufacturing	3	0.5%	71.8%
334310	Audio and Video Equipment Manufacturing	3	0.5%	72.3%
334417	Electronic Connector Manufacturing	3	0.5%	72.9%
335129	Other Lighting Equipment Manufacturing	3	0.5%	73.4%
335999	All Other Miscellaneous Electrical Equipment and Component Manufacturing	3	0.5%	73.9%
423810	Construction and Mining (except Oil Well) Machinery and Equipment Merchant Wholesalers	3	0.5%	74.4%
423830	Industrial Machinery and Equipment Merchant Wholesalers	3	0.5%	75.0%
423840	Industrial Supplies Merchant Wholesalers	3	0.5%	75.5%
441222	Boat Dealers	3	0.5%	76.0%
443120	Computer & Software Stores	3	0.5%	76.5%
511120	Periodical Publishers	3	0.5%	77.1%
511210	Software Publishers	3	0.5%	77.6%
532490	Other Commercial and Industrial Machinery and Equipment Rental and Leasing	3	0.5%	78.1%
112511	Finfish Farming and Fish Hatcheries	2	0.4%	78.5%
112519	Other Animal Aquaculture	2	0.4%	78.8%
213111	Drilling Oil and Gas Wells	2	0.4%	79.2%
238210	Electrical Contractors and Other Wiring Installation Contractors	2	0.4%	79.5%
238910	Site Preparation Contractors	2	0.4%	79.9%
332313	Plate Work Manufacturing	2	0.4%	80.2%
332510	Hardware Manufacturing	2	0.4%	80.6%
332618	Other Fabricated Wire Prod Manufacturing	2	0.4%	80.9%
332912	Fluid Power Valve and Hose Fitting Manufacturing	2	0.4%	81.3%
332991	Ball and Roller Bearing Manufacturing	2	0.4%	81.6%
333519	Rolling Mill and Other Metalworking Machinery Manufacturing	2	0.4%	82.0%
334112	Computer Storage Device Manufacturing	2	0.4%	82.3%

334119	Other Computer Peripheral Equip Manufacturing	2	0.4%	82.7%
334417	Electronic Connector Manufacturing	2	0.4%	83.0%
334512	Automatic Environmental Control Manufacturing for Residential, Commercial, and Appliance Use	2	0.4%	83.4%
336612	Boat building	2	0.4%	83.7%
517210	Wireless Telecommunications Carriers (except Satellite)	2	0.4%	84.1%
517919	All Other Telecommunications	2	0.4%	84.4%
518210	Data Processing, Hosting, and Related Services	2	0.4%	84.8%
519130	Internet Publishing and Broadcasting and Web Search Portals	2	0.4%	85.1%
541370	Surveying and Mapping (except Geophysical) Services	2	0.4%	85.5%
541380	Testing Laboratories	2	0.4%	85.8%
541613	Marketing Consulting Services	2	0.4%	86.2%
541620	Environmental Consulting Services	2	0.4%	86.5%
541910	Research Services	2	0.4%	86.9%
221122	Electric Power Distribution	1	0.2%	87.0%
221310	Water Supply and Irrigation Systems	1	0.2%	87.2%
237120	Oil and Gas Pipeline and Related Structures Construction	1	0.2%	87.4%
237130	Power and Communication Line and Related Structures Construction	1	0.2%	87.6%
237990	Other Heavy and Civil Engineering Construction	1	0.2%	87.7%
238120	Structural Steel and Precast Concrete Contractors	1	0.2%	87.9%
238220	Plumbing, Heating, and Air-Conditioning Contractors	1	0.2%	88.1%
314999	Fishing nets made from purchased materials	1	0.2%	88.3%
325211	Resins-Manufacturers	1	0.2%	88.4%
325212	Synthetic Rubber Manufacturing	1	0.2%	88.6%
326130	Laminated Plastics Plate, Sheet (except Packaging), and Shape Manufacturing	1	0.2%	88.8%
326140	Polystyrene Foam Product Manufacturing	1	0.2%	89.0%
326191	Plastics Plumbing Fixture Manufacturing	1	0.2%	89.1%
327110	Pottery, Ceramics, and Plumbing Fixture Manufacturing	1	0.2%	89.3%
327211	Flat Glass Manufacturing	1	0.2%	89.5%
327215	Glass Product Manufacturing Made of Purchased Glass	1	0.2%	89.7%
327993	Mineral Wool Manufacturing	1	0.2%	89.8%
331420	Copper Rolling, Drawing, Extruding, and Alloying	1	0.2%	90.0%
331422	Copper Wire (except Mechanical) Drawing	1	0.2%	90.2%
333120	Construction Machinery Manufacturing	1	0.2%	90.4%
333132	Oil and Gas Field Machinery and Equipment	1	0.2%	90.5%
333132	Oil and Gas Field Machinery and Equipment Manufacturing	1	0.2%	90.7%
333314	Optical Instrument and Lens Manufacturing	1	0.2%	90.9%
333517	Machine Tool Manufacturing	1	0.2%	91.1%
333613	Mechanical Power Transmission Equipment Manufacturing	1	0.2%	91.2%
333991	Power-Driven Handtool Manufacturing	1	0.2%	91.4%

333994	Industrial Process Furnace and Oven Manufacturing	1	0.2%	91.6%
333995	Fluid Power Cylinder and Actuator Manufacturing	1	0.2%	91.8%
333996	Fluid Power Pump and Motor Manufacturing	1	0.2%	91.9%
334210	Telephone Apparatus Manufacturing	1	0.2%	92.1%
334220	Radio and Television Broadcasting and Wireless Communications Equipment Manufacturing	1	0.2%	92.3%
334412	Bare Printed Circuit Board Manufacturing	1	0.2%	92.5%
334413	Semiconductor and Related Device Manufacturing	1	0.2%	92.6%
334514	Totalizing Fluid Meter and Counting Device Manufacturing	1	0.2%	92.8%
335311	Electric Power & Specialty Transformer Manufacturing	1	0.2%	93.0%
335921	Fiber Optic Cable Manufacturing	1	0.2%	93.2%
335929	Other Communication and Energy Wire Manufacturing	1	0.2%	93.3%
336413	Other Aircraft Parts and Auxiliary Equipment Manufacturing	1	0.2%	93.5%
339112	Surgical & Medical Instrument Manufacturing	1	0.2%	93.7%
339932	Game, Toy, and Children's Vehicle Manufacturing	1	0.2%	93.9%
423450	Medical, Dental, and Hospital Equipment and Supplies Merchant Wholesalers	1	0.2%	94.0%
423710	Hardware Merchant Wholesalers	1	0.2%	94.2%
423830	Industrial Machinery & Equipment Merchant Whlsrs	1	0.2%	94.4%
423850	Service Establishment Equipment and Supplies Merchant Wholesalers	1	0.2%	94.6%
423860	MARINE SUPPLIES (EXCEPT PLEASURE) MERCHANT WHOLESALERS [INCLUDES SHIPS, BOATS, ENGINES, AND OTHER TRANSPORTATION EQUIPMENT]	1	0.2%	94.7%
423990	Other Miscellaneous Durable Goods Merchant Wholesalers	1	0.2%	94.9%
425110	Business to Business Electronic Markets	1	0.2%	95.1%
441228	Motorcycle, ATV, and All Other Motor Vehicle Dealers	1	0.2%	95.3%
441310	Automotive Parts & Accessories Stores	1	0.2%	95.4%
443141	Appliance, Television and Other Electronics Stores	1	0.2%	95.6%
444210	Outdoor Power Equipment Stores	1	0.2%	95.8%
448320	Luggage and Leather Goods Stores	1	0.2%	96.0%
451110	Diving equipment stores	1	0.2%	96.1%
451110	Sporting Goods Stores	1	0.2%	96.3%
454111	Electronic Shopping	1	0.2%	96.5%
481219	Other Non-Scheduled Air Transportation	1	0.2%	96.7%
488310	Port and Harbor Operations	1	0.2%	96.8%
491990	Transmission, electric power	1	0.2%	97.0%
519130	Internet Publishing and Broadcasting and Web Search Portals	1	0.2%	97.2%
523120	Stock options brokerages	1	0.2%	97.4%
524291	Claims Adjusting	1	0.2%	97.5%
541330	Engineering Svcs	1	0.2%	97.7%
541340	Drafting services	1	0.2%	97.9%
541360	Geophysical surveying and mapping services	1	0.2%	98.1%

541611	Administrative Management and General Management Consulting Services	1	0.2%	98.2%
541720	Research and Development in the Social Sciences and Humanities	1	0.2%	98.4%
541990	Weather forecasting services	1	0.2%	98.6%
551112	Offices of Other Holding Companies	1	0.2%	98.8%
561311	Employment Placement Agencies	1	0.2%	98.9%
561320	Personnel (e.g., industrial, office) Suppliers	1	0.2%	99.1%
561599	All Other Travel Arrangement and Reservation Services	1	0.2%	99.3%
611430	Professional and Management Development Training	1	0.2%	99.5%
713990	All Other Amusement & Recreation Industries	1	0.2%	99.6%
811219	Other Electronic and Precision Equipment Repair and Maintenance	1	0.2%	99.8%
811411	Home & Garden Equip Repair	1	0.2%	100.0%
		571		

Appendix 2. List of Company Locations by State

State	Number	Percent	Cumulative Percent
CA	134	23.6%	23.6%
TX	96	16.9%	40.4%
MA	51	9.0%	49.4%
WA	45	7.9%	57.3%
FL	38	6.7%	64.0%
NY	20	3.5%	67.5%
LA	15	2.6%	70.1%
CO	14	2.5%	72.6%
MD	14	2.5%	75.0%
NJ	11	1.9%	77.0%
OR	11	1.9%	78.9%
VA	9	1.6%	80.5%
NH	8	1.4%	81.9%
RI	8	1.4%	83.3%
UT	8	1.4%	84.7%
AZ	7	1.2%	85.9%
PA	7	1.2%	87.2%
WI	7	1.2%	88.4%
AK	6	1.1%	89.5%
CT	6	1.1%	90.5%
IL	6	1.1%	91.6%
OH	6	1.1%	92.6%
HI	5	0.9%	93.5%
ME	5	0.9%	94.4%
MI	5	0.9%	95.3%
AL	3	0.5%	95.8%
MN	3	0.5%	96.3%
SC	3	0.5%	96.8%
GA	2	0.4%	97.2%
ID	2	0.4%	97.5%
IN	2	0.4%	97.9%
KS	2	0.4%	98.2%
MT	2	0.4%	98.6%
VT	2	0.4%	98.9%
DC	1	0.2%	99.1%
KY	1	0.2%	99.3%
MO	1	0.2%	99.5%
MS	1	0.2%	99.6%
NE	1	0.2%	99.8%
NM	1	0.2%	100.0%