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Moving from Print to Electronic Dissemination: When to Do it and How the National Ocean Service Tide Prediction Tables Experience

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Among the many products of the Department of Commerce, National Oceanic & Atmospheric Administration (NOAA), National Ocean Service, the Tide Prediction Tables are one of the oldest. Since their introduction in the early 1800's, many constituencies and regulations had grown up around them, adding to the complexity of instituting change. When change become inevitable, a period of learning, compromise and adjustment followed.

Background

At the beginning of the nineteenth century, the leaders of the United States of America recognized that our economy was dependent upon its fledgling maritime capabilities. And so, in 1807, Thomas Jefferson created the Survey of the Coast. Besides the activity of mapping and charting our coasts and harbors in support of maritime safety and commerce, there was the need to measure the rise and fall of the daily tides and to compute datums such as Mean Sea Level. This had been done from earliest times by individual Port Captains, but now there was a national need for coordinated measurements and common datum definitions.

Systematic water level measurements in the United States, which are the basis for tide predictions, date from about 1805 in New York harbor. By 1830, the first tide predictions for the United States were formally published in The American Almanac. They included the daily time of high water for Boston, New York and Charleston, with time differences for 96 other stations. In 1867, the first Tide Tables were published, initiating the presentation format which is essentially the same as that still used today. In the intervening years the publication went from East Coast coverage in one volume to global coverage in seven volumes. Meanwhile, in 1836 the Survey of the Coast became the Coast Survey. In succeeding years the Coast Survey would become the Coast and Geodetic Survey (1878), the National Ocean Survey (1970), and finally the National Ocean Service (1982).

The National Ocean Service has been the custodian of the tide prediction information at an enviable time in history. Every few years technological innovation creates new distribution vehicles for information in general, and every few years society creates a new class of users of and stakeholders in the tide prediction information. By closely monitoring its information holdings and their evolving relationship to society and technology, the National Ocean Service has actively sought to change the way it does business in its endeavor to better serve the Nation.

Stakeholders

There is quite an array of stakeholders having an interest in the Tide Tables. Some represent a traditional way of doing business, tradition borne out of the harsh reality of practical experience. With the recent proliferation of scalable computers and telecommunication networks to satisfy every market niche, stakeholders representing new ways of doing business continue to appear as well. All would need the benefit of an agency that understood their concerns and perspectives: an agency that could successfully draw all parties into the ongoing process of redefining their mutual roles; a process which would return value to all.

The first group of stakeholders that come to mind are the ship captains and pilots responsible for vessels ranging in size from the largest down through the smaller commercial carriers, tug and barge combinations, and those of our commercial fishing fleet. They are not at all interested in change for its own sake, but are very concerned with reliability, practicality, fail-safe operation and return on investment. They know best how situations at sea can quickly become life-threatening when poor planning or just plain bad luck intervene. They need products that perform.

Another group is composed of the career civil servants who, from long-standing dialogue with the members of the first group and even personal experience at sea, are best able to appreciate and represent those interests before others necessarily less intimate with the subject. These civil servants also have the best familiarity with the tide prediction information in its various raw and finished forms, both in the public and private sectors. They would be instrumental in suggesting new products and practical means to achieving desired future courses of action.

As America’s merchant marine reached out globally, so expanded the Tide Table coverage, and international agreements between governments followed. As a consequence of incorporating international information in the U.S. Tide Tables it is necessary to honor foreign copyright laws and other sensitivities to the release of their information. Some countries are simply not ready for more adventuresome modes of distribution. We still receive some foreign predictions in boxes quaintly wrapped with brown paper, tied with string and secured with sealing wax. Other countries, though adopting modern technologies, are very wary of government and private partnerships for distribution.

To facilitate the distribution of the Tide Tables there developed over the years a global network of official NOAA Chart Agents. These are retail outlets ranging in size from "mom and pop" fishing tackle shops to the largest marine supply companies. NOAA not only authorizes them to sell NOAA’s products, but encourages them to sell only the latest

product editions by offering them good terms for the return of unused product. Chart Agents are very proud of the trust relationship they share with NOAA.

Then, there are embodied in the laws and regulations of the land what appear at first reading to be impediments to altering the way the Tide Tables are produced and distributed. The Tide Tables published by the National Ocean Service are specifically named in the Code of Federal Regulations as the document required aboard all vessels subject to U.S. Coast Guard inspection. And, while the Secretary of Commerce is authorized to enter into partnerships to accomplish Government work, "all fees collected from the sale of... and from any licensing of such products... shall be deposited in the U.S. Treasury."[1] This would seem to remove all economic incentive for the potential private sector partner interested in new arrangements for production and distribution of book-form or electronic products.

However, there are a number of parties quite interested in new forms of production and styles of distribution. For example, if the Government ever decided to cease printing the Tide Tables, there are a number of printing houses eager to fill the void. Of course they would only produce Tide Tables with the promise of economic return. Marginally profitable geographical areas would be dropped. There are also a number of private entities wishing to place the Tide Tables on electronic bulletin boards accessible by subscription. This leaves unanswered the question of how the Tide Tables would be made available to ships at sea.

As just alluded to, there is an existing and growing cadre of private companies offering tide prediction information. Their products run the gamut from pocket tide tables, office calendars with tide curves, to specialized products for sport fishermen and kayakers, up to and including sophisticated software packages for personal computers. All this tide prediction information is derived from Government sources.

Another new stakeholder for tide prediction information is a growing industry of electronic nautical chart makers and Electronic Chart Display & Information System designers. These products would be sanctioned "for navigational use" by international maritime standard setting bodies, of which the United States is a member, and so it is very much in the Government’s interest to support them.

Users

The utility of tide prediction information goes well beyond navigation, and more uses become apparent as society’s needs evolve. The National Ocean Service has sought to quickly recognize these new functions and users and encourage them with new services.

The National Ocean Service supports society’s growing environmental concerns with new customized product combinations tailored to each requestor. These answer regional and city managers seeking data sets supporting their research and policy needs. They are also used by consulting firms specializing in environmental studies on their own or on behalf of public decision makers.

The call for specialized data sets in response to unique needs continues to grow. Engineering and construction firms use our data to correlate with past structural failure

events and to wisely plan future designs and operations. Law enforcement agencies seek information as input to criminal and civil cases. Government agencies at all levels now use tide prediction information to enhance the successful outcome of programs for the benefit of their citizens. Universities constantly use the information in planning future field work and to correlate with their own data sets.

Requests for "certified tide predictions" for presentation in courts of law are an example of change instituted from within the National Ocean Service by making imaginative use of simple technologies and attention to customer needs. Certification times were cut from as much as two weeks to two days by taking full advantage of the National Ocean Service's consolidation at its new Silver Spring campus. But a more important value was added to this product by sending a draft certification just a few hours after the request. The advantage to the customer was an immediate opportunity to evaluate the information, modify the request if necessary, act on the information in preparation for court, all the while confident that the true "certification" would be in hand within 48 hours.

New and customized data formats support other users. The National Ocean Service works closely with printers seeking to create products for an ever more diverse clientele. Educators at all levels need customized products to use as examples in teaching and to plan student field trips.

The National Ocean Service actively considered all of these users and stakeholders when the time came for change.

A Time for Change

As the midpoint of the development cycle for the 1996 Tide Tables approached, the word was received that the funding to print the book form of the Tide Tables would no longer be available. Though the announcement came suddenly, it was in fact an event whose time had come.

National Ocean Service management had already been giving consideration to more fitting roles for Government in the creation of the tide prediction information. In that light it had already begun to give thought to a range of potential new relationships with its users, stakeholders and untapped partners in the private sector.

The lack of Government funding to print the Tide Tables was indeed a significant event. It had important maritime safety and legal aspects. It represented a potentially new balance in the commercial market. And finally, there were the implications arising out of the perception of the event in the eyes of the stakeholders, users and other interested parties. All these issues required enlightened and tactful leadership to affect a well regarded outcome.

The National Ocean Service was capable of effectively addressing these sometimes conflicting issues because of its continuing close and informed relationship with interested parties. It was able to draw its stakeholders and user community into a new future reality while minimizing the disruption to each. It was able to quickly reach out to new partners in the private sector under this special circumstance because of its experience with private partners in related subject areas.

The precipitous withdrawal of funding to print the Tide Tables forced the National Ocean Service to adopt revolutionary methods of meeting user needs. It enabled the National Ocean Service to put into practice in one more area of its authorized expertise the belief that the customer's needs must define the value of information as well as its format, time and place utility. As customer preferences for information content, style and delivery become increasingly more diverse, no one format or media type will best serve the maritime community. Furthermore, no one organization is capable of serving all customer preferences as expressed in the marketplace.

Lessons Learned

About six months lapsed from the time we first heard news about our lack of funding until we and our partners had defined our future course. Obviously this period was the most unsettling and disruptive, and from it we acquired a few lessons.

Move forward. Our internal deliberations to define the scope of our funding situation and explore possible new printing and distribution scenarios for the Tide Tables was very focused. Spend your energy concentrating on defining and resolving issues that have a potential impact on your future maneuverability. Issues that defined the past are almost irrelevant. Someone might suggest that an understanding of the past provides perspective for the future. While this may be true, do not let it also become a trap to remaining unnecessarily enmeshed in practices of the past.

Information is only useful when shared. One must do everything possible to shorten the awkward and destructive time of uncertainty. This means do your in-house homework as quickly as possible and bring it to resolution. Once you know where you stand, even if you do not yet know in detail where you are going, share this much in as tight a time frame as possible with all potentially interested parties. They will find out anyway and it might as well come from a single authoritative source. From the range of responses to your initial contacts formulate as quickly as possible your future course of action and share it.

Our internal and external deliberations involved many parties. Multiple conversations took place with, for example, the Defense Mapping Agency, the U.S. Coast Guard, the Government Printing Office, the NOAA and Department of Commerce General Counsels, and finally the NOAA Chart Agents and the private sector value-added-retailers of tide prediction information. Of all the parties in question the last two had to be treated with great impartiality.

With each party we had to go through the same process of education, reaction, negotiation or exploration and acceptance. Initial reactions to the situation ranged from disbelief and anger to acceptance and delight. Touching base with each party was absolutely necessary to defining our future course, but each also added a delay to defining that course. With delay came the opportunity to add to the growing suite of rumors. Furthermore, angry respondents required additional consultation and coaching to help them see their place in an as yet to be defined future.

Special attention should be paid to your oldest constituencies. Their fear is what they might or will lose under the new arrangement. Where possible show them how they can

participate in the future arrangement. Show them hidden opportunities in the new arrangement. It probably will not be their old style of doing business and the financial picture may be different. It will be uncomfortable for them, but they will appreciate learning of it and exploring it with you.

Special attention must also be paid to the newest of your interested parties. Ours were private sector value-add-retailers and their overriding concern is that they have the same opportunity to play in the new arrangement as their competitors. In this regard we were very successful in addressing their concerns.

One is advised to keep detailed event and communication logs as documentation for the above. In the normal course of addressing a major change they will daily prove invaluable in reminding yourself of what was said to whom and when. In the event that your management of the change process is challenged they will serve to help reconstruct events.

Finally, an observation on using the valuable resources at General Counsel. It must be remembered that their expertise and perspective are of a legal nature. Yours might be programmatic or technical. Both must be combined to give you complete solutions in your new and changing situation. Seeing and following only one of those points of view will lead to unsatisfactory results at best. And those unsatisfactory results will, in all probability, require you to revisit the question with the attendant loss of time and opportunity.

Two Years Later

All of the above transpired in 1994-1995 as we faced publication of the 1996 Tide Tables. Our solution was to publish the tide prediction information on CD-ROM. The National Ocean Service then worked very closely with interested private printers to help them complete arrangements to print and distribute the Tables for retail sale and public use from the CD-ROM. Today the National Ocean Service continues in that role.

The National Ocean Service occupies a unique position vis-à-vis tide prediction information. It is the Government agency authorized by Congress to engage in the observation, analysis, creation and dissemination of such information. This role is recognized by the community of nations and international standards setting bodies. For example, the National Ocean Service is the U.S. focal point for the annual exchange of tide prediction information between nations and the maintenance of the international tide prediction database.

Closer to home the National Ocean Service continues to act under its policy that Government's business is to collect and analyze scientific observations to create and maintain a database of basic tide prediction information while its presentation in user-friendly forms is best left to the private sector. One inherent and key role for Government is the quality control of that tide prediction information. Good quality assurance of the source data enables the value-added-retailer to exploit the full range of potential products and the customer to use them with confidence.

The World Wide Web is a new area where the National Ocean Service can play a constructive quality assurance role. The recent proliferation of tide prediction information on the Web has clearly brought this to light. As it has done successfully before, the National

Ocean Service will use its knowledge of the marketplace, its customers and its partners to address this new situation.

1. Excerpt from United States Code, Title 44: §1307 (b)