



Projected Benefits and Costs of the Digital Coast

April 2015

National Oceanic and Atmospheric Administration (NOAA)

Office for Coastal Management

(843) 740-1200 | www.coast.noaa.gov



Digital Coast

The Digital Coast website was developed to meet the unique needs of the coastal management community. The site provides data, as well as the tools, training, and information needed to make this data truly useful. Content comes from many sources, all of which are vetted by NOAA.

The Digital Coast is managed by NOAA's Office for Coastal Management, with input from the Digital Coast partners, a group that includes the American Planning Association, Association of State Floodplain Managers, Coastal States Organization, National Association of Counties, National Estuarine Research Reserve Association, National States Geographic Information Council, The Nature Conservancy, and Urban Land Institute.

NOAA's Office for Coastal Management

"Coastal management" is the term used by communities and organizations working to keep the nation's coasts safe from storms, rich in natural resources, and economically strong. The national lead for these efforts is NOAA's Office for Coastal Management, an organization devoted to partnerships, science, and good policy. This agency, housed within NOAA's National Ocean Service, oversees major initiatives that include the National Coastal Zone Management Program, Coral Reef Conservation Program, Digital Coast, and National Estuarine Research Reserve System.

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Executive Summary

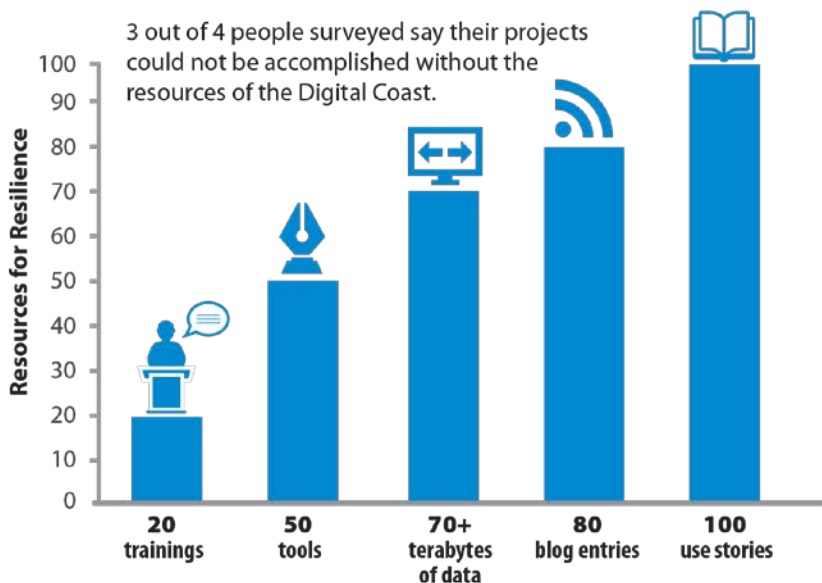
The Digital Coast makes it easier for community leaders to locate and apply the resources needed to address coastal challenges. The recently released “Projected Benefits and Costs of the Digital Coast” report examines past and expected costs and benefits associated with creating and operating this resource.

According to the report, annual net benefits have grown from about \$2.3 million in 2009 to more than \$6.7 million in 2013. Currently, benefits exceed costs by a margin of 3 to 1, with net benefits of \$25 million. Continued operation over the next 15 years is expected to yield a net benefit of \$117 million, equating to a return on investment of 411 percent. This high return on investment is a good deal for the taxpayer and the growing base of customers who use the site to gain easy access to data and tools worth millions of dollars.

These benefits are calculated by looking at the costs associated with providing the resources versus the costs users would expend, both in time and money, obtaining this information from other sources if the Digital Coast were not there. This is a tangible benefit and was captured by this study.

Equally valuable and not captured are the intangibles: the communities and natural resources preserved as a result of how this information is being used.

The analysis conducted is sufficient to address the question that must always be asked whenever government resources are being expended: Is it worthwhile to continue on the present investment path? According to this report, the subset of benefits that can be assessed with a high degree of confidence greatly exceed the anticipated future costs for the Digital Coast.



ABOUT THE DIGITAL COAST

- **Content:** More than 70 terabytes of data, 50 tools, 100 use stories, 20 trainings, and 80 blog entries.
- **Use:** More than 150,000 data downloads, over 50,000 times for tools, and about 1 million unique visits.
- **Customer Satisfaction:** Three-fourths of those surveyed say their projects could not be accomplished without the resources of the Digital Coast.

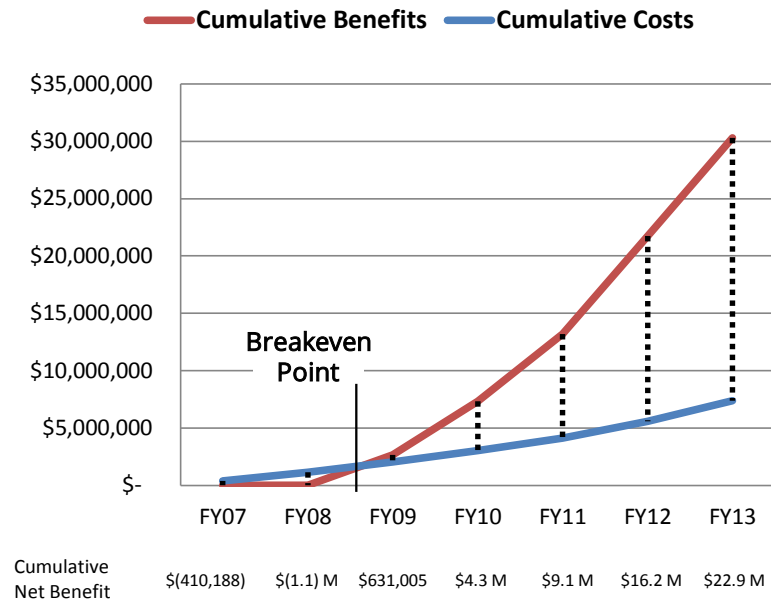
Highlights Dashboard

Digital Coast Return on Investment through Fiscal Year 2013

Net Benefits **ROI**
\$22,915,419 **311%**

– Cumulative values from fiscal year (FY) 2007 (project initiation) to FY13
 – ROI (Return on Investment) = Cumulative Net Benefits / Cumulative Costs

Historical Benefits and Costs



Data Downloads	153,391	Data Services Visits	42,510	Partner Data Page Visits	39,303
Tool Downloads	51,056	Tool Visits	167,786	Map Services Visits	893,971
				Partner Tool Page Visits	46,466

Projected Values

15 Years (through FY28)

- Net Present Benefits: \$117 million
- ROI: 411%

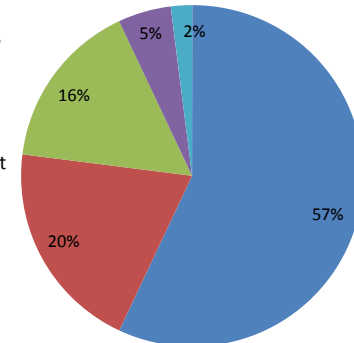
– Net present benefit (NPB) is the cumulative net benefit in the future that is discounted to show its present values in 2013
 – Values are based on conservative estimation of future benefits and costs

Survey Results

NSGIC survey respondents represented 197 professionals and described more than 300 projects that use Digital Coast resources

Project Results without Digital Coast

- conduct lower quality work without the resources or with less suitable resources
- could not do the project without the resources
- conduct comparable work by extra effort (time/cost)
- conduct higher quality work with additional effort
- conduct comparable work without the resources



Introduction

Study Background

The Digital Coast was developed by the NOAA Office for Coastal Management for the coastal managers, planners, decision makers, and technical users who are charged with managing the nation's coastal and ocean resources. The products and services provided by the Digital Coast include more than 70 terabytes of data, 50 tools, 100 success stories, 20 trainings, and 80 blog entries. It has quickly become one of the most widely used resources for coastal managers, with users representing more than 4,000 coastal communities.

This study is a follow-up of two previous studies of the projected benefits and costs of the Digital Coast, one conducted in 2009 and the other in 2012. The current study combines both qualitative and quantitative measures that provide a basis for assessing the true value of the Digital Coast. Quantitative measures are then used to compute the breakeven point, net present value (NPV), benefit-cost ratio (BCR), and return on investment (ROI) associated with the Digital Coast.

Another important though largely unquantified benefit of the Digital Coast comes from the partnership that has been formed to help guide its development and operations. This partnership includes NOAA and eight national organizations representing a large share of the Digital Coast's diverse user base. This partnership consists of the following organizations:

- American Planning Association
- Association of State Floodplain Managers
- Coastal States Organization
- National Association of Counties
- National Estuarine Research Reserve Association
- National Oceanic and Atmospheric Administration
- National States Geographic Information Council
- The Nature Conservancy
- Urban Land Institute

To learn more about the benefits of the Digital Coast and confirm several assumptions made in the previous two assessments of the benefits and costs of the Digital Coast, the National States Geographic Information Council (NSGIC) conducted surveys of members of the partnership organizations and a wide range of other governmental, nongovernmental, and private sector users of the Digital Coast. The results of these surveys were shared with the Office for Coastal Management for consideration in this study.

The responses from the NSGIC surveys provided insights into two primary classes of benefits attributable to the Digital Coast:

1. **Improved Efficiency:** Many millions of dollars have been spent on the development of data, tools, and other products and services that are needed for coastal management. The value of these resources, however, is greatly diminished by the fact that it is hard to find them, hard to determine their reliability, and hard to prepare them for use. Investments in the Digital Coast restore this lost value by identifying trustworthy products and services and saving people time in finding, obtaining, and using them. The

survey responses provided a refined understanding of the amount of time that Digital Coast users save and the value of this time, measured in terms of labor cost.

2. **Increased Effectiveness:** A great number of coastal management projects are enabled or improved by Digital Coast data and tools. Furthermore, the values of these resources are expanded by the supportive products and services, such as case studies, trainings, and partnerships. The ripple effect of the Digital Coast fosters new management ideas, attracts more public interest, and leads to better decision-making on coastal issues. The survey responses provided a rich inventory of case studies showing how Digital Coast

“Digital coast is a well-designed website and an efficient-effective web service. It is better than many.”

– A geographer working in the private sector

resources have been used to improve coastal management outcomes.

Study Perspectives and Scopes

Because the Digital Coast is funded primarily by the federal government, current and past assessments of costs and benefits have been conducted from a national perspective. This means that the focus is on benefits to the nation at large, including government agencies, nongovernmental organizations, researchers, and the private sector (as opposed to investments designed to increase the flow of revenues to the federal government). Costs are considered from a similar perspective, accounting for not only outlays by the federal government, but also costs incurred by partners who participate in the management and operations of the Digital Coast. Treating benefits and costs in this manner makes it possible to address the question: is the nation better off because of investments in the Digital Coast and, if so, how much better off?

Although accounting for the costs of the Digital Coast is a relatively straightforward accounting exercise, it is much more difficult to identify all the benefits, quantify them, and express them in monetary terms. Thus, the analysis reflected in this report compares total costs with only part of the benefits—the efficiency gains whose monetary value can be assessed within the constraints of the resources available for this study—yielding very conservative estimates of the net value of investments in the Digital Coast.

The contribution the Digital Coast makes in improving the effectiveness of coastal management is described in qualitative terms. Other benefits that are not captured in this analysis include the educational values to students and individuals, values of open GIS data to the public, and environmental impacts of the projects using the resources of the Digital Coast. Though these benefits might be equal to or even greater than those associated with efficiency gains, their quantification would require comprehensive studies and, in some cases, the development of new measurement methods. Simply asking users (in a survey) the value in dollar terms of these uses is unlikely to yield useful information.

The scenarios analyzed in this study reflect the current mission and priorities of the Digital Coast. They do not account for potential additional investments to support, for example, new national-scale mapping exercises. Such investments would have their own benefits and costs and would require independent analyses to determine their desirability.

Costs

Since fiscal year (FY) 2007, a total of \$7.4 million¹ has been spent in developing and managing the Digital Coast. The costs includes labor costs for information technology and management, purchases for server and storage equipment, and travel costs for outreach and other purposes. The costs of developing the contents, such as the collection and processing of a data set, are not included. These costs are derived from the accounting records in nominal (current year) terms. The values in the table below have been adjusted to account for the effects of inflation; all values reflect 2013 price levels.

Take the Coastal Change Analysis Program (C-CAP) as an example: the costs of developing its land cover and land cover change data are not included in this study, such as the costs for NASA and USGS to collect satellite imagery data, the labor costs of C-CAP to thematically classify the imagery pixels and map the changes, and the licensing costs to use essential software packages. The costs in this study are only related to creating and maintaining the Digital Coast website to deliver the land cover and change data and its documentation.

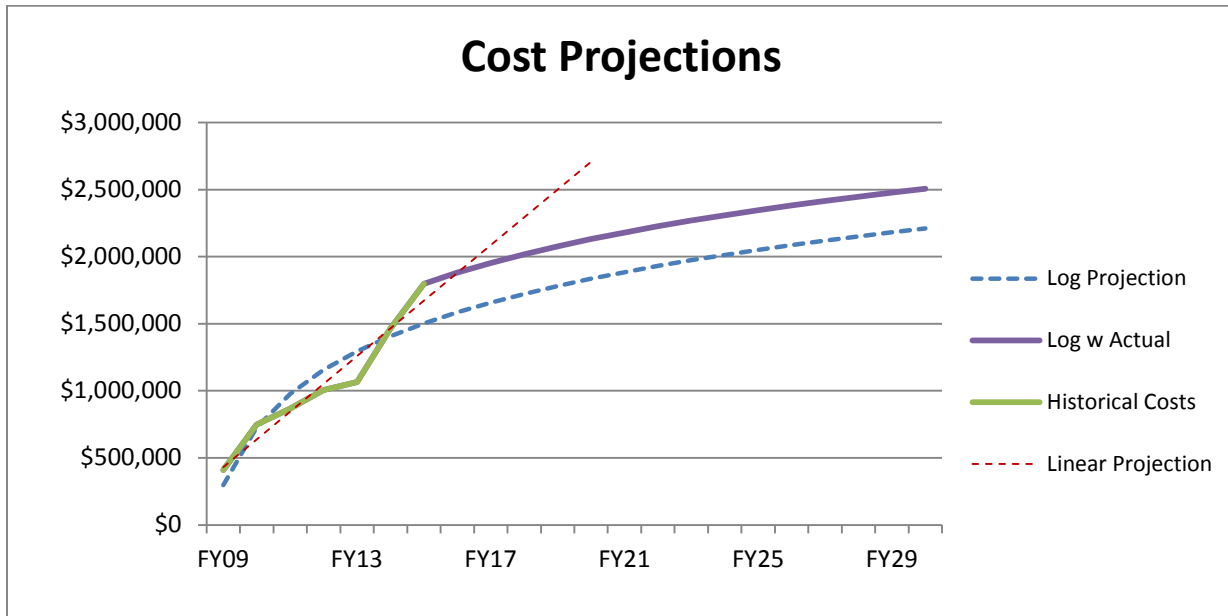
Inflation Adjusted	OCM Non-Labor Costs	OCM Fed Labor Costs	OCM Contract Labor Costs	Partner Costs	Total Cost
FY07	\$198,363	\$63,634	\$119,719	\$28,472	\$410,188
FY08	\$82,729	\$169,338	\$467,369	\$27,924	\$747,361
FY09	\$74,828	\$254,778	\$482,583	\$55,424	\$867,613
FY10	\$81,122	\$295,003	\$391,504	\$239,065	\$1,006,694
FY11	\$75,344	\$331,745	\$424,724	\$234,457	\$1,066,270
FY12	\$44,051	\$355,813	\$698,045	\$366,221	\$1,464,131

¹ Figures are adjusted to remove the effects of inflation.

Inflation Adjusted	OCM Non-Labor Costs	OCM Fed Labor Costs	OCM Contract Labor Costs	Partner Costs	Total Cost
FY13	\$207,450	\$385,795	\$740,550	\$464,000	\$1,797,795
Total	\$763,887	\$1,856,107	\$3,324,494	\$1,415,563	\$7,360,051

After the initial build-out of the Digital Coast, it is unlikely that costs will continue to increase at a linear pace; instead, the rate of growth in project costs is likely to decrease over time. To estimate the flattening of future costs, a logarithmic regression was performed on historical costs, shown as the blue line in the figure below. However, because this resulted in projected 2014 costs that are lower than actual 2013 costs (implying that expenditures would go down), the growth implied by the logarithmic curve was applied to 2013 costs, yielding the projected cost curve shown as the purple line in the figure below. Under this scenario, real annual growth in cost declines from 4.6 percent in the near-term to 1.2 percent in 15 years (FY28). This represents a more reasonable projection than simple linear extrapolation; further, it's consistent with the method used to project benefits. Obviously, it is important to control costs to maximize net returns on Digital Coast investments. Sensitivity tests indicate that cost increases of 15 percent annually (real increases, not as the result of inflation) result in negative net benefits before the end of the 15-year project life (assuming that the increase in benefits flattens over time; see discussion in the "Scenario Analysis" section).

The chart below shows the historical costs and projections of future costs. The projection that is chosen for use in this study resulted from both the log regression and actual historical data.



Benefits

There are two ways for Digital Coast to benefit users: helping people do their jobs more efficiently, with less time and cost in finding, obtaining, and using the products and services that they need; and more importantly, by helping users do a better job in managing the resources of our nation’s coasts and oceans. The benefits that were quantified in this study represent only those benefits that could be quantified with the most certainty. These benefits are already sufficient to address the basic question of the economic soundness of investments in the Digital Coast, since they are much larger than costs.

The following is a summary table of the benefits quantified in this study categorized by usage. The details are explained in the following sections.

Benefits by Type	Usage by Category	Base Analysis		
		Used for Work	Used for Other Purpose	
Efficiency Gains	Data Downloads	Quantified	Not Quantified	
	Data Wizard Visits	Quantified	Not Quantified	
	Tool Downloads	Quantified	Not Quantified	
	Web-Based Tools Visits	Accessed via Digital Coast	Quantified	Not Quantified
		Accessed via Other Means	Not Quantified	Not Quantified
	Web Services Visits	Accessed via Digital Coast	Quantified	Not Quantified
		Accessed via Other Means	Not Quantified	Not Quantified
	Leveraging the Infrastructure	Quantified	Not Quantified	
	Avoiding Duplicate Efforts	Quantified	Not Quantified	
	Effectiveness Gains	All Usage	Not Quantified	Not Quantified

Improving Efficiency

The efficiency gains associated with the Digital Coast fall into three general classes:

1. Time savings: reducing the amount of time it takes users to find, obtain, and use resources
2. Leveraging NOAA investments in infrastructure: reducing partners' expenditures for hardware, software, and labor when they provide access to their resources through the infrastructure of the Digital Coast, and
3. Avoiding duplication of effort: reducing the cost of creating duplicative data sets, tools, or other resources.

Time Savings. The Digital Coast provides “one-stop” access to a wide range of resources needed to support coastal planning and management. The value of these resources is enhanced by efforts to ensure the quality of the resources that are provided, consistency in formatting and other essential attributes, and completeness of the metadata and other supporting information. This improves the efficiency of users' work, making it easier for them to

- find resources, reducing the amount of time spent searching for relevant resources
- obtain resources, reducing the amount of time spent selecting and downloading relevant resources, and
- use resources, providing standard formats, adequate documentation, case studies illustrating the use of resources, and complete metadata so they can quickly understand the attributes of the resources and begin using it.

The survey conducted by NSGIC confirmed that the Digital Coast is meeting this goal. Users describe the Digital Coast as their “starting point” in their search for resources, providing “one-stop” shopping for “ready-to-use” resources. Responses also indicate that the interactive tools and resource descriptions make it easier for users to share and demonstrate the information to the public and stakeholders.

The monetary value of improvements in efficiency is based on the number of times the Digital Coast resources were used and the time and money saved by users of the resources (cost reduction per use). Responses to the NSGIC survey confirm that the Digital Coast is in fact saving users a lot of time and money²—on average, users of data, tools, and web services report time savings in excess of 3 hours per use.

“Gaining access through one portal listing of all required sites when doing projects saves . . . time.”

– An emergency manager from North Carolina

² In addition, the NSGIC survey indicates that Digital Coast resources (in particular, blogs and training) have improved the effectiveness of their work. The value of this contribution was not quantified in this study but could be quantified with further study.

The usage of Digital Coast products is monitored through the collection of web statistics that quantify the number of downloads of Office for Coastal Management data sets, visits to partners' data pages, downloads of downloadable tools, visits to Office for Coastal Management web-based applications (tools), visits to partners' tool pages, and the queries of Digital Coast web services.

There are several caveats associated with the use of web stats as indicators of the actual use of Digital Coast products:

1. Download statistics collected for the Data Access Viewer can be expressed in terms of requests or jobs (a user may ask for multiple data sets in a single request, with each data set representing one "job"). Download statistics used in this study represent the total number of data sets requested ("jobs").
2. Some users access Digital Coast web applications and web services via URLs sent in emails, bookmarks, or other websites like ArcGIS Online. These users do benefit from the Digital Coast, but not as fully as those also using its "one-stop" access, which makes it easy for users to find the content delivered by the Digital Coast. The number of such users was determined and the benefit accruing to them was treated as zero. This results in a conservative estimate of benefits, since it's likely that these users do benefit in other ways from the Digital Coast resources they access.³
3. It is unlikely that everyone who visited a data page or tool page actually downloaded the data or used the tool. In fact, in those instances where statistics are collected for both data/tool page visits and data/tool downloads, downloads represent only 37 percent of the page visits. This same ratio was applied to page visits where the actual number of downloads cannot be determined by examining web statistics.
4. A 2012 survey of Digital Coast users indicated that 38 percent were individuals, students, and others using these resources outside a formal work setting. Although these users benefit from the use of the Digital Coast, this value was treated as zero in this study, since it would not result in wage-based savings. Other indicators could be used, such as the value of leisure time, but an accurate assessment of this value is beyond the resources available to conduct this study. For this reason, usage estimates were reduced by another 38 percent (multiplying results by 62 percent).

The table below uses web statistics from FY13 to illustrate the effects of adjustments made to reflect the caveats described above. For downloads using the Data Access Viewer, for example, statistics on the number of jobs correctly reflect the number of data sets downloaded, so no adjustment is needed in response to item 1 above. Items 2 and 3 don't apply to Data Access Viewer downloads, but item 4 results in an estimate of just under 12,000 usages for the 23,000 Data Access Viewer downloads. To estimate the use of data accessed via links to the web pages

³ Web statistics indicate that only 11 percent of the users of web applications, data services, and map services came directly from a Digital Coast web page. Thus, only 11 percent of the total visitors were counted in this assessment of efficiency gains.

of Digital Coast partners (“Partner Data Visits”), the following computations were performed:
 18,849 visits to data pages X 0.37 X 0.62 = 4,241 uses of the data.

Web Stats	FY13	Adjustments				Adjusted Stats	
		1	2	3	4		
Data	Data Access Viewer Downloads	22,587	*100%	-	-	*62%	14,004
	FTP Downloads	8,070	-	-	-	*62%	5,003
	HT Data Downloads	1,910	-	-	-	*62%	1,184
	Data Wizard Visits	494	-	-	*37%	*62%	113
	Partners Data Visits	18,489	-	-	*37%	*62%	4,241
Tools	Tool Downloads	7,538	-	-	-	*62%	4,674
	Web Applications Visits	357,863	-	*11%	-	*62%	24,406
	Partners Tools Visits	21,797	-	-	37%	*62%	5,000
Web Service	Data Services Visits	15,997	-	*11%	*37%	*62%	404
	Map Services Visits	462,955	-	*11%	*37%	*62%	11,682

The table below summarizes the adjusted web statistics from FY09 to FY13 for data, tools, and web services.

Digital Coast Usage Adjusted from Web Stats			
	Data	Tool	Web Services
FY09	11,929	7,993	0
FY10	16,476	21,724	0
FY11	17,746	31,104	0
FY12	21,819	40,929	8,746
FY13	24,546	34,080	12,086
Total	92,516	135,831	20,832

By making these resources easier to find, acquire, and use, the Digital Coast allows users to accomplish more work with the same budget. These cost reductions are quantified as a function of the amount of time saved and the labor cost associated with that time savings.

Cost Reduction per Use = Time Saved per Use * Wages per Unit Time

Users are paid at different wages according to their occupation and the sectors within which they work. The NSGIC survey indicates that Digital Coast users fall into 14 occupational classes, including engineers, economists, geoscientists, technicians, and managers. Cost differentials are observed among users in the same occupational class; wages are generally higher in the private sector than in government agencies and nongovernmental organizations.

Occupational classes used in the NSGIC survey and labor costs used in this study are based on estimates of wages by occupation developed by the Bureau of Labor Statistics' Occupational Employment Statistics (OES) program.⁴ For the occupations represented in the NSGIC survey of Digital Coast users, wages range from \$20.73 to \$54.66 per hour (corresponding to technicians and managers, respectively). The average wage per hour is \$36.65, which is nearly identical to the estimated average wage used in the two previous ROI studies (\$36.00).

According to the NSGIC survey, data use accounted for the largest time savings per use (3.6 hours per use), tool use saved an average of 3.0 hours per use, and the use of web services

⁴ See www.bls.gov/oes/current/oes_nat.htm. For more information, see Appendix I of this report.

saved an average of 3.3 hours per use. Applying the weighted average labor cost to these time savings yields benefits per use of \$133.68, \$110.90, and \$120.94, respectively.⁵

Time Saved per Use (hours)			Cost Reduction per Use		
Data	Tool	Web Services	Data	Tool	Web Services
3.6	3.0	3.3	\$133.68	\$110.90	\$120.94

The benefits associated with time savings (the efficiency gains related to finding, acquiring, and using Digital Coast resources) are computed as follows:

Benefits of Time Savings = Cost Reduction per Use X Usage

In 2013, for example, the benefits of time savings for data use equate to \$133.68 of cost reduction per use (see table above) X 24,546 uses, for a total of \$3.3 million (see table below).

	Data Use	Cost Reduction for Data	Tool Use	Cost Reduction for Tool	Web Services Use	Cost Reduction for Web Services
FY09	11,929	\$1,594,774	7,993	\$886,392	0	\$-
FY10	16,476	\$2,202,572	21,724	\$2,409,143	0	\$-
FY11	17,746	\$2,372,339	31,104	\$3,449,350	0	\$-
FY12	21,819	\$2,916,867	40,929	\$4,538,840	8,746	\$1,057,752
FY13	24,546	\$3,281,417	34,080	\$3,779,355	12,086	\$1,461,671
Total	92,516	\$12,367,968	135,831	\$15,063,080	20,832	\$2,519,423

⁵ The NSGIC survey included eight responses that indicated time savings in excess of 25 hours per data or tool use. Based on their responses to other survey questions, it was not clear that these savings were solely the result of efficiency gains as described in this section. For this reason, the responses were adjusted downward to reflect a more typical time savings. Without these adjustments, the resulting time savings would be 26.1 hours for data, 10.4 hours for tools, and 18.0 hours for web services; it is unreasonable to allow these outliers to have such a pronounced effect on benefits (the result would be a return on investment seven times greater than estimated in this study).

Leveraging NOAA Investments in Infrastructure. Partners who use the infrastructure of the Digital Coast as the sole means of delivering a product will realize a reduction in their own expenditures for hardware, software, and labor.⁶ From FY09 to FY13, eight partner products have been added to the Digital Coast as the sole means of delivery, at an estimated savings of \$25,000 per product. The actual savings per product is unknown but this estimate is used to formally (but only partially) account for this value. The results are summarized in the first three columns in the table below.

Avoiding Duplication of Effort. The NSGIC survey indicates that Digital Coast users are spared the expense of creating data and tools needed for their work because they're able to obtain these products from the Digital Coast. The actual number of such instances is unknown but to formally (but only partially) account for this value, it has been assumed that the acquisition of products from the Digital Coast prevents one duplicative effort each year, valued at \$25,000 per effort. The results are summarized in the table below.

	Cost Reduction per Product	Partners Serving Products on NOAA Infrastructure	Cost Reduction by Using NOAA Infrastructure	Duplicated Product Avoided	Cost Reduction by Avoiding Duplication of Efforts
FY09	\$25,000	6	\$150,000	1	\$25,000
FY10	\$25,000	1	\$25,000	1	\$25,000
FY11	\$25,000	1	\$25,000	1	\$25,000
FY12	\$25,000	0	\$-	1	\$25,000
FY13	\$25,000	0	\$-	1	\$25,000

"[The] LIDAR dataset . . . was extremely helpful and saved us several weeks of field time from doing it by traditional survey methods."

– A geographer from National States Geographic Information Council

⁶ By using the Digital Coast as the sole means for delivering products, partners avoid the costs of hardware, software, IT support, and other labor and materials needed to develop and maintain their own servers. Providing these resources on multiple, independent systems would result in redundancies (like the duplication of IT security efforts to multiple servers being used at less than full capacity).

The surveyed users stated that the last two types of benefits were significant. For example, the Department of Energy case studies mentioned later in the report reported \$50,000 savings on data and tool development. Yet due to lack of details to support the computation, the rough estimation of these additional benefits is only a placeholder for this study. They only compose a very small portion to the total efficiency benefits—1 percent of the cumulative efficiency benefits through FY13. Future research could reveal much higher benefits in these two categories.

Through FY13, the benefits of data and tools take the largest share, accounting for 41 percent and 50 percent respectively.

	Benefits through FY13	% of Efficiency Benefits
Data	\$ 12,367,968	40.9%
Tool	\$ 15,063,080	49.8%
Web Services	\$ 2,519,423	8.3%
Using Infrastructure	\$ 200,000	0.7%
Duplication Avoided	\$ 125,000	0.4%

Improving Effectiveness

The benefits that are quantified in this study do not reflect the value of Digital Coast resources in improving the effectiveness of users in performing their work. Quantifying these benefits would involve assessing the value of the information itself. Information, in most cases, is an intermediate good whose value lies in the value of the outputs produced. The information contained in the Digital Coast is used for a wide array of applications, ranging from habitat restoration to community development, engineering, and hazard preparedness. A single data set or tool is likely to contribute to many distinct outputs in small or large ways. Assessing the value of the information would involve estimating the contribution that the information makes to the value of each of the outputs improved by its use.

Many of these values of Digital Coast will accrue in the form of ecosystem services as users slow the decline of ecosystem health or, in some cases, restore health to ecosystems impacted by human activity. Although methods and tools exist to assess this impact, the analysis is expensive, time-consuming, and often poorly understood.

The discussion that follows is descriptive in nature and is provided to illustrate the contribution that Digital Coast products makes in the realm of effectiveness (the value added to final outputs that rely on these products). This contribution is diverse and large.

This discussion is based on responses to the NSGIC survey that describe the professions in which Digital Coast users are employed and the type of projects that they are working on to

show the nature of the outcomes that are being affected by the use of Digital Coast products. For more information on the results of the NSGIC survey, see Appendix I.

Who Are the Users? Respondents to the NSGIC survey represent 197 professionals, 57 of which work for federal, regional, or state governments; 36 for municipal, county, or parish governments; 48 for nonprofit organizations or academia; and 56 in the private sector.

Respondents represent 17 broad occupational classes.⁷ Engineers account for about 18 percent of all users. Managers account for another 18 percent of the users. Surveyors, cartographers, and geographers in total account for about 15 percent of the users. Each of the three following occupational classes account for about 10 percent of the users: planners, environmental and geo-scientists, and technicians. Other respondents fall into one of the remaining eleven occupational classes.

Respondents to the NSGIC survey represent 49 professional organizations. About a quarter of the respondents are members of the Association of State Floodplain Managers. Other organizations represented by more than 10 percent of respondents include the American Planning Association, The Nature Conservancy, and Coastal States Organization. About 60 percent of the respondents indicated membership in two or more professional organizations. See discussion of “Profile of Digital Coast Users” in Appendix I for more information and charts.

What Are the Projects? Respondents to the NSGIC survey describe more than 300 projects that use Digital Coast resources. Data obtained from the Digital Coast were used in two-thirds of these projects. Another 19 percent used tools obtained through the Digital Coast, and the remainder used other products and services provided by the Digital Coast.

The benefits associated with these projects are diverse and large. They focused on a wide range of issues:

- climate adaptation
- coastal conservation
- coastal economy
- coastal hazards
- community resilience
- emergency management
- land use planning
- natural resources management
- ocean planning
- water quality

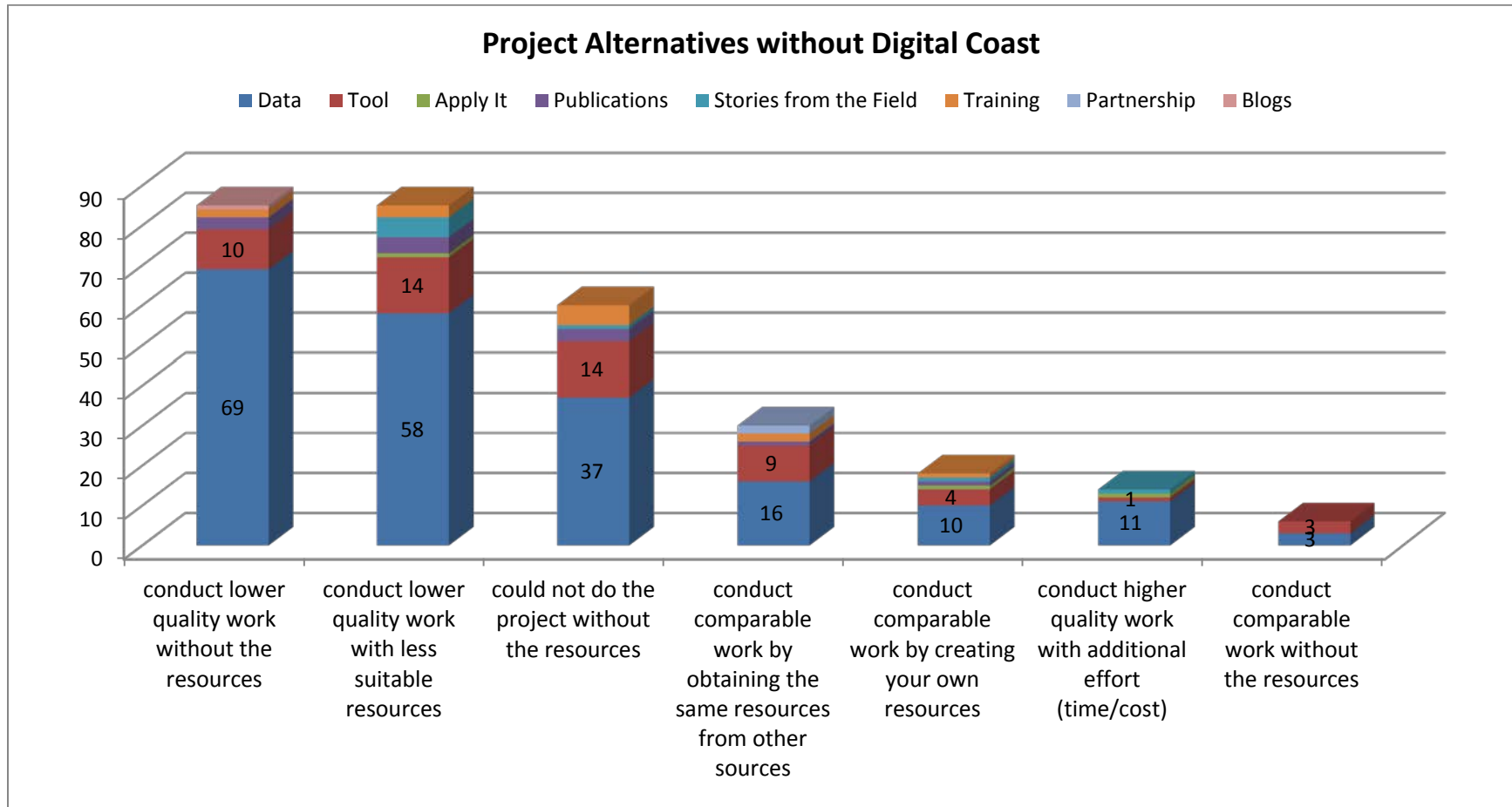
⁷ See Appendix I. The occupational classes that appear in the NSGIC survey are based on those used by the Bureau of Labor Statistics (BLS) to report wages by occupational class. To simplify the survey, classes were aggregated when they were somewhat similar and, more importantly, when the average wages were the same among the classes being aggregated. This allowed us to use survey responses to estimate the value of time savings, based on the wages of the workers whose time was being saved.

Coastal hazards, land use planning, and natural resources management account for more than half of the 306 projects.

Respondents indicated that 60 of the 306 projects could not have been accomplished without Digital Coast resources, and that another 171 projects could have been accomplished, but at a lower quality. Overall, 75 percent of the projects could not have been performed at their current levels without Digital Coast resources. See discussion of “Profiles of Projects” in Appendix I for more information and charts.

“...Digital Coast [resources] are used often because they are free, readily accessible, easy to use, and have grown to become a standard “go to” in the flood management industry.”

– A member of the Association of State Floodplain Managers



Quantified Benefits

Historical Benefits. The total benefits of the Digital Coast are a function of its contributions to the efficiency and effectiveness of its users in performing their work. This study describes but does not quantify gains in effectiveness. The benefits associated with three classes of efficiency gains were quantified:

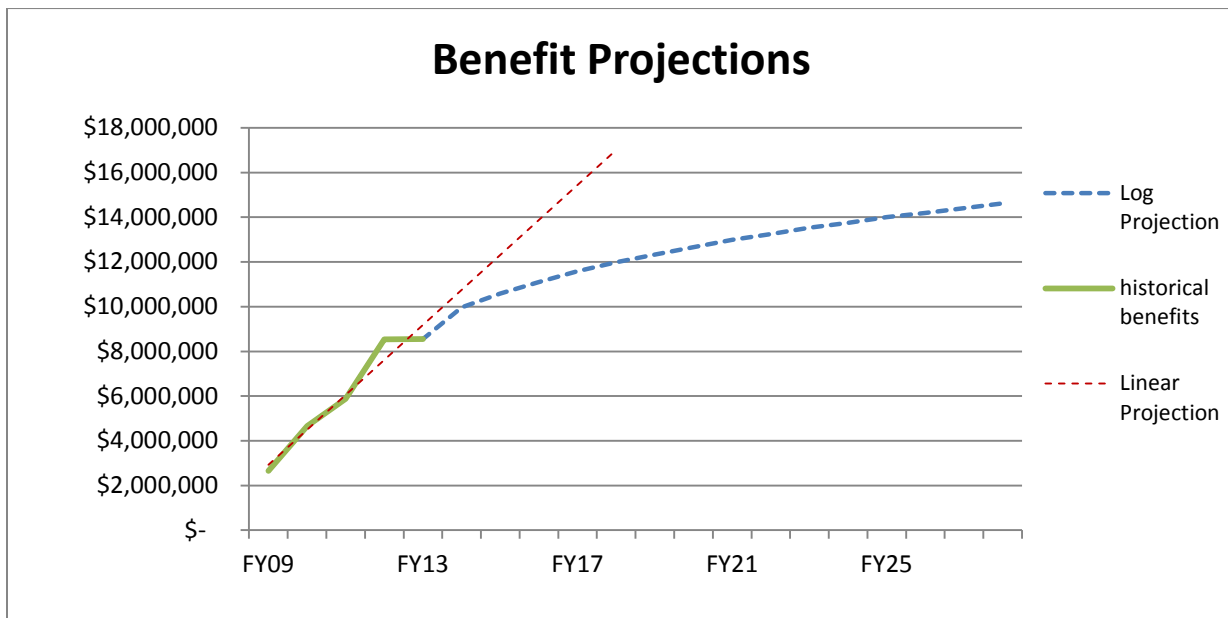
- Time savings: reducing the amount of time it takes users to find, obtain, and use resources
- Leveraging NOAA investments in infrastructure: reducing partners’ expenditures for hardware, software, and labor when they provide access to their resources through the infrastructure of the Digital Coast, and
- Avoiding duplication of effort: reducing the cost of creating duplicative data sets, tools, or other resources.

These benefits—all cost-reduction benefits—are summarized in the table below.

Cost Reduction from Efficiency Improvement						
	Data	Tool	Web Services	Using NOAA Infrastructure	Avoiding Duplication of Efforts	Total
FY07	\$-	\$-	\$-	\$-	\$-	\$-
FY08	\$-	\$-	\$-	\$-	\$-	\$-
FY09	\$1,594,774	\$886,392	\$-	\$150,000	\$25,000	\$2,656,166
FY10	\$2,202,572	\$2,409,143	\$-	\$25,000	\$25,000	\$4,661,715
FY11	\$2,372,339	\$3,449,350	\$-	\$25,000	\$25,000	\$5,871,688
FY12	\$2,916,867	\$4,538,840	\$1,057,752	\$-	\$25,000	\$8,538,458
FY13	\$3,281,417	\$3,779,355	\$1,461,671	\$-	\$25,000	\$8,547,443
Total	\$12,367,968	\$15,063,080	\$2,519,423	\$200,000	\$125,000	\$30,275,470

Projected Benefits. The notion of a product’s “life cycle” has been tested and verified in business and economic literature dating back at least to the 1960s.⁸ An important component of this theory is the idea that products tend to grow more rapidly during initial phases of “introduction” and “growth,” then gradually leveling off as the product matures. To approximate this pattern of growth in Digital Coast benefits, projected future benefits follow a logarithmic regression of historical benefits.⁹ Since its launch in FY09, benefits associated with the efficiency improvement have grown at about 30 percent annually. Projected future growth rates range from 6 percent in FY15 to less than 2 percent after FY22.

Projected future benefits are compared to a linear and a logarithmic extrapolation of historical trends in the chart below.



Return on Investment

Breakeven Analysis

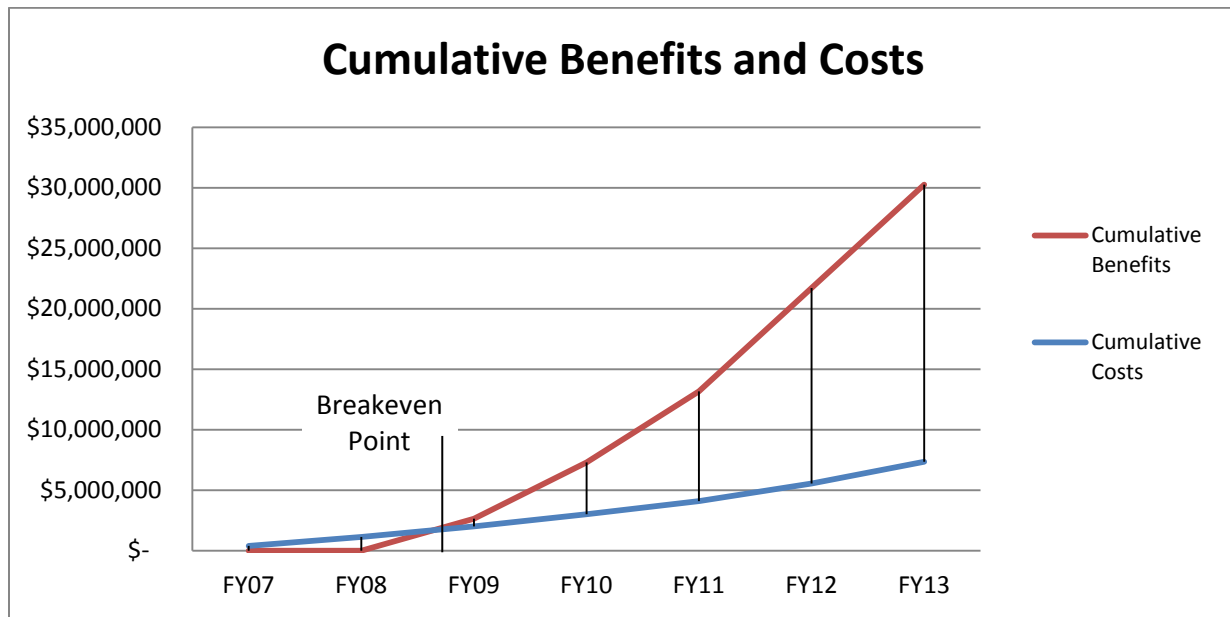
You have to plow, sow, water, and wait before you harvest. This is the case in most endeavors, where up-front costs are offset (hopefully) by future gains. Investments in the Digital Coast

⁸ See, for example, Rolando Polli and Victor Cook, "Validity of the Product Life Cycle," *Journal of Business* (1969), pages 385-400.

⁹ More specifically, future benefits are the sum of a logarithmic regression of benefits associated with time savings; benefits associated with using NOAA infrastructure and avoiding duplication of effort were held constant (no growth projected).

began in FY07, but benefits did not begin to accrue until FY09. Despite this fact, the benefits produced by the Digital Coast in FY09 were greater than cumulative costs since FY07. Thus, the project “broke even” the first year that it became operational. Annual net benefits have grown from about \$2.3 million in FY09 to \$6.7 million annually.¹⁰ Without discounting, the cumulative net benefit from FY07 to FY13 was around \$23 million (2013 price levels).

The trends of cumulative benefits and cumulative costs are presented in the chart below. The differences of the two figures are the cumulative net benefits. The intersection of the two trends is the breakeven point, when cumulative benefits began to exceed cumulative costs.



Net Present Value

A study of historical benefits and costs tells us about the project’s historical performance, but the real questions relate to expected future performance relative to future investments in the Digital Coast. It’s great that past investments have paid off but can we expect the same for planned future expenditures? To address this question, we have to compare projected future benefits and costs.

But before future benefits and costs can be compared, we must determine their “present value,” accounting for the fact that a dollar received today is worth more, in economic terms, than a dollar received in a year, and much more than a dollar received in 10 years. This is true, in part, because people simply prefer to receive benefits sooner rather than later. From a societal

¹⁰ As noted above, only efficiency gains were monetized; the benefits associated with increased effectiveness in coastal and ocean management were not monetized, although they are likely to be large.

standpoint, it also relates to the fact that a dollar received today can be put to good use, yielding in the future an amount greater than the original investment.

The present value of projected future benefits and costs associated with the Digital Coast is computed using a 7 percent discount rate, according to guidance published by the Office of Management and Budget.¹¹ (For more information on the selection of a discount rate, see Appendix II.) The present values of benefits and costs were computed as follows:

$$\text{Present Value of Benefits}_{\text{year } n} = \text{Benefits} / (1+7\%)^n$$

$$\text{Present Value of Costs}_{\text{year } n} = \text{Costs} / (1+7\%)^n$$

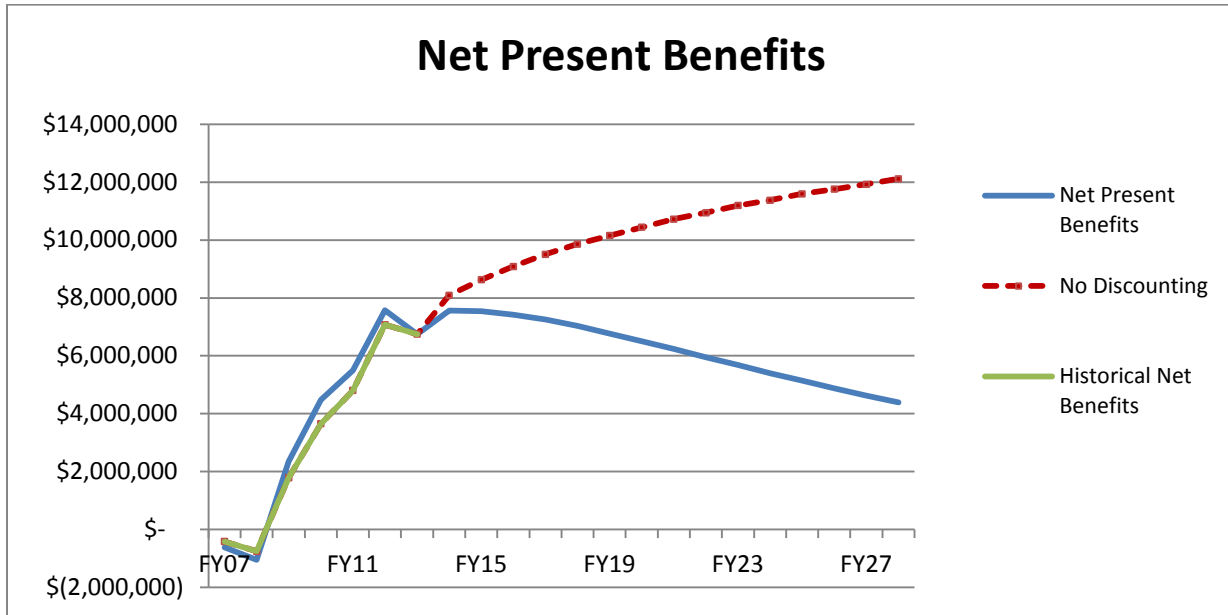
The base year for computations (Year 0) is FY13. For years after 2013, the “n” is positive; for years before 2013, the “n” is negative. The net present value of benefits (NPB) is simply the difference between the cumulative present value of benefits and the cumulative present value of costs.

$$\text{Net Present Value of Benefits} = \text{Present Value of Benefits} - \text{Present Value of Costs}$$

The NPB of the Digital Coast (including sunk benefits and costs) is \$93 million through FY23, \$117 million through FY28, and \$136 million through FY33.

The chart below displays discounted and non-discounted net benefits for the Digital Coast over the next 15 years (through FY28). Annual net benefits without discounting increase over the next 15 years. The present value of those benefits (discounted net benefits) decline after FY14, although they remain strongly positive, remaining above \$4 million annually throughout this period.

¹¹ See Office of Management and Budget, Circular A-94 Revised, October 29, 1992, and annual updates.



Benefit-Cost Ratio

Another commonly used comparison of benefits and costs is the benefit-cost ratio (BCR). Like NPB, BCR is computed using discounted benefits and cost:

$$\text{Benefit-Cost Ratio} = \text{Present Value of Benefits} / \text{Present Value of Costs}$$

Since this ratio is simply the quotient of benefits and costs, a BCR must be greater than one for a project to be worthwhile. The projected BCR of the Digital Coast is 4.96 when evaluated through FY23 (benefits are 4.96 times the amount of costs, or 3.96 times greater than costs, as explained below). Projected BCR of Digital Coast is 5.11 through FY28 and 5.20 through FY33.

Return on Investment

Return on investment (ROI) is very similar to BCR. ROI differs from BCR in two important ways: (1) ROI is normally used for short-term investments (those paying off in one year or less), using undiscounted dollars, and (2) ROI uses the net benefit as the divisor. Because investments in the Digital Coast are being evaluated over a number of years, a “discounted ROI” is being used here (using discounting to express future benefits and costs in terms of their present value):

$$\text{Discounted ROI} = \text{Net Present Value of Benefits} / \text{Present Value of Costs}$$

By substituting the formula for NPB into this equation and comparing it to the BCR computation, it is possible to show algebraically that the ROI will always be one less than the BCR (although ROI is typically expressed as a percentage rather than a ratio). Thus, the 4.96 BCR for the Digital Coast (evaluated through FY23) equates to a discounted ROI of 396 percent. Similarly, the 5.11 BCR equates to a discounted ROI of 411 percent through FY28 and the 5.20 BCR equates to a discounted ROI of 420 through FY33.

	Current	FY23	FY28	FY33
NPB	\$24,979,094	\$92,923,890	\$117,366,937	\$135,979,669
BCR	3.90	4.96	5.11	5.20
ROI	290%	396%	411%	420%

Scenario Analysis

This section describes tests that were performed to show the sensitivity of these results to changes in selected variables. Projected costs were first examined to assess the effects of cost increases exceeding the rates projected in the basic analysis. Then, the effects of accounting for a broader range of benefits were examined.

Assessing Various Cost Scenarios

It should be obvious that cost increases have a negative effect on the economic viability of any project. For this reason, a series of tests was conducted to show how increasing costs affect the various measures of economic return for the Digital Coast. The base scenario reflected a flattening trend in cost increases over time (using a logarithmic regression, as described above). The table below shows the results of continued linear growth in costs over the next 15 years (through FY28), considered at rates ranging from 3 to 30 percent annually. A fixed growth rate of 3 percent is shown in the first column; this growth rate yields results similar to those produced using the flattening logarithmic cost trend. Next, a 15 percent growth rate is shown; this represents the point at which annual costs overtake annual benefits before the end of the study period. Further cost increases further erode the net benefit of the Digital Coast, with a 27 percent annual rate of growth in costs yielding a project of 0 percent ROI and a 30 percent annual rate of growth resulting in negative net benefits.

FY28	3% growth rate	15% growth rate	27% growth rate	30% growth rate
NPB	\$117,128,785	\$86,906,247	\$(518,002)	\$(41,073,830)
BCR	5.07	2.47	1.00	0.78
ROI	407%	147%	0%	-22%
Annual NPB of FY28	\$4,284,066	\$(2,896)	\$(18,199,212)	\$(28,053,671)

Benefit estimates reflected in this study exclude users who were referred to Digital Coast resources from emails, bookmarks, and other websites. Although the benefits to these users were not quantified, they are likely to experience some of the same cost-reduction benefits as other users.

Scenario with Broader Range of Benefits

A number of benefit classes have not been quantified in this analysis. Thus, the various measures of economic return presented in this report greatly understate the full value of the Digital Coast. To show the effects of a more complete measurement of Digital Coast benefits, a test was conducted to include a crude measure of just one additional class of benefits. As mentioned before, only tool visits referred by Digital Coast are included in this analysis—visits of users who were referred to Digital Coast resources from emails, bookmarks, and other websites are excluded.

Even though the Digital Coast does not benefit users referred by others in the precise manner measured in this analysis, it does provide them with a number of benefits:

- The organization of Digital Coast resources in a single website makes it easier to direct others to these resources through emails and messages;
- The thorough metadata and standard formats and projections reduce the amount of time it takes for users to determine the suitability of the data for their application and to incorporate the data into a GIS;
- Tools obtained from the Digital Coast result in time savings for users even if they accessed the tool by an email referral, through a bookmark, or by other means.

This is only a partial list of the benefits to users of Digital Coast resources who did not find those resources by direct use of the Digital Coast (referred users). The broader benefits scenario includes non-referral web stats of visitors who 1) accessed web-based applications and web services; or 2) came from emails, bookmarks, or websites other than Digital Coast.

Benefits by Type	Usage by Category	Base Analysis		Broader Scenario		
		Used for Work	Used for Other Purpose	Used for Work	Used for Other Purpose	
Efficiency Gains	Data Downloads	Quantified	Not Quantified	Quantified	Not Quantified	
	Data Wizard Visits	Quantified	Not Quantified	Quantified	Not Quantified	
	Tool Downloads	Quantified	Not Quantified	Quantified	Not Quantified	
	Web-based Tools Visits	Accessed Via Digital Coast	Quantified	Not Quantified	Quantified	Not Quantified
		Accessed Via other means	Not Quantified	Not Quantified	Quantified	Not Quantified
	Web Services Visits	Accessed Via Digital Coast	Quantified	Not Quantified	Quantified	Not Quantified
		Accessed Via other means	Not Quantified	Not Quantified	Quantified	Not Quantified
	Leveraging the Infrastructure	Quantified	Not Quantified	Quantified	Not Quantified	
	Avoiding Duplicate Efforts	Quantified	Not Quantified	Quantified	Not Quantified	
	Effectiveness Gains	All Usage	Not Quantified	Not Quantified	Not Quantified	Not Quantified

Applying the benefit per use figures to these users yields an ROI of 2,273 percent evaluated through FY28 (see the table below).

	Current	FY23	FY28	FY33
NPB	\$102,378,170	\$500,358,792	\$648,603,104	\$762,634,902
BCR	12.88	22.34	23.73	24.56
ROI	1,188%	2,134%	2,273%	2,356%

Scenario tests were not conducted to include approximations for the full range of benefits produced by the Digital Coast. Benefits that have not been quantified in the analysis or sensitivity tests include the value of Digital Coast resources used by students or individuals (not in a work setting) and, most importantly, the improvement that Digital Coast resources make in coastal and ocean management outcomes. Although the latter is the primary reason for creating the Digital Coast, quantification of benefits associated with improved future ecosystem services, reduced future flood losses, improved quality of life in coastal areas, more resilient coastal development, and so forth, would be a monumental task. It would require the estimation of future scenarios for ecosystems, coastal development, quality of life, etc., the attribution of some portion of the change to the use of Digital Coast resources, and the monetization of a wide range of dissimilar market and nonmarket goods and services.

Furthermore, the analysis that has been conducted is sufficient to address the question at hand: is it worthwhile to continue on the present investment path for the Digital Coast? The subset of benefits that can be assessed with relative confidence greatly exceeds anticipated future costs. This outcome was expected, since the cost of the Digital Coast thus far has been much smaller than the high values of its contents, and users would not easily find and use these contents without the Digital Coast. Governments and agencies create many millions of dollars in products, such as data, tools, training, and other resources. Yet “the economic value of new data and information is effectively zero until the information is used productively in an application that actually brings economic benefit to an end user.”¹² A little extra expenditure on a website platform can move benefits from zero (not used) to a much higher figure.

¹² Williamson, Ray A., Henry R. Hertzfeld, and Joseph Cordes. 2002. "The Socio-Economic Value of Improved Weather and Climate Information." Washington, DC: Space Policy Institute, George Washington University.

Case Studies

The following case studies were obtained from survey responses and other user feedback and are provided to illustrate the nature and general magnitude of benefits provided by the Digital Coast to its users.

Digital Coast resources were used to assess energy infrastructure in metropolitan areas. The Office of Electricity Delivery and Energy Reliability, U.S. Department of Energy (DOE), released a report in September 2014 on the “Effect of Sea Level Rise on Energy Infrastructure in Four Major Metropolitan Areas.” An important part of this study was the development of coastline delineations that reflect alternative sea level rise scenarios. Their initial estimate of the labor required to accomplish this task was on the order of about 300 to 400 hours, using National Elevation Data, digital elevation models, and Federal Emergency Management Agency (FEMA) Digital Flood Insurance Rate Map (DFIRM) data sets. This effort required the development of methods to apply alternative sea level rise scenarios in a uniform way across multiple regions, methods that are greatly dependent on the nature of the data that are available.

As they searched for resources, DOE staff members found on the Digital Coast the Sea Level Rise and Coastal Flooding Impacts Viewer and sea level rise data. These products provided the information that DOE needed, saving them an estimated \$50,000 to develop their own data and tool. They also were able to use the NOAA historical tidal data series to assess variations in sea level rise in different areas and to use these variations to develop localized assessments of sea level rise. The DOE reported improvements in both service delivery and accuracy resulting from the use of Digital Coast.

The goal of the DOE study is to show how energy infrastructure is exposed to inundation from sea level rise and how, even when not inundated, energy facilities can be isolated by sea level rise. Their approach demonstrates that there is sufficient information available for others to undertake similar studies, at reasonable cost, to assess impacts on other infrastructure. This pilot study provided proof of concept and that the approach can be expanded to other locations and the entire coastline.

“Our accuracy was improved by being able to represent the variations in sea level and trends in sea level rise using state-of-the-art information.”

Federal government agency used Digital Coast resources to support U.S. Senate. The National Hurricane Center (NHC) is using digital elevation models that support the Digital Coast’s Sea Level Rise Viewer to produce their own surge mapping graphics. One such graphic, the new Potential Storm Surge Flooding map that the NHC has used since the 2014 hurricane season, is getting a lot of attention. In response to an inquiry from a U.S. Senate appropriations staff member, NHC responded with links to the tip sheets provided by the Digital Coast and Eastern Research Group. The tip sheets are created specifically for the media and emergency managers.

“The Digital Coast products and services saved NHC much time and effort, and help to ensure a consistent message on risk communication.”

State of Minnesota used Digital Coast resources for coastal management planning. Staff members of the State of Minnesota report that they start each new project with research into

the Digital Coast to identify the resources they need for the project—for comprehensive planning, zoning, and supporting of ocean special area management plan development for Minnesota’s coast. Following is a sampling of the Digital Coast resources they’ve used:

- Minnesota worked with Digital Coast to prioritize the collection of bathymetric lidar data, resulting in the acquisition of data for Minnesota’s entire Lake Superior coast, which was then provided to the Minnesota Department of Natural Resources (DNR).
- Coastal Change Analysis Program (C-CAP) data have been added to the GIS library of Minnesota DNR for use in classifying land cover for the Lake Superior watershed.
- The CanVis visualization tool, Coastal County Snapshots, Habitat Priority Planner, Impervious Surface Analysis Tool (ISAT), and open-source version of the Nonpoint Source Pollution and Erosion Comparison Tool (OpenNSPECT) are also being used to help state coastal programs complete Section 309 assessment.

“Digital Coast plays an essential role in informing multiple levels of government and decision making in Minnesota Coastal Management.”

Lidar data from the Digital Coast are used in a local government’s GIS projects. Lidar digital elevation model data provided by the Digital Coast are used to support GIS projects in Torrington, Connecticut. The GIS manager expressed that the Digital Coast products, such as the large imagery and elevation data sets, are invaluable for small cities, since they have no other access to comprehensive elevation data sets. The public works director and a contractor in Torrington are now working with the state to assess the Digital Coast for additional projects.

“The Digital Coast fills a need for ‘small GIS shops’ like Torrington, who have a small staff (one), a bit of knowledge, a bit of software, a project in mind, and little funding for data.”

Private sector used Digital Coast resources for consulting work on hazards and risks. The Digital Coast data on emergency management, community resilience, the coastal economy, and coastal hazards are used by a New Jersey engineer, a member of the Association of State Floodplain Managers, on projects that include a pier safety and regulatory compliance study for the City of Hoboken, post-Sandy resilience planning for the City of Hoboken, a risk assessment on the property tax base for the Borough of Tuckerton, and a hazard mitigation plan for County of Union.

“Without the Digital Coast resources, the consultant would have to conduct lower quality work without suitable resources.”

Potential Future Studies

This study assessed the full cost of the Digital Coast, comparing those costs to the subset of benefits about which we are most confident. The total benefits of the Digital Coast are greater than those that were quantified in this study, and probably much greater. Future studies will lead to a more complete quantification of benefits by addressing the following limitations of this study:

- Our understanding of the use of web services and offsite products is limited.
- The benefits associated with visits referred by emails, bookmarks, and other websites could be formally quantified using surveys.

- Results from web stats and the NSGIC survey differ regarding the relative use of data and tools. Survey responses indicate that data use is greater than tool use, but web stats indicate that downloads of tools are five times more than data. A likely explanation is that data that are downloaded are used multiple times. Surveys could shed light on this and allow the inclusion of benefits for repeated use of Digital Coast resources.
- We do not currently quantify the benefits to students and individuals. Surveys targeting these users could give more insights on how to measure the benefits that accrue to them.
- Future survey questions could be designed to learn more about the coastal management outcomes that are affected by the use of Digital Coast resources. To incorporate this information into the benefit assessment, however, would require both an estimate of the degree of improvement associated with coastal management actions and the portion of this improvement attributable to the use of the Digital Coast.

Appendix I. Survey Results Summary Report

2014 Survey of Digital Coast Users

In the fall of 2014, the National States Geographic Information Council (NSGIC) conducted a web-based survey¹³ of Digital Coast users, yielding 351 total responses. The final results were completed in October 2014 and assessed for the Digital Coast return on investment study. The responses to the survey provide a wealth of information about the users, the time-savings associated with the use of Digital Coast resources, and the nature of the work in which they are using those resources.

The results of this survey, summarized in the following sections of this report, were provided to NOAA for use in assessing the benefits attributable to the use of Digital Coast resources. Survey results were used in three ways. First, information about the occupation of the users and the sector in which they work (e.g., local government vs. private sector) were used in conjunction with wage data from the Bureau of Labor Statistics to estimate the hourly labor cost associated with Digital Coast users.

Second, responses to questions about the time-savings associated with the use of Digital Coast resources were used with the hourly labor cost estimates developed from survey responses to estimate the value of time saved through the use of Digital Coast resources.

Finally, information on the nature of the work being performed using Digital Coast resources was used to learn about the coastal management outcomes that are influenced through the use of Digital Coast resources. Information from this part of the survey is the source of many of the quotes and case studies cited in the main report.

Profile of Digital Coast Users

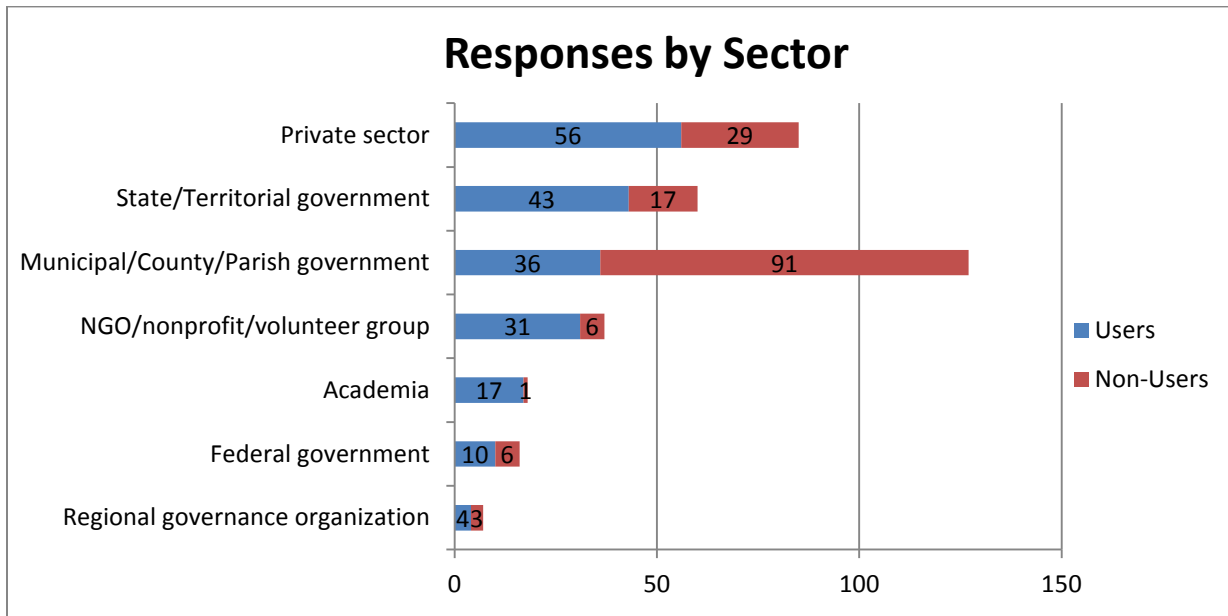
A little more than half of the respondents to the NSGIC survey (56 percent) indicated that they have used data, tools, and other resources from the Digital Coast (197 responses). Statistics computed for use in the benefit assessment focused on users of the Digital Coast resources. The large number of responses from non-users is an indication of the credibility and influence of NSGIC and other Digital Coast partner organizations among their members. Further surveys of non-users could provide valuable insights to guide future expansion of Digital Coast content, targeting the needs of important segments of non-users.

Economic Sector of Employment

Respondents to the NSGIC survey indicated the economic sector that they work in. Federal, regional, or state government workers accounted for 29 percent of the 197 users of Digital Coast resources. Private sector workers accounted for another 29 percent of the users. The remainder work for municipal, county, or parish governments, nonprofit organizations, or in academia.

¹³ Using SurveyMonkey (www.surveymonkey.com)

Survey respondents who indicated that they do not use Digital Coast resources present a strikingly different distribution across these sectors. Three of every five “non-users” work for municipal, county, or parish government. Another 20 percent work in the private sector. State government accounts for only 10 percent of non-users, with the remainder distributed across the remaining categories.



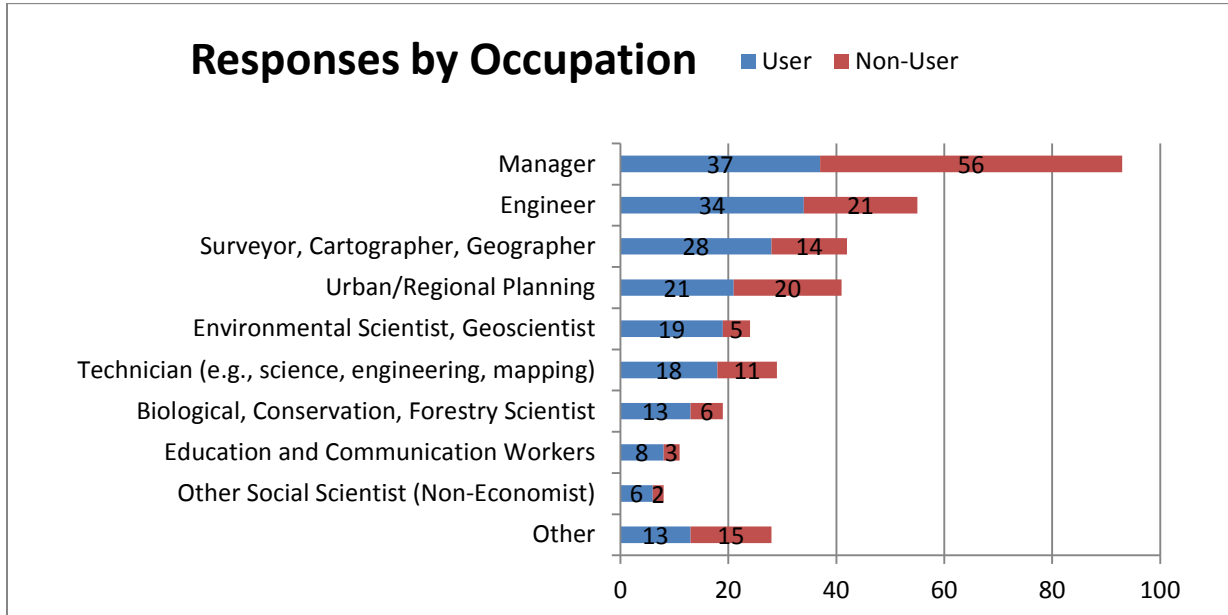
Occupation

The occupational classes that appear in the NSGIC survey are based on those used by the Bureau of Labor Statistics (BLS) to report wages by occupational class.¹⁴ To simplify the survey, classes were aggregated when they were somewhat similar and, more importantly, when the average wages were the same among the classes being aggregated. This allowed us to use survey responses to estimate the value of time savings, based on the wages of the workers whose time was being saved.

Surprisingly, managers constituted the largest class among both users and non-users of Digital Coast resources, at 19 percent and 37 percent, respectively. Engineers were the second most common class of users and non-users, at 17 percent and 14 percent, respectively. Surveyors, cartographers, and geographers accounted for another 14 percent of users (9 percent of non-users), followed by planners (11 percent of users and 13 percent of non-users).

¹⁴ Occupational Employment Statistics (OES), Bureau of Labor Statistics (see www.bls.gov/oes/current/oes_nat.htm); since all values in this report reflect 2013 price levels, 2013 OES wages were used in the analysis.

In this study, the weighted average of the wages reported by BLS was used to estimate the value of time savings attributable to the use of Digital Coast resources (weighted by the number of responses in each occupational class).



Professional Affiliation

Respondents to the NSGIC survey indicated membership in 49 professional organizations, including but not limited to the following:

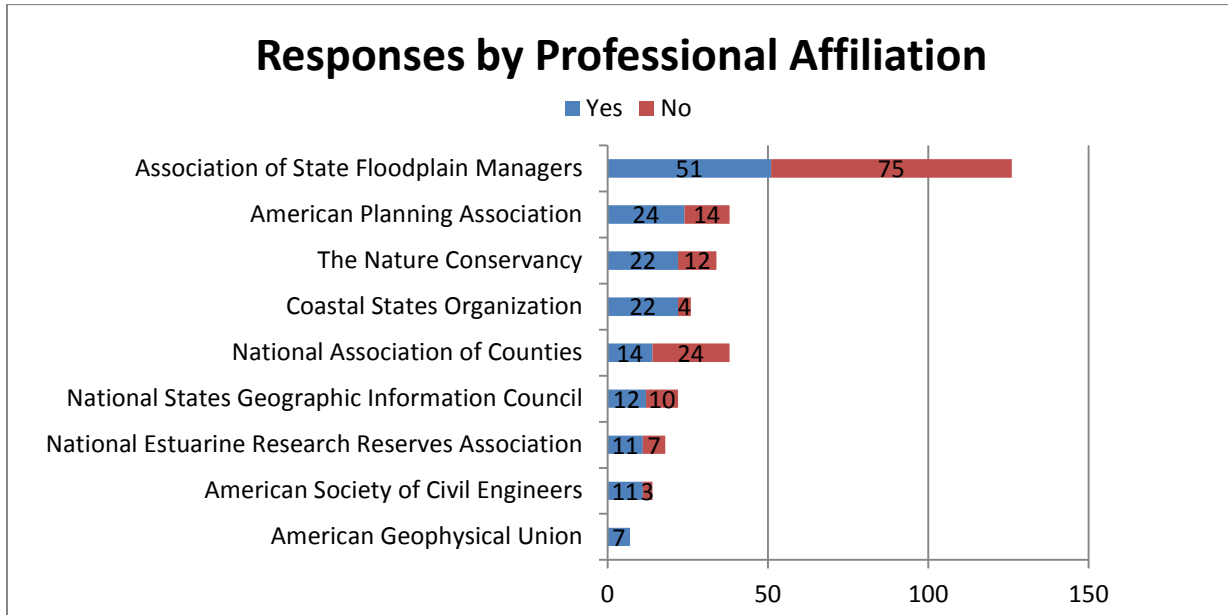
- Association of State Floodplain Managers
- American Planning Association
- The Nature Conservancy
- Coastal States Organization
- National Association of Counties
- National States Geographic Information Council
- National Estuarine Research Reserve Association
- American Society of Civil Engineers
- American Geophysical Union

Most indicated membership in two or more of these organizations.

A large number of respondents who indicated that they use Digital Coast resources were member of the Association of State Floodplain Managers, accounting for 26 percent of the 197 users. This organization also accounted for the largest single block of non-users of Digital Coast resources.

Just over 10 percent of the users indicated membership in each of the following organizations: American Planning Association, The Nature Conservancy, and Coastal States Organization.

Since the NSGSIC survey was voluntary and does not represent a random sample of the membership of these organizations, the proportion of respondents reporting that they do not use Digital Coast resources (quite high with ASFPM) is probably an indicator of the membership’s favorable attitude towards NSGIC and the Digital Coast.



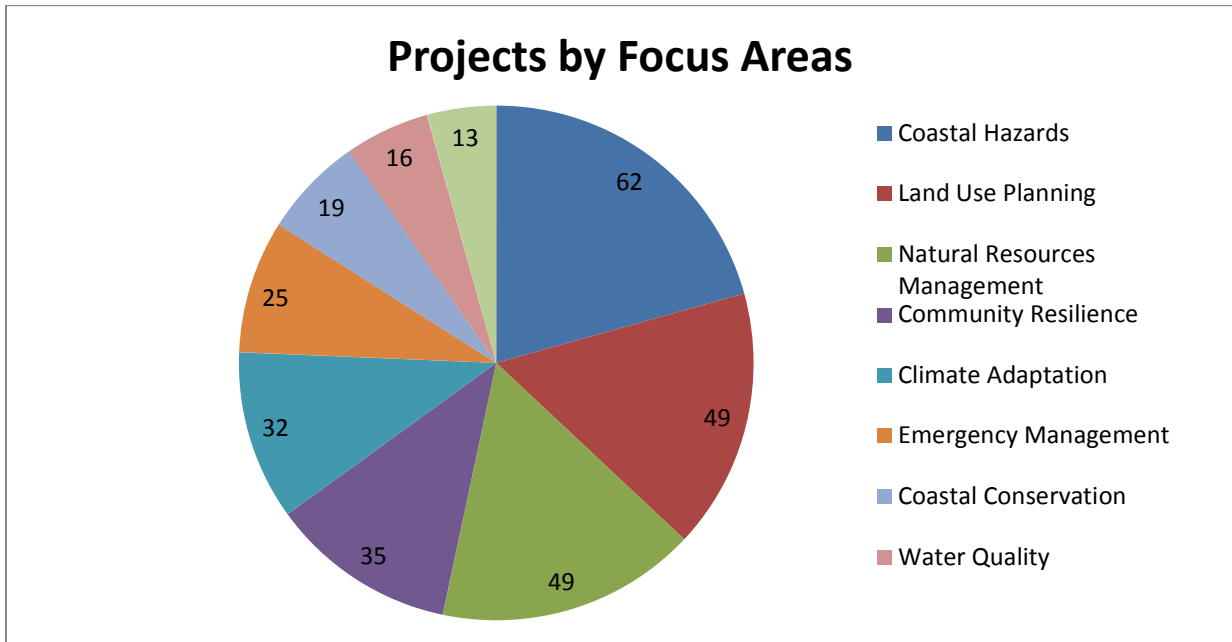
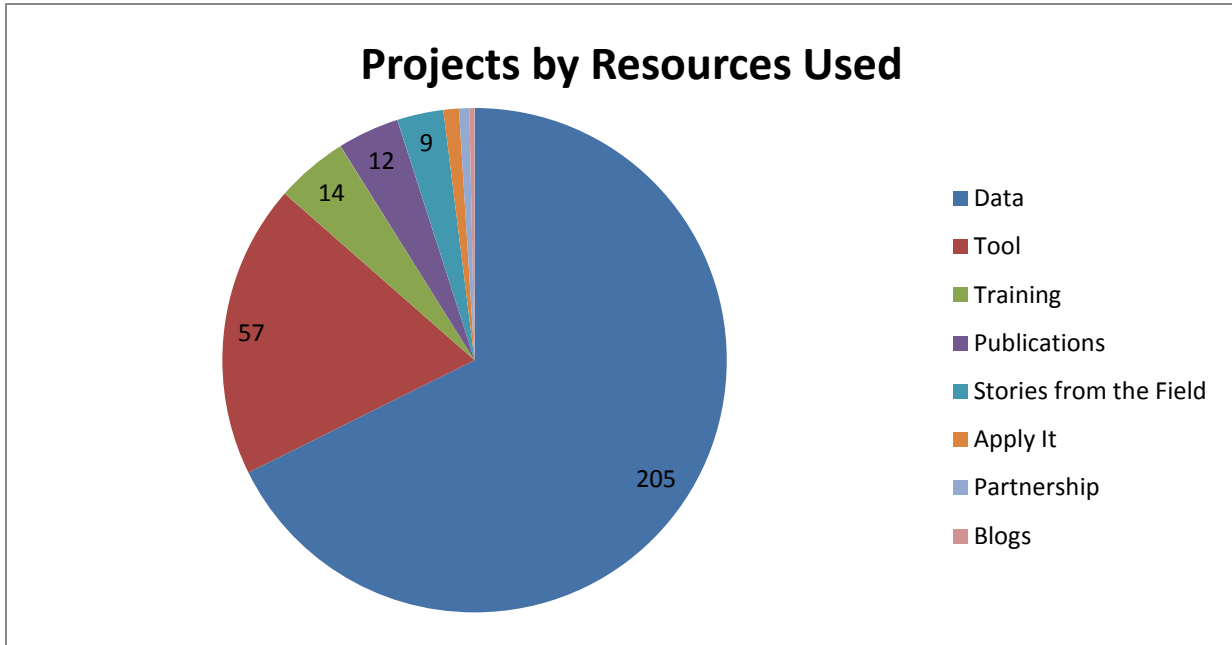
Profiles of Projects

The 197 respondents who indicated that they use Digital Coast resources reported that they used these resources in more than 300 projects. They reported using a wide range of Digital Coast resources: data, tools, Apply It, publications, stories from the field, training, partnerships, and blogs. In more than 200 of these projects, data obtained from the Digital Coast were cited as a major resource. Digital Coast tools were cited as a major resource for another 57 projects, with the remaining projects citing use of other products and services provided by the Digital Coast.

The implementation of the projects that used the products and services from Digital Coast brings tremendous economic and environmental benefits to the nation. The projects reported to the survey address ten different kinds of coastal issues:

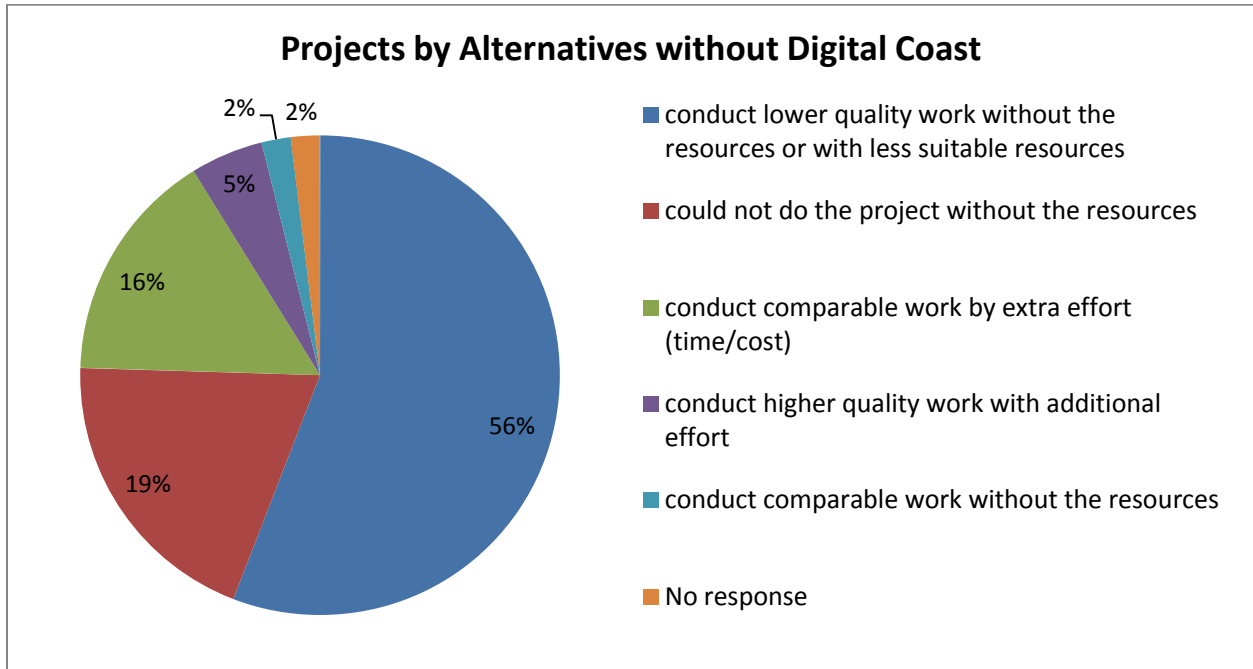
- climate adaptation
- coastal conservation
- coastal economic development
- coastal hazard mitigation
- community resilience
- emergency management
- land use planning
- natural resources management
- ocean planning
- water quality management

The majority of the projects focus on coastal hazard mitigation, land use planning, and natural resources management; these focus areas account for about 52 percent of the 306 projects.



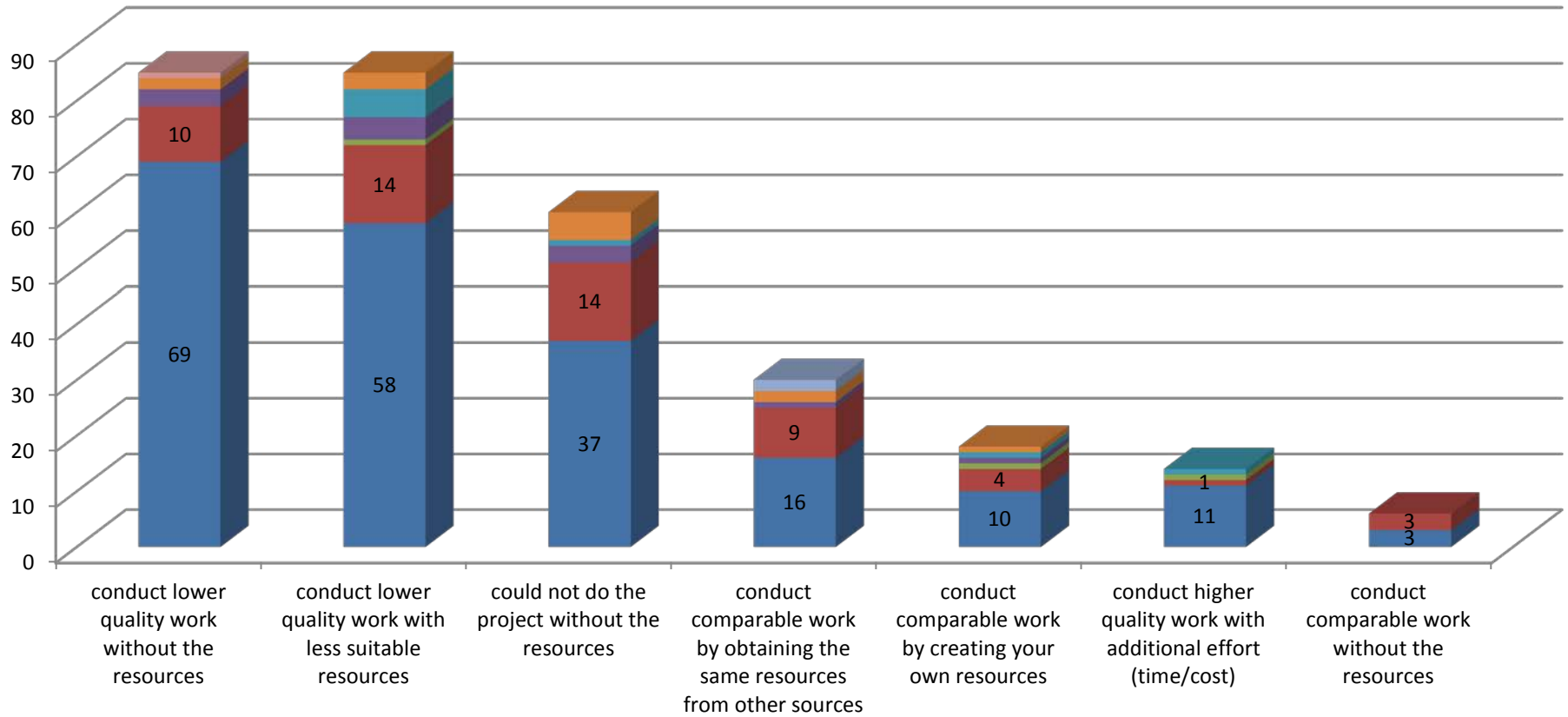
Alternatives without Digital Coast

Respondents indicated that, without the Digital Coast, the quality of 171 of the 306 projects (58 percent) would be reduced. Another 60 projects (20 percent) could not have been conducted at all. Respondents indicated that another 48 projects (16 percent) could maintain their current quality, but at a higher costs. Although the value of these benefits of the Digital Coast were not quantified in this study, these figures serve as strong indicators of the value that Digital Coast resources bring to the coastal management applications that use them.



Projects by Alternatives without Digital Coast

■ Data
 ■ Tool
 ■ Apply It
 ■ Publications
 ■ Stories from the Field
 ■ Training
 ■ Partnership
 ■ Blogs



The following is a sample of comments provided by users of the Digital Coast, describing its importance to their work. *All comments are direct quotes.*

General Descriptions of the Digital Coast

One-Stop Shopping: well put together suite, one-stop, great hub, all in one place, comprehensive.

Starting Point: best place to start, first stop for anything, great starting point

Great Source:

- current, up-to-date, free, educational, informative, important, and evaluative resource
- broad selection of tools and data, a variety of info, advances in the field, new concepts
- fantastic resource to contact other folks that could help you with your project

Ready for Use:

- easy to navigate, well-designed, great job of presenting a lot of complex information in a clearly organized manner, explain things in simple, concise straight forward terms
- convenient database, ready for use, use data and resources on the fly to address immediate issues
- allow performing everyday operations on the roads
- Helps relate the data in an accurate, proper manner

Authoritative:

- reliable source of data for planning purposes
- data provided by NOAA, the national, authoritative source, credible
- elected officials language make the information immediately captivating

Shareable:

- incorporated or used by regional ocean partnerships data portals
- helps our members get access to tools that they need
- enable us to refer the public to it and when more familiar with the concepts the public would be more willing to accept our projects
- helps to explain concepts to students and inform their decision making in the future

Kudos to Specific Products and Services

Data

- We primarily use the LiDAR data server. It is fast and easy to use. The availability of multiple years of data is particularly useful to us.
- We here at the University of South Florida use the LiDAR data available on the website every day. Hundreds of student and research projects use this site for their data.
- Using the Coastal LiDAR benefited our client identify unstable areas, unmapped roads/skid trails & unmapped watercourses. This allowed us to help enhance the active management of the SRL landholdings along our coast.

- I am using the resources to describe the demographics of the WA Coastal population in a grant application of affected people. I have used it to describe the economy of Grays Harbor County in WA State

Tools

- Canvis helps us to demonstrate the reality of coastal impacts due to sea level rise
- Our other clients have benefited is the use of one of your tools CANVIS. We can show them what the impacts of a project may look like before anything takes place.
- Always love the tools to explain concepts like sea level rise - especially the interactive mapping tools
- I use the SLR viewer in many applications, including a communicating climate change course and in SLR workshops.

Web Services

- My applications use DC data without having to sign on to the website through map services.
- We primarily use the LiDAR data server. It is fast and easy to use. The availability of multiple years of data is particularly useful to us.

Trainings, Stories From the Field, and Apply Its

- Stories from the Field show real world applications, real life example to share with my local leaders and constituents.
- Trainings improve awareness and understanding of existing data/tools
- Stories From the Field help to explain to professionals in my field, local government clients /residents, and stakeholders/important executives
- Trainings broadened and refreshed my skill set
- These resources are very useful resource for understanding the types of datasets supplied

Blogs, Videos, Publications

- Econ 120 YouTube videos are great for non-economists.
- Citing an economic report saves time by making my guidebook I was writing one chapter shorter.
- The blogs and publication provide valuable background information as well as on appropriate techniques and method used in data processing along the coast
- There have been many useful blog entries. I have used the blogs and training to better understand what data sets are available
- Blogs and training helps a lot, stories always gives some insight that might not otherwise be apparent.
- The blogs have helped explain information to hundreds of students.

Partnership

- I would imagine Digital Coast Partnership would involve the dissemination of those tools and data to at least hundreds, more likely thousands, of professional users across the country.

Suggestions for Improving the Digital Coast

Website Design

- Maybe a simpler, phone based application for field work.
- For the homepage, I'd suggest making the About Page more visible on the top toolbar.
- Make finding and obtaining digital data for a project area easier. Be clear about the horizontal and vertical datum the data conforms to. Provide an on-line tool to convert the datum of a data set prior to downloading.
- The ability to SHARE an individual dataset via social media would be useful.
- Clear Datum pre downloads view
- In the Enter Location box, you can only input the Latitude and Longitude in Degrees, Degrees. It will be nice to be able to input degrees, minutes, and seconds.

Content

- It would be a great service to deploy a geocommons approach to sharing coastal management projects. As a State Coastal Program we are often challenged with ways to share Coastal Management Act funded projects in an efficient manner.
- Highlighting other sources of information that users may want to explore for particular states or regions if not linked to Digital Coast (for example, "Cal Adapt" in California)
- It's not clear how Digital Coast fits together with National Geoplatform, Data.gov, and other regional or thematic portals.
- Many times these tools are national or regional in scale and having local scale products is very useful.

Web Services

- Keep adding to the coastal and ocean map services; tile caching data to speed up access; improving the navigation to find map services. It would be nice to know where the Digital Coast services are being used right now in other applications so I could go to those websites for additional information beyond DC. Making some of the databases accessible via API.

Currency of Content

- The Apply it section of the website has some good information but seems clunky and dated.
- Some Data sets are old and need updated, i.e., Critical Facilities Data set of 2001.
- Keep the Data and Datum updated. Show active survey of flood prone areas as it is occurring.
- Updated data sets on a regular basis (IE bathymetry, photos)
- Provide the latest Lidar data for Houston, Texas area. Update old LIDAR data with recent airborne LIDAR.

Expand the Range of Products and Services

- More Great Lakes datasets/resources/case studies, and ocean coastline resources
- Expand with new data/tools, especially regard to hazard mitigation and climate adaptation planning

- Maybe work with USGS to partner up with their DSAS (Digital Shoreline Analysis System) to show your collection of National Vector Shorelines and create an easy database for folks to download to showcase the movement of shorelines along US Coasts.
- ...more high resolution imagery and [high resolution?] land use mapping products made available for coastal counties.
- Working with Coast Survey and making the nautical chart data available would be helpful.
- Would be great to have more REST services of your data.
- Hopefully find additional resources of Lidar and Aerial photography. Add other remote sensing data.
- Acquire more imagery, at higher resolution, farther inland. It's all about imagery!
- Overcoming the tool learning curve; and perhaps comparing the results to other tools.
- Solid training for users and a good, clear manual that can be downloaded would be great tools for getting the most out of this technology.
- Keep offering the three day trainings, which have been invaluable.

Comments from Users Who Indicate that the Digital Coast Does Not Save Them Time

- Digital Coast is one resource not the answer.
- NOAA is not the answer to local governmental needs. Understand that the diverse needs of the coastal areas of this country are limited to reacting to a crisis or a funding opportunity.
- Unfortunately, my state does not have the software necessary to utilize digital data.
- For the most part the DC tools save users time. The challenges that may require added time may include understanding the data and its limitations.
- Digital coast web maps were useful in introducing local officials to on-line resources and describing availability of data. My primary use is as a source of data. To that end, the ftp site is the best resource. Frankly, it is much more efficient for me to bypass any web-based interface whenever possible (they just get in the way). Once I found out where data is stored, it was more useful for me to go to ftp sites. I strongly encourage you to maintain and refine these services since they are an important service for people doing serious work.
- What we are finding, though, is that there are many other online resources showing similar data, sometimes with more accuracy (data determined by other methods) I have in the past recommended colleagues, yet with several other online options it's become more rare. We've done future conditions analysis with SLR then compared our results to the Digital Coast SLR data. This comparison is to help communities understand the limitations of the data. (sorry)
- We are reviewing and coordinating with FEMA their DFIRM digital products for the coastal and inland county-wide studies in New Jersey for 18 of the 21 counties at the NJDEP. This information has been incorporated into the new FEMA Coastal studies viewable using Arc GIS. We do not use NOAA Digital Coastal resources and its data alone has not reached New Jersey.

Website Issues

- There's one disconnect between the elevation data in the data access viewer and what is (or isn't) listed on the web page selection. I've often found elevation data is listed inconsistently. A review of all data should be done to ensure that data available from web viewer is consistent with main page search.
- One resource that I was referring to did not have a date on which it was last updated. It would be helpful to have that information.

In Their Own Words: Use Cases Described by Users

Federal Government Agencies

- Digital Coast benefits NERR projects at the scoping stage
 - Professional Occupation: Biological, Conservation, Forestry Scientist
 - Professional Organization: NERRs

Project Focus Area	Resources Used	Alternatives without Digital Coast
Climate Adaptation	Tool	conduct comparable work by obtaining the same resources from other sources
Climate Adaptation	Training	conduct lower quality work with less suitable resources

“Digital Coast is tremendously helpful during the scoping for climate adaptation work being conducted at the Tijuana River National Estuarine Research Reserve System. Our stakeholders have benefited from these resources, particularly the Climate Adaptation for Coastal Communities training. It's hard to tell whether they save me time per say but they do help make the process of climate adaptation more focused and informed which may save time but is hard to quantify.”

- Department of Defense Collaborating with Digital Coast on data development

“GIS experts of Department of Defense were able to link Digital Coast into DoD's mapping database. Hopefully we are able to save the government some money and resources. Digital Coast is being used by DoD in the initial SLR assessment phase. The two offices are currently working on a pilot sea level rise study and the navy bases use the mapping resource to report data back to the Digital Coast. Nice collaboration all around.”

State and Regional Government

- Data used for Rhode Island coastal vulnerability assessment
 - Professional Occupation: Surveyor, Cartographer, Geographer
 - Professional Organization: NSGIC, URISA

Project Focus Area	Resources Used	Alternatives without Digital Coast
Climate Adaptation	Data	conduct comparable work by creating your own resources

“The State of Rhode Island, Statewide Planning Program utilized NOAA's Sea Level Rise scenarios raster dataset as the primary data source for a report (currently in draft form) entitled "Vulnerability of Transportation Assets to Sea Level Rise."

“This study analyzes the transportation assets at risk under 1, 3, and 5 feet of sea level rise. Using a GIS-based methodology, the project finds that XX miles of roadway are expected to flood at high tide under 1 foot of sea level rise, up to XX miles at 5 feet of sea level rise. In addition, numerous coastal bridges, rail segments, bike infrastructure, ports and harbors, and RIPTA routes will flood in these three sea level rise scenarios, along with portions of an airport and intermodal hubs.”

- Data are used to describe Washington population and economy
 - Professional Occupation: Education and Communication Worker
 - Professional Organization: ASFM

Project Focus Area	Resources Used	Alternatives without Digital Coast
Coastal Hazards	Tool	conduct comparable work without the resources
Community Resilience	Data	conduct lower quality work with less suitable resources
Coastal Economy	Data	conduct lower quality work with less suitable resources

“Climate Change Communication course is using the Digital Coast SLR viewer to visualize impacts, and a proposal to fund community resilience efforts was created using coastal economy and population data. I am also using the resources to describe the demographics of the WA Coastal population in a grant application of affected people. I have used it to describe the economy of Grays Harbor County in WA State. I also use the SLR viewer in many applications, including a communicating climate change course and in SLR workshops.”

- Accurate data save the time and efforts for California engineers
 - Professional Occupation: Engineer
 - Professional Organization: ASFM, ASCE

Project Focus Area	Resources Used	Alternatives without Digital Coast
Land Use Planning	Data	conduct lower quality work without the resources
Water Quality	Stories from the Field	conduct lower quality work with less suitable resources
Natural Resources Management	Data	conduct comparable work without the resources

“Digital Coast makes outlining and illustrating a watershed very easy and 100 times more accurately than using those old topo maps, they save me a ton of time. I could not imagine going back and doing a watershed with a plain-meter. I last used it to do a watershed and hydrologic study for a bridge along the 101 freeway. I am a state bridge engineer and I do this activity often for many bridges along the California coast.”

- Web services used by GIS specialist to access to data easier
 - Professional Occupation: Surveyor, Cartographer, Geographer
 - Professional Organization: NSGIC, TNC

Project Focus Area	Resources Used	Alternatives without Digital Coast
Ocean Planning	Data	conduct comparable work by creating your own resources

“Even though I don’t use the Digital Coast to find data directly, I do believe that the DC efforts to improve documentation, searchability, and access throughout the whole geospatial community has greatly improved the GIS data for coastal and ocean datasets of the US. It does this by helping the entire community improve access to high quality data for decision making. My applications can use DC data without having to sign on to the website through map services. ”

- Partnership and training helped Delaware to improve staff skills
 - Professional Occupation: Engineer
 - Professional Organization: CSO, NERRs

Project Focus Area	Resources Used	Alternatives without Digital Coast
Coastal Hazards	Training	conduct lower quality work with less suitable resources

Community Resilience	Data	conduct lower quality work without the resources
Community Resilience	Tool	conduct lower quality work without the resources

"The projects benefited by Digital Coast resources includes: Delaware Sea Level Rise Scenarios, Delaware Sea Level Rise Vulnerability Assessment, and State of Delaware Sea Level Rise Adaptation Plan.

"Delaware has benefited in many ways through our close partnership with the Office for Coastal Management and participation in the Digital Coast. We have provided examples and pilot projects that have been published on Digital Coast. This has helped us refine and disseminate our message. We often send people to Digital Coast as first step to find data or understand coastal issues. We benefit tremendously from the training offered. Inundation Mapping, Process Development, Negotiating are just some of the courses we have brought to Delaware to train not only our staff but interested parties from other agencies and local gov'ts."

- SLR viewer data are downloaded by different states and organizations

Here are several examples of the states and organizations which have been downloading and using our SLR viewer data.

- California: CSLR rest services were requested by CA PRBO Conservation Science; SLR layers and VDATUM Grid for SF Bay were requested by Brian Fulfroost and Associates; SLR layers for CA were requested by National Park Service.
- Delaware: SLR data for Wilmington were requested by City of Wilmington, DE.
- Florida: SLR data for Tampa were requested by NOAA NMFS Southeast Regional Office; All SLR data for FL were requested by US Fish and Wildlife; SLR Inundation layers for FL were requested by Florida Museum of Natural History.
- Louisiana: Coastal Flood Threshold layers for Louisiana WFO's were shared with Jonathan Brazell with NOAA NWS.
- Massachusetts: SLR Inundation and confidence layers for Great Marsh region, and the towns of Scituate, Marshfield, and Duxbury were developed for local group to use in a workshop on the topic of MA Office of Coastal Zone Management; SLR layers for MA were requested by Town of Marshfield.
- Mississippi: Links to the SLR and confidence layers for MS were provided to AMEC/Sea Grant Funded Project; SLR data for MS were requested by Criterion Planners.
- New York: Data as SHPS from SLR Viewer were provided to NYC Parks; SLR Data and digital elevation models (DEMs) are requested by Climate Central at New York.
- New Jersey: HTDATA for SLR, SOVI, and FI Freq, Marsh, and confidence data for NJDEPA were requested by University of MD Center for Environmental Science, Appalachian.
- Trust for Public Land: SLR inundation layers were provided to the Trust for Public Land for NJ and Puget Sound, WA.
- National Park Service: SLR DEMs for FL, PR, VI were requested.

- North Carolina State University: SLR Inundation layers for East Coast and Caribbean were requested
- Climate Central: SLR DEMs for NJ, DE, PA, MD were requested.
- AECOM for NEC futures project: SLR data and DEMs for Northeast Corridor were requested for states of MD, DE, PA, NJ, NY, CT, RI, and D.C.

Municipal/County/Parish government

- Free resources enable small town to do GIS analysis in Connecticut
 Torrington manager of GIS thanks for useful LIDAR DEM data: “Torrington’s public works director and a contractor worked with the state to assess the site for potential use. The Digital Coast products used were invaluable for a small city like Torrington. Without products like these, we have little access to updated elevation data. Large imagery and elevation datasets are priceless to “small GIS shops” like Torrington. You fill a need for those of us who have a small staff (one), a bit of knowledge, a bit of software, a project in mind, and little funding for data.”
- Digital Coast benefits everyday operation for North Carolina emergency manager
 - Professional Occupation: Manager
 - Professional Organization: North Carolina Emergency Management association

Project Focus Area	Resources Used	Alternatives without Digital Coast
Emergency Management	Data	conduct comparable work by creating your own resources
Land Use Planning	Tool	conduct comparable work by obtaining the same resources from other sources
Coastal Economy	Data	conduct lower quality work with less suitable resources

“Digital Coast benefits my performing on every day operations, dealing with Hazard Mitigation and Coordinating with our planning folks on roads for emergency vehicle access.”

- LIDAR data support assessing land value in Pinellas County, Florida
 “As reported in the St. Petersburg Tribune, the Pinellas County property appraiser’s office is meticulously reviewing data collected across the Tampa Bay area several years ago with airborne LIDAR sensors. Examining each home or office building to estimate its elevation over flood levels should make it easier to analyze how insurance costs might affect future land values. It also could be useful for challenging the Federal Emergency Management Agency’s controversial flood maps, which have a big effect on rates.”
- Digital Coast is mentioned on Florida County Infrastructure Planning

The Miami-Dade county commission passed a resolution requiring that SLR be considered in future infrastructure projects. NOAA and Digital Coast are mentioned in the memorandum of county infrastructure projects planning.

Non-Profit Groups

- Data used by NGO to advocate for ocean recreation activities

“The Surfrider Foundation believes that the ocean recreation enthusiasts comprise an important stakeholder group for ocean planning. To advocate for the ocean recreation activities, Surfrider Foundation referred the economic data released on the Digital Coast that visitors contribute significantly to the coastal economy, bringing in early 7 Billion dollars annually to the New England region, alone (National Oceanic and Atmospheric Administration. ENOW Data 2010).”
- Resources are used for consulting work on coastal issues
 - Professional Occupation: Biological, Conservation, Forestry Scientist
 - Professional Organization: TNC

Project Focus Area	Resources Used	Alternatives without Digital Coast
Coastal Conservation	Data	conduct lower quality work with less suitable resources
Land Use Planning	Data	conduct lower quality work with less suitable resources
Natural Resources Management	Tool	could not do the project without the resources
Coastal Conservation	Training	could not do the project without the resources

“I have benefited from training classes as well as tutorials of how to Apply It in my daily work to create maps and examples to explain to stakeholders/important executives of how our work is implemented and how it is essential to protecting the coastline. Small case study where I did an example of showing what a living shoreline could look like with reefs and marsh plantings. This was done with Canvis and this is a great example of showing important executives a visual picture of living shorelines. I also have used the National Vector Shorelines to help in analyzing the trend of erosion/accretion along our coastlines.”

- Publications and related information benefits consultant to draft economic report
 - Professional Occupation: Economist
 - Professional Organization: TNC

Project Focus Area	Resources Used	Alternatives without Digital Coast
Coastal Economy	Publications	conduct lower quality work with less suitable resources

“I used a report in a guidebook I was writing – I was able to cite the report and then save time by making my guidebook one chapter shorter.”

Private Sectors

- LIDAR used in maps of outdoor events

“I'm working on integrating DEM into custom orienteering maps, using tools to process the data into contour lines for Untamed New England outdoor events. The topo mapping in the US is so out of date; LIDAR gives us at least a chance to offer something better.”
- Engineer contrast LIDAR data to Land Survey

“We use the LIDAR information extensively for our preliminary site studies. It saves us time and the detailed contour data is invaluable. Prior to having a site surveyed by a professional land surveyor, we often pull up the LIDAR data to get an idea of what the topography is like. It amazing how close it is to a field survey.”
- Consulting works on hazard and risks management
 - Professional Occupation: Engineer
 - Professional Organization: ASFM

Project Focus Area	Resources Used	Alternatives without Digital Coast
Emergency Management	Data	Conduct lower quality work without the resources
Community Resilience	Data	Conduct lower quality work without the resources
Coastal Economy	Data	Conduct lower quality work without the resources
Coastal Hazards	Data	Conduct lower quality work without the resources

“The projects I did with Digital Coast resources include: building on pier safety and regulatory compliance for City of Hoboken, Post-Sandy resiliency planning for City of Hoboken, Risk assessment on property tax base for Borough of Tuckerton, and Hazard Mitigation Plan for County of Union.”

- Save work compares with traditional survey methods
 - Professional Occupation: Surveyor, Cartographer, Geographer

- Professional Organization: NSGIC, ASPRS, ASPS

Project Focus Area	Resources Used	Alternatives without Digital Coast
Coastal Hazards	Data	conduct higher quality work with additional effort (time/cost)

“Multiple Projects over the last 5 years utilized the available LIDAR data for Flood Mapping, Large drainage studies and modeling, educational presentations for Surveyors and GIS Professionals. Blogs and training also help a lot; Stories from the Field always give some insight that might not otherwise be apparent. I used the 2007 FDEM LIDAR dataset for portion of Broward County to define drainage basins, sub basins and stream flows for the west half of Central Broward Drainage District. Mostly rural area but it was extremely helpful and saved us several weeks of field time from doing it by traditional survey methods and we got a more accurate product in the end since this data was available and already met certain standards and accuracy.”

- Digital Coast resources brings coastal community together
 - Professional Occupation: Technician (e.g., science, engineering, mapping)
 - Professional Organization: ASFM, TCS

Project Focus Area	Resources Used	Alternatives without Digital Coast
Emergency Management	Data	Conduct lower quality work without the resources
Community Resilience	Tool	Conduct comparable work by creating your own resources
Coastal Hazards	Data	Could not do the project without the resources

“Typically, I've found these resources to be interesting and useful in bringing the coastal community together. I've found that the efficiency afforded to the community through the presence of Digital Coast is an incredibly valuable benefit. We are lucky to have it at our fingertips.”

Benefits of the ROI Survey

The ROI survey brought unexpected benefits to the Digital Coast. It introduced Digital Coast to more coastal professionals who haven't use the Digital Coast, and informs users who have only used data or tools to broader resources provided by the Digital Coast. Here are several examples from the survey responses.

- Q: If Digital Coast resources do not currently save you time when performing your work, please explain.

A: “. . .That said, I've taken the opportunity of this survey to better understand what Digital Coast is offering and there are several resources we could better leverage to solve planning and resource conservation issues, as well as targeted issues caused by sea-level rise.”

- Q: Have you benefitted from other Digital Coast resources?

A: “No, but that is not because the resources are not good, but simply that I have not known of most of these resources before today.”

- Q: Would you recommend Digital Coast to a colleague?

A: “Yes, I've found that the efficiency highlighted in question #6 that is afforded to the community through the presence of Digital Coast is an incredibly valuable benefit. We are lucky to have it at our fingertips.”

- Q: Would you recommend Digital Coast to a colleague?

A: “Yes. Just sent it today to all my staff to look through and identify what training and information they could use.”

NSGIC Survey Questions

Digital Coast User Survey

1st Page -----

Thank you for taking time to participate in this user survey. Your response will help us understand the value of the Digital Coast.

Your participation in the survey is completely voluntary. All results will be reported anonymously.

2nd Page -----

1. Please indicate which of the following best represents your current professional affiliation (Check the single best choice).
 - Municipal/County/Parish government
 - State/Territorial government
 - Tribal government
 - Federal government
 - Regional governance organization
 - NGO/nonprofit/volunteer group
 - Private sector
 - Academia
 - Other (please specify) _____

2. Please indicate which of the following best represents your current professional occupation (Check the single best choice).
 - Technician (e.g., science, engineering, mapping)
 - Surveyor, Cartographer, Geographer
 - Physical Scientist
 - Biological, Conservation, Forestry Scientist
 - Environmental Scientist/Geoscientist
 - Hydrologist
 - Economist
 - Other Social Scientist (Non-Economist)
 - Engineer
 - Computer Occupations
 - Urban/Regional Planning
 - Manager
 - Other
3. To which professional organization(s)/association chapter(s) do you belong? (check all that apply)
 - American Planning Association
 - Association of State Floodplain Managers
 - Coastal States Organization
 - National Association of Counties
 - National Estuarine Research Reserve Association
 - National States Geographic Information Council
 - The Nature Conservancy
 - Urban Land Institute
 - Other (please specify) _____
4. Are you a user of Digital Coast resources (data, tools, training, stories from the field, "Apply It", blogs, or partnership)?
 - Yes
 - No [If no, skip to closing statement.]

3rd Page -----

5. Please tell us how you have used Digital Coast resources in your projects and how the results of these projects have been affected by the use of Digital Coast resources.

Item	Select the major area on which your project focused (Drop Down)	Select the major Digital Coast resources you used in your project (Drop Down)	What would you do without Digital Coast resources?(Drop Down)
Project 1			

Project 2			
Project 3			
Project 4			

“Select the major area on which your project focused” drop-down list:

- Climate Adaptation
- Coastal Conservation
- Coastal Economy
- Coastal Hazards
- Community Resilience
- Emergency Management
- Land Use Planning
- Natural Resources Management
- Ocean Planning
- Water Quality

“Select the major Digital Coast resources you used in your project” drop-down list:

- Data
- Tool
- Training
- Blogs
- Publications
- Stories from the Field
- Apply It
- Partnership

“What would you do without Digital Coast resources?” drop-down list:

- could not do the project without the resources
- conduct lower quality work without the resources
- conduct lower quality work with less suitable resources
- conduct comparable work by creating your own resources
- conduct comparable work by obtaining the same resources from other sources
- conduct comparable work without the resources
- conduct higher quality work with additional effort (time/cost)
- Name or description of your projects (Optional) _____

4th Page -----

It is the intent of the Digital Coast to improve the efficiency of your work as you:

- *find resources*, by reducing the amount of time spent searching for relevant resources

- *obtain resources*, by reducing the amount of time spent selecting and downloading relevant resources, and

- *use resources*, by providing standard formats, metadata, or training for users to quickly understand the attributes of the resources and begin using them.

6. The following questions attempt to gauge how Digital Coast may improve the efficiency of your work:
 - How many hours does Digital Coast save you to find, obtain, and use a data set? ____
 - How many hours does Digital Coast save you to find, obtain, and use a tool? ____
 - How many hours does Digital Coast save you to find, obtain, and use a data service or map service? ____
7. Have you benefitted from other Digital Coast resources (blogs, training, stories from the field, or “Apply It”) or from participation in the Digital Coast Partnership? For instance, have these Digital Coast resources helped you explain issues to important executives or elected officials? If yes, please explain _____
8. If Digital Coast resources do not save you time when performing your work, please explain _____

5th Page -----

9. Do you have further suggestions to improve Digital Coast? _____
10. Would you recommend Digital Coast to a colleague? Please explain. _____
11. Do you have a case study or example of how you used Digital Coast resources? If yes, please explain below?
12. If you would like to include your case study in a “Story From the Field” for the website or provide more detailed information for our analysis on the values of Digital Coast, please leave your email address in the following box or email Digital.Coast@noaa.gov.

Closing Statement:

Thank you for your participation in this survey. All results will be reported anonymously. Your input will help us assess the value of the Digital Coast to our members.

Appendix II. OMB Discount Rate

Selection of a discount rate for assessing the return on investments in the Digital Coast

In 1992, the President's Office of Management and Budget (OMB) published "Guidelines and Discount Rates for Benefit-Cost Analysis of Federal Programs"¹⁵. Section 8 of this document presents OMB's Discount Rate Policy specifies that "public investments and regulatory programs that provide benefits and costs to the general public" should be reported as present values "determined using a real discount rate of 7 percent. This rate approximates the marginal pretax rate of return on an average investment in the private sector in recent years. Significant changes in this rate will be reflected in future updates of this Circular."

This particular discount rate has not yet been updated. However, this OMB guidance does suggest showing the sensitivity of results to variations in the discount rate. It also identifies the shadow price of capital as the preferred (though not required) means of "capturing the effects of government projects on resource allocation in the private sector." The use of shadow prices requires OMB approval.

This same guidance provides alternative discount rates for use with cost-effectiveness, lease-purchase, and internal government investment. The OMB releases Nominal Discount Rates annually, which are often encountered in lease-purchase analysis; and Real Discount Rates are often required in cost-effectiveness analysis. With regard to the internal government investment, the guidance notes that

"Some Federal activities provide a mix of both Federal cost savings and external social benefits. For example, Federal investments in information technology can produce Federal savings in the form of lower administrative costs and external social benefits in the form of faster claims processing. The net present value of such investments should be evaluated with the 7 percent real discount rate ... unless the analysis is able to allocate the investment's costs between provision of Federal cost savings and external social benefits. Where such an allocation is possible, Federal cost savings and their associated investment costs may be discounted at the Treasury rate, while the external social benefits and their associated investment costs should be discounted at the 7 percent real rate."

This speaks most directly to the circumstances of the Digital Coast, which provides benefits to the government and the general public. Since it is not possible to allocate costs and benefits among government and private beneficiaries, a 7 percent discount rate was used in this analysis.

¹⁵ OMB Circular No. A-94, Revised (Transmittal Memo No. 64, October 29, 1992).