

Cost Estimating Software System Survey Analysis Report



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Introduction

In order to more fully understand the training needs for Cost Estimating Software System (CESS) users within the National Park Service, the Eppley Institute for Parks and Public Lands, Indiana University designed a web-based survey for distribution. The purpose of the survey was to identify CESS-related training needs as indicated by National Parks Service (NPS) professionals using the system. The results of the survey are discussed in the report that follows and both complement and conflict with the *CESS Training Strategy Proposal (Draft)* document (see Appendix A) conducted by Bret Bower of EOS Group. Although some recommendations were supported by the survey, several assumptions in the training proposal were not supported by the results of the conducted survey research.

Methodology

NPS chiefs of maintenance were sent notification and access to the web-survey. They were also encouraged to forward the survey to other CESS users in their units. The results of the survey distribution are indicated in Tables 2 and 3.

The web-survey contained eleven (11) quantitative questions and four (4) qualitative questions asking for feedback on the use of the CESS in relation to the individuals using the software and the requirements of each park. Results from the survey (n=186) were used for analysis and the construction of this report. Note that a chief of maintenance is assigned to 319 of 391 NPS units, and approximately 299 individuals are assigned as chiefs. Some chiefs are responsible for more than one park unit.

Regional Representation

Survey participants were asked to select their region at the start of the survey in order to organize the data according to representation and regional response. All regional options are represented in the survey, although with uneven numbers. As each region has a varying number of chiefs of maintenance in accordance to the size of the region and the number of national parks in that region, this variation in numbers is expected.

Washington Service Office (WASO), the National Capital, and Alaska regions are the three smallest representative groups as compared to the other regions, as shown in Table 1. Eight (8) survey respondents provided their park code but not their particular region. These respondents were grouped into the correct region according to the regional map and park allocation specified on *InsideNPS*. One case was deleted from the data set, because no question responses were present other than a regional designation. One (1) survey participant did not report either their park or region, but did provide responses to many of the other questions on the survey and thus is designated as “Not specified” in Table 1.

Region	Number of respondents	Percentage of total
WASO	3	1.6%
Alaska	6	3.2%
National Capital	11	5.9%
Pacific West	23	2.4%
Northeast	28	15.1%
Southeast	33	17.7%
Midwest	39	21.0%
Intermountain	42	22.6%
Not specified	1	0.5%
Total	186	100%

Table 1: Regional Representation of Respondents

Cost Estimating Software System (CESS) Survey

Quantitative Analysis

The participants were first asked a few general questions about their usage, familiarity, and previous training with CESS. By choosing from ranges and selections provided to them, they were asked to respond to the following questions:

- How many people in the park are currently using CESS?
- Of the people using CESS software, what is their primary function in the park?
- How often do you use CESS?
- Did you attend Facility Condition Assessment Survey (FCAS) training, and if so, what year did you complete it?
- Did you attend commercial cost estimating training, and if so, where and in what year did you attend?
- What is the timeline for project requirements?
- What is your level of understanding of the four cost estimating principles?

The responses to these questions are presented in the following tables and charts.

Number of CESS users in a park	Number of responses	Percent
1-2	91	48.9%
3-4	64	34.4%
5-10	21	11.3%
10 or more	7	3.8%
No response	3	1.6%
Total	186	100%

Table 2: Number of CESS Users

The majority of CESS users, as indicated by the responses in Table 2, fall within the range of one to four users in each park. About half of the respondents (91 of 186) reported that CESS users at each park ranged between one and two. Although only seven respondents (3.8% of the total survey respondents) indicated that there were ten or more CESS users in their park, it is important to note that there are at least 70 CESS users represented in this particular category of responses.

Of those users, what is their primary function in the park?	Number of responses	Percent
Facility Manager	62	33.3%
Maintenance Supervisor	37	19.9%
Facility Management Software System (FMSS) Specialist	32	17.2%
Administrative	5	2.7%
Other	48	25.8%
No response	2	1.1%
Total	186	100%

Table 3: Primary CESS User Function

Fully one third of the respondents indicated that the primary CESS user’s function is that of an NPS Facility Manager. Other primary CESS users fall into the Maintenance Supervisor (19.9%) and FMSS Specialist (17.2%) job roles (see Table 3). Another notable response includes that of “Other,” where 25.8% of the survey respondents believed that their response to the survey question was not adequately represented in the job roles provided in the survey. Survey participants elaborated on their answers to this question by typing specific information about CESS users relevant to their particular park. Many of the comments indicated that the survey response selections represented only a portion of the CESS users. Other maintenance workers, administrative support staff, engineers, architects, curators, and resource managers were specified as other additional park CESS users. After holding maintenance employee positions constant, engineers and architects were specified most frequently in this category of written responses.

How often do you use CESS?	Number of responses	Percent
Daily	4	2.2%
Weekly	39	21.0%
Monthly	80	43.0%
Yearly	49	26.3%
Never	14	7.5%
No response	0	0%
Total	186	100%

Table 4: CESS Frequency

Of all the survey respondents, 43% indicated that they use CESS primarily monthly, but 21% also indicated that weekly use was representative of their patterns. Alternately, a similar number of respondents (26.3%) indicated that they use CESS on a yearly basis.



As a result, survey participants mostly fall within the weekly to yearly range of CESS usage (see Table 4).

Have you attended Facility Condition Assessment Survey (FCAS) training?	Number of responses	Percent
Yes	139	74.7%
No	45	24.2%
No response	2	1.1%
Total	186	100%

Table 5: FCAS Training

A clear majority of survey respondents indicated that they had attended FCAS training, responding at a rate of 74.7%. However, a notable number (24.2%) responded negatively; that is, they indicated that they had never attended a FCAS training event (see Table 5).

Have you ever attended a commercial cost estimating training, such as RS Means?	Number of Responses	Percent
Yes	35	18.8%
No	150	80.6%
No response	1	.6%
Total	186	100%

Table 6: Other Cost Estimating Training

As indicated in Table 6, a robust 80.6% of respondents indicated that they had not attended a commercial cost estimating training course or event. Over eighteen percent (18.8%) indicated that they had. No conclusions can be drawn about the relationship between the numbers in Tables 5 and 6, such as whether those participants who did not attend FCAS attended a commercial training event.

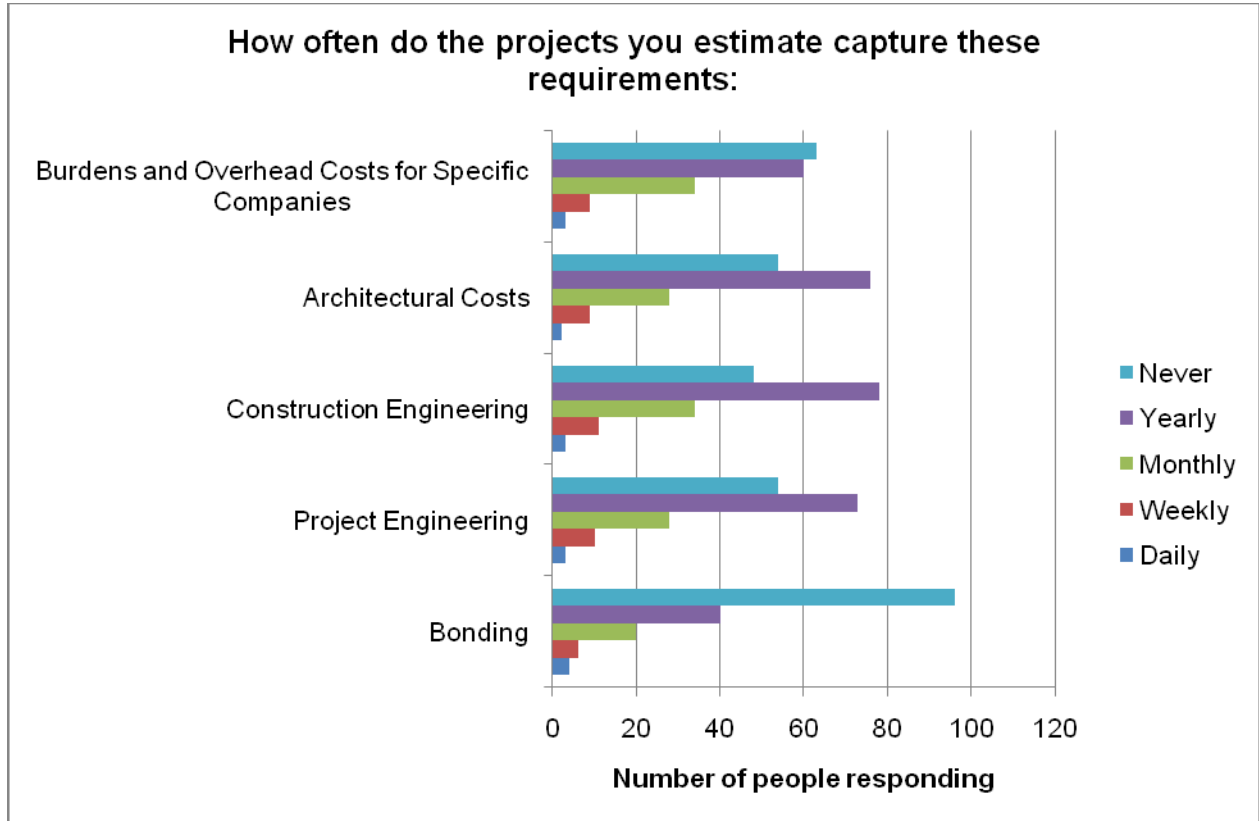


Figure 1: Types of projects

Chiefs of Maintenance and other CESS-users responded to this survey question (Figure 1: Types of projects) with a small minority (a combined total of less than twenty) indicating that each of the requirements presented in the survey are employed “Daily” or “Weekly.” Most respondents indicated that the projects they estimate “Never” or “Yearly” involve the requirements specified in the survey. Notably, bonding requirements are most infrequently needed. Between twenty and forty respondents consistently indicated that their project estimates “Monthly” necessitate capturing the specified requirements (see Figure 1).

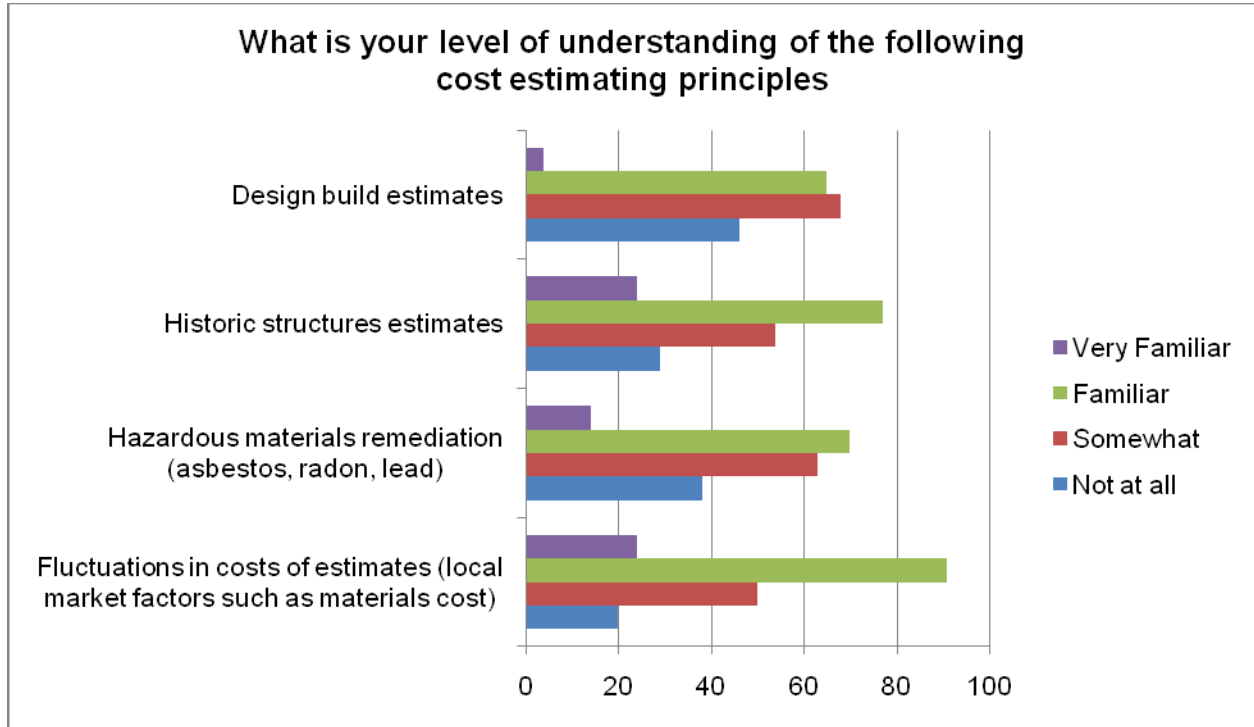


Figure 2: Level of understanding in different categories

The information in Figure 2 shows that, for the majority of categories, many respondents felt “Somewhat” or “Not at all” clear in their understanding about performing the various tasks using CESS. Only a small minority of respondents consistently responded with “Very Familiar” with their level of understanding on cost estimating principles. A stable group of respondents indicated that they were “Familiar” with the four specified cost estimating principles. This group was outnumbered by the combined effect of “Somewhat” and “Not at all” in three of the four principle topic areas. The single cost estimating principle where “Familiar” outpaced the combined group is with the fourth principle: Fluctuations in costs of estimates.

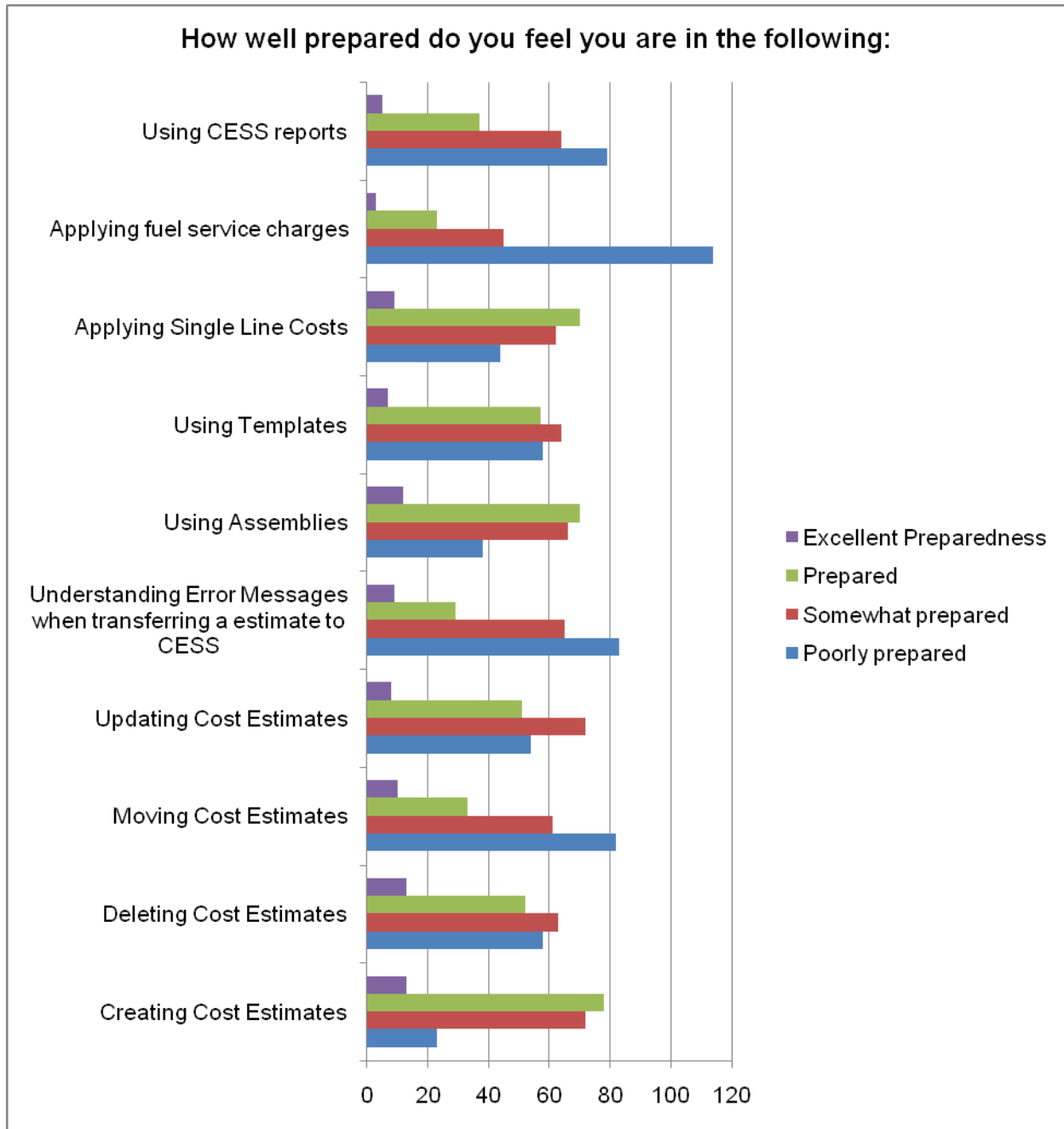


Figure 3: Preparedness by area

Combining the information in Figure 3 with the information in Figure 4 illustrates a few trends. In Figure 3, a large majority responded that they were poorly prepared to apply fuel service charges, and in Figure 4, the majority of respondents thought that training was “Very Important” and “Important” in applying fuel service charges. Similar trends can be seen with responses to the other categories. Figure 3 illustrates that only a small minority of respondents (fewer than 20 of 186) expressed the belief that they have “Excellent Preparedness” for any of the categories.

Survey responses documented in Figure 3 also provide supporting evidence that respondents desire more CESS or CESS-related training and that such training would help them be better prepared for various tasks. Since the majority of respondents already have some CESS training through either FCAS or commercial cost estimating training (Tables 5 and 6), more prominent “Excellent preparedness” or “Prepared” responses in Figure 3 might be anticipated. However, the data supports a strong contingency of respondents who believe that they are only “Somewhat prepared” or “Poorly prepared” to accomplish tasks in the specified topic areas.

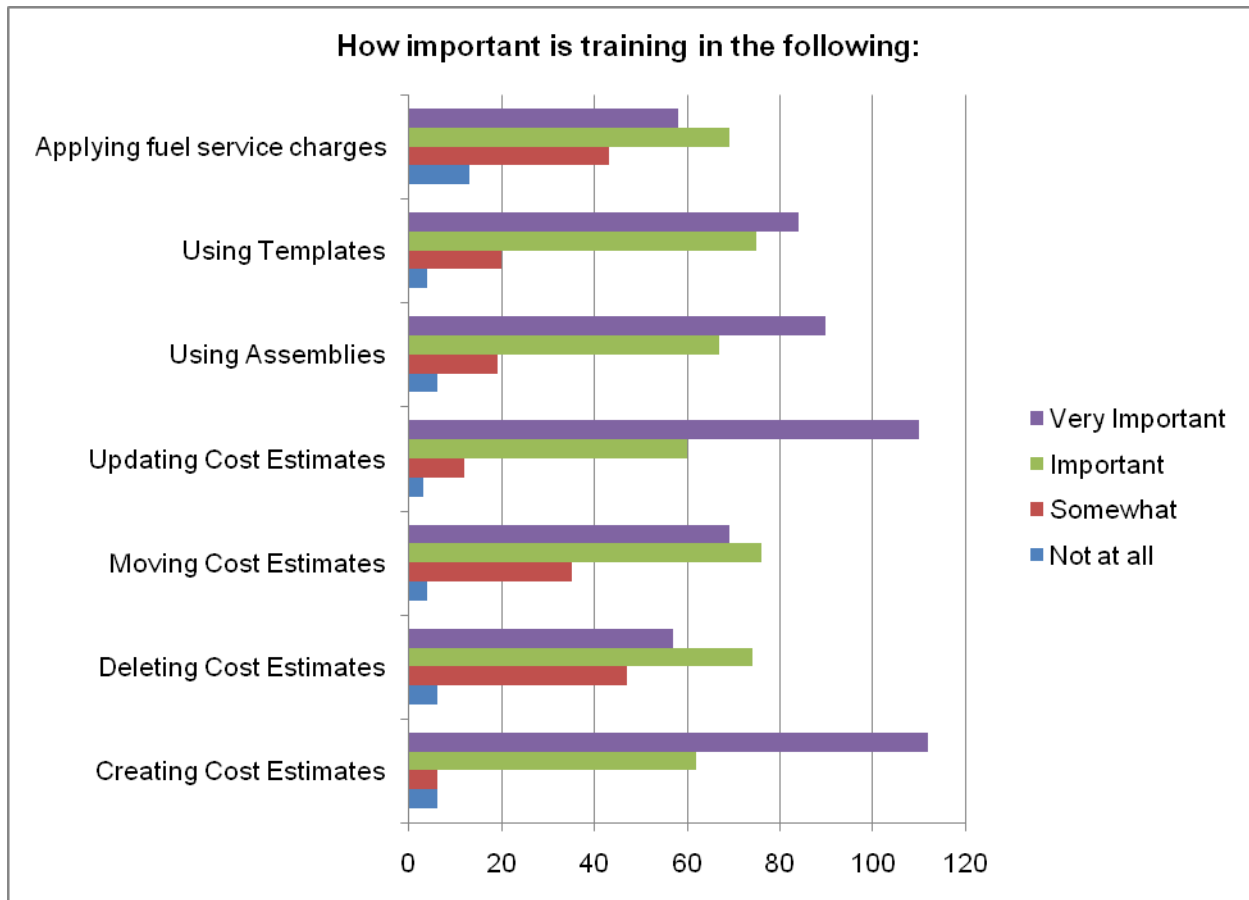


Figure 4: Importance of training in different areas

It is clear from the information captured in Figure 4 that respondents overwhelmingly value training for accomplishing tasks associated with CESS.

Qualitative Analysis

The qualitative portion of the survey circulated to NPS CESS-users consisted of four different qualitative questions. Each statement requested participants to provide their own comments regarding ease of CESS and each park's specific needs with regard to cost estimating and CESS. The participants were also given the opportunity to provide additional comments without restriction to the topic. There were more than 400 total responses to the four questions asked of the 186 survey participants. Response comments have been grouped into broader themes to aid in the comprehension of user requirements, needs, and experiences. Selected, representative comments are presented in the data below.

Feedback on Training

- Many participants felt that training had helped them in the past, or that more training in CESS would help them better understand the system. Some users felt that if they were more fluent in CESS, using it would be more appropriate as opposed to other methods of estimating.
 1. "The 8-hour training provided at the November 2006 Facility Manager's Conference was great. Working in CESS has been easier, and I find myself using CESS more often."
 2. "I support CESS training for all staff charged with FMSS and PMIS cost data entry."
 3. "I have not received CESS training to date. I would like to receive CESS training."
 4. "I would like to see a "CESS-specific" week-long course developed. The FCAS course is too broad and doesn't focus enough on the cost estimation process, in my opinion."
- The comments listed above are in contrast with other participants who felt that inadequate or a lack of training led to erroneous estimates and spending significantly more time creating estimates because of their lack of familiarity with the software.
 1. "Too many people using the system that are not adequately trained. Everyone seems to be estimating using different criteria in the same park."
 2. "We are not well trained in using the CESS program, and when we do use it, we are not confident in our estimates."
- Some participants who had completed a training course felt that they did not use CESS frequently enough and had forgotten their training by the time they made an estimate. This perception relates to other comments that it may be more appropriate for some sites to have specific people trained in CESS, who would use it frequently.
 1. "I need to train a few key people, so they can become proficient through frequent use."

2. "For some time now, I have been unable to access CESS. Because of this, I feel like I no longer know the system and could use some additional training."
 3. "The only problem that I have with CESS is not being able to work in it but once or twice in a year, which makes it slow for me to move around in."
 4. "Since there is not a full-time employee in the Facility Management Division, there is no one who uses the system often enough to retain the information."
- Various comments were made regarding who should undergo training and in which areas participants would like training.
 1. "Both the maintenance and resource management divisions would benefit from having a couple of key people trained to do CESS estimates."
 2. "Interpretation needs to learn to use CESS."
 3. "Need to have more training in cost estimating."
 4. "I believe all divisions would benefit from cost estimating training."
 - Some participants felt that they would be better able to utilize CESS, if they had training or experience in other areas, such as FMSS, cost estimating, and RS Means.
 1. "Why would they get involved in CESS? You need to TRAIN the entire park to use FMSS first."
 2. "A RS Means course would be very helpful in creating accurate estimates for repairs needed, and alleviate cost overruns on certain repair projects."
 3. "Professional estimating training needs to be offered to each park."

Feedback on CESS

- Some participants felt that CESS software had either helped them greatly, or that it could help them, if there were people who were properly trained to use it.
 1. "People who use CESS typically generate more realistic estimates than those who don't."
 2. "As time goes by, I want my park to use cost estimating for all maintenance projects (except for very small projects)."
 3. "I believe HUTR's maintenance division has had beneficial results from the utilization of CESS."
 4. "CESS would provide a more accurate cost estimate for PMIS projects."
 5. "An onsite park training with an expert in CESS and general cost estimating would be invaluable to our park staff in creating better estimates."
- A large number of participants made comments about CESS not being flexible enough for their specific work sites and projects, such as providing accurate costs for materials used for restoration of a historical site.

1. "The CESS database uses generalized 'park factors' for cost adjustments regionally, but [these] are inappropriate for a lot of the gulf coast since Hurricane Katrina."
 2. "...not a very accurate or effective tool in generating accurate cost estimates for work on historic structures."
 3. "...there should be an assembly, but there isn't. For instance, asbestos abatement has item takeoffs, but no assembly."
 4. "One problem I have encountered is the added costs of construction for remote areas. DSC puts on 21% for our park when the last three contracts were actually at 48%."
- Other users commented on CESS not being able to account for inflation, costs and materials, if there was a significant amount of time between the creation of an estimate and the date the project was started.
 1. "The developed cost estimates need to be adjusted each year for inflation."
 2. "With reference to accurate length and cost estimates, "the opposite occurs when a huge amount of time lapses between the estimates and actual funding."
 3. "Keeping the cost estimates updated is a big concern. It is hard to re-visit estimates that were done several years ago."
 - Users commented on the CESS system being too complex for their specific sites with regard to the size of their project and the requirements of the projects.
 1. "We are using a Class A construction estimating tool to develop Class C maintenance/rehab estimates. If you forget to add any minor detail, your estimate will be too low"
 2. "CESS is a slow process that is time consuming for an estimate which I can come up in the ball park much quicker by calculator and pen. "
 3. "Sometimes you just need a quick estimate without creating a whole project with work orders"
 - Users also made comments about how difficult they found CESS to use. Participants felt the software should be more intuitive, menus should be changed, that it was hard to find items, that it should be more efficient, and that it should be easier and less time consuming to make small estimates.
 1. "The CESS estimating tool is hard to navigate."
 2. "You can get lost trying to figure out where to start with CESS."
 3. "It should be easier to use. I should be able to quickly go to the area I need and create an estimate in less than 30 minutes."
 4. "I believe searching for items, especially using the sixteen divisions of the construction trade, is very time consuming."

5. "CESS is not easy; it's usually slow, [and] the drop down lists are difficult to navigate."
- Contrasting comments were also made, detailing that using the software would be easier if there was a manual or "cheat sheet." Some stated that it was easier to use the RS Mean book than to use CESS for estimation.
 1. "I have used the RS Means book to prepare cost estimates, and it wasn't as bad as using the CESS program."
 2. "A 'cheat sheet' of most common items or assemblies is a critical need."
 3. "I think having the books handy would be helpful when looking for a specific takeoff item."

Discussion

Training

Data presented in Figures 1 through 4 reveal that many participants did not feel comfortable with the various aspects of CESS, and almost all participants felt there was at least one area where training would help them learn to use CESS. Many of the written comments also reflected the frustration users felt about not being comfortable with CESS, the perception that estimates took extra time because of a lack of familiarity, and a general lack of knowledge about how to use CESS to its full potential.

Many participants felt poorly prepared to use CESS because of a lack of training in other areas. Users commented on the difficulties of using CESS as presented without FMSS training, or without having some level of prior training/experience with cost estimating. There were also comments about not having adequate training with RS Means, and how such training would have helped them better use CESS. These comments relate to comments made about the accuracy of CESS estimates when a person outside their area of expertise, such as a person with little or no construction expertise, creates an estimate for a construction project.

Some park units use CESS only a few times a year and thus the users lose the familiarity they developed in their training. Some participants indicated that a needed improvement is to have a CESS expert that they could contact. This way, estimates could be more accurate and be completed more efficiently. Others felt that some sort of refresher training should have been available to them when they needed to create a CESS estimate.

Software

The majority of participants in this survey expressed frustration with CESS software. Some made the point that RS Means allowed them to make estimates quicker, easier, and more accurately, as they did not have to relearn how to use the RS Means book every time they needed to create an estimate.

Comments were made about the difficulty of the CESS interface. If this is compounded with a lack of familiarity with the software because of sporadic use, a difficult interface is even more cumbersome. As some participants said, a help system (whether a manual, a person to call, a “cheat sheet,” or an online reference) would greatly help them to use CESS more easily.

Participants also stated that CESS lacked items and options for sites that went beyond new construction, or even all the items in RS Means. People were unable to discover if CESS offered some way to enter these missing items, or if there was some way to make an estimate more accurately reflect the cost of items not listed in CESS.

If functionality is already built into CESS to address the various issues participants have brought up, the users are not able to access it. Training will help them address this, but a one-time training targeted only to CESS may not be appropriate for certain sites.

Conclusions

This survey was conducted in order to gain a perspective on CESS training from the field of NPS CESS-users. The purpose of the survey was to discover both the compliments and contradictions associated with the *CESS Training Strategy proposal (draft)* in which information was gathered from sources within the National Park Service, although the exact population was never identified in the document. The results of this survey both agree and conflict with the *CESS Training Strategy Proposal (Draft)* (see *Appendix A*).

Agreements

Survey respondents in this study agreed that training is important for accomplishing the tasks associated with cost estimating. Further, respondents said that they need additional training, often including “just-in-time” training or assistance when using CESS.

Conflicts

Engineers and architects are the largest non-solicited group of NPS CESS-users (indicated in the “Other” job role category) outside of the facilities/maintenance job roles. Although other career fields, such as curatorial, resource and interpretation employees, also use CESS, individuals in these fields and their particular training experience is unknown. It was not indicated whether these workers are NPS or contractor employees.

Respondents specified that because of sporadic use of the system, a support structure of some type would be helpful in re-familiarizing the user with CESS as the need arises. Varying levels of support from “cheat sheets,” manuals, or online references were suggested in addition to having a CESS expert to contact.

Service-wide training may be accomplished in various ways, including through other sources, but the best method of accomplish this training remains to be determined.



Recommendations

According to the data, respondents indicated two primary issues.

Issue 1: An important distinction is that there is a need for improved understanding of cost estimating process in order to complete CESS, as opposed to CESS software. The cost estimating component of CESS requires additional attention and training.

Strategy: Professional cost estimating training is extensive and often contains a pathway for certification. Thus, there are other (non-NPS) experts who are qualified to host cost estimating training courses. In other words, this can be an area in which outsourced training is necessary and appropriate. These resources are listed in Appendix B of this document. If a professional level of understanding and operating is necessary, then professional certification is the right course of action.

Notably, if assistance is available for the cost estimating process, an improved level of understanding can be developed and skills can be enhanced as the need arises.

Suggestion for consideration:

- Develop a group of regional Class C cost estimators who have construction knowledge to serve as consultants to small staffed parks.

Issue 2: CESS training is an important ongoing, regular, yet intermittent NPS employee need.

Strategy: The development and implementation of a quick refresher course could be helpful, especially since CESS-users have infrequent occasion to use the software. Addressing this issue with Just-in-Time-Training (JiTT) can be used effectively to meet this need. Suggestions include but are not limited to:

- Develop a one-hour online refresher course available on-demand;
- Develop a rapid response web conference training course to be held at strategic times throughout the fiscal year;
- Train the current cadre of FMP instructors to be “on call” in order to respond to inquiries and Help Desk type assistance as needed by CESS users; and/or
- Investigate the possibility of a CESS classroom course.



APPENDICES



Appendix A

CESS Training Strategy Proposal (Draft)

Prepared for: NPS Cost Estimating Working Group

Date of initial Draft: July 28th, 2006

Current Version: October 5th, 2006

Attachments: Attachment A - Issues Table

Introduction

The National Park Service (NPS) currently uses the Cost Estimating Software System (CESS) to support cost estimating processes within the Park Facility Management Division (PFMD). CESS is a valuable tool that several organizational and functional units in the NPS could leverage to support cost estimating processes in a variety of areas and processes. In order to expand the use of CESS, current users need training to leverage the rich functionality of the existing system, and new users need to learn how to use the system in order to manage existing processes. This document categorizes issues developed by NPS leaders and users and, outlines a strategy for providing high-leverage training to the NPS cost estimating population.

Issue

The National Park Services could benefit from a defined CESS training strategy to ensure the diverse user population within NPS is capable of leveraging CESS technology. CESS training enables cost estimating users and administrators across various NPS business units to maximize the effectiveness of forthcoming CESS technology. CESS is a very robust cost estimating system that can provide cost estimating capability in support of many NPS business processes. Use of CESS has been limited by a lack of understanding of its core capabilities and advanced features. As a result, CESS use has been limited to a small portion of the overall NPS user population.

Several business processes required to support cost estimating within NPS have not reached maturity. This document will highlight the points of intersection between training and process to identify 'high-leverage' training issues that, once solved, will provide the most utility to the NPS cost estimating community.

There are also some instances where user requests exceed the current functionality of CESS. While not specified in the initial scope, this document will highlight the points of intersection between development and training to identify suggested development projects that will provide worthwhile enhancement to CESS.

For the purposes of providing suggestions for developing a training strategy for CESS, this document assumes the following:

- Business processes that are prerequisites for training will be created prior to initiation of training
- System changes required to support training are developed and deployed (within the constraints of the system vision, task direction and funding).
- Training will address the transition to CSI MasterFormat 2004 and its impact on the NPS cost estimator.

Discussion

NPS currently uses the CESS system to develop and manage cost estimates for facilities management processes. The two largest group of CESS users are NPS contractors and employees engaged in Facility Condition Assessment Surveys (FCAS). Future users of CESS will employ the system to develop new construction and renovation estimates in support of general management plans (GMP), line-item construction, PMIS submissions, and other facilities and infrastructure cost estimating activities such as maintained landscapes.

NPS leadership solicited input from current and potential NPS users to determine what concerns and issues exist with respect to use and management of CESS. The table in Attachment A outlines input provided to NPS leadership (including Mike Doherty and Jeff Reed), the Cost Estimating Working Group, and other forums within NPS and the associated contractors. This document groups identified issues into a series of related concepts in order to tailor the proposed NPS training strategy to the needs of the users and to maximize use of CESS to support NPS cost estimating. When the need for business processes or system development is required, it has been noted in the appropriate column in the table in Attachment A. Based on the input, training issues have been grouped into three major categories:

- CESS User Issues – Issues that day to day users face in utilizing CESS to manage and create cost estimates
- CESS Administrator Issues – Issues that administrators face in managing the CESS system. This may include security, performance, updates, general management, and other issues
- Cost Estimating Issues – Issues regarding knowledge and application of sound cost estimating principles and practices

Further discovery and training development may reveal additional categories for cost estimating training. The following sections highlight some of the issues facing each of the above mentioned categories.

CESS User Issues

- Users need to understand how and when to add bonding, project engineering, and construction engineering.
- Users need to understand the concepts behind the archiving and site management processes (deleting and moving estimates, etc) in addition to knowing how to execute them.

- Users need to be able to develop, find, and utilize templates in CESS
- Users need access to a clear directory of assemblies
- Users need to know how to access and update existing estimates
- Users need to know how to differentiate between the various databases
- Users need to know how to use the various databases
- CESS User Issues involve a variety of training issues that are either dependent on, or exacerbated by, the lack of a formal business process. Some of the issues that are impacted by incomplete or non-existent processes are marked with a check mark in the column labeled 'BP' in the table in Attachment A. These issues include application of:
 - Add-ons
 - Park location factors
 - Fuel service charges
 - Known overhead and burden costs for specific companies
 - Mobilization costs
 - Planning costs

CESS Administrator Issues

- The chief issue among administrators is the need to understand and manage security restrictions. Since CESS is a system of several applications, administrators need a deeper understanding of how to manage application security settings. Additionally, it will be extremely valuable to provide NPS security points of contact to facilitate administrator functions.
- Administrators need a basic understanding of cost estimating processes in order to support the cost estimating applications that make up the current and future versions of CESS.

Cost Estimating Principles Issues

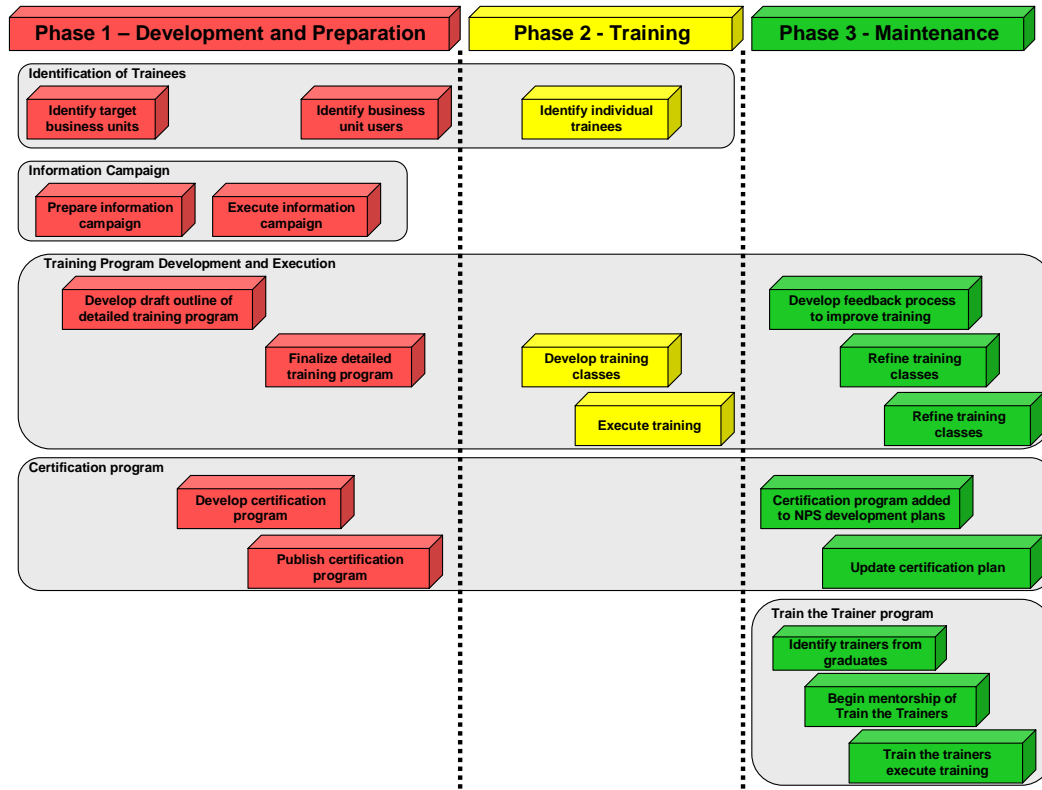
- Users need to understand the specifics of types of estimates to include, but not limited to:
 - Design-build, historic structures, etc.
 - Hazardous materials remediation
- Users need to understand how and when to account for fluctuations in costs to include:
 - Local market costs
 - Estimates created for smaller jobs that are required to be bid to small businesses and set-asides
- There is a concern that basic math skills among the potential estimating user population may not be adequate

Recommendations

It is recommended that the NPS execute a three phase approach to training. The three phases are:

- Development and Preparation
- Training
- Maintenance

The following diagram illustrates the components of the three phased approach:



Development of a training strategy for CESS must account for several existing conditions within the NPS. These include, but are not limited to:

- Geographical dispersion of training population
- Variety of user needs within the NPS population
- Lack of understanding of how CESS works
- Limited funding for travel and other development
- Limited core group of trained cost estimators

NPS should execute the following tasks in order to fully realize the potential of the NPS training strategy outlined above.

1. **Identify NPS personnel requiring CESS training.** NPS cost estimating leaders should review all NPS business units to identify prospects for training. Utilize the internal marketing campaign (see recommendation #2 below) to refine the list of prospects for training. In addition to developing a cost estimating body of knowledge throughout NPS, additional funding assistance from other business units will ensure that the cost estimating training program serves, and is supported by, the entire NPS.

2. **Conduct an internal marketing campaign** to raise the awareness level of CESS within the NPS. Avenues for marketing include:

- NPS newsletters
- NPS internal web sites
- Forthcoming NPS cost estimating web-site
- New employee training
- Advanced training for experienced users
- Leadership training and seminars
- Other training events

3. **Develop and execute a training program** that meets the needs of identified NPS users. An initial review of NPS training needs has identified the following training user groups:

- Training for CESS Administration
- Training for CESS Use
- Training for Cost Estimating

If other user types are identified, the training plan should include training to meet the needs of the new users. At a minimum, each of the courses above should integrate an understanding of CESS architecture and processes to ensure all users and administrators understand how to integrate CESS into new and existing business processes. Additional comments among the user community point to a need for online tutorials and the ability to access self-help instructions. The plan should also include training to assist users with understanding the components of the park location factor (PLF). The training program could also include various “off-the-shelf” training provided by cost estimating professionals and organizations.

4. **Develop a certification program** that can be integrated into the development plans of cost estimating personnel. A formal certification program, managed by NPS leadership, could ensure that training remains a priority and achieves results.

5. **Develop a 'Train-the-Trainer' program** to develop internal subject matter experts within NPS. Further training of internal talent may enable NPS to provide training at a lower cost over time. Additionally, a cadre of internal cost estimating subject matter experts should enable quick resolution of many issues that currently require outside support.

Attachment A: Issues Table (BP=Business Process required; Dev=Development required)

Issue	Category	BP	Dev	Proposed solution	Priority	Level of Effort
NPS needs to develop a process that synchronizes contracting cost data formats with cost estimate formats to enable comparison of estimates to actual costs. The imminent update to CSI MasterFormat 2004 should be considered	Non-Training	✓	✓	Mike LeBorgne working with Bret Bowser to develop this process.	High	Complex
NPS users need a tool that tracks project cost and the accuracy of CESS estimates against the actual bid	Non-Training	✓	✓	This is a request for a historical cost database and does not fall under training	High	Moderate
NPS users need a more flexible CESS training format that adapts to changing events in order to keep estimate costs close to the last published cost year (would include oversight by reviewing authorities)	Training Strategy	✓		CESS Training Strategy. NPS must define the acceptable tolerance for changed estimates. Class C estimates have a broad range of expected accuracy. Also, if project scope changes, one should expect a significant change in cost estimate.	High	Simple
NPS managers need to know what level of education to provide to new and current users based on realistic servicewide needs	Training Strategy	✓		CESS Training Strategy should address training requirements with respect to user frequency and type. Training program should be developed to account for users across all usage spectrums (occasional, regular, heavy - or some other frequency indicator)	Medium	Moderate

Issue	Category	BP	Dev	Proposed solution	Priority	Level of Effort
NPS administrators need to understand how to apply and manage security restrictions	Training: CESS Administration		✓	CESS administrator training	Low	Moderate
NPS users and contractors need to understand add-ons, and the processes required to develop them in CESS	Training: CESS Use			Cost estimating principles. Develop description and guidelines for assigning add-ons at various levels of estimate class. Potentially, this guidance could be linked to the appropriate fields in CESS for easy access by Users.	High	Simple
NPS users need clear direction on what to do with old estimates after the work is done, or there is a change/deletion. This includes closed work-orders.	Training: CESS Use	✓		CESS-specific training. The NPS Cost Estimating Working Group (CEWG) has tasked itself to develop a White Paper to identify the legal and 'best practice' requirements for archiving cost estimates. The focus has been improving data retrieval speed given the hundreds of Gigabytes of data currently being stored.	High	Moderate
NPS users need to be trained on how to add Architectural Costs to estimates.	Training: CESS Use		✓	CESS-specific training. Training is required to inform users how to determine if an estimate contains Architectural Costs, and how to add Architectural Costs if they are not included	Medium	Simple

Issue	Category	BP	Dev	Proposed solution	Priority	Level of Effort
NPS users need to determine how to add Bonding costs in CESS	Training: CESS Use			CESS-specific training	Medium	Simple
NPS users need to learn the full capabilities of CESS to ensure that it is leveraged across all types of cost estimating, not just for Maximo	Training: CESS Use	✓		CESS-specific training	Medium	Simple
NPS users need to know how to find new assemblies and cost data when databases are updated. The imminent update to CSI MasterFormat 2004 will require updated materials and guidance on use of the new 50-division format.	Training: CESS Use	✓		Training strategy should include provision to provide training and guidance bulletins or broadcasts following all upgrades to ensure that users understand how to find commonly used cost data	Medium	Simple
NPS users need to understand how to apply fuel service charges	Training: CESS Use	✓		CESS-specific training.	Medium	Simple
NPS users would like to be able to apply known burdens and overhead costs for specific companies in a drop down	Training: CESS Use	✓		Cost estimating principles. Training is required to inform users how to determine burdens and overhead costs for specific companies	Medium	Simple

Issue	Category	BP	Dev	Proposed solution	Priority	Level of Effort
NPS users need to be able to develop add-ons that are not embedded in line item costs so that the costs are transparent	Training: CESS Use	✓		Cost estimating principles. The NPS Cost Estimating Working Group (CEWG) has tasked itself to refine add-on definitions and values. One outcome of this effort should be to 'systemize' the information using the Timberline functionalities available. Once this effort is complete, training should include specific instructions.	Medium	Moderate
NPS users need to understand how to navigate CESS and move between databases	Training: CESS Use			CESS-specific training	Medium	Moderate
NPS users need to be able to build templates in CESS as well as use the servicewide templates.	Training: CESS Use		✓	CESS-specific training	Medium	Moderate
NPS users need a clear directory of assemblies.	Training: CESS Use		✓	CESS-specific training	Medium	Moderate
NPS users need to learn how to handle multiple park location factors (or other multiple factors)	Training: CESS Use		✓	CESS-specific training	Medium	Moderate

Issue	Category	BP	Dev	Proposed solution	Priority	Level of Effort
NPS users across different disciplines require access to CESS production. A user states, "If we are going to use CESS servicewide then all disciplines should have access. What process is there for an architect to go into CESS and produce an estimate, store it, and notify the park FMSS user that it's ready to be moved into FMSS? Some CESS users may need to know very little about FCAS (and FMSS) to do costing using CESS - Accessibility, Contracted CAC's, Structural Fire, DSC Estimating, WASO Line Item Construction, Regional Engineering Staff, Estimate QA/QC staff, Contracting Bid validation, etc."	Training: CESS Use	✓		Cost estimating principles (once this process is developed)	Medium	Complex
NPS users need a better understanding of how to use RS Means. Even seasoned estimators will require some re-education to learn how to use the new CSI MasterFormat 2004.	Training: Cost Estimating			Cost estimating principles	High	Simple

Issue	Category	BP	Dev	Proposed solution	Priority	Level of Effort
NPS users need a better understanding of inflation and how to account for it in cost estimates.	Training: Cost Estimating	✓		Cost estimating principles. The NPS Cost Estimating Working Group (CEWG) has developed a White Paper proposing that each cost include a field for 'Base Year' so that all costs can be normalized prior to aggregating into summary reports. The CEWG has tasked itself with determining which indices will be most suitable for each type of estimate (e.g., CRV vs. deficiency).	High	Simple
NPS users need a glossary of terms and definitions that non-cost estimating employees can reference	Training: Cost Estimating	✓	✓	Cost estimating principles training should include introduction to a glossary. (NPS should develop a comprehensive glossary which can be accessed by a single click. One possibility would be to hyperlink these terms to text in application. E.g., "Please provide a contingency for the design phase," where 'contingency' links to the glossary. The glossary could be hosted on the forthcoming cost estimating web page.)	High	Moderate
NPS users need training to determine if an estimate will include contact with asbestos, radon, or lead	Training: Cost Estimating			Cost estimating principles	Medium	Simple

Issue	Category	BP	Dev	Proposed solution	Priority	Level of Effort
NPS users need to understand how to add a premium to cost estimates for situations where the bidder is required to be an 8(a) or other set-aside	Training: Cost Estimating	✓		Cost estimating principles. Develop a policy regarding cost estimates that fall within 8(a) or set-aside scope and train users within the policy guidelines. Cost estimating principles should cover the policy.	Medium	Simple
NPS users need to understand how to adjust cost estimates for specific methods of construction (e.g., design/build, historic structure)	Training: Cost Estimating	✓		Cost estimating principles	Medium	Simple
NPS users need to understand how to account for local market material costs	Training: Cost Estimating			Cost estimating principles. Park Location Factor concept should be covered in this as well.	Medium	Moderate
NPS users need to understand how to account for local market labor costs (e.g., due to labor shortage, extreme cases)	Training: Cost Estimating			Cost estimating principles. Park Location Factor concept should be covered in this as well.	Medium	Moderate
NPS users need to determine how to account for local and out of state wage rates	Training: Cost Estimating			Cost estimating principles. Park Location Factors (PLF) are intended to account for local differences in labor and materials. The NPS Cost Estimating Working Group (CEWG) has tasked itself to revisit this issue and will potentially redefine how PLFs are calculated using for defensible data.	Medium	Moderate

Issue	Category	BP	Dev	Proposed solution	Priority	Level of Effort
NPS users may need a basic math course to assist with estimating.	Training: Cost Estimating			Cost estimating principles	Low	Simple
NPS users will be using "CESS for way more than Facility Condition Assessment Surveys (FCAS) deficiency costing, and that growth will continue with the expanding emphasis on current, and new, Work Types and Sub-work types, the maturity of existing partners, the addition of new partners, etc, all of which impact CESS"	Training: Cost Estimating			Cost estimating principles (once this process is developed)	N/A	N/A

B. Bower, EOS Group

Appendix B

Association for the Advancement of Cost Engineering (AACE)

www.aacei.org/certification/certexplained.shtml

The Society of Cost Estimating and Analysis (SCEA)

www.sceaonline.org/certification/certification.cfm