

*O*NET® Analyst Occupational Abilities Ratings: Procedures Update*

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O*NET ANALYST OCCUPATIONAL ABILITIES RATINGS: PROCEDURES UPDATE

Executive Summary

The Occupational Information Network (O*NET[®]) is a comprehensive system developed by the U.S. Department of Labor that provides information for over 950 occupations within the U.S. economy. This information is maintained in a comprehensive database, developed to replace the Dictionary of Occupational Titles (DOT) (U.S. Department of Labor, 1991). In order to keep the database current, the National Center for O*NET Development is involved in a continual data collection process aimed at identifying and maintaining up-to-date information on the characteristics of workers and jobs. To ensure a controlled data collection and management process, occupational data is being collected in groups or “cycles”. This report describes the data collection process that generalizes across all occupations, but refers specifically to the data collection process for the twelfth analysis cycle of 107 occupations. These same analyst procedures will be used to collect ability information for the remaining occupations in the O*NET data collection.

The rating process in Cycle 12 was slightly modified due to a large percentage of repeat occupations. Specifically, 88 of the 107 occupations had been rated by analysts in previous cycles. The 19 new occupations were rated according to established procedures, whereas the 88 repeat occupations were rated according to a modified process utilizing information from the cycle in which the occupation was previously rated. Looking into the future, the vast majority of occupations will receive a second analyst rating. Thus, the procedures described in this report will continue in the future. The purpose of this report is to produce a comprehensive update of all procedures associated with making ability ratings.

To facilitate the ability ratings, relevant occupational information was developed from recent data collected from job incumbents. This information was provided to analysts to help them make ability level and importance ratings. Specifically, analysts received the:

- Title and definition of the occupation
- Job Zone of the occupation (i.e., level of vocational preparation needed)
- Mean importance of core and supplementary tasks for the targeted occupation
- Mean importance of Generalized Work Activities (GWAs) that (1) have a mean importance for the occupation ≥ 3.0 , and (2) require the targeted ability to be performed
- Mean rating of Work Context (WC) statements that (1) have a mean ratings for the targeted occupation ≥ 3.0 , and (2) require the targeted ability to work in that context
- Mean importance of the 10 most important Knowledge domains associated with the occupation with a mean importance rating of ≥ 3.0 .

Following the development of the occupational information, 16 analysts were selected as raters based on criteria related to education and work experience. These analysts were trained to interpret the occupational data and make importance and level ratings of the abilities. Following standardized procedures to review the occupational information, the trained analysts completed the rating process. Analysts’ performance and ratings were monitored and evaluated throughout

the project. If necessary, remedial training and guidance was provided. Final importance and level ratings for each occupation were delivered to the National Center for O*NET Development.

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Introduction

The Occupational Information Network (O*NET) is a comprehensive system developed by the U.S. Department of Labor that provides information for over 950 occupations within the U.S. economy. This information is maintained in a comprehensive database, developed to replace the Dictionary of Occupational Titles (DOT) (U.S. Department of Labor, 1991). In order to keep the database current, the National Center for O*NET Development is involved in a continual data collection process aimed at identifying and maintaining current information on the characteristics of workers and jobs. The information that populates the O*NET database is collected from three primary sources: incumbents, occupational experts, and occupational analysts. Targeted job incumbents provide ratings on occupational tasks, generalized work activities (GWA), knowledge, education and training, work styles, and work context areas. Importance and level information regarding the abilities and skills associated with these occupations is collected from occupational analysts.

Although ability information initially was collected from job incumbents, recent research suggests that trained occupational analysts understand the ability constructs better than incumbents (Morgeson & Campion, 1997; Tsacoumis, 2007), and therefore it follows that they should provide the ability data. In these instances, it is imperative that the occupational analysts have detailed occupation information in order to rate the ability constructs. It has also been suggested that incumbents are more likely than analysts to deliberately inflate their ratings to influence policy decisions such as those associated with compensation and training (Harvey, 1991; Morgeson, Delaney-Klinger, Mayfield, Ferrara, & Campion, 2004). Ability ratings may be particularly vulnerable to such effects given that they are more abstract and thus more difficult to verify than more observable descriptors such as job tasks (Morgeson & Campion, 1997; Morgeson et al., 2004). Given these considerations, occupational analysts as opposed to incumbents provided the ability information in the O*NET database.

This report provides a comprehensive update of a previous procedures report focusing on ability ratings (Donsbach, Tsacoumis, Sager, & Updegraff, 2003). Abilities are "... relatively enduring attributes of an individual's capability for performing a particular range of different tasks" (Fleishman, Costanza, & Marshall-Mies, 1999, p. 175). Abilities are sometimes referred to as traits as they tend to remain stable over long periods. The 52 O*NET abilities cover performance applicable to a broad range of jobs in the world's economy. These abilities are grouped into four categories: cognitive, psychomotor, physical, and sensory-perceptual (see Appendix A). To facilitate the ability rating process, occupational analysts are provided relevant occupational information from incumbents. The purpose of this report is to describe the entire analyst data collection process, from preparation of the materials describing occupational data to analysis of the final ability ratings. A flow diagram of this process is presented in Figure 1.

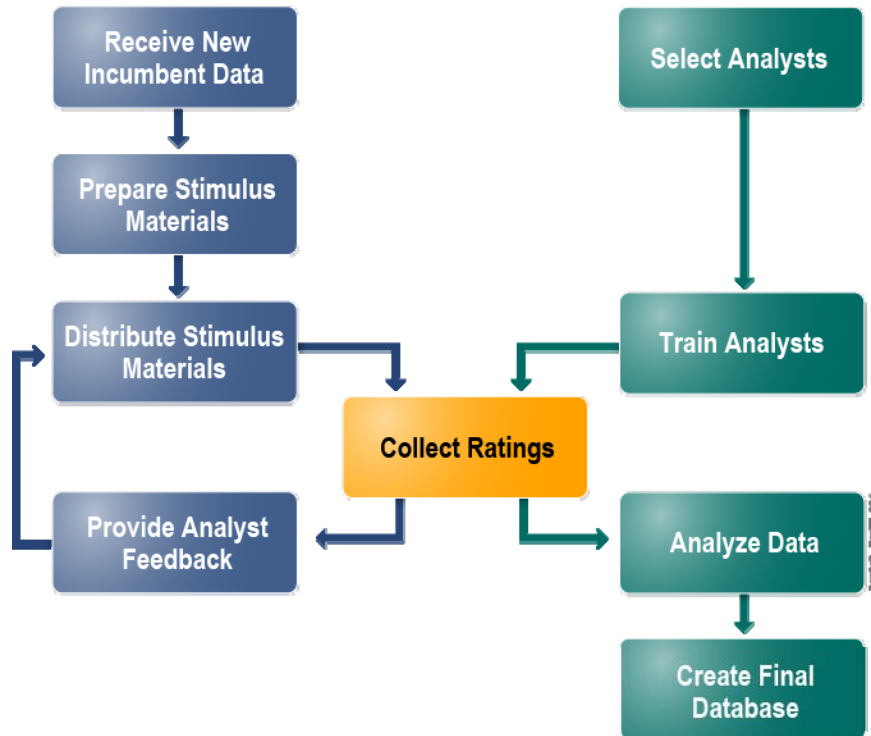


Figure 1. O*NET Analyst Data Collection Process

It should be noted that to ensure a controlled data collection and management process, occupational data are being collected in groups or “cycles.” This report describes the data collection process that generalizes across all occupations, but refers specifically to the data collection process for the twelfth analysis cycle of 107 occupations. These same analyst procedures will be used to collect skill information for the remaining occupations in the O*NET data collection.

The rating process in Cycle 12 was slightly modified due to a large percentage of repeat occupations. Specifically, 88 (82%) of the 107 occupations had been rated by analysts in previous cycles. The 19 new occupations were rated according to established procedures, whereas the 88 repeat occupations were rated according to a modified process utilizing information from the cycle in which the occupation was previously rated. We presented the new procedures to our 16 analysts before they were implemented, and they approved of them, offering no suggestions for improvement. Looking into the future, the vast majority of occupations will receive a second analyst rating. Thus, the procedures described in this report will continue in the future. In this report all changes to procedures are highlighted (placed in a text box) for readers familiar with previous procedures but interested in what changed in the most recent cycle.

A description of the procedures for new occupations as well as procedures for repeat occupations is provided below.

Ability Rating Process

Given the volume of occupational data available, it was imperative to identify the requisite information that would facilitate the ability rating process without overwhelming raters. In addition, it was necessary to develop a clear-cut procedure for reviewing and interpreting the data, and making the final rating. The ultimate goal was to identify the data that would provide sufficient information about the occupation as a whole so the analysts can make accurate ability importance and level ratings. At the same time, it was important to balance the desire to present all available information with the possibility of overwhelming the analysts with more data than can be reasonably processed. Given this, there were several issues that needed to be addressed:

- What occupational information should be included in the stimulus materials?
- At what level of detail should the information be presented (e.g., importance means)?
- What other information should be included in the stimulus material?
- How should the information be presented?

Based on a review of the O*NET Content Model (Peterson, Mumford, Borman, Jeanneret, Fleishman, 1995; Peterson, Mumford, Borman, Jeanneret, Fleishman, & Levin, 1997; Peterson, Mumford, Borman, Jeanneret, Fleishman, 1999), it was determined that the following information would be informative for the analysts and included on the stimulus materials:

- Title, definition, and Job Zone of the occupation
- Task statements and data
- Generalized Work Activity statements and data
- Work Context items and data
- Knowledge domains and data

These pieces of information offer a comprehensive description of the occupation, as a whole, and provide insight about how the abilities may be applied on the job. In contrast, the other domains (e.g., skills, work styles) were not deemed to provide critical information required to make judgments about the importance or level of the abilities to an occupation.

The presentation of occupation title and definition is straightforward. Somewhat less straightforward, *Job Zone* is also presented to analysts. *Job Zone* is a *classification system that describes the amount of preparation that can lead to successful job performance* (National Center for O*NET Development, 2008). Occupations are sorted into five Job Zones based on similar levels of vocational preparation (see Appendix B). This information assists in understanding the scope of different occupations.

There are a number of different pieces of information that could be presented for the tasks, GWAs, Work Context items, and Knowledge domains. For example, incumbents provide a variety of ratings (e.g., importance, frequency, level) for tasks, GWAs, Work Context items, and Knowledge domains. Given this, the next step was to determine what data, specifically, would be included in the stimulus materials to facilitate the analyst rating process. The issues and final decisions associated with each key piece of occupational information included in the stimulus material are presented below.

Tasks

A task is defined as an activity that occurs in order to produce a product or outcome required on the job. In reviewing the options for what task data should be presented, it was determined that it would be meaningful for the analysts to be aware of the importance associated with each task, although frequency and relevance were deemed less informative. With regard to importance, it seemed insufficient to simply provide a list of the important tasks, without a clear understanding of the degree to which each task was important to the specific occupation. It is likely that the importance level of the various tasks may influence the judgments about the importance and level of an ability. Given this, the mean task importance rating, rounded to the nearest tenth, is presented on the stimulus material.

Clearly, knowing the tasks' importance to the occupation would be informative in rating an ability's importance and level. However, it is less clear that knowing specific information regarding the frequency with which a task is performed or the relevance of the task to the occupation would be beneficial to making ability judgments. Frequency data does not provide sufficient unique information relevant to the ability rating process to warrant inclusion in the stimulus material. In terms of relevance, that information was captured in a fairly indirect manner — the incumbent either marked “not relevant” or provided a rating. Therefore a task was considered relevant if (1) “not relevant” was *not* marked, and (2) either an importance or frequency rating was provided. Although it does not seem critical to share the exact percentage of incumbents that indicated a task is relevant to their job, there may be some benefit to communicating, in general, the relevance of the task. Given that, and as a means to help interpret the importance ratings, tasks were grouped into three categories: core, supplemental, and non-relevant. More specifically, statements rated on relevance or importance by 15 or more incumbents were classified into one of the three categories:

- **Core Tasks:** (a) relevance $\geq 67\%$ and (b) a mean importance rating ≥ 3.0
- **Supplementary Tasks:** (a) tasks rated $> 67\%$ on relevance but < 3.0 on importance, or (b) tasks rated between 10% and 66% on relevance, regardless of mean importance rating
- **Non-Relevant Tasks:** relevance $< 10\%$ regardless of mean importance

Tasks that fell into the non-relevant category were not identified as meaningful data for the analyst's rating process and therefore omitted from the stimulus material. Presenting the task data in terms of either core or supplementary tasks was considered beneficial, since analysts can easily appreciate the incumbent perspective regarding the relative importance of tasks and thus, increase the accuracy of their ratings.

Knowledge

Knowledge is defined as organized sets of principles and facts applying in general domains (Peterson et al., 1999). Through discussions with occupational analysts after multiple rating cycles, it was determined that it would be meaningful for the analysts to be aware of the

most important knowledge domains associated with each occupation. Similar to the tasks, it was deemed informative to include the importance associated with each knowledge domain. Thus, beginning with Cycle 10, knowledge domains with importance ratings of 3.0 or greater were also provided in the stimulus materials accompanied by the mean knowledge importance ratings, rounded to the nearest tenth. Only the first 10 knowledge statements meeting the importance criteria were listed in an effort to provide meaningful information that is not overwhelming. Appendix C lists the knowledge domain definitions.

Generalized Work Activities (GWAs)

GWAs are defined as “a set of similar actions that are performed together in many different occupations” (Peterson et al., 1999). Like the abilities, GWAs are divided into several taxonomic categories (i.e., Information Input, Mental Processes, Work Output, and Interacting with Others). Incumbents provide both importance and level ratings for each GWA. Given this, several pieces of GWA data were considered for inclusion in the stimulus materials. The first was whether to include data on all GWAs for each occupation or only those that were deemed important to the target occupation. It was determined that listing all GWAs would be excessive and therefore only those important to the occupation (i.e., mean importance rating of 3.0 or greater) should be included in the stimulus materials. This judgment was, of course, at the occupational level (i.e., the particular GWA is important to the occupation). However, it’s also possible to think about GWAs at the individual ability level (i.e., the particular GWA needs the target ability to be performed successfully). Given this, the project team decided that the most meaningful GWA information for the analyst rating process would be a presentation of only those GWAs that are important to the occupation, and require the specific ability in order to be performed successfully. That is, if the ability is not required to perform a particular GWA, then it would be irrelevant to present information about that GWA for that specific ability. Thus, the stimulus material for a particular ability would only include those GWAs (1) found to be important for the occupation (mean ≥ 3.00) and (2) that require the targeted ability to be performed successfully. The process of identifying the abilities needed to successfully perform each GWA involved collecting ability/GWA linkage data and is described later in this report.

As noted above, in addition to importance ratings, level ratings information is available for each GWA. Initially, the inclusion of both importance and level data was deemed appropriate, and potentially informative. Therefore stimulus materials containing both pieces of information was included in a pilot test. Pilot results and feedback from pilot analysts however indicated that the level ratings significantly increased the complexity of the cognitive task associated with making ability importance and level ratings. The analysts also found it difficult to interpret the level ratings since the benchmarks were not provided on the stimulus material. For these reasons, and because level rating information is often redundant with importance information, a decision was made to drop the level ratings from the stimulus materials.

In summary, the GWA data that is presented in the stimulus material are those GWAs that are those GWAs that are (1) important to the occupation (mean ≥ 3.00) and (2) require the targeted ability for successful performance. Importance means are rounded to the nearest whole number to simplify the cognitive process. The GWAs are presented in the order that they occur on the incumbent questionnaire and are organized by their highest order taxonomic categories.

Presenting the GWAs in this order communicates information about the meaning of the descriptors, provides a consistent format across ability pages, and facilitates analyst consumption and understanding of this information.

Work Context Descriptors

Work Context descriptors (WCs) are conditions under which job activities must be carried out including physical conditions (e.g., temperature and noise) and social-psychological conditions (e.g., time pressure and dependence on others) that have the potential to influence how people perform certain work activities. Incumbents rated each WC on a 5-point scale, although the benchmarks vary depending on the nature of the statement (e.g., frequency, importance, amount of responsibility, time spent).

Based on a review of the WCs and their associated benchmarks, it seems as though the most meaningful information for the analyst's rating task would be those WCs that meet a certain threshold on their respective rating scale (e.g., at least 3.0 mean importance). This would avoid presenting WCs that receive low ratings, suggesting that they are not sufficiently relevant to the target occupation and therefore, would have little or no impact on the analyst's judgment. In addition, to ensure only the most pertinent information is included in the stimulus material, only the WCs which require the specific ability in order to perform work in that context should be included in the stimulus material. Like the GWAs, this information was collected by conducting an ability/WC linkage study (described below). Thus, the WC data that is included in the stimulus material for a particular ability are those that (1) received a mean rating of at least 3.0 for the specific occupation and (2) needed the target ability in order for work to be performed in that context. To facilitate interpretation, the WCs are organized by their scale (e.g., frequency, length of time, and level of responsibility) and the mean ratings are rounded to the nearest whole numbers.

Ability/GWA and WC Linkages

As mentioned above, a requisite precursor to the development of the stimulus materials was the identification of the abilities that are linked to each GWA and WC outside the context of a particular occupation (i.e., abilities required to perform each GWA successfully or to conduct work in each work context). Then, this information could be used to narrow the list of GWAs and WCs presented in the stimulus materials to only those relevant to the target ability.

Linkage data was collected from eight experienced industrial/organizational psychologists. All participants hold doctorates in industrial/organizational psychology or a closely related field, and have extensive experience in job analysis and knowledge of O*NET. For each ability and GWA (or WC) combination, the participant made a dichotomous judgment regarding whether the ability was needed to perform each GWA (or perform work in this context). The complete linkage exercise instructions are presented in Appendix D. The results were recorded into a matrix and summarized across all participants.

After each participant made his/her independent linkage judgments, everyone met to review and discuss the results. An a priori decision was made that a majority of the judges (i.e.,

at least five) had to indicate that the ability was linked to a specific GWA/WC for a linkage to be established. If four or fewer judges considered the pair linked, a linkage was not established. All borderline situations (i.e., four judges suggested a linkage), as well as cases which a particular judge wanted to review, were discussed among the judges. Following this discussion, judges had the opportunity to modify one's original linkage judgment. The final results of this exercise indicated that on average each ability is linked to seven GWAs (min = 0 and max = 31) and four WCs (min = 0 and max = 14). The final linkage matrix depicting the abilities required to perform each GWA and work in each context is presented in Appendix E.

Changes to the Stimulus Materials for Repeat Occupations

As mentioned in the introduction, the rating process in Cycle 12 was modified for repeat occupations. One important change was to the stimulus materials. We thought it was important to highlight any changes to the occupational information since it was initially rated. To accomplish this, any new piece of information (tasks, GWAs, WCs) was bolded and had an asterisk on the end. Also, any statement that was presented in a previous cycle that is no longer part of the occupational information was crossed out with a strikethrough. No other changes were made to the stimulus materials.

Ability Rating Procedures

Given the potential complexity of the ability rating process, a set of standardized steps for reviewing and interpreting the data presented in the stimulus material were established. Appendix F contains detailed instructions for making ratings following both the traditional procedures and following the revised procedures created for repeat occupations. A brief overview of the procedures is presented below.

First, analysts should review the occupation title, definition, Job Zone, tasks, and knowledge domains to get an overall image of the occupation. Then, they should proceed with the importance and level rating as follows:

Making Importance Ratings

- Step 1. Consider the Construct: Review the title, definition, Job Zone, and three *Level* scale anchors tailored to the specific construct
- Step 2. Consider the Tasks: Review importance ratings, make preliminary importance rating on ability
- Step 3. Consider Knowledge Statements: Review importance ratings, review/revise preliminary rating
- Step 4. Consider GWAs: Review importance ratings, review/revise preliminary rating
- Step 5. Consider Work Context: Review mean ratings
- Step 6. Document Final Ability Importance Rating

For repeat occupations, as soon as an analyst enters a rating in step 6, the previous average importance rating for the construct from the cycle in which the occupation was

previously rated is displayed. Analysts were instructed to consider the previous average rating, along with changes to the occupational information since the previous time the occupation was rated (information in bold with an asterisk and crossed out information). As a reminder, information in bold with an asterisk is new, or was *not* rated as important enough to be presented during the previous cycle. Crossed out information *was* rated as important enough to be presented during the previous cycle but was *not* rated as important enough to be presented in the current cycle. Both types of information were used by analysts to judge the difference between their initial rating and the previous average analyst rating against changes to incumbent ratings of the occupation. Once they gave full consideration to all relevant information, analysts entered their final importance rating.

Making Level Ratings

Step 1. Determine Whether to Provide a Level Rating: If the analyst rated the construct as *Not Important* (i.e., 1), then they would give the construct a *Level* rating of 0 and move on to the next construct. If the analyst rated the construct as at least *Somewhat Important* (i.e., ≥ 2), then they would provide a *Level* rating for the target construct

Step 2. Consider the Level Anchors

Step 3. Consider the Tasks: make a preliminary level rating on ability

Step 4. Consider Knowledge Statements: review/revise preliminary level rating

Step 5. Consider GWAs: review/revise preliminary level rating

Step 6. Consider Work Context

Step 7. Document Final Ability Level Rating

Similar to the importance rating process, once the analyst enters a rating, the previous average level rating for the construct from the cycle in which the occupation was previously rated is displayed. After considering any modifications to the occupational information, the analyst enters a final level rating.

Stimulus Material Development

The ultimate goal is to generate stimulus materials that present meaningful data aimed at facilitating the ability rating process, without being burdensome or excessive. As described above, the information presented in the materials for each occupation, and each ability within an occupation, is as follows:

- Title, definition, and Job Zone of the occupation
- Mean importance of core and supplementary tasks for the targeted occupation
- Mean importance of Generalized Work Activities (GWAs) that (1) have a mean importance for the occupation ≥ 3.0 , and (2) require the targeted ability to be performed
- Mean rating of Work Context (WC) statements that (1) have a mean ratings for the targeted occupation ≥ 3.0 , and (2) require the targeted ability to work in that context
- Mean importance of the 10 most important Knowledge domains associated with the occupation with a mean importance rating of ≥ 3.0 .

Occupation Title, Definition, and Job Zone

The occupational titles, eight-digit codes, definitions, and Job Zone categories were presented on the first page of stimulus materials (for a given occupation) above the tasks. Occupational titles, codes, definitions, and Job Zone information were provided to HumRRO in a Microsoft Excel spreadsheet by the National Center for O*NET Development staff.

Tasks

As described above, all relevant tasks were divided into two categories: core and supplementary. Given this, the tasks were organized by category, listing all the core tasks first, followed by the supplementary statements. Accompanying each task was the mean importance rating, rounded to the nearest tenth. The task data required to populate the stimulus material for each occupation was provided to HumRRO in a Microsoft Excel spreadsheet. This data was then transferred into a formatted table template developed in Microsoft Access and saved as new separate files for each occupation. Next, these tables were printed, proofed, revised if necessary and reprinted for distribution to the analysts (see Appendix G for a sample task stimulus material sheet).

Knowledge

Important knowledge domains (≥ 3.0) were listed below the task statements on the first page of the stimulus materials. Accompanying each knowledge was the mean importance rating, rounded to the nearest tenth. The knowledge data required to include in the stimulus material for each occupation was provided to HumRRO in a Microsoft Excel spreadsheet. Data were then inserted in the Microsoft Access database that was created to house all of the stimulus material information.

Generalized Work Activities

Following the occupation title, definition, Job Zone, and task data, the stimulus material continued with information specific to each of the 52 abilities for the targeted occupation. First, the ability title, definition, Job Zone, and level scale with its job-related activities anchors were presented. Then, those GWAs that require the targeted ability to be performed successfully and have a mean importance rating for the particular occupation of at least 3.0 were listed. The mean importance ratings, rounded to the nearest whole number, were listed next to the corresponding GWA.

GWA data was delivered to HumRRO in a Microsoft Excel spreadsheet, which was then imported into a formatted stimulus material template file. The template presenting the ability data was developed in Microsoft Access. Formulas embedded in the template pulled the appropriate occupational data from the raw data spreadsheet into the formatted template. The template displayed descriptors and data for the GWAs to which each ability was linked. After the data was imported, GWAs with incumbent mean ratings less than 3.0 were eliminated with Visual Basic Macros.

Work Context Statements

The WC statements were presented below the GWA data on each of the 52 ability sheets for each occupation. Those WCs that require the targeted ability to work in that context and have mean ratings for the targeted occupation ≥ 3.0 were listed. The mean importance ratings, rounded to the nearest whole number, are listed next to the corresponding WCs. The same procedures that were used to manage the GWA data were implemented on the WC data. The WC data was also delivered to HumRRO in an Excel spreadsheet (see Appendix G for a sample ability stimulus material sheet).

Occupational Analysts

Sixteen trained analysts were responsible for rating the importance and level of the 52 abilities for each of the O*NET occupations. A minimum of eight raters per occupation was required. This number was based on the number of raters estimated to be required to ensure the target level of interrater reliability. The type of reliability of most interest in this situation is the extent to which raters agree about the order of and relative distance between occupations on a particular scale for a particular construct. For example, is there consistency across raters in how they differentiate among occupations on the required level of the ability *Oral Comprehension*?

Our target level of interrater reliability is that the median *ICC* (3, *k*) across the construct ratings for a particular domain on a particular scale be .80 or greater (e.g., the median reliability across 52 Ability Level ratings should be at least .80). The value of .80 is judged to be a good rule-of-thumb that has been used previously in the O*NET context (e.g., Clement, Chauvot, Philipp, & Ambrose, 2003; McCloy, Waugh, & Medsker, 1998; Rase & Tognetti-Stuff, 1983). The need for eight raters per occupation was based on the reliability values observed in the prototype O*NET project (Peterson et al., 1997) and the work HumRRO performed to generate occupational workforce patterns for O*NET (McCloy, et al., 1998).

Occupational Analyst Criteria

To ensure that the job analysts selected were qualified to complete the rating task, minimum criteria for serving as an analyst were established. An analyst must have:

- At least two years work experience. This work could be full or part time work, but it could not be an internship, summer job, or research assistantship position in school. The work experience requirement was set to ensure that the analysts were highly familiar with a work environment and job responsibilities.
- Completed two years of graduate education in either Industrial/Organizational Psychology, Vocational Psychology, Human Resources (business department), or Industrial Relations.
- Completed courses in both job analysis (or something comparable) and research methods (or something comparable).

The education and course requirement was set to ensure that the analyst had training and experience working with occupational or job analytic terminology and constructs and

measurement methodology. For the current effort, all 16 analysts met (and many exceeded) the criteria listed above.

Occupational Analyst Training

HumRRO project staff developed a program to train analysts to make reliable and valid ratings of occupational abilities. The final training program and content are discussed below.

The training lasted about 8 hours and was conducted over one day. The training followed an analyst training manual that included four modules and appendices:

Module 1: Introduction. Overview of the O*NET database structure and uses; also includes and a general review of the rating process along with common rating errors and a brief history of O*NET.

Module 2: Overview of the Stimulus Materials. Detailed introduction and discussion of the stimulus materials including the associated terminology and concepts.

Module 3: Making Your Ratings. Step-by-step description of the rating process and practice making ratings on several of the O*NET abilities for a sample occupation.

Module 4: Recording Your Ratings. Introduction of the electronic rating form used to enter and submit ability ratings.

Appendices. Materials related to Modules 1-4.

Each training module incorporated hands-on exercises and quizzes. In addition, a manual for the trainers with instructions for presenting information was developed and provided in each module. Imbedded in the training modules was repeated exposure and discussion of the ability constructs. To facilitate the rating process, analysts were provided detailed instructions for making their ratings (see Appendix F). In general, the rating process involved three main steps:

- Step 1. Review the occupational title, definition, Job Zone, incumbent task ratings, and incumbent knowledge ratings and make a preliminary rating of the ability.
- Step 2. Review the GWAs and ratings and modify their preliminary rating as necessary.
- Step 3. Review the relevant WC descriptors, make any needed adjustments to their rating, and then record a final rating.

A bulk of the training time was devoted to going through these steps and discussing the meaning underlying each scale and how the various pieces of information are used and combined to synthesize the ratings. As part of the step-by-step process, analysts were trained to make preliminary ratings with each piece of occupational information considered before making their final rating. Analysts were given the opportunity to practice making preliminary ratings in groups and individually and were given extra time to practice and discuss examples of making preliminary ratings at the end of training. These training areas were covered chiefly in Module 3, so the training time for this Module was greater than other Modules.

Experienced Occupational Analyst Training

Although unnecessary to review the entire training program with experienced occupational analysts, it was deemed beneficial to conduct abbreviated training sessions at the beginning of each subsequent rating cycle. The abbreviated training included a detailed review of the rating process as well as a targeted review of potentially problematic construct definitions. Occupational analysts were given the opportunity to practice rating constructs for multiple occupations and to discuss their judgments with the group. Feedback from the abbreviated training was positive, as analysts felt the session was useful and assisted in maintaining a process that resulted in reliable and valid ratings.

Data Collection

Rating Schedule and Assignments

Sixteen raters were randomly assigned to Rater Group A or B such that each group consisted of eight raters. Ratings were collected for 107 occupations during the twelfth rating cycle. First, the 19 new occupations were rated following traditional procedures, and then the remaining 88 repeat occupations were rated following the new procedures for repeat occupations. In total, there were 20 sets of occupations. All sets consisted of five occupations with the exception of Set 4, which only contained four occupations. Table 1 depicts the assignment of the 107 occupations to the two groups of raters. As can be noted, Rater Group A rated occupation sets 1, 2, 3, 5, 7, 9, 11, 13, 15, 17, and 19, and Rater Group B rated occupation sets 1, 2, 4, 6, 8, 10, 12, 14, 16, 18, and 20. The table also shows that initially both groups rated two sets of occupations (i.e., 1 and 2). This allowed for preliminary assessments of the reliability of the ratings to be based on 16 raters for 10 occupations.

Table 1. General Batch Assignments

	Group A	Group B
Batch 1	Set 1	Set 2
Batch 1-Reverse	Set 2	Set 1
Batch 2	Set 3	Set 4
Batch 3	Set 5	Set 6
Batch 4	Set 7	Set 8
Batch 5	Set 9	Set 10
Batch 6	Set 11	Set 12
Batch 7	Set 13	Set 14
Batch 8	Set 15	Set 16
Batch 9	Set 17	Set 18
Batch 10	Set 19	Set 20

Additionally, unlike previous cycles, raters took a one week break after the first set of repeat occupations (Batch 3) to participate in a one-hour teleconference with the same HumRRO staff member who conducted the analyst training. This call was intended to discuss the new repeat rating procedures to ensure clarity and efficiency. This call revealed that the analysts perceived the new procedures to be easily understood and easy to follow. It was noted that the new process increased the time necessary to rate each occupation, especially at first; but this time decreased as the analysts gained practice. Further, rating sheets were improved to make the previous average ratings appear next to initial ratings after they were entered rather than as a pop-up window because analysts indicated that the latter was more cumbersome than the former.

Disseminating Stimulus Materials

As described above, each group of raters received a set of five occupations at a time. Given this, the stimulus materials were produced in batches of 10 occupations (five in each set). Each batch of stimulus materials was generated, distributed and returned in a series of steps:

- Step 1. The stimulus materials were generated and automatically formatted using the access database and sent to the printer.
- Step 2. The materials were printed, proofed, packaged, and shipped to the occupational analysts.
- Step 3. Occupational analysts returned their completed ratings for the batch of five occupations seven days after the day they were distributed.

The stimulus materials were prepared one week prior to distribution. For a given cycle, analysts received stimulus materials on Wednesday and returned their ratings Wednesday the following week. Analyst feedback indicated that on average, it took 1 to 1 ½ hours to complete the ratings for a single occupation. Analysts had their stimulus materials shipped to them using express mail. It should be noted that care was taken to only use an express mail service (e.g., FedEx) that is able to track shipments. This helped ensure that the materials arrived on time at the appropriate location.

Recording the Ratings

The occupational analysts entered their importance and level ratings into an electronic rating form designed in Microsoft Excel. This form contained special features to enhance the accuracy of the data entry process. For example, a warning message would appear if the analyst accidentally entered a number that was out of range. Each week, the occupational analysts returned this electronic rating form to HumRRO staff via email by the scheduled due date.

Rating Analysis

Each batch of ratings was compiled and analyzed to provide feedback to occupational analysts. This feedback informed analysts of any rating tendencies that they should note. Also, abilities with large values for the standard error of the mean (SE_M) were identified so that

analysts could revisit their ratings. At the end of the cycle, a number of reliability statistics were computed along with additional information described in the cycle report.

Batch Analysis

First, ratings were reviewed for errors (e.g., missing ratings). Forms submitted with errors were returned to the occupational analysts for correction. Then, the ratings were examined for common rating errors (e.g., leniency, severity). Occupational analysts who showed any sort of rating bias or tendency across multiple occupations received feedback regarding the relative rating error. For example, some raters consistently provided higher ratings than others across numerous occupations. This information was shared with the particular raters and they were instructed to keep this in mind when making future ratings.

Then, ratings were analyzed for interrater agreement. These indices were computed to examine the level of absolute agreement among the occupational analysts in ratings within a construct, regardless of how they rank ordered the relative importance or level of the abilities for a particular occupation. For example, these indices were calculated to look at the extent to which eight raters provided the same rating regarding the level of the *Ability Oral Comprehension* required to perform a particular occupation. To look at the agreement, we calculated the standard deviation (SD_x) of ratings across occupational analysts for a given construct and scale for each occupation and the standard error of the mean (SE_M) of these ratings.

If the SE_M of the importance ratings for a given construct within an occupation was large (i.e., $>.51$), it was deemed to have insufficient agreement across raters. An SE_M greater than .51 means that the upper and lower bounds of the confidence interval are more than one scale point away from the observed mean. For these constructs, all raters in the rating group were asked to reconsider their ratings. Although not required to change their initial ratings, occupational analysts were encouraged to provide their final ratings after reconsideration, along with a brief rationale in support of the new ratings, to all other raters in the group.

Cycle Analysis

After all of the batches were analyzed, the rating data were compiled into one database for analyses. In addition to computing interrater agreement on the combined cycle data (as described above), two different types of interrater reliability were also calculated.

Interrater Reliability: Across Constructs Within Occupations. These indices were computed to look at the consistency across constructs within occupations. This type of reliability explains the extent to which raters agree about the order of and relative distance between constructs on a particular scale *within* a particular domain and occupation. For example, these indices were computed to determine if there was consistency across raters in terms how they rated the relative importance of the 52 Ability constructs to performance in a particular occupation. To look at this type of reliability, we calculated Shrout and Fleiss' (1979) $ICC(3, k)$ for each occupation on each scale. $ICC(3, k)$ is an intraclass correlation. Our target level of interrater reliability for this coefficient was that the median $ICC(3, k)$ across occupations for each domain and scale be .80 or greater (e.g., the median reliability across occupations for Ability

Level ratings should be at least .80). The value of .80 is judged to be a good rule-of-thumb for this type of reliability and has been used for previous O*NET analyses (e.g., Clement, Chauvot, Philipp, & Ambrose, 2003; McCloy, Waugh, & Medsker, 1998; Rase & Tognetti-Stuff, 1983).

Interrater Reliability: Across Occupations Within Constructs. These indices were calculated to measure the consistency across occupations within constructs. This type of reliability determines the extent to which raters agree about the order of and relative distance between occupations on a particular scale for particular construct. For example, is there consistency across raters in how they differentiate among occupations on the required level of the *Ability Oral Comprehension*? In this circumstance, we computed Shrout and Fleiss' (1979) $ICC(3, k)$ for each construct on each scale (instead of for each occupation on each scale as described above). Therefore, each of the 52 Ability Importance Scale ratings will have a reliability value. Our target level of interrater reliability for this coefficient is that the median $ICC(3, k)$ across the construct ratings for a particular domain on a particular scale be .80 or greater (e.g., the median reliability across 52 Ability Level ratings should be at least .80). As with the previously discussed $ICC(3, k)$, the value of .80 is judged to be a good rule-of-thumb.

This type of reliability could not be used to evaluate raters during the rating process because it cannot be calculated until a reasonable number of occupations have been rated by a given group of analysts. Also, it is important to note that this reliability is dependent on the sample of occupations being rated. That is, all else being equal, the $ICC(3, k)$ based on ratings of a sample of homogeneous occupations will be lower than the $ICC(3, k)$ based on ratings of a sample of heterogeneous occupations. It is important to keep this point in mind when interpreting the reliability results.

After completing all analyses, a final summary dataset of the cycle ratings was prepared in Microsoft Excel and delivered to the National Center for O*NET Development. Reports describing additional description of abilities analysis and results are available at <http://www.onetcenter.org/research.html>.

Future Research

No empirical comparisons were made between previous ratings and Cycle 12 ratings of the same occupations, but such comparisons would be an interesting avenue for future research. For example, changes in rating reliability and mean rating differences could be examined within occupations over time.

Additionally, in the past analysts have rated some occupations a second time without the benefit of the new procedures implemented in Cycle 12. It is possible that larger differences would be found between first and second ratings of occupations rated and then updated prior to Cycle 12 than differences found after the implementation of the new procedures. In other words, it is possible that viewing previous average ratings narrows the gap between old and new ratings to some extent. Future research could examine this possibility.

Summary

The process of collecting occupational ability ratings from analysts involved designing, preparing, and distributing stimulus materials containing data associated with the target occupation, and collecting and analyzing the analyst data. The stimulus materials included the following pieces of information:

- Title, definition, and Job Zone of the occupation
- Tasks and mean importance rating for the targeted occupation
- Knowledge domains and the mean importance rating for the targeted occupation
- Generalized Work Activities (GWAs) to which the target ability are linked and mean importance for the linked GWAs with means ≥ 3.0
- Work Context (WC) statements to which the target ability are linked and the mean rating for the linked WC statements with means ≥ 3.0

Trained analysts followed standardized procedures to review the information and make ability ratings. Analysts' performance and ratings were monitored and evaluated throughout the process and, if necessary, remedial training and guidance was provided. Final importance and level ratings for each occupation were saved in an Excel spreadsheet and delivered to the National Center for O*NET Development.

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Appendix A – Ability Definitions by Category

Abilities are enduring attributes of the individual that influence performance. The 52 O*NET abilities are grouped into four categories: cognitive, psychomotor, physical, and sensory-perceptual.

Cognitive Abilities: Abilities that influence the acquisition and application of knowledge in problem solving.

- ❖ Verbal Abilities — Abilities that influence the acquisition and application of verbal information in problem solving
 - *Oral Comprehension* — Listening to and understand information and ideas presented through spoken words and sentences.
 - *Written Comprehension* — Reading and understand information and ideas presented in writing.
 - *Oral Expression* — Communicating information and ideas in speaking so others will understand.
 - *Written Expression* — Communicating information and ideas in writing so others will understand.

- ❖ Idea Generation and Reasoning Abilities — Abilities that influence the application and manipulation of information in problem solving
 - *Fluency of Ideas* — Coming up with a number of ideas about a topic (the number of ideas is important, not their quality, correctness, or creativity).
 - *Originality* — Coming up with unusual or clever ideas about a given topic or situation, or to develop creative ways to solve a problem.
 - *Problem Sensitivity* — Telling when something is wrong or is likely to go wrong. It does not involve solving the problem, only recognizing that there is a problem.
 - *Deductive Reasoning* — Applying general rules to specific problems to produce answers that make sense.
 - *Inductive Reasoning* — Combining pieces of information to form general rules or conclusions (includes finding a relationship among seemingly unrelated events).
 - *Information Ordering* — Arranging things or actions in a certain order or pattern according to a specific rule or set of rules (e.g., patterns of numbers, letters, words, pictures, mathematical operations).
 - *Category Flexibility* — Generating or using different sets of rules for combining or grouping things in different ways.

- ❖ Quantitative Abilities — Abilities that influence the solution of problems involving mathematical relationships
 - *Mathematical Reasoning* — Choosing the right mathematical methods or formulas to solve a problem.

- *Number Facility* — Adding, subtracting, multiplying, or dividing quickly and correctly.
- ❖ Memory — Abilities related to the recall of available information
 - *Memorization* — Remembering information such as words, numbers, pictures, and procedures.
- ❖ Perceptual Abilities — Abilities related to the acquisition and organization of visual information
 - *Speed of Closure* — Quickly making sense of, combining, and organizing information into meaningful patterns.
 - *Flexibility of Closure* — Identifying or detecting a known pattern (a figure, object, word, or sound) that is hidden in other distracting material.
 - *Perceptual Speed* — Quickly and accurately comparing similarities and differences among sets of letters, numbers, objects, pictures, or patterns. The things to be compared may be presented at the same time or one after the other. This ability also includes comparing a presented object with a remembered object.
- ❖ Spatial Abilities — Abilities related to the manipulation and organization of spatial information
 - *Spatial Orientation* — Knowing your location in relation to the environment or to know where other objects are in relation to you.
 - *Visualization* — Imagining how something will look after it is moved around or when its parts are moved or rearranged.
- ❖ Attentiveness — Abilities related to application of attention
 - *Selective Attention* — Concentrating on a task over a period of time without being distracted.
 - *Time sharing* — Shifting back and forth between two or more activities or sources of information (such as speech, sounds, touch, or other sources).

Psychomotor Abilities: Abilities that influence the capacity to manipulate and control objects.

- ❖ Fine Manipulative Abilities — Abilities related to the manipulation of objects
 - *Arm-hand Steadiness* — Keeping your hand and arm steady while moving your arm or while holding your arm and hand in one position.
 - *Manual Dexterity* — Quickly moving your hand, your hand together with your arm, or your two hands to grasp, manipulate or assemble objects.
 - *Finger Dexterity* — Making precisely coordinated movements of the fingers of one or both hands to grasp, manipulate, or assemble very small objects.

- ❖ **Control Movement Abilities** — Abilities related to the control and manipulation of objects in time and space
 - *Control Precision* — Quickly and repeatedly adjusting the controls of a machine or a vehicle to exact positions.
 - *Multi-limb Coordination* — Coordinating two or more limbs (for example, two arms, two legs, or one leg and one arm) while sitting, standing, or lying down. It does not involve performing the activities while the whole body is in motion.
 - *Response Orientation* — Choosing quickly between two or more movements in response to two or more different signals (lights, sounds, pictures). It includes the speed with which the correct response is started with the hand, foot, or other body part.
 - *Rate Control* — Timing your movements or the movement of a piece of equipment in anticipation of changes in the speed and/or direction of a moving object or scene.

- ❖ **Reaction Time and Speed Abilities** — Abilities related to speed of manipulation of objects
 - *Reaction Time* — Quickly responding (with the hand, finger, or foot) to a signal (sound, light, picture) when it appears.
 - *Wrist-finger Speed* — Making fast, simple, repeated movements of the fingers, hands, and wrists.
 - *Speed of Limb Movement* — Quickly moving the arms and legs.

Physical Abilities: Abilities that influence strength, endurance, flexibility, balance and coordination.

- ❖ **Physical Strength Abilities** — Abilities related to the capacity to exert force
 - *Static Strength* — Exerting maximum muscle force to lift, push, pull, or carry objects.
 - *Explosive Strength* — Using short bursts of muscle force to propel oneself (as in jumping or sprinting) or to throw an object.
 - *Dynamic Strength* — Exerting muscle force repeatedly or continuously over time. This involves muscular endurance and resistance to muscle fatigue.
 - *Trunk Strength* — Using your abdominal and lower back muscles to support part of the body repeatedly or continuously over time without “giving out” or fatiguing.

- ❖ **Endurance** — exert oneself physically over long periods without getting out of breath
 - *Stamina* — Exerting yourself physically over long periods of time without getting winded or out of breath.

- ❖ Flexibility, Balance, and Coordination — Abilities related to the control of gross body movements
 - *Extent Flexibility* — Bending, stretching, twisting, or reaching with your body, arms, and/or legs.
 - *Dynamic Flexibility* — Quickly and repeatedly bending, stretching, twisting, or reaching out with your body, arms, and/or legs.
 - *Gross Body Coordination* — Coordinating the movement of your arms, legs, and torso together when the whole body is in motion.
 - *Gross Body Equilibrium* — Keeping or regaining your body balance or stay upright when in an unstable position.

Sensory Abilities: Abilities that influence visual, auditory and speech perception.

- ❖ Visual Abilities — Abilities related to visual sensory input
 - *Near Vision* — Seeing details at close range (within a few feet of the observer).
 - *Far Vision* — Seeing details at a distance.
 - *Visual Color Discrimination* — Matching or detect differences between colors, including shades of color and brightness.
 - *Night Vision* — Seeing under low-light conditions.
 - *Peripheral Vision* — Seeing objects or movement of objects to one’s side when the eyes are looking ahead.
 - *Depth Perception* — Judging which of several objects is closer or farther away from you, or to judge the distance between you and an object.
 - *Glare Sensitivity* — Seeing objects in the presence of a glare or bright lighting.
- ❖ Auditory and Speech Abilities — Abilities related to auditory and oral input
 - *Hearing Sensitivity* — Detecting or telling the differences between sounds that vary in pitch and loudness.
 - *Auditory Attention* — Focusing on a single source of sound in the presence of other distracting sounds.
 - *Sound Localization* — Telling the direction from which a sound originated.
 - *Speech Recognition* — Identifying and understand the speech of another person.
 - *Speech Clarity* — Speaking clearly so others can understand you.

Appendix B – Job Zone Descriptions

A Job Zone is a group of occupations that are similar in:

- ◆ how much education people need to do the work,
- ◆ how much related experience people need to do the work, and
- ◆ how much on-the-job training people need to do the work.

Job Zone 1: Little or No Preparation Needed

Experience:	Little or no previous work-related skill, knowledge, or experience is needed for these occupations. For example, a person can become a cashier even if s/he has never worked before.
Education:	Some of these occupations may require a high school diploma or GED certificate.
Job Training:	Employees in these occupations need anywhere from a few days to a few months of training. Usually, an experienced worker could show you how to do the job.
Examples:	These occupations involve following instructions and helping others. Taxi drivers, amusement and recreation attendants, counter and rental clerks, cashiers, and waiters/waitresses.

Job Zone 2: Some Preparation Needed

Experience:	Some previous work-related skill, knowledge, or experience is usually needed. For example, a teller would benefit from experience working directly with the public.
Education:	These occupations usually require a high school diploma.
Job Training:	Employees in these occupations need anywhere from a few months to one year of working with experienced employees. A recognized apprenticeship program may be associated with these occupations.
Examples:	These occupations often involve using your knowledge and skills to help others. Sheet metal workers, forest fire fighters, customer service representatives, pharmacy technicians, salespersons (retail), and tellers.

Job Zone 3: Medium Preparation Needed

Experience:	Previous work-related skill, knowledge, or experience is required. For example, an electrician must have completed three or four years of apprenticeship or several years of vocational training, and often must have passed a licensing exam, in order to perform the job.
Education:	Most occupations in this zone require training in vocational schools, related on-the-job experience, or an associate's degree.
Job Training:	Employees usually need one or two years of training involving both on-the-job experience and informal training with experienced workers. A recognized apprenticeship program may be associated with these occupations.
Examples:	These occupations usually involve using communication and organizational skills to coordinate, supervise, manage, or train others to accomplish goals. Funeral directors, electricians, forest and conservation technicians, legal secretaries, interviewers, and insurance sales agents.

Job Zone 4: Considerable Preparation Needed

Experience:	A considerable amount of work-related skill, knowledge, or experience is needed for these occupations. For example, an accountant must complete four years of college and work for several years in accounting to be considered qualified.
Education:	Most of these occupations require a four-year bachelor's degree, but some do not.
Job Training:	Employees in these occupations usually need several years of work-related experience, on-the-job training, and/or vocational training.
Examples:	Many of these occupations involve coordinating, supervising, managing, or training others. Accountants, human resource managers, computer programmers, teachers, chemists, and police detectives.

Job Zone 5: Extensive Preparation Needed

Experience:	Extensive skill, knowledge, and experience are needed for these occupations. Many require more than five years of experience. For example, surgeons must complete four years of college and an additional five to seven years of specialized medical training to be able to do their job.
Education:	Most of these occupations require graduate school. For example, they may require a master's degree, and some require a Ph.D., M.D., or J.D. (law degree).
Job Training:	Employees may need some on-the-job training, but most of these occupations assume that the person will already have the required skills, knowledge, work-related experience, and/or training.
Examples:	These occupations often involve coordinating, training, supervising, or managing the activities of others to accomplish goals. Very advanced communication and organizational skills are required. Librarians, lawyers, aerospace engineers, physicists, school psychologists, and surgeons.

Appendix C – Knowledge Domain Definitions

- **Business and Management** — Knowledge of principles and facts related to business administration and accounting, human and material resource management in organizations, sales and marketing, economics, and office information and organizing systems
 - *Administration and Management* — Knowledge of business and management principles involved in strategic planning, resource allocation, human resources modeling, leadership technique, production methods, and coordination of people and resources.
 - *Clerical* — Knowledge of administrative and clerical procedures and systems such as word processing, managing files and records, stenography and transcription, designing forms, and other office procedures and terminology.
 - *Economics and Accounting* — Knowledge of economic and accounting principles and practices, the financial markets, banking and the analysis and reporting of financial data.
 - *Sales and Marketing* — Knowledge of principles and methods for showing, promoting, and selling products or services. This includes marketing strategy and tactics, product demonstration, sales techniques, and sales control systems.
 - *Customer and Personal Service* — Knowledge of principles and processes for providing customer and personal services. This includes customer needs assessment, meeting quality standards for services, and evaluation of customer satisfaction.
 - *Personnel and Human Resources* — Knowledge of principles and procedures for personnel recruitment, selection, training, compensation and benefits, labor relations and negotiation, and personnel information systems.
- **Manufacturing and Production** — Knowledge of principles and facts related to the production, processing, storage, and distribution of manufactured and agricultural goods
 - *Production and Processing* — Knowledge of raw materials, production processes, quality control, costs, and other techniques for maximizing the effective manufacture and distribution of goods.
 - *Food Production* — Knowledge of techniques and equipment for planting, growing, and harvesting food products (both plant and animal) for consumption, including storage/handling techniques.
- **Engineering and Technology** — Knowledge of the design, development, and application of technology for specific purposes.
 - *Computers and Electronics* — Knowledge of circuit boards, processors, chips, electronic equipment, and computer hardware and software, including applications and programming.
 - *Engineering and Technology* — Knowledge of the practical application of engineering science and technology. This includes applying principles, techniques, procedures, and equipment to the design and production of various goods and services.

- *Design* — Knowledge of design techniques, tools, and principles involved in production of precision technical plans, blueprints, drawings, and models.
- *Building and Construction* — Knowledge of materials, methods, and the tools involved in the construction or repair of houses, buildings, or other structures such as highways and roads.
- *Mechanical* — Knowledge of machines and tools, including their designs, uses, repair, and maintenance.
- **Mathematics and Science** — Knowledge of the history, theories, methods, and applications of the physical, biological, social, mathematical, and geography
 - *Mathematics* — Knowledge of arithmetic, algebra, geometry, calculus, statistics, and their applications.
 - *Physics* — Knowledge and prediction of physical principles, laws, their interrelationships, and applications to understanding fluid, material, and atmospheric dynamics, and mechanical, electrical, atomic and sub- atomic structures and processes.
 - *Chemistry* — Knowledge of the chemical composition, structure, and properties of substances and of the chemical processes and transformations that they undergo. This includes uses of chemicals and their interactions, danger signs, production techniques, and disposal methods.
 - *Biology* — Knowledge of plant and animal organisms, their tissues, cells, functions, interdependencies, and interactions with each other and the environment.
 - *Psychology* — Knowledge of human behavior and performance; individual differences in ability, personality, and interests; learning and motivation; psychological research methods; and the assessment and treatment of behavioral and affective disorders.
 - *Sociology and Anthropology* — Knowledge of group behavior and dynamics, societal trends and influences, human migrations, ethnicity, cultures and their history and origins.
 - *Geography* — Knowledge of principles and methods for describing the features of land, sea, and air masses, including their physical characteristics, locations, interrelationships, and distribution of plant, animal, and human life.
- **Health Services** — Knowledge of principles and facts regarding diagnosing, curing, and preventing disease, and improving and preserving physical and mental health and well-being
 - *Medicine and Dentistry* — Knowledge of the information and techniques needed to diagnose and treat human injuries, diseases, and deformities. This includes symptoms, treatment alternatives, drug properties and interactions, and preventive health-care measures.
 - *Therapy and Counseling* — Knowledge of principles, methods, and procedures for diagnosis, treatment, and rehabilitation of physical and mental dysfunctions, and for career counseling and guidance.

- **Education and Training** — Knowledge of principles and methods for curriculum and training design, teaching and instruction for individuals and groups, and the measurement of training effects.
- **Arts and Humanities** — Knowledge of facts and principles related to the branches of learning concerned with human thought, language, and the arts.
 - *English Language* — Knowledge of the structure and content of the English language including the meaning and spelling of words, rules of composition, and grammar.
 - *Foreign Language* — Knowledge of the structure and content of a foreign (non-English) language including the meaning and spelling of words, rules of composition and grammar, and pronunciation.
 - *Fine Arts* — Knowledge of the theory and techniques required to compose, produce, and perform works of music, dance, visual arts, drama, and sculpture.
 - *History and Archeology* — Knowledge of historical events and their causes, indicators, and effects on civilizations and cultures.
 - *Philosophy and Theology* — Knowledge of different philosophical systems and religions. This includes their basic principles, values, ethics, ways of thinking, customs, practices, and their impact on human culture.
- **Law and Public Safety** — Knowledge of regulations and methods for maintaining people and property free from danger, injury, or damage; the rules of public conduct established and enforced by legislation, and the political process establishing such rules.
 - *Public Safety and Security* — Knowledge of relevant equipment, policies, procedures, and strategies to promote effective local, state, or national security operations for the protection of people, data, property, and institutions.
 - *Law and Government* — Knowledge of laws, legal codes, court procedures, precedents, government regulations, executive orders, agency rules, and the democratic political process.
- **Communications** — Knowledge of the science and art of delivering information
 - *Telecommunications* — Knowledge of transmission, broadcasting, switching, control, and operation of telecommunications systems.
 - *Communications and Media* — Knowledge of media production, communication, and dissemination techniques and methods. This includes alternative ways to inform and entertain via written, oral, and visual media.
- **Transportation** — Knowledge of principles and methods for moving people or goods by air, rail, sea, or road, including the relative costs and benefits.

Appendix D – Linkage Exercise: Participant Instructions

Linkage Exercise: Participant Instructions

Background

As you know the Occupational Information Network (O*NET) is a comprehensive conceptual framework designed to serve as the foundation for a variety of human resource programs, such as school curriculum development, job placement, and training. The National O*NET Consortium's National Center for O*NET Development is getting ready to collect what we would call job analytic ratings from incumbents for a number of occupations in a number of conceptual domains (e.g., Generalized Work Activities [GWAs], Work Context, Education, Work Styles, Knowledges, etc.). These areas make up what is referred to the O*NET Content Model. While the National Center for O*NET Development plans to collect most of its job analytic information from incumbents, it has contracted with HumRRO to develop, pilot-test, and implement a method of collecting Ability and Skill ratings of occupations from occupational analysts.

The idea is that incumbents are in the best position to rate their occupations on characteristics like the activities they perform (i.e., GWAs) and the physical and social context in which their work takes place (i.e., Work Context). Opportunity to observe the job directly is the most salient advantage of the incumbents' perspective. In contrast, occupational analysts might in better position to rate occupations on the underlying capabilities (e.g., Abilities and Skills) relevant to performing the activities required by an occupation.

Relevant occupation data will be provided to facilitate the analyst rating process. Among other things, we plan to show them incumbent ratings on GWAs and Work Context descriptors that are relevant to each ability or skill. How do we determine which GWAs and Work Context descriptors are relevant to each ability and skill? That is where you come in. Your task, along with seven of your colleagues, is to help us determine which Skills and Abilities should be linked to each GWA and Work Context variable. So that, for example, when an analyst is considering incumbent ratings on the GWAs for the purpose of rating an occupation on a particular ability the analyst will only see the GWAs that are likely to be influenced by that ability.

Materials

1. Linkage Exercise: Participant Instructions (Your reading them right now.)
2. GWAs & Abilities Linkage Workbook
3. GWAs & Skills Linkage Workbook
4. Work Context & Abilities Linkage Workbook
5. Work Context & Skills Linkage Workbook

Each workbook is set up so that you consider one GWA or Work Context variable at a time. For example, the first two pages of the GWAs/Abilities Linkage Workbook presents GWA #1 — *Getting Information* and all of the Abilities with check boxes for you to indicate which Abilities should be linked to this GWA.

Specific Linkage Instructions

How do you determine whether an ability or skill should be linked to a GWA or Work Context descriptor?

Ask yourself,

- ◆ “Is this Ability/Skill needed to perform this GWA?”
- ◆ “Is this Ability/Skill needed to perform work in this context?”

If the answer is yes, place a check mark in the box next to the Ability/Skill in your workbook.

If this question is difficult to answer, another way to think about it is,

- ◆ “Would an individual be able to perform this GWA or perform in this context if he/she were very low on this ability or skill?”

If the answer is “no,” then the ability or skill is needed to perform the GWA or to perform in that context and you should check the box.

Some things to keep in mind:

- ◆ Do not think about the other GWAs or Work Context descriptors when making your linkage judgment. Each judgment should be independent.
- ◆ When making the linkages, ask yourself whether an Ability/Skill is needed to perform a GWA or work in a particular context, *in general*, not in reference to a particular occupation.
- ◆ If you think about it carefully and you are still not sure about whether to check the box, force yourself to “check” or “not check” and put a “?” next to the box. You also might want to make a brief note next to the “?” describing your concern. You will be able to refer your worksheets during the focus group that will follow this exercise.

Next Steps

After you and your colleagues have completed your ratings we will analyze the results of the ratings including an assessment of interrater agreement. During a focus group meeting including you and the other judges we will review these results and finalize the linkages including:

- (a) any necessary modifications to the linkages (e.g., six of the eight judges individually linked an ability to a GWA, but on careful examination of the group agrees that the linkage doesn’t make theoretical sense) and
- (b) reaching consensus on close calls (e.g., four of the eight judges linked the GWA to the skill).

Appendix E – Work Context and Generalized Work Activity Linkage Results

Work Context Statements

1. Having face-to-face discussions with individuals and within teams
2. Speaking in public
3. Having telephone conversations
4. Using Electronic mail
5. Writing letters and memos
6. Having contact with others (by telephone, face-to-face, or otherwise)
7. Working with or contributing to a work group or team
8. Dealing with external customers (as in retail sales) or the public in general (as in police work)
9. Coordinating or leading others in accomplishing work activities
10. Being responsible for the health and safety of other workers
11. Being responsible for work outcomes and results of other workers
12. Being in conflict situations
13. Dealing with unpleasant, angry, or discourteous people
14. Dealing with violent or physically aggressive people
15. Working indoors in an environmentally controlled environment (like a warehouse with air conditioning)
16. Working in an environment that is not environmentally controlled (like a warehouse without air conditioning)
17. Working outdoors, exposed to all weather conditions
18. Working outdoors, under cover (like in an open shed)
19. Working in an open vehicle or operating equipment (like a tractor)
20. Working in a closed vehicle or operating enclosed equipment (like a car)
21. Being physically close to other people
22. Being exposed to sounds and noise levels that are distracting and uncomfortable
23. Being exposed to very hot (above 90° F) or very cold (under 32° F) temperatures
24. Being exposed to extremely bright or inadequate lighting conditions
25. Being exposed to contaminants (such as pollutants, gases, dust or odors)
26. Being exposed to cramped work space that requires getting into awkward positions
27. Being exposed to whole body vibration (like operating a jackhammer or earth moving equipment)
28. Being exposed to radiation
29. Being exposed to diseases or infection (This can happen with workers in patient care, some laboratory work, sanitation control, etc.)
30. Being exposed to high places (This can happen for workers who work on poles, scaffolding, catwalks, or ladders longer than 8 feet in length.)
31. Being exposed to hazardous conditions (This can happen when working with high voltage electricity, flammable material, explosives, or chemicals. Do not include working with hazardous equipment.)
32. Being exposed to hazardous equipment (This includes working with saws, close to machinery with exposed moving parts, or working near vehicular traffic, but not including driving a vehicle.)

33. Being exposed to minor burns, cuts, bites, or stings
34. Sitting
35. Standing
36. Climbing ladders, scaffolds, poles, etc.
37. Walking or running
38. Kneeling, crouching, stooping, or crawling
39. Keeping or regaining balance
40. Using hands to handle, control, or feel objects, tools, or controls
41. Bending or twisting body
42. Making repetitive motions
43. Wearing common protective or safety equipment such as safety shoes, glasses, gloves, hearing protection, hard hats, or life jacket
44. Wearing specialized protective or safety equipment such as breathing apparatus, safety harness, full protection suits, or radiation protection
45. Making a serious mistake (one you can't easily correct)
46. Making decisions that affect other people or the image or reputation or financial resources of employer
47. DELETE
48. Being free to make decisions without supervision
49. Performing automated work
50. Being very exact or highly accurate
51. Performing continuous, repetitious physical activities (like key entry) or mental activities (like checking entries in a ledger)
52. Being free to determine the tasks, priorities, or goals
53. Being in a competitive environment
54. Meeting strict deadlines
55. Keeping a pace set by machinery or equipment
- 56A. Keeping a regular work schedule (established routine, set schedule)
- 56B. Keeping an irregular work schedule (changes with weather conditions, production demands, or contract duration)
- 56C. Keeping a seasonal work schedule (only during certain times of the year)
- 57A. Working less than 40 hours in a typical week
- 57B. Working 40 hours in a typical week
- 57C. Working more than 40 hours in a typical week

Generalized Work Activity Statements

1. Getting Information: Observing, receiving, and otherwise obtaining information from all relevant sources.
2. Identifying Objects, Actions, and Events: Identifying information by categorizing, estimating, recognizing differences or similarities, and detecting changes in circumstances or events.
3. Monitoring Processes, Materials, or Surroundings: Monitoring and reviewing information from materials, events, or the environment, to detect or assess problems.
4. Inspecting Equipment, Structures, or Materials: Inspecting equipment, structures, or materials to identify the cause of errors or other problems or defects.
5. Estimating the Quantifiable Characteristics of Products, Events, or Information: Estimating sizes, distances, and quantities; or determining time, costs, resources, or materials needed to perform a work activity.
6. Judging the Qualities of Objects, Services, or People: Assessing the value, importance, or quality of things or people.
7. Evaluating Information to Determine Compliance with Standards: Using relevant information and individual judgment to determine whether events or processes comply with laws, regulations, or standards.
8. Processing Information: Compiling, coding, categorizing, calculating, tabulating, auditing, or verifying information or data.
9. Analyzing Data or Information: Identifying the underlying principles, reasons, or facts of information by breaking down information or data into separate parts.
10. Making Decisions and Solving Problems: Analyzing information and evaluating results to choose the best solution and solve problems.
11. Thinking Creatively: Developing, designing, or creating new applications, ideas, relationships, systems, or products, including artistic contributions.
12. Updating and Using Relevant Knowledge: Keeping up-to-date technically and applying new knowledge to your job.
13. Developing Objectives and Strategies: Establishing long-range objectives and specifying the strategies and actions to achieve them.
14. Scheduling Work and Activities: Scheduling events, programs, and activities, as well as the work of others.
15. Organizing, Planning, and Prioritizing Work: Developing specific goals and plans to prioritize, organize, and accomplish your work.
16. Performing General Physical Activities: Performing physical activities that require considerable use of your arms and legs and moving your whole body, such as climbing, lifting, balancing, walking, stooping, and handling of materials.
17. Handling and Moving Objects: Using hands and arms in handling, installing, positioning, and moving materials, and manipulating things.
18. Controlling Machines and Processes: Using either control mechanisms or direct physical activity to operate machines or processes (not including computers or vehicles).
19. Working with Computers: Using computers and computer systems (including hardware and software) to program, write software, set up functions, enter data, or process information.

20. Operating Vehicles, Mechanized Devices, or Equipment: Running, maneuvering, navigating, or driving vehicles or mechanized equipment, such as forklifts, passenger vehicles, aircraft, or water craft.
21. Drafting, Laying Out, and Specifying Technical Devices, Parts, and Equipment: Providing documentation, detailed instructions, drawings, or specifications to tell others about how devices, parts, equipment, or structures are to be fabricated, constructed, assembled, modified, maintained, or used.
22. Repairing and Maintaining Mechanical Equipment: Servicing, repairing, adjusting, and testing machines, devices, moving parts, and equipment that operate primarily on the basis of mechanical (not electronic) principles.
23. Repairing and Maintaining Electronic Equipment: Servicing, repairing, calibrating, regulating, fine-tuning, or testing machines, devices, and equipment that operate primarily on the basis of electrical or electronic (not mechanical) principles.
24. Documenting/Recording Information: Entering, transcribing, recording, storing, of maintaining information in written or electronic/magnetic form.
25. Interpreting the Meaning of Information for Others: Translating or explaining what information means and how it can be used.
26. Communicating with Supervisors, Peers, or Subordinates: Providing information to supervisors, coworkers, and subordinates by telephone, in written form, e-mail, or in person.
27. Communicating with People Outside the Organization: Communicating with people outside the organization, representing the organization to customers, the public, government, and other external sources. The information can be exchanged in person, in writing, or by telephone or e-mail.
28. Establishing and Maintaining Interpersonal Relationships: Developing constructive and cooperative working relationships with others, and maintaining them over time.
29. Assisting and Caring for Others: Providing personal assistance, medical attention, emotional support, or other personal care to others such as coworkers, customers, or patients.
30. Selling or Influencing Others: Convincing others to buy merchandise/goods or to otherwise change their minds or actions.
31. Resolving Conflicts and Negotiating with Others: Handling complaints, settling disputes, and resolving grievances and conflicts, or otherwise negotiating with others.
32. Performing for or Working Directly with the Public: Performing for people or dealing directly with the public. This includes serving customers in restaurants and stores, and receiving clients or guests.
33. Coordinating the Work and Activities of Others: Performing for people or dealing directly with the public. This includes serving customers in restaurants and stores, and receiving clients or guests.
34. Developing and Building Teams: Encouraging and building mutual trust, respect, and cooperation among team members.
35. Training and Teaching Others: Identifying the educational needs of others, developing formal educational or training programs or classes, and teaching or instructing others.
36. Guiding, Directing, and Motivating Subordinates: Providing guidance and direction to subordinates, including setting performance standards and monitoring performance.
37. Coaching and Developing Others: Identifying the developmental needs of others and coaching, mentoring, or otherwise helping others to improve their knowledge or skills.

38. Providing Consultation and Advice to Others: Providing guidance and expert advice to management or other groups on technical, systems-, or process-related topics.
39. Performing Administrative Activities: Performing day-to-day administrative tasks such as maintaining information files and processing paperwork.
40. Staffing Organizational Units: Recruiting, interviewing, selecting, hiring, and promoting employees in an organization.
41. Monitoring and Controlling Resources: Monitoring and controlling resources and overseeing the spending of money.

Work Context/Abilities

X =Linked by Consensus

=Linked by >4 Raters, pre-consensus

=De-Linked by Consensus

Work Context	oral comp	writ comp	oral exp	writ exp	flu ideas	originality	prob sens	ded reas	ind reas	info order	cat flex	math reas	num facil	memoriz	speed clos	flex clos	perc sp	spat orient	visual	selec att	time share	arm-hand st	manual dex	finger dex	control pre	multi-lim	resp orien	rate cont	react time	wrist-fing	
1	8	1	8		1		X	2	2	1	1				1					X	1										
2	5	1	8		2		2	1	1	2				3						3	1										
3	8		8		1		2	1	1	1										2											
4		8		8	1		2	2	2	1	1				1					1			1	4						1	
5		6		8	1		1	2	2	2	2				1					1			2	2						2	
6	8	3	8	3	1	1	2	1	1	1	1									1	1	1	1	1							
7	8	4	8	4	2	1	X	3	3	1	3			1	1	1				2	3										
8	8	3	8	2	1	1	6	X	X	2	3			1	1	1				3	1										
9	8	3	8	X	2	2	X	6	X	5	X				1	1				2	5										
10	5	3	6	3			6	3	3	2	2		1	2	2	1		1	1	1	1										
11	6	4	5	4	1		5	4	4	3	3		1	1	2	1				2	1										
12	8	2	8	2	3	4	7	7	6	1	3				1	1				2	2										
13	8	1	8	1	2	2	7	6	6	2	3				1	1				3	2										
14	7		7		1	1	5	X	3		1				1					2	2		2			4	5			X	
15																															
16							1																								
17							1											1													
18							1											1													
19	1	1	1				1	1							1	1	1	2		1	1	3	4		5	5	3	3	4		
20	1	1	1				1	1							1	1	1	2		1	1	3	4		X	5	3	3	4		
21	1		1				1																								
22																					X										
23							1														1										
24							1														2										
25							2														2										
26							1														1										
27							1														1				1	1			1		
28							3																								
29							3																								
30							1	1										2			1		2	2			2	1			1

Work Context/Abilities

X =Linked by Consensus

=Linked by >4 Raters, pre-consensus

=De-Linked by Consensus

Work Context	oral comp	writ comp	oral exp	writ exp	flu ideas	originality	prob sens	ded reas	ind reas	info order	cat flex	math reas	num facil	memoriz	speed clos	flex clos	perc sp	spat orient	Visual	selec att	time share	arm-hand st	manual dex	finger dex	control pre	multi-lim	resp orien	rate cont	reac time	wrist-fing	
31							3													1		1	1	1			1		1		
32							3											1		2		2	2	1	1	2	1	1	X		
33							1													1		1								1	
34																															
35																															
36							1											1								3	1			1	
37																			1												
38																															
39																															
40																							6	7	5	X	2	2	2	2	2
41																										1					
42																					2		1				1	1		2	
43				1																	1		1								
44																					1		1	1							
45						1	5	4	3		1				1					1											
46	2	1	2	1	3	2	6	8	7	1	3				1	1				1											
48	1	1			3	3	5	7	7	2	3				2	2															
49							2			1				1						2		1		1				1	1		
50							X	2	2		1	1				1	2			2		2	1	2	1			1			
51							1	1				1	1				2			5		1		1							
52	1	1			3	2	X	6	5	3	4				1	1				1											
53	1	1			2	2	3	3	3		1				2					1	1										
54							3	1	1	2	1			1	1					3	2										
55							1													2					1			5	X		
56A																				1											
56B																				1											
56C																															
57A																				1											
57B																															
57C																															

Work Context/Abilities

X =Linked by Consensus

=Linked by>4 Raters, pre-consensus

=De-Linked by Consensus

Work Context	speed limb	static st	expl str	dynam st	trunk st	stamina	extent flex	dynam flex	grs bdy coord	grs bdy equil	near vision	far vision	vis col disc	night vis	perip vis	depth perc	glare sens	hear sens	audit att	sound local	speech rec	speech clar
1																			3	2	8	7
2																			1	1	2	8
3																		1	3	1	8	8
4											6											
5											2											
6											2							1	3	1	8	8
7											2							1	2	1	8	8
8											4							1	3	2	8	8
9											1							1	1	1	8	8
10											2	1			1	1	1	2	1	3	5	6
11											1										X	X
12											1							1	2	1	8	8
13											1							1	1	1	8	8
14	3	6	6	2	3	X	2	2	6	6	2	1			2	1				2	5	5
15																						
16																						
17					1		1				2	2	1	1	1	2	3					
18											2	1	1	1	1	1	1					
19	2	1		1	1	1	1	1	2		7	4	1	3	3	5	3	3	1	3	1	1
20	2	1		1	1	1	1	1	2	1	7	4	2	3	3	5	2	2	1	3	1	1
21											1										1	1
22																		1	X	2		
23						2																
24											1	1	1	3	1	1	5	1				
25																						
26					2	1	7	2		1	2											
27		1	1	3	3	3				1												
28																						
29																						
30	1			1	2	2	2	2	3	7	3	1			1	3				1	1	1

Work Context/Abilities

X =Linked by Consensus

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=De-Linked by Consensus

Work Context	speed limb	static st	expl str	dynam st	trunk st	stamina	extent flex	dynam flex	grs bdy coord	grs bdy equil	near vision	far vision	vis col disc	night vis	perip vis	depth perc	glare sens	hear sens	audit att	sound local	speech rec	speech clar
31	1										2				1	1						
32	1								1		5	1			2	3		2		1	1	
33											1											
34					2																	
35					X	1				2												
36	1	2	3	2	X	3	X	2	7	X	1	1				3						
37	X		2	4	3	6	1	2	8	2					1	1						
38	1			2	X	3	6	2	2	2	1											
39					1				2	7												
40	1	1	1	1	1	1	1	1	1	1												
41					3		7	3		2												
42				1	1	1	1	3														
43																						
44						2																
45																						
46																						
48																						
49																						
50											1											
51				1	1			1			2											
52																						
53																						
54																						
55				1		2		1	2													
56A																						
56B																						
56C																						
57A																						
57B																						
57C																						

GWAs/Abilities

X =Linked by Consensus

█ =Linked by >4 Raters, pre-consensus

=De-Linked by Consensus

GWA	oral comp	writ comp	oral exp	writ exp	flu ideas	originality	prob sens	ded reas	ind reas	info order	cat flex	math reas	num facil	memoriz	speed clos	flex clos	perc sp	spat orient	visual	selec att	time share	arm-hand st	manual dex	finger dex	control pre	multi-lim	
1	8	8	X	4	2	1	1	3	X	3	3	1	1	3	4	6	4	1	1	5	3		1	1			
2	5	5			2	2	5	5	6	7	8	2	1	2	5	7	7	3	X	3	2						
3	6	7			2	1	8	6	5	X	6	2	2	3	3	6	5	1	3	X	5						
4	1	1			1	1	7	5	6	2	X	2	2	2	3	5	6	1	5	3	2	1	2	2	1	1	
5	1	2					1	6	X	6	3	7	6	2	4	X	3	2	X	2							
6	5	5			1		3	5	6	2	5				2	2	2		1	2							
7	6	7					6	7	5	6	3	3	2	3	3	3	4	1	2	4	1						
8	5	5	1	1	2	2	3	X	5	7	6	7	8	2	4	6	6	1	2	3	1			1			
9	4	5			2	2	1	7	6	X	6	4	3	2	2	3	1	1	2	X	1						
10	#	6			5	5	X	7	8	X	X	3	2	1	4	X	2	1	3	6	1						
11	2	3	1	1	6	8	3	3	5	4	7	2	2	1	3	4	1	1	6	5	1	1	1	1		1	
12	7	8	2	2	3	3	2	7	5	3	2	2	1	3	2	2	1		2	3	1						
13	2	2	5	5	6	6	X	7	6	4	X	1	1	1	3	3	1		3	1	1						
14	2	2	2	2	1	1	X	X	4	8	6	1	3	1	3	1	1	1	2	2							
15	1	2			3	3	X	6	5	7	7	1	1	1	2	1	1		1	2							
16																			3			5	4	2	2	5	
17																			1	1			7	7	6	3	7
18	1	1					1	2						1	2	2	3	2	3	3	3	5	4	4	8	X	
19	1	7		4	X	5	5	8	4	7	5	7	3	5	3	3	2	1	2	5		1	2	5			
20	3	4	1				X	3	1	1	1		1	3	3	1	X	6	3	X	5	5	X	1	7	8	
21	1	4	5	7	1	1	2	5	4	6	4	2	1	2	3	2	1	1	6	2			1	1			
22		2			2	3	6	8	6	5	2	1	2	X	X	3	2	2	6	3	1	7	8	7	5	2	
23		3			2	3	6	8	6	5	2	3	3	X	4	3	2	1	5	3	1	5	8	7	4	2	
24	3	5		8			1	1	1	5	4		1	1	2	3	2		1	3	2		3	7	2		
25	8	8	8	8	2	2	2	5	6	X	5	2	1	1	3	2	1	1	1	1							
26	6	5	8	8			1	1	1	X	3	1	1	2	3	1	1		1	1			1	3			
27	8	8	8	8	1	1	2	1	1	X	3	1	1	2	3	1	1			2	1		1	3			
28	8	4	8	4			X	2	2											1							
29	8	4	8	3	1	2	5	X	3	2	1				1					3		1	1	1		1	
30	6	3	8	6	6	7	3	6	5	5	X			3	2	1	3			2	1						
31	8	5	8	X	6	7	7	6	7	5	X			2	X	2	1			3	1						
32	8	3	8	2	2	X	6	X	3	3	3		1	3	3	1	1	1	1	5	X		1			1	
33	7	2	8	X	5	5	6	5	7	6	6		1	1	2	2	1		2	3	3						
34	7	2	8	5	X	X	6	5	5	2	3				1	1				3	3						
35	7	6	8	6	X	6	6	7	7	6	5	1	1	X	3	2	1	1		5	4						
36	8	5	8	7	X	5	7	7	7	3	2				2	1											
37	8	5	8	7	X	5	7	7	7	3	X				2	1				1	2						
38	8	7	8	8	6	7	7	7	7	5	5	3	1	2	4	2	2	1	1	3	3						
39	3	7	2	5			3	5	2	7	6		2	3	2	1	3	1	1	3	2		3	2		1	
40	8	7	8	6	1	2	5	6	7	X	5			1	2	1	1		1	2	2						
41	6	7	3	4		3	5	6	4	5	3	3	5	2	3	2	1		1	3							

GWAs/Abilities

X =Linked by Consensus

█ =Linked by >4 Raters, pre-consensus

=De-Linked by Consensus

GWA	resp orien	rate cont	reac time	wrist-fing	speed limb	static st	expl str	dynam st	trunk st	stamina	extent flex	dynam flex	grs bdy coord	grs bdy equil	near vision	far vision	vis col disc	night vis	perip vis	depth perc	glare sens	hear sens	audit att	sound local	speech rec	speech clar
1				1											7	5	4	2	2	3	2	3	2	8	3	
2															6	5	X	3	3	4	2	5	4	3	4	
3															7	5	X	3	3	4	2	5	X	3	4	
4				1		2		1	1	1	2	1	1	1	8	5	X	2	3	5	2	6	5	3	1	
5															6	5	2	2	2	X	1	1			1	
6															5	2	3		1	1		2			3	
7															5	2	3	1	2	3	2	2	2	1	4	
8			1	1											X		1			1			1		2	
9															3							1	1	1	2	
10															3		1					1	2	2	3	
11				1											3		2		2	2		2	2	1	2	
12															3										2	
13															1											
14															2										1	1
15																1									1	
16	2	3	2	1	3	6	4	6	6	5	6	3	8	8	2	1			2	2				1		
17	2	4	1	4	2	X	3	3	2	2	3	3	2	2	3	1	1		2	2		1	1	1		
18	6	7	5	5	4	3	2	2	2	3	2	2	3	1	5	4	3	2	3	X	3	X	3	3	1	
19				3											8		1								1	
20	8	7	7	1	X			1	1	1	2	2	1		7	6	X	5	5	6	X	3	1	5	2	1
21															X		1			1					2	3
22		1	2	1	1	3	1		2		2		1	1	7	1	2		2	X		X	2	3		
23	1	2	2	2							2		1	1	6		X			2			4	4	4	1
24			1	2					1						8							1	2		3	
25															3										5	5
26															3										5	8
27															3								1		8	8
28															1							1	1		8	8
29			1			1							1		3							1	1	1	8	8
30															1							1			6	7
31															2							1	2		8	8
32													1		3								2		6	7
33															2								2		8	8
34															2										7	8
35															2								2		7	8
36															2										7	8
37															2										6	6
38															2								1		8	8
39			1	1											7										2	1
40															2							1			7	7
41															4										2	1

Appendix F – Rating Instructions

Analyst Rater Instructions

Review the Occupation

Before beginning the ability and skill ratings, review the occupation title, definition, Job Zone, and Tasks to get a full picture of the occupation.

Making Importance Ratings

(Follow Steps 1 — 6 for every construct to be rated.)

◆ *Step 1 — Considering the Construct*

- ◆ Review the title, definition, and *Level* scale anchors of the construct you are about to rate. This will help you understand the construct and what behaviors are like that require only a little or a lot of the particular Ability/Skill.

◆ *Step 2 — Considering the Tasks*

- ◆ Consider the *Importance* Rating scale and its anchors.

1 = Not Important
2 = Somewhat Important
3 = Important
4 = Very Important
5 = Extremely Important

- ◆ Look at the tasks and their incumbent mean *Importance* ratings. Read each task carefully keeping in mind that they are presented in order of importance, within their designation of Core or Supplementary Tasks.
- ◆ Focus primarily on the Core Tasks (i.e., tasks that are critical to the occupation, and have both (a) relevance of $\geq 67\%$ and (b) mean importance rating of ≥ 3.0).
- ◆ However, you should also review the Supplementary Tasks (i.e., tasks that are less relevant and/or important to the occupation and either (a) tasks rated $> 67\%$ on relevance but < 3.0 on importance, or (b) tasks rated between 10% and 66% on relevance, regardless of mean importance rating).
- ◆ Based on your review of the tasks and their *Importance* ratings, think of a preliminary rating for the *Importance* of this construct to performance of this occupation. Your preliminary rating should reflect the importance of this particular construct to the overall performance of this occupation.

◆ **Step 3 — Considering Knowledge**

- ◆ Look at the knowledge list and the incumbent mean *Importance* ratings. Read each knowledge, keeping in mind that they are presented in order of importance. Note that only the 10 most important (mean importance rating of ≥ 3.0) knowledges are provided.
- ◆ If necessary, adjust your preliminary rating for the *Importance* of this construct to performance of this occupation.

◆ **Step 4 — Considering GWAs**

- ◆ Now move on to the GWAs that are relevant to this construct for this occupation. Only GWAs that were linked to this construct and that received incumbent mean *Importance* ratings of 3.0 or greater are shown. Review the linked GWAs and their mean *Importance* ratings. (Note: If there are no GWAs linked to this construct/occupation, move on to Step 5.)
- ◆ If necessary, adjust your preliminary rating for the *Importance* of this construct to performance of this occupation.

◆ **Step 5 — Considering Work Context**

- ◆ Now move on to the Work Context statements that are relevant to this construct. Only Work Context statements that were linked to this construct and that received incumbent mean ratings indicating sufficient relevance are shown. Review the statements and their mean ratings. (Note: If there are no Work Context statements linked to this construct/occupation, base your rating on Steps 1 — 4.)

◆ **Step 6 — Documenting Your Rating**

- ◆ If necessary, adjust preliminary rating for the *Importance* of this construct to performance of this occupation and enter your final rating in the spreadsheet for this occupation.
- ◆ Remember that the appropriate range for *Importance* ratings is 1 — 5 (out of range values will highlight in red indicating an error).
- ◆ Note that if you enter a “1” rating for *Importance*, the *Level* rating will automatically populate as “0”.
- ◆ Now that you have completed the *Importance* rating for this construct, complete the *Level* rating (if your *Importance* rating was ≥ 2) for this construct before moving on to the next construct.

Making Level Ratings

(Follow Steps 1 — 7 for every construct to be rated.)

Step 1 — When to Provide a Level Rating

- ◆ If you rated this construct as at least *Somewhat Important* (i.e., ≥ 2), follow Steps 2 — 7 to provide a *Level* rating between 1 and 7.

- ◆ If you rated this construct as *Not Important* (i.e., 1), the *Level* rating will automatically populate as “0”. You may then move on to the next construct.
- ◆ **Step 2 — Considering the Level Anchors**
 - ◆ Consider the rating scale and its anchors.
 - ◆ Review the *Level* scale anchors and at what point on the scale they fall.
 - ◆ Remember *Level* scale anchors increase (from 1 — 7) in the amount of the particular Ability/Skill required to perform the behavior.
- ◆ **Step 3 — Considering the Tasks**
 - ◆ Consider the *Level* Rating scale and its anchors.
 - ◆ Think about the Core and Supplementary Tasks.
 - ◆ Based on these tasks, think of a preliminary rating for the *Level* of this construct needed to perform this occupation. Remember, this rating reflects the *Level* of this particular construct needed to perform this occupation as a whole.
- ◆ **Step 4 — Considering Knowledge**
 - ◆ Look at the knowledges and their incumbent mean importance ratings. Read each knowledge, keeping in mind that they are presented in order of importance. Note that only the 10 most important (mean importance rating of ≥ 3.0) knowledges are provided.
 - ◆ If necessary, adjust your preliminary rating about the *Level* of this construct needed to perform this occupation.
- Step 5 — Considering GWAs**
 - ◆ Now move on to the GWAs. Think about the GWA statements and their mean *Level* ratings. (Note: If there are no GWAs linked to this construct/occupation, move on to Step 6.)
 - ◆ If necessary, adjust your preliminary rating about the *Level* of this construct needed to perform this occupation.
- ◆ **Step 6 — Considering Work Context**
 - ◆ Now move on to the Work Context statements. Think about the statements and their mean ratings. (Note: If there are no Work Context statements linked to this construct/occupation, base your rating on Steps 1 — 5.)
- ◆ **Step 7 — Documenting Your Rating**
 - ◆ If necessary, adjust your preliminary rating about the *Level* of this construct needed to perform this occupation and enter your final rating in the spreadsheet for this occupation.
 - ◆ Remember that the appropriate range for *Level* ratings is 0 — 7 (out of range values will highlight in red indicating an error). If you rated this construct as *Not Important* (i.e., 1), the *Level* rating will automatically populate as “0”; if your *Importance* rating

for that construct was ≥ 2 the appropriate range for *Level* ratings is 1 — 7 (out of range values will highlight in red indicating an error).

◆ ***Next Steps***

- ◆ Now that you have completed the *Level* rating for this construct, move on to the next construct.
- ◆ Review rating tendency feedback from previous batches and check them against your current ratings
- ◆ Remember to refer regularly to the Ability, Skill, GWA and WC definitions.
- ◆ Remember to refer regularly to the *Clarifying Potentially Misunderstood Ability and Skill Definitions* handout.

Analyst Rater Instructions for Repeat Occupations

Note on Repeat Occupations

Unlike previous cycles, a large number (over 80%) of the occupations rated in this cycle will be repeats from previous cycles. The purpose is to update occupational information to stay current with changes in the world of work. This necessitates some changes to the rating process, which are highlighted throughout this document.

Review the Occupation

Before beginning the ability and skill ratings, review the occupation title, definition, Job Zone, and Tasks to get a full picture of the occupation.

Making Importance Ratings

(Follow Steps 1 — 7 for every construct to be rated.)

- ◆ ***Step 1 — Considering the Construct***
- ◆ Review the title, definition, and *Level* scale anchors of the construct you are about to rate. This will help you understand the construct and what behaviors are like that require only a little or a lot of the particular Ability/Skill.
- ◆ ***Step 2 — Considering the Tasks***
- ◆ Consider the *Importance* Rating scale and its anchors.

1 = Not Important
2 = Somewhat Important
3 = Important
4 = Very Important
5 = Extremely Important

- ◆ Look at the tasks and their incumbent mean *Importance* ratings. Read each task carefully keeping in mind that they are presented in order of importance, within their designation of Core or Supplementary Tasks.

◆ You will notice that for repeat occupations we have highlighted new tasks and crossed out (e.g., ~~striketrough~~) tasks no longer meeting the relevance/importance threshold. Do not consider crossed out tasks when making your initial ratings (we will describe when to use this information later). Do consider highlighted tasks, but be careful not to let them influence your ratings to a greater extent than other tasks.

- ◆ Focus primarily on the Core Tasks (i.e., tasks that are critical to the occupation, and have both (a) relevance of $\geq 67\%$ and (b) mean importance rating of ≥ 3.0).
- ◆ However, you should also review the Supplementary Tasks (i.e., tasks that are less relevant and/or important to the occupation and either (a) tasks rated $> 67\%$ on relevance but < 3.0 on importance, or (b) tasks rated between 10% and 66% on relevance, regardless of mean importance rating).
- ◆ Based on your review of the tasks and their *Importance* ratings, think of a preliminary rating for the *Importance* of this construct to performance of this occupation. Your preliminary rating should reflect the importance of this particular construct to the overall performance of this occupation.
- ◆ **Step 3 — Considering Knowledge**
- ◆ Look at the knowledge list and the incumbent mean *Importance* ratings. Read each knowledge, keeping in mind that they are presented in order of importance. Note that only the 10 most important (mean importance rating of ≥ 3.0) knowledges are provided.
- ◆ If necessary, adjust your preliminary rating for the *Importance* of this construct to performance of this occupation.

◆ For repeat occupations, do not consider crossed out knowledges when making your initial ratings. Do consider highlighted knowledges, but be careful not to let them influence your ratings to a greater extent than other knowledges.

- ◆ **Step 4 — Considering GWAs**
- ◆ Now move on to the GWAs that are relevant to this construct for this occupation. Only GWAs that were linked to this construct and that received incumbent mean *Importance* ratings of 3.0 or greater are shown. Review the linked GWAs and their mean *Importance* ratings. (Note: If there are no GWAs linked to this construct/occupation, move on to Step 5.)
- ◆ If necessary, adjust your preliminary rating for the *Importance* of this construct to performance of this occupation.

- ◆ For repeat occupations, do not consider crossed out GWAs when making your initial ratings. Do consider highlighted GWAs, but be careful not to let them influence your ratings to a greater extent than other GWAs.

- ◆ ***Step 5 — Considering Work Context***

- ◆ Now move on to the Work Context statements (WCs) that are relevant to this construct. Only WCs that were linked to this construct and that received incumbent mean ratings indicating sufficient relevance are shown. Review the statements and their mean ratings. (Note: If there are no WCs linked to this construct/occupation, base your rating on Steps 1 — 4.)

- ◆ For repeat occupations, do not consider crossed out WCs when making your initial ratings. Do consider highlighted WCs, but be careful not to let them influence your ratings to a greater extent than other WCs.

- ◆ ***Step 6 — Documenting Your Initial Rating***

- ◆ If necessary, adjust preliminary rating for the *Importance* of this construct to performance of this occupation and enter your initial rating in the spreadsheet for this occupation. Remember that the appropriate range for *Importance* ratings is 1 — 5 (out of range values will highlight in red indicating an error).
- ◆ The moment you make this initial rating, a pop-up message will be displayed informing you of the previous average rating (the average *Importance* rating for this construct across analysts from the cycle in which the occupation was previously rated).
- ◆ Hit “OK”. Do not change this initial rating once you have entered it.
- ◆ Note that if you enter a “1” rating for *Importance*, the *Level* rating will automatically populate as “0”.

- ◆ ***Step 7 — Documenting Your FINAL Rating***

- ◆ Consider the previous average *Importance* rating (displayed in the pop-up) before making your final rating in the adjacent cell. This is when you should closely examine highlighted new information and crossed out information in the stimulus materials. If your initial rating differs noticeably from the previous average rating, i.e. the rounded previous rating differs by 1 point from your rating (e.g., “2.4” vs. “3” or “1.9” vs. “1”), then you should weigh changes in occupational information against the previous average rating before deciding on your final rating.
- ◆ Remember that the appropriate range for *Importance* ratings is 1 — 5 (out of range values will highlight in red indicating an error).
- ◆ Note that if you enter a “1” rating for *Importance*, the *Level* rating will automatically populate as “0”.
- ◆ Now that you have completed the *Importance* rating for this construct, complete the *Level* rating (if your *Importance* rating was ≥ 2) for this construct before moving on to the next construct.

Making Level Ratings

(Follow Steps 1 — 8 for every construct to be rated.)

Step 1 — When to Provide a Level Rating

- ◆ If you rated this construct as at least *Somewhat Important* (i.e., ≥ 2), follow Steps 2 — 7 to provide a *Level* rating between 1 and 7.
- ◆ If you rated this construct as *Not Important* (i.e., 1), the *Level* rating will automatically populate as “0”. You may then move on to the next construct.
- ◆ ***Step 2 — Considering the Level Anchors***
- ◆ Consider the rating scale and its anchors.
- ◆ Review the *Level* scale anchors and at what point on the scale they fall.
- ◆ Remember *Level* scale anchors increase (from 1 — 7) in the amount of the particular Ability/Skill required to perform the behavior.
- ◆ ***Step 3 — Considering the Tasks***
- ◆ Consider the *Level* Rating scale and its anchors.
- ◆ Think about the Core and Supplementary Tasks.

◆ For repeat occupations, do not consider crossed out tasks when making your initial ratings. Do consider highlighted tasks, but be careful not to let them influence your ratings to a greater extent than other tasks.

- ◆ Based on these tasks, think of a preliminary rating for the *Level* of this construct needed to perform this occupation. Remember, this rating reflects the *Level* of this particular construct needed to perform this occupation as a whole.
- ◆ ***Step 4 — Considering Knowledge***
- ◆ Look at the knowledges and their incumbent mean importance ratings. Read each knowledge, keeping in mind that they are presented in order of importance. Note that only the 10 most important (mean importance rating of ≥ 3.0) knowledges are provided.
- ◆ If necessary, adjust your preliminary rating about the *Level* of this construct needed to perform this occupation.

◆ For repeat occupations, do not consider crossed out knowledges when making your initial ratings. Do consider highlighted knowledges, but be careful not to let them influence your ratings to a greater extent than other knowledges.

Step 5 — Considering GWAs

- ◆ Now move on to the GWAs. Think about the GWA statements and their mean *Level* ratings. (Note: If there are no GWAs linked to this construct/occupation, move on to Step 6.)
- ◆ If necessary, adjust your preliminary rating about the *Level* of this construct needed to perform this occupation.

◆ For repeat occupations, do not consider crossed out GWAs when making your initial ratings. Do consider highlighted GWAs, but be careful not to let them influence your ratings to a greater extent than other GWAs.

Step 6 — Considering Work Context

- ◆ Now move on to the Work Context statements (WCs). Think about the statements and their mean ratings. (Note: If there are no WCs linked to this construct/occupation, base your rating on Steps 1 — 5.)

◆ For repeat occupations, do not consider crossed out WCs when making your initial ratings. Do consider highlighted WCs, but be careful not to let them influence your ratings to a greater extent than other WCs.

Step 7 — Documenting Your Initial Rating

- ◆ If necessary, adjust your preliminary rating about the *Level* of this construct needed to perform this occupation and enter your initial rating in the spreadsheet for this occupation.
- ◆ Remember that the appropriate range for *Level* ratings is 0 — 7 (out of range values will highlight in red indicating an error). If you rated this construct as *Not Important* (i.e., 1), the *Level* rating will automatically populate as “0”; if your *Importance* rating for that construct was ≥ 2 the appropriate range for *Level* ratings is 1 — 7 (out of range values will highlight in red indicating an error).
- ◆ The moment you make this initial rating, a pop-up message will be displayed informing you of the previous average rating (the average *Level* rating for this construct across analysts from the cycle in which the occupation was previously rated).
- ◆ Hit “OK”. Do not change this initial rating once you have entered it.

Step 8 — Documenting Your FINAL Rating

- ◆ Consider the previous average *Level* rating (displayed in the pop-up) before making your final rating in the adjacent cell. This is when you should closely examine highlighted new information and crossed out information in the stimulus materials. If your initial rating differs noticeably from the previous average rating, i.e. the rounded previous rating differs by 1 point from your rating (e.g., “5.2” vs. “6” or “0.9” vs. “0”), then you should weigh changes in occupational information against the previous average rating before deciding on your final rating.

- ◆ Remember that the appropriate range for *Level* ratings is 0 — 7 (out of range values will highlight in red indicating an error). If you rated this construct as *Not Important* (i.e., 1), the *Level* rating will automatically populate as “0”; if your *Importance* rating for that construct was ≥ 2 the appropriate range for *Level* ratings is 1 — 7 (out of range values will highlight in red indicating an error).

- ◆ *Next Steps*
- ◆ Now that you have completed the *Level* rating for this construct, move on to the next construct.
- ◆ Review rating tendency feedback from previous batches and check them against your current ratings
- ◆ Remember to refer regularly to the Ability, Skill, GWA and WC definitions.
- ◆ Remember to refer regularly to the *Clarifying Potentially Misunderstood Ability and Skill Definitions* handout.

Appendix G – Sample Stimulus Material

19-1031.01 Soil and Water Conservationists

Job Zone: 4

Plan and develop coordinated practices for soil erosion control, soil and water conservation, and sound land use.

1 = Not Important 2 = Somewhat Important 3 = Important 4 = Very Important 5 = Extremely Important

Core Task	Importance
1 Advise land users such as farmers and ranchers on conservation plans, problems and alternative solutions, and provide technical and planning assistance.	4.5
2 Calculate and compare efficiencies associated with changing from low-precision irrigation technologies, such as furrow irrigation, to high-precision technologies, such as computer-controlled systems.*	4.4
3 Implement soil and water management techniques, such as nutrient management, erosion control, buffers, or filter strips, in accordance with conservation plans.*	4.2
4 Enter local soil, water, or other environmental data into adaptive or web-based decision tools to identify appropriate analyses and techniques.*	4.2
5 Initiate, schedule, and conduct annual audits and compliance checks of program implementation by local government.	4.2
6 Evaluate and recommend geographic information systems (GIS) applications to address issues such as surface water quality, groundwater quality, ecological risk assessments, air quality, or environmental contamination.*	4.1
7 Compute design specifications for implementation of conservation practices, using survey and field information technical guides and engineering manuals.	4.0
8 Compile and interpret biodata to determine extent and type of wetlands and to aid in program formulation.	3.9
9 Advise land users, such as farmers and ranchers, on plans, problems and alternative conservation solutions.*	3.8
10 Respond to complaints and questions on wetland jurisdiction, providing information and clarification.	3.8
11 Conduct fact finding and mediation sessions among government units, landowners, and other agencies to resolve disputes.(S)	3.7
12 Compute cost estimates of different conservation practices, based on needs of land users, maintenance requirements, and life expectancy of practices.	3.7
13 Gather information from geographic information systems (GIS) databases or applications to formulate land use recommendations.*	3.6
14 Identify or recommend integrated weed and pest management (IPM) strategies, such as resistant plants, cultural or behavioral controls, soil amendments, insects, natural enemies, barriers, and pesticides.*	3.6
15 Visit areas affected by erosion problems to identify causes and determine solutions.	3.5
16 Plan soil management and conservation practices, such as crop rotation, reforestation, permanent vegetation, contour plowing, or terracing, to maintain soil and conserve water.	3.4
17 Apply principles of specialized fields of science, such as agronomy, soil science, forestry, or agriculture, to achieve conservation objectives.	3.3
18 Review proposed wetland restoration easements and provide technical recommendations.(S)	3.1
19 Monitor projects during and after construction to ensure projects conform to design specifications.	3.1
20 Coordinate and implement technical, financial, and administrative assistance programs for local government units to ensure efficient program implementation and timely responses to requests for assistance.	3.0
Supplementary Task	Importance
21 Manage field offices and involve staff in cooperative ventures.	4.2
22 Develop, conduct, or participate in surveys, studies, or investigations of various land uses to inform corrective action plans.(C)	4.0
23 Survey property to mark locations and measurements, using surveying instruments.(C)	3.3
24 Develop water conservation or harvest plans, using weather information systems, irrigation information management systems, or other sources of daily evapotranspiration (ET) data.*	3.3
25 Revisit land users to view implemented land use practices and plans.(C)	3.2
26 Review and approve amendments to comprehensive local water plans and conservation district plans.	3.2
27 Provide access to programs and training to assist in completion of government groundwater protection plans.	3.0
28 Develop and maintain working relationships with local government staff and board members.(C)	3.0
29 Develop or conduct environmental studies, such as plant material field trials or wildlife habitat impact studies.*	3.0
30 Provide information, knowledge, expertise, and training to government agencies at all levels to solve water and soil management problems and to assure coordination of resource protection activities.(C)	2.8

19-1031.01 Soil and Water Conservationists

Ability 1 Oral Comprehension

The ability to listen to and understand information and ideas presented through spoken words and sentences.

Level Scale Anchors						
1	2	3	4	5	6	7
	Understand a television commercial		Understand a coach's oral instructions for a sport		Understand a lecture on advanced physics	

Incumbent Ratings for Relevant Descriptors

Generalized Work Activity:		Importance
Information Input		
1	Getting Information	4
2	Identifying Objects, Actions, and Events	4
3	Monitor Processes, Materials, or Surroundings	4
Mental Processes		
6	Judging the Qualities of Things, Services, or People	3
7	Evaluating Information to Determine Compliance with Standards	4
8	Processing Information	4
12	Updating and Using Relevant Knowledge	4
Interacting with Others		
25	Interpreting the Meaning of Information for Others	4
26	Communicating with Supervisors, Peers, or Subordinates	4
27	Communicating with Persons Outside Organization	4
28	Establishing and Maintaining Interpersonal Relationships	4
30	Selling or Influencing Others	3
31	Resolving Conflicts and Negotiating with Others	4
32	Performing for or Working Directly with the Public	4
33	Coordinating the Work and Activities of Others	4
34	Developing and Building Teams	4
35	Training and Teaching Others	3
36	Guiding, Directing, and Motivating Subordinates	3
37	Coaching and Developing Others	3
38	Provide Consultation and Advice to Others	3
40	Staffing Organizational Units	3
41	Monitoring and Controlling Resources	3

19-1031.01 Soil and Water Conservationists

Ability 1 Oral Comprehension

The ability to listen to and understand information and ideas presented through spoken words and sentences.

Level Scale Anchors						
1	2	3	4	5	6	7
	Understand a television commercial		Understand a coach's oral instructions for a sport		Understand a lecture on advanced physics	

Incumbent Ratings for Relevant Descriptors

Work Context:	Rating
Frequency (3 = Once a month or more but not every week; 4 = Once a week or more but not every day; 5 = Every day)	
1 How often does your current job require face-to-face discussions with individuals and within teams?	5
2 How frequently does your current job require public speaking? (one speaker with an audience)	3
3 How frequently does your current job require telephone conversation?	5
12 How often are conflict situations a part of your current job?	3
13 How often is dealing with unpleasant, angry or discourteous people a part of your current job?	3
Amount of Contact with Others (3 = Contact with others about half the time; 4 = Contact with others most of the time; 5 = Constant contact with others)	
6 How much contact with others (by telephone, face-to-face, or otherwise) is required to perform your current job?	4
Importance (3 = Important; 4 = Very important; 5 = Extremely important)	
7 How important are interactions that require you to work with or contribute to a work group or team to perform your current job?	4
8 In your current job, how important are interactions that require you to deal with external customers (as in retail sales) or the public in general (as in police work)?	4
9 In your current job, how important are interactions that require you to coordinate or lead others in accomplishing work activities? (not as a supervisor or team leader)	3
Level of Responsibility (3 = Moderate responsibility; 4 = High responsibility; 5 = Very high responsibility)	
10 How responsible are you for the health and safety of other workers on your current job?	3
11 How responsible are you for work outcomes and results of other workers on your current job?	3