NRS FIA – DATA COLLECTION QUALITY ASSURANCE SYSTEM

The "Q" Document
Field Guide Version 8, Urban, P2, P2+

Revised
July, 11 2019

TABLE OF CONTENTS

MISSION

The mission of the Northern Research Station, Forest Inventory Data Collection group is to provide high quality data to all of our customers in a timely and cost effective manner through a system of effective training and certification, inspections, an unobstructed flow of information and a thorough system of documentation and assessment.

OVERVIEW

The purpose of this document is to detail the quality assurance measures taken by the Data Collection group within the scope of the overall Forest Inventory and Analysis Quality Assurance Plan that allow us to succeed in our mission. Quality assurance is integrated into the planning, execution and monitoring of our data collection efforts.

To the best of our ability, we attempt to maintain a seamless quality assurance process that allows us to be proactive rather than reactive to issues of data quality. This process is illustrated in Figure 1. The dark green field in the center of the diagram represents the bulk of the production activities. The lighter green perimeter represents the quality assurance efforts. The railway represents the flow of knowledge and information between production and quality assurance staff. Information exchange takes place through the events or processes annotated in the center of the diagram. Quality assurance activities are annotated on the perimeter.

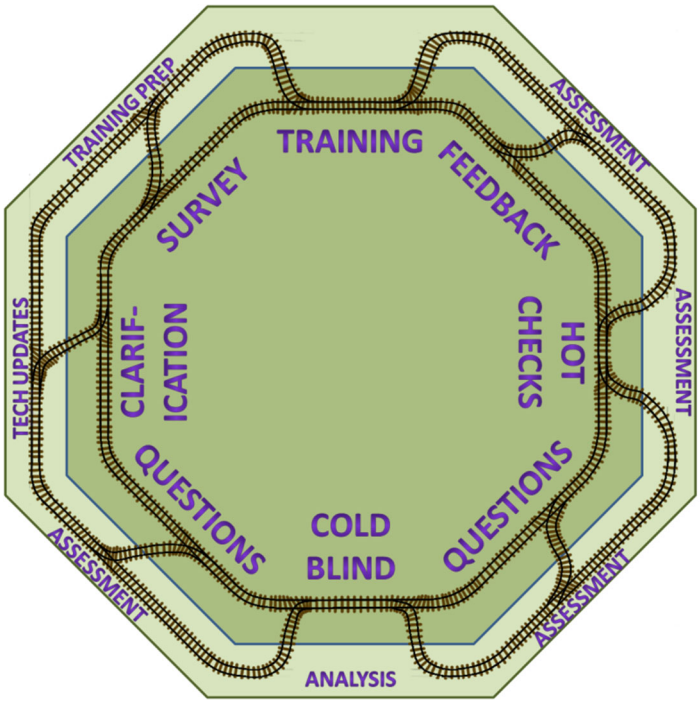

Figure 1. Conceptual model for NRS FIA Data Collection Quality Assurance Program

Training – Training sessions are designed to achieve as much consistency as possible between geographic regions with significantly different conditions. Training sessions are coordinated across the entire unit prior to commencement of the session, and specific training goals are established. Whenever possible, where similar training sessions are held at different times and locations, trainers will attend multiple sessions to help ensure thorough coverage of the training materials at each session. Presentations are based on training templates that can be adapted by the presenter to his or her communication style and to highlight regionally specific points of interest. Training sessions may consist exclusively of field or classroom sessions or a combination of the two. These sessions may be highly formalized or may be informal, depending on need. Most presentation materials are made available to participants following the session.

Feedback – In order to assess the effectiveness of the training session, audience feedback forms are utilized to determine if the goals of the training session were adequately met. In addition, presenter forms are used to document questions that arise during the course of the session that should be shared between presenters at subsequent training sessions

Hot Checks – Trainers and inspectors can offer valuable input, particularly to inexperienced data collectors through periodic hot checks. These hot checks are often most effective immediately following a training session. However, periodic checks aid in maintaining consistency over time between groups of data collectors.

Questions (2) – Data collectors may contact inspectors and field supervisors at any time with questions about data collection practices. These questions are documented and shared between supervisors and inspectors to ensure that the responses given are consistent and accurate. Such questions also give clues as to potential training focus areas.

Cold/Blind Checks – NRS FIA combines cold and blind checks. A Cold Check is an inspection that contributes to overall quality improvement of FIA data by tracking field crew performance, promoting consistency in data collection, and identifying training needs. The initial blind check is completed without the aid of the data from the production crew. Once the blind data have been collected, the inspector(s) save the blind data which are later used to assess the variability of the data. Inspectors then perform a cold check by reviewing the blind and production data for discrepancies. Records that are within prescribed tolerances are considered accurate. Records that do not fall within prescribe tolerances are reassessed. If production crew assessments and measurements can be shown to be inaccurate, corrections are made to the cold check file. The plot is scored following the cold check inspection and the results are

provided to the production crew and his/her supervisor, along with a narrative of the findings of the inspector(s).

Questions – Some questions cannot be answered immediately due to lack of clarity or direction from the field guide, or from interpretive discrepancies between the quality assessment staff. In those cases, the questions are reviewed by the Data Collection Team to determine what clarifications or corrections must be made to arrive at greater consistency.

Clarifications – Following questions of data collection protocol and a after a thorough review by the Data Collection Team, clarification statements may be provided as documentation supplemental to the field guide. These clarifications become part of the clarifications document and are made available to all data collectors. In some cases, clarifications may be significant enough to create a need for a training session to address those issues.

Survey – Prior to any training session, a survey may be conducted to determine what specific issues need to be addressed during pending training sessions. This serves to assist the Data Collection Team in setting training goals and designing a training plan.

TRAINING AND CERTIFICATION

NEEDS ASSESSMENT

NRS training sessions are intended to by highly adaptive and tailored to suit the needs of the unit and the audience. Training needs are often dependent on the experience of the field staff and the seasonal projects to which they are assigned. Training can take numerous forms:

Phase 1

Photo interpretation training is currently not done by data collection staff. We instead rely on training by PI specialists.

Phase 2.

Phase 2 training sessions can be variable in scope, but are limited to phase 2 data collection procedures.

Phase 2+ and/or Phase 3

Phase 2+ (P2+) and Phase 3 (P3) training sessions focus exclusively on the P2+ and P3 indicators which may include Crowns, Down Woody Material, Soils, Lichens and Vegetation Diversity and Structure (Veg) and/or other indicators. Both Lichens and Veg training sessions are typically concurrent to the other P3 indicators due to time constraints.

Urban

Urban training generally takes place each spring prior to the opening of the Urban data collection window.

Ozone

Ozone is a P3 indicator; however, the training sessions are held separately and focus exclusively on ozone. *The Ozone indicator is currently not in use.*

Invasives

Invasives training sessions focus exclusively on the identification of current invasive species and the protocols used to collect invasive species data.

Refresher/Supplemental

Refresher or supplemental training sessions are generally tailored to specific issues or to a specific audience and may focus on any area of interest.

New Employee
These are commonly referred to as "full" training sessions and cover most P2 data collection protocols. These sessions are usually a week in duration and may extend for a greater period of time depending on the needs of the audience.

Veteran Employee
These types of training sessions often revolve around changes to existing data collection procedures. The focus is exclusively on changes to existing practices or correcting practices that have been identified as needing improvement.

Quality Assurance Inspector
Inspector training sessions are held annually and involve a review of inspection and scoring protocols as well as a certification process that allows individuals to conduct inspections.

MIDAS/Computer
Training sessions involving the data recorder are conducted as needed – usually whenever there is a major change to the system of recording or loading data.

Administrative
Administrative training sessions are infrequent and are often conducted in response to procedural changes or the identification of problems in following existing protocols. These sessions are generally run concurrently with other training sessions and are conducted by administrative specialists.

Safety
Numerous safety training requirements make it necessary and efficient to provide safety training to larger groups, often in conjunction with or concurrent to other training sessions.

Other Regional Projects
Training sessions are provided for special projects as needed.

PRETRAINING SURVEY

Pretraining surveys are conducted to help determine and meet the needs of training attendees. Some of the considerations include:

What are the perceived training needs of the data collection crews?
What are the perceived training needs of the inspectors?
What are the training needs based on analysis of cold/blind/hot check data?
What are the needs based on feedback throughout the preceding period?

GOAL SETTING

Given the limited amount of time that can be devoted to a single training session, it is important to identify the specific goals? These should be targeted, not simply stating "know everything about FIA" for a new employee, but rather, they should have concrete measures of success. In some cases, certification may be the goal (P3, Veg, etc.). To avoid the scenario where we focus excessively on a given topic, the needs of the staff must be identified prior to developing the training plan to allow for the most efficient use of time.

TRAINING

The purpose of the training session is to convey information critical to the data collection process in order to prevent errors in the process and to correct operational errors identified through quality control and quality assessment practices.

The practices outlined in the section are intended to be adaptive to the needs of the individual trainers and should not be viewed as restrictions on that trainer's ability to adapt to the needs of the audience in a creative and responsive fashion.

Documentation

Adequate recordkeeping includes a clear summary of what was done at each training session in terms of information provided. Full records of materials (copies) that were handed out, as well as records of who delivered what portions of the training session are maintained. If additional materials were covered (or if there were materials that were scheduled, but not covered) this must be documented. This gives us the ability to access information about any training session, what was covered, who attended, who presented, etc.

Consistency

Training consistency is important because we have significant numbers of people distributed across a very large area and a very narrow window in which to conduct

training sessions. This makes it impossible for a single trainer or training team to conduct every training session. Additionally, it is desirable to involve as many "local" individuals in the process as is practical. Consequently, each training session should be conducted using a base training plan that can be adapted to fit the needs of the individual trainers, the environment (training site) and in some cases the weather.

On-the-Job-Training (OJT)

This most often takes the form of working with a more experienced "certified" individual. It is not a hot check. It is needed for new employees or employees who are undergoing performance counseling or are in a Performance Improvement Plan (PIP). It can be limited to certain types of measurements or can encompass all data collection protocols.

CERTIFICATION

NRS Data Collection certifies that its employees have demonstrated an ability to serve in a capacity consistent with their duty assignments.

Data Collector

Each data collector must be certified as qualified to collect NRS FIA data. Certification is a two-phase process. A prospective data collector must pass a written examination designed to assess the individual's understanding of procedures and his/her ability to utilize the field guide and other reference materials.

The second phase of the certification process involves the collection of field data from a plot or other designated sample area. Each variable or element is assessed for quality and a data collector will be considered certified when he or she can collect data that meets or exceeds minimum specified quality levels.

Any individual who successfully passes both the written and field certifications is considered able to work independently collecting data.

Individuals who fail to pass either portion of the certification may be given another opportunity to recertify. If they are unable to certify at that time, they may work with a certified data collector who shall be responsible for the quality of all data collected. After a period of time working with the certified data collector, the individual may request certification. This process will involve repeating the phase(s) of the certification process that did not meet minimum standards. The written exam shall follow the same process as outlined above. The field phase

of the certification will be based on an inspection of a completed plot. The inspector will be notified 1 week in advance of the request for certification.

Inspector

Each inspector must be certified as qualified to perform NRS FIA Data Collection quality inspections. Certification is a 4-phase process. In order to be considered an inspector, the individual must first be certified as qualified to collect NRS FIA data.

In the second phase, a prospective inspector must pass a written examination designed to assess the individual's understanding of inspection procedures and his/her ability to evaluate the accuracy of assessments made by the production crew.

During the third phase, the prospective inspector must also pass a scoring certification designed to assess the individual's ability to enter inspection data into the scoring program in order to generate inspection scores in a consistent and accurate fashion.

Finally, he/she must also be able to pass a field certification designed to test the individual's ability to recognize assessment errors in the field.

Individuals who fail to certify or fail to maintain certification as a data collector may not serve as an inspector until they can demonstrate an ability to maintain certification and collect high quality data on a consistent basis.

Individuals failing to pass the written, scoring or field portions of the certification process may be given another opportunity to recertify. If they are unable to certify at that time, they may work with a certified inspector who shall be responsible for the quality of all inspection data collected. After a period of time working with the certified inspector, the individual may request certification. This process will involve repeating the phase(s) of the certification process that did not meet minimum standards. Inspectors may also be recertified by working with a field supervisor.

POST TRAINING EVALUATION

Following each training session, a survey of the attendees is conducted to assess the effectiveness of the training in achieving the stated goals. That, combined with certification data can be used to improve training efforts in future sessions.

HOT CHECKS

Hot checks are usually conducted immediately following training sessions, but can be used at any time as a tool for assessing how well a given crew adheres to policies and procedures and

assessing efficiency and data quality. Hot checks serve primarily as a training tool, but can also be used to evaluate other aspects of the data collection process.

CERTIFICATION MAINTENANCE

INSPECTIONS

Periodic inspections are conducted on all data collection personnel. Such inspections can take several forms, but general serve to quantify data quality and assess performance and acceptability of the data collected, and to identify training needs.

Hot Checks

See Training and Certification

Blind/Cold Checks

Blind/Cold checks are completed by supervisors and other certified QA personnel on a plot that a production field crew has completed, preferably within the last 2 weeks. If conditions permit, checks may be performed on plots for up to 30 days following initial completion. An inspector will locate the plot to be checked and complete a partial remeasurement of that plot without reviewing or considering the production crew data. This partial remeasurement will include at least 15 trees and/or saplings tallied by either the production crew or the inspector. These 15 stems will include all ingrowth and reconciled trees, regardless of Present Tree Status, and will include all omissions and inclusions as well. If 15 trees/saps are not present on the first inspected subplot, the inspector will proceed to the next consecutive subplot. From subplot 4, the inspector will continue with subplot 1. This process is repeated until 15 trees/saps are tallied or until all 4 subplots have been inspected. Once an inspector has begun to collect data on a subplot, all data on that subplot must be completed regardless of the number of trees/saplings present. Seedling data are collected on all subplots where tree data are collected. This process provides blind check data. After completing the blind check and while still on the plot, the inspector then reviews and compares the production crew data with the blind data, recording discrepancies on a hard-copy of the production crew data. This is the cold check. Neither the production file nor the blind file may be altered in any way as a result of the cold check inspection.

The work of each employee shall be inspected at least once per quarter, or 4 times per year.

While deviation from these procedures is not discretionary, performance management strategies may at times dictate protocols that are substantially different from those outlined in this document. Such protocols are often unique to an individual and are typically biased toward investigating or monitoring specific performance related issues.

Because of this goal related bias, these types of inspections are generally not compatible with our normal blind/cold inspection process.

Blind/Cold Check Selection:
Blind/Cold plots are preselected at the beginning of a state sub-cycle, stratified by predetermined zones, at a 4% inspection rate unless otherwise specified. In addition, in order to meet quarterly forested check requirements, an inspector may visit additional completed forested plots and apply these same check procedures. A supplemental inspection plot is chosen by a randomized selection from plots completed within the preceding 2 weeks. The starting subplot is also chosen at random.

Blind Check Review:
Once collected, no changes are made to the blind data. The blind data will be analyzed for consistency with the production data. Results are published every 5 years in the statistical reports for each state covered by the Northern Research Station.

Cold Check Review:
After the completion of the blind check data, the inspector(s) will compare the blind check data with the crew's production data. (The inspector carries a photocopy of the crew's electronic production data to the plot location. These data are not viewed until the blind check measurement has been completed.) The inspector compares the two data set values while still on plot. Values that are found to be in error based on the stated tolerances from the regional field guide are reexamined by the inspector. If the crew's data are found to be out of tolerance with the inspector's data, these values are circled as errors on the hard copy of the production data and the correct value written beside it. If only the inspector's blind check data are found to be in error, then the crew's values are accepted. When this occurs, no changes are made to the blind check data. On occasion, both data sets may be found to be in error. In these cases, the crew's data are still marked as errors. No changes are ever made to the blind data or the production data. The entire plot record will also be examined for completeness and accuracy of plot location data, plot setup work and owner information. All inspected items are entered into the *Standard Scoring Workbook* to generate a rating for the crew.

In addition to the required 15 trees/saps, all condition, plot, subplot and site tree data will be inspected.

It is extremely important that no changes are made to the crew's original production data or the inspector's blind check data. Inspectors are allowed to mark the hardcopy of the production data for scoring purposes, but these changes will not be reflected in the database. An exception that is allowed is to the recorded plot location data that includes the GPS coordinate and other plot location information (SP, C-to-P, sketch map, etc.). If these data items are found to be unsatisfactory, then the inspector is allowed to modify so that the plot can be relocated during the next cycle. All other errors that are found during the cold check will be corrected during the next cycle.

Inspection Cold Checks

Inspections will be made of previously inspected plots for each inspector at least once per year. During these inspections, a second certified inspector will revisit the inspected plot and reassess the production crew data. They will also assess the inspector's ability to recognize errors and accurately score the plot.

A data collector is considered certified so long as he/she can demonstrate a continuing ability to collect data that meet minimum quality standards, and so long as there are no major changes to data collection protocols for which certification is required.

If a data collector fails to pass inspections he/she may be decertified. A decertified inspector may not collect data without the aid of a qualified (certified) data collector. The decision to recertify an individual is made at the discretion of NRS FIA.

If at any time a data collector is found to have acted in a manner which compromises the integrity of the inventory, he/she may be decertified immediately and permanently.

In addition to maintaining certification as a data collector, inspectors must also pass quality inspections. Any inspector who is found to have acted in an unethical manner during any aspect of the inspection process shall, at a minimum, be immediately decertified as an inspector.

PARTNERING

In order to maintain certification, data collectors must work with other qualified/certified data collectors for a minimum of 2 weeks, every 3 months. Failure to comply may result in decertification.

Inspectors must also work with other inspectors at a minimum of once per year. Supervisors and inspectors will work together to schedule co inspections between different states or sub regions.

CONTRACT INSPECTION

In general all inspections whether focused on federal employees, state cooperators or contracted data collectors will follow the same protocols. When inspecting contractors, it is imperative that no inspector provide specific direction on how to collect data. Instead, the focus must be on whether the quality standards prescribed in the field guide have been met.

DENIED ACCESS PLOTS

All completed plots are available for inspection. Plots where landowner(s) denied access are inspecting using a modified protocol.

1. The inspector will verify that all contact efforts are documented appropriately and that when necessary, appropriate timeframes were followed. If all documentation is in order, the plot will be scored.
2. If documentation is lacking, the inspector may inquire with the data collector about the efforts to obtain permission in order to determine if appropriate procedures were followed. If the validity of the denial can be confirmed, the plot will be scored.
3. If there is a question as to the validity of the denial, the inspector will make an attempt to verify the denial. If it can be shown that access to the plot was not denied, the plot will be scored, recording an error for Condition Class Status. If the plot was correctly denied, but permission is then granted the Nonsampled plot will be deleted from MIDAS and completed.

COLD CHECK SCORING PROCEDURES

The cold check scoring procedure begins with the completion of the blind inspection. On P2 plots, all data are remeasured with the exception of Tree and Seedling data. Tree and Seedling data collection for the blind check will begin on a randomly assigned subplot and microplot. All trees on that subplot will be remeasured as well as all Seedling data on the microplot. Upon completion of that subplot, if 15 trees and saps were remeasured, no additional Tree or

Seedling data will be collected. The 15 trees will include all trees assigned a Present Tree Status. If 15 trees and saplings are not measured, data collection will continue on the next consecutively numbered subplot. From subplot 4, the next consecutive subplot will be Subplot 1. Subsequent subplots and the associated microplots will be measured in their entirety. Here again, after remeasuring all trees and saplings on the subplot and microplot, if at least 15 (cumulative) trees and saps are measured, no additional Tree or Seedling data will be collected. This process will be repeated until at least 15 trees and saplings are tallied or until all subplots and microplots have been remeasured. Any subplot or microplot where Tree and Seedling data are collected, must be remeasured completely. Partial remeasurement of a subplot or microplot is not permitted.

For P2+ plots, the process is essentially the same as for the P2 plot. The Down Woody Material, Invasives, Crown, and Vegetation indicators will also be remeasured on each subplot where Tree and Seedling data are collected. The Soils indicator will be remeasured only on the starting subplot for Tree data, and subplot 2.

Because the Urban plot design differs significantly from the P2 and P2+ plot, the protocol has been modified. Rather than using a random starting subplot, the Urban subplot is divided into 4 quadrants:

Quadrant 1: 001° to 090^0 including microplot 11
Quadrant 2: 091° to 180^0 including microplot 12
Quadrant 3: 181° to 270^0 including microplot 13
Quadrant 4: 271° to 360^0 including microplot 14

Remeasurement begins in a randomly assigned quadrant and all trees in that quadrant are remeasured as well as all regeneration in the associated microplot. If 15 or more trees and saplings were remeasured, no additional Tree or Seedling data will be collected. If fewer than 15 trees or saplings were remeasured, the next consecutive quadrant, moving clockwise around subplot center, will be remeasured in its entirety, including the associated microplot. Once 15 or more trees and saplings have been remeasured, no additional quadrants will be remeasured. Any quadrant in which trees or seedlings have been remeasured must be completed. Partial remeasurement of a quadrant or the associated microplot is not permitted.

Once the blind inspection is complete, the data must not be changed. The cold check is then performed by comparing the blind data to the production data from the crew being inspected. Discrepancies must be reviewed in the field to determine the correct value. Errors in the production data are noted on the printout of the production data.

A summary of checked values and errors is entered into the Standard Scoring Workbook.

The *QA/QC Standard Scoring Workbook* was developed with the intent of maintaining consistency between inspectors and to generate comparable scores in order to quantify performance of data collectors.

Each variable or scoring element has an associated "weight" that it contributes to the plot score. The system is designed to be generally tolerant of occasional items that are found to fall outside of prescribed tolerances. When it can be demonstrated that a substantial percentage of recorded values fall outside of the tolerance levels for a given variable; penalties may be applied and may result in an unsatisfactory score.

To use the scoring program, an inspector enters the number of checks for each scoring element, along with the number of errors for that element. The program then generates a scoring summary that can be provided to the production crew along with a narrative summary (entered by the inspector) detailing the findings of the inspection. This written feedback is essential for a crew to improve the quality of their work.

The narrative summary is often the most useful component of the inspection process as it provides key information to improving data quality. Although the narrative need not detail every error found during an inspection, it should summarize errors adequately, such that the production crew is aware of all types of errors found. It is also useful to indicate if the errors were trends or aberrations. By referencing the field guide when appropriate, it also serves to familiarize the production crew with the guide.

The *QA/QC Standard Scoring Workbook* is a Microsoft Excel workbook. Each inspection report is saved as an electronic workbook file. A report is saved on an inspector's computer using the following naming convention

STUCTYPLOTT.xlsm

Where: ST = State code
U = Unit code
CTY = County code
PLOTT = Plot code

All records created during the inspection process must be maintained, including the markup hard copy of the production data showing both errors and correct values.

An inspection shall include a minimum of 15 trees or saplings including live, dead or cut stems, and including all inclusions and omissions. Additionally, each subplot, once started, will be inspected to completion even if it yields more than 15 stems. Once 15 stems have been inspected and that subplot completed, no additional tree data will be collected.

Under some circumstances, inspection protocols may be altered in order to address performance or quality concerns.

HOME PAGE/HEADER DATA

When the scoring workbook is opened, you will always be directed to the home page. On this page you will be prompted to enter basic information identifying the following information:

- Plot Number
- Production Completion Date
- Inspection Date
- Production Crew Numbers 1 - 5
- Inspector Number(s)
- Inspection Date
- SK
- Protocol

Sample kind, Phase and Region determine what data will be utilized in the scoring process. The other fields serve as identifiers on the report provided to the production crew.

The Protocol field is a critical field that must be completed accurately. It determines what scoring elements (P2, P2+ or Urban) will or will not be visible when entering inspection data.

AUTOFILL

The autofill function can be used on most of the tree data check fields. These fields are filled based on a multi-dimensional matrix using Protocol, Previous and Present Tree Status, Standing Dead, Tree Class and saw, pole or sapling designation. In general, the autofill function uses the

data summary from the production crew to form the basis for matching data. Where there are errors in stem counts or any of the variables listed above, the number of checks may differ as a result. Because the program does not have access to the actual production and inspection data, it cannot determine the nature of the error, such as a change from a live status to dead. Consequently, those changes must be made manually. In general, specific items are scored only when there are comparable data. Omissions and inclusions are not entered into the autofill matrix because matching data do not exist. However, omissions and inclusions must be included (manually) in the check totals for tree and sapling counts.

To enter data into the Autofill Matrix, begin by summarizing the number of trees tallied by the production crew, by sapling, pole and sawlog designation, then dividing each into subgroups based on Past/Present Tree Status and Standing Dead combinations. A button on the home page will direct you to the Autofill screen where these data can be entered.

The NRS Tree Class matrix is used to determine how many checks are made on variables based on Tree Class. Summaries of stem counts by sawlog and pole designation, by tree class, are entered into the Tree Class matrix. The Tree Class matrix is accessible only through the Autofill screen. When the Tree Class data have been entered, return to the Autofill screen and click the "ENTER DATA" button to populate the Tree Data portion of the form.

The Autofill function will direct you to the Data Entry screen where you will be able to enter the remaining QA data.

CHAPTER 0 - GENERAL

Plot Location

The purpose of the Plot Location group is to assess whether the plot is in the correct location. The evaluation criteria differ depending on whether the plot is being remeasured or it is a new installation. Remeasurement plots are evaluated from the true plot location. New plots must be within located prescribed tolerance of the GPS coordinates.

There are three components to the Plot Location group:

Plot location - 1 check: For newly established plots, the plot location must be within tolerance (2 chains) of the prescribed coordinates used to establish the plot and must be in the correct land use (condition) and must be visually accurate relative to landmarks on the imagery and ground or an error is

recorded. The plot must also be free from any obvious bias in the establishment of the plot or an error is recorded.

For previously established plots, the original location must be used when collecting data. There is no specified tolerance for error. However, while there is no tolerance for any deviation, from a practical standpoint it is not always possible to relocate the plot perfectly.

Plot center can be shown to be inaccurately relocated on a previously established plot in 3 ways

- The original pin/marker was found at a location inconsistent with the pin/marker used by the current production crew. In this case an error will be recorded for "Multiple pins found at subplot center(s)"
- Where the old pin/marker could not be found, previous and current horizontal distances and azimuths to tally stems do not match up well. Where this can be demonstrated, the plot will be inspected from the *true* location rather than the location indicated by the pin left by the current production crew.
- Relocation of the plot is so grossly inaccurate that data are not even comparable. This is considered a plot location error.

In the first two examples, the plot will be evaluated from the true location, not the location used by the production crew. **No error will be recorded for Plot Location.** However, there may be omissions or inclusions of tally stem as a result of the inaccurate location of plot center. These omissions or inclusions will serve as an indicator of plot quality in the absence of any scoring error recorded for Plot Location.

In cases where there is a gross error in relocating a remeasure plot, an error will be recorded for Plot Location. Typically, gross errors for plot location will exceed the tolerance of the prescribed coordinates used to establish the plot.

If it can be shown that the plot is relocated in the wrong location, the current pin/marker should be moved to the true location to avoid perpetuating the mistake.

Subplot location – 0 to 3 total checks (excludes PC): For new P2 and P2+ plots, subplots 2, 3 and 4 will be inspected to ensure that they fall within 7 feet of the prescribed location, and that they are free from obvious bias in their establishment. An error is recorded for each subplot that does not fall within tolerance. However, the inspector should rule out the possibility that such errors are a result of consistent deviation between compasses. Do not attempt to correct the location of inaccurate subplots on newly established plots.

For previously established subplots where trees are not inspected, either because no trees exist on that subplot, or because the 15 tree minimum has already been met, if the pin/marker for a previously established, treeless subplot deviates by more than 7 feet from the true location, an error will be recorded for subplot location. For subplots with trees that are not being inspected, do not attempt to verify the true location by comparing azimuths and distances to tally trees unless it is obvious that the existing pin/marker is in the wrong location. Typically, the presence of two pins/markers would be the indicator of such an error. A Subplot Location error would be recorded if it can be shown that the error would result in the omission or inclusion of a tally tree.

For subplots with trees that are being inspected, no check and no errors will be recorded for Subplot Location. The subplot will be inspected from the true location, even if that is not the location indicated by the current production crew.

When the production crew fails to accurately relocate an existing subplot, remove the current pin/marker and place it at the original location in order to avoid perpetuating the mistake into future inventories.

Microplot location – 0 to 4 checks: For newly established plots, checks are made for each of the 4 microplots. Microplots must be within 1 foot of the prescribed location.

For previously established microplots, a check will be recorded only when a) no seedlings or saplings exist on that microplot, or b) no seedlings or saplings are being inspected on that microplot. If the pin/marker for a remeasured treeless microplot deviates by more than 1 foot from the true location, an error will be recorded. For microplots with saplings that are not being inspected, do not attempt to verify the true location by comparing azimuths and distances to tally

saplings unless it is obvious that the existing pin/marker is in the wrong location. Typically, the presence of two pins/markers would be the indicator of such an error. A Microplot Location error would be recorded if it can be shown that the error would result in the omission or inclusion of a sapling and a Subplot Location error would be recorded.

When the production crew fails to accurately relocate an existing microplot, remove the current pin/marker and place it at the original location in order to avoid perpetuating the mistake into future inventories.

There should be no check for Microplot Location for microplots that are based upon inaccurate subplot locations.

Monument Type (Urban only) – 1 check for each witness object or starting point: The recorded type should reflect accurately the actual type used.

Monument Number (Urban only) – 1 check for each witness object or starting point.

Subplot/Microplot Number (Urban only) - 1 check for each reference.

Subplot/Microplot Offset Point (Urban only) – 1 check for each reference.

Witness Object / SP / RP / Type (Urban only) – 1 check for each witness object, SP, or RP.

Witness Object / SP / RP / Species (Urban only) – 1 check for each witness object, SP, or RP.

Object Description (Urban only) – 1 check for each witness object, SP, or RP.

Monument Azimuth (Urban only) – 1 check for each witness object, SP, or RP.

Monument Horizontal Distance (Urban only) – 1 check for each witness object, SP, or RP.

Plotsheet SP/RP Records (Urban only) – 1 check for each witness object, SP, or RP. Record an error if objects, SP or RP are not referenced on plot sheets.

Monumentation allows for relocation – 1 check: Record an error if the monumentation is insufficient to relocate the plot.

Multiple pins found at subplot center(s) – 1 to 4 errors: For each subplot, record an error if multiple pins are found.

.

Plot Integrity

The purpose of the Plot Integrity group is to assess whether the plot can be relocated efficiently and whether site disturbance is minimized so there is no adverse effect on the plot or on our ability to access or relocate the plot in the future.

Remeasurement Plots:

Site disturbance minimized – 1 check on each plot with accessible forestland: An assessment of the attempt to minimize site disturbance is made by looking for avoidable damage to the plot, particularly damage to vegetation. Any evidence of unnecessary damage is considered an error. Litter left behind by the production crew is also considered a site disturbance.

SP monumented – 1 check on each plot. If the SP monumentation is absent or inaccurate, an error is recorded. Do not score SP monumentation.

Subplot/ Microplot monumented – 1 checks for all subplots and microplots: Verify that an acceptable marker is placed at subplot and microplot center. Standard markers vary from state-to-state, but are generally wire pins, wooden dowels, landscaping nails, PVC pipe, or similar types of permanent or semi-permanent markers. Natural sticks do not constitute acceptable markers because they are indistinguishable from surrounding debris and are not likely to whether well enough to persist until the following inventory cycle. A single error is recorded if no suitable marker is placed at any subplot or microplot. If there is a reasonable cause for the monumentation, sufficiently noted, no error will be recorded.

SP Map – No checks: The SP map scoring element summarizes specific features that are to be included on all sketches. It will be populated when the following map features are scored.

Nearest City/Town/Village – 1 check: Each sketch map should include one or more references to the nearest city, town or village. If it does not include a reference to a city, town or village, or if the reference is incorrect, an error will be recorded.

Road Names – 1 check: Each sketch map must include all pertinent road names. If it does not, or if a reference is incorrect, an error will be recorded.

Key Landmarks – 1 check: Each sketch map must accurately depict key landmarks such as, bridges, rivers, trails etc. If it does not, or if the reference is incorrect, an error will be recorded.

Common Symbols – 1 check: Each sketch map should include common symbols whenever necessary. If it does not, or if the reference is incorrect, an error will be recorded.

North Arrow – 1 check: Each sketch map must include a north arrow. If it does not, or if the reference is incorrect, an error will be recorded.

PC/SP – 1 check: Each sketch map must include plot center and the starting point. If it does not, or if the reference is incorrect, an error will be recorded.

Parking Location – 1 check: Each sketch map must include the parking location used along with any notes regarding parking problems. If it does not, or if the reference is incorrect, an error will be recorded.

Waypoint Mileages – 1 check: Each sketch map must include sufficient mileages to allow for the efficient travel to the plot from an easily identifiable location. If the mileages are absent or are so inaccurate as to cause significant difficulty in navigating to the plot (such as a reversal of mileages) an error will be recorded. Do not record an error for minor mileage discrepancies that can be attributed to variability between odometers.

Gates – 1 check for any map where a gate is or should have been noted: Each sketch map should include references to all gates that are currently in use, whether open or closed. If the reference is incorrect or omitted, an error will be recorded. Do not record an error for abandoned gates that are not noted.

Trails Used – 1 check for each map that includes or should have included a trail: Each sketch map should include references to any trail, formal or otherwise, that was utilized in accessing the plot. If the reference is omitted, an error will be recorded.

SP Coordinates – 1 check on each plot. If the coordinates are inaccurate or incomplete an error is recorded. If no coordinates are collected at SP, there must be a note indicating why. In such cases, no error is recorded. Do not score SP Coordinates.

Plot diagram/map – 1 check on each plot. If the diagram/map is incomplete, an error is recorded. The map should include all important landmarks as well as condition boundaries across the entire plot, not just the subplots.

Plot sheet information – 1 check for all plots: Verify that all plot sheet information is complete and accurate. If it is inaccurate, an error is recorded.

Sample Kind 1 Plots (image installation)

Dist and AZ computation – 1 check for each new plot installed by using an image: If there is inaccuracy in the calculation of distance and azimuth an error is recorded.

C-T-P Traversed accurately (photo) – 1 check for each new plot installed by using an image: Verify that the course-to-plot was traversed correctly on the ground. If it was not, record an error.

Documentation allows for relocation – 1 check for each established plot: For both new and remeasure plots, the documentation provided by the production crew must allow for the relocation of the plot. If the information provided is so limited or inaccurate that **only by using plot GPS** coordinates can the plot be relocated, an error is recorded.

Ownership

The Ownership group consists of the actual owner name and address data and whether or not permission to access the property was granted.

Owner Type – 1-check for each owner referenced: Midas entry is required. If the recorded type is inaccurate, an error is recorded.

Owner Short Name – 1-check for each owner: If the recorded type is inaccurate, an error is recorded. Do not check Owner Short Name.

Agency – 1 check for each public landowner: If the agency is inaccurate, an error is recorded.

Company – 1 check for each organization owning land: If the company name is inaccurate, an error is recorded.

Management Unit – 1 check for landowner when a management unit exists: Record an error only if the Unit is inaccurate or if the Unit it was known but not recorded.

Name – 1 check for each landowner: If the name is inaccurate, an error is recorded.

Attention – 1 check for each landowner: If the data are inaccurate, an error is recorded.

Address – 1 check for the first private forest landowner: If any address entry (address, city, state, zip code, country) is inaccurate or omitted, an error is recorded. While it is acceptable to enter address information on multiple owners, do not check the address information except on the first private forest owner as this information is not required on additional owners.

Phone - 1 check for all landowners (when available). If the phone number provided is inaccurate, or if the phone number was used but not recorded, record an error.

Email - 1 check for each landowner (when available). If the email address provided is inaccurate, or if the email was used but not recorded, record an error.

Data Source – 1 check for each landowner: Midas entry is required. If the source is inaccurate, an error is recorded.

Legal Description – 1 check for each landowner (when available): If the description is inaccurate, an error is recorded. Do not record an error unless the description was available when the data were recorded.

Map Number – 1 check for each landowner (when available): If the description is inaccurate, an error is recorded. Do not record an error unless the description was available when the data were recorded.

Parcel Number – 1 check for each landowner (when available): If the description is inaccurate, an error is recorded. Do not record an error unless the description was available when the data were recorded.

Tract Size – 1 check for each landowner (when available): If the description is inaccurate, an error is recorded. Do not record an error unless the description was available when the data were recorded.

Tract Percent Forested – 1 check for each landowner (when available): If the description is inaccurate, an error is recorded. Do not record an error unless the description was available when the data were recorded.

Owner Notes – 1 check for each landowner: If the description is inaccurate or a necessary note is omitted, an error is recorded.

Contact Name – 1 check for each contact: Midas entry is required. If the name is inaccurate, an error is recorded.

Contact Date – 1 check for each contact: Midas entry is required. If the date is inaccurate, an error is recorded.

Contact Method – 1 check for each contact: Midas entry is required. If the description is inaccurate, an error is recorded.

Posted – 1 check for each landowner: If the description is inaccurate, an error is recorded. Do not record an error unless the data collector should have been aware that the land was posted.

Access Granted – No Checks: Record an error only if a trespass occurred. This item does not factor into scoring. However, failure to obtain permission to access private property will result in disciplinary action in most cases.

Access Granted Date – 1 check for each landowner: If the date is inaccurate, an error is recorded.

Access Notes – 1 check for each landowner: If the description is so inaccurate as to cause problems with accessing the plot again, an error is recorded.

Ownership Request Notice – 1 check for each landowner contacted: If it can be determined that the data are inaccurate, an error will be recorded.

Ownership Condition List – 1 check for each list: Record an error for each inaccurate list

CHAPTER 1 - PLOT

Plot identification is provided electronically and cannot be changed. It is not currently scored.

Identification

This information cannot be edited and therefore is not scored.

State
County
Plot number

Assessment

The assessment group contains basic information about the plot.

Plot Status – 1check per plot: Do not record an error unless the production crew correctly identified the presence or absence of accessible forestland and the status code is inaccurate. If there is an error in the recognition of Condition Class Status, this should be scored in the Condition Recognition section.

Non sampled reason – 1 check when Status = 3: If the value is inaccurate, record an error.

Subplots examined – 1 check on each P2/P2+ plot. If the code is inaccurate, one error is recorded.

Year – 1 check on each plot: If the value is inaccurate, record an error.

Month - 1 check on each plot: If the value is inaccurate, record an error.

Day – 1 check on each plot: If the value is inaccurate, record an error.

HD to improved Road - 1 check when plot status = 1: If the value is inaccurate, record an error. Consideration must be given as to whether the improved road in question should be improved and whether the distance to that road is accurate. Also, improved roads may exist within other developed nonforest conditions without being delineated as Rights-of-Way. For example, a road through a strip mall parking lot may meet the definition of an improved road, but it would be classified as a Cultural Nonforest Land Use. Such roads **would** be considered for Horizontal Distance to Improved Road.

Water on Plot - 1 check when plot status = 1: If the value is inaccurate, record an error. Although this is a plot variable, the water must occur on the forested portion of any subplot in order to be considered.

Crew Numbers – 1 check per plot: If there are discrepancies in any of the recorded values, record an error.

QA Status – 1 check on each plot: If the value is inaccurate, record an error.

Crew Type – 1 check on each plot: If the value is inaccurate, record an error.

One or two person plot – This item may be checked and commented on in the notes, but it is not scored.

Plot season – This item may be checked and commented on in the notes, but it is not scored.
Training plot – 1 check on each plot: If the value is inaccurate, record an error.
Denied Access Reason – 1 check on each plot where access is denied: If the value is inaccurate, record an error.
Safety – 1 check on each plot
Safety Description – 1 check on each plot with a safety concern.

GPS

The GPS group includes information about Plot Center coordinates.

GPS unit – 1 check on each plot when GPS coordinates were taken: If the value is inaccurate, record an error.
GPS serial number – 1 check on each plot when GPS coordinates were taken: If the value is inaccurate, record an error.
Latitude – 1 check on each plot when GPS coordinates were taken. If the value is inaccurate, record an error. If it can be demonstrated that there is an error in only the Latitude, such as transposed values where the value was keypunched in error, then only score an error for Latitude. If the location of the coordinates can be shown to be in error, then record errors for both Latitude and Longitude.
Longitude – 1 check on each plot when GPS coordinates were taken: If the value is inaccurate, record an error. If it can be demonstrated that there is an error in only the Longitude, such as transposed values where the value was keypunched in error, then only score an error for Longitude. If the location of the coordinates can be shown to be in error, then record errors for both Latitude and Longitude.
Azimuth to plot center - 1 check whenever coordinates were taken at a location other than PC and could not be calculated using the functions of the GPS unit: If the value is inaccurate, record an error. In the Northern Region, there is no reason, absent technical issues with the GPS unit or the use of a GPS unit without the ability to calculate coordinates from another location, that any value should be entered for Azimuth to Plot Center. Corrections should be made in the field. If a value is entered for Azimuth to Plot Center, it is assumed that the recorded coordinates are inaccurate and they will be corrected at a later time. These corrected coordinates must be used by the inspector to determine if the Latitude and Longitude are correct. Consequently, if the production crew

incorrectly enters Azimuth to Plot Center and also corrects the coordinates, the resulting coordinates will be in error by the amount of the correction.

Distance to plot center - 1 check whenever coordinates were taken at a location other than PC and could not be calculated using the functions of the GPS unit: If the value is inaccurate, record an error. In the Northern Region, there is no reason, absent technical issues with the GPS unit or the use of a GPS unit without the ability to calculate coordinates from another location, that any value should be entered for Azimuth to Plot Center. Corrections should be made in the field. If a value is entered for Azimuth to Plot Center, it is assumed that the recorded coordinates are inaccurate and they will be corrected at a later time. These corrected coordinates must be used by the inspector to determine if the Latitude and Longitude are correct. Consequently, if the production crew incorrectly enters Azimuth to Plot Center and also corrects the coordinates, the resulting coordinates will be in error by the amount of the correction.

GPS Elevation – 1 check on each plot when GPS coordinates were taken: If the value is inaccurate or absent, record an error.

GPS error – 1 check on each plot when GPS coordinates were taken: If the value is inaccurate or absent, record an error.

Number of readings - 1 check on each plot when GPS coordinates were taken: If the value is inaccurate or absent, record an error.

GPS PDOP – 1 check on each plot when GPS coordinates were taken (if GPS unit gives PDOP reading): If the value is inaccurate, record an error.

GPS unavailable (noted) – 1 check if coordinates were not taken: If there are no valid reasons in the notes indicating why coordinates were not taken, an error is recorded. If the GPS is unavailable, this is the only item scored in this group.

Other

Plot notes – 1 check for each plot: An error is recorded only when notes of significance are omitted or when the notes provided are inaccurate.

CHAPTER 3 - CONDITION

There are 4 components to the condition recognition chapter dealing with 4 types of assessments.

Recognition

The recognition group includes only the factors that affect whether a condition is recognized and not the specific tally items recorded for each condition. They do not rely on having comparable data for scoring. They are the cumulative number of conditions that are assessed for recognition.

Conditions recognized (error within forestland) – 1 check for each condition recognized, or that should have been recognized by production crew. For example, if the production crew recognized 2 conditions, but an inspection yields only 1 condition, 2 checks are recorded. Similarly, if a crew recognizes 1 condition, but an inspection yields 2 conditions, 2 checks are recorded. If both the production crew and the inspector(s) record one matching condition, but each also records an additional non-matching condition, 3 checks are recorded. If there is an error within accessible forestland such as the omission of a condition based on one of the delineating variables, an error is recorded. Do not record errors between statuses in this scoring item.

Status Error – 1 error is recorded for each error between any of the 5 status codes. Do not record errors within accessible forestland or within nonforest in this scoring element. For status errors between Accessible Forestland and Nonforest that are based canopy cover, if the 10% threshold is within 4% of the true (QA) value, do not record a Status Error.

Failure to Delineate All Recognized Conditions – 1 error when a condition is not delineated correctly across the entire plot. Although the failure to delineate a given condition also results in discrepancies in a contrasting condition, only 1 error is recorded. Do not record multiple errors for additional failures to delineate the same condition elsewhere on the plot. Do not record an error if the delineation error is the result of boundary discrepancies, even if a boundary error is recorded. An error should only be recorded if it stems from a mistake in *recognizing* the condition.

Failure to Delineate with Missed Trees – 1 error when a condition that was not delineated correctly across the entire plot and the error results in the omission or inclusion of trees. This generally occurs when there are errors between forest and nonforest conditions identified elsewhere on the plot, but may occur within accessible forestland as well. Although the failure to delineate a condition results in discrepancies in both the missing condition and the condition that was actually recorded, this error is recorded only once for the missing condition. Do not record an error if the delineation error is the result of boundary

discrepancies, even if a boundary error is recorded. An error should only be recorded if it stems from a mistake in recognizing the condition.

Description

The scoring items under condition description group are dependent on having matching conditions to allow for data comparison. For conditions that do not match, no scoring can be done. For example, if the production crew records two forested conditions but the inspection shows there to be only 1, the second condition cannot be scored because it does not exist. Consideration must be given to how the inclusion of the unrecognized condition affects assessments. Because this error is already accounted for in the recognition group, no additional errors are recorded.

Condition number – 1 check for each matching condition: If the number of conditions does not match, do not record an error. Only record an error when the number assigned to matching conditions is incorrect. For example, if the production crew visits the subplots out of order, this may result in conditions being recorded with inaccurate condition numbers. Also, when a recognition error has occurred, consideration must be given that it is impossible for the numbers to match. In such cases, no checks and no errors would be recorded.

Condition class status - Do not score this item

Condition nonsampled reason – 1 check whenever there is a nonsampled condition on the plot: Record an error whenever the reason given is inaccurate. Do not score an error for nonsampled conditions that were not correctly recognized.

Mapping

The variables in this group are the mapping or delineating variables. These variables are dependent on having matching conditions to allow for data comparison. For conditions that do not match, no scoring can be done. For example, if the production crew records two forested condition but the inspection shows there to be only 1, the second condition cannot be scored because it does not exist. This error is already accounted for in the recognition group. Additionally, discrepancies in these variables does not necessarily connote an error in condition recognition.

Reserved Status – 1 check for each publicly owned accessible forestland condition: If the coding is inaccurate, an error is recorded.

Owner Group - 1 check for each accessible forestland condition: If the coding is inaccurate, an error is recorded.

Forest Type - 1 check for each accessible forestland condition: If the coding is inaccurate, an error is recorded. Consideration must be given to the fact that Forest Type is a subjective assessment and only general guidelines are provided for reference.

Stand Size Class - 1 check for each accessible forestland condition: If the coding is inaccurate, an error is recorded.

Regeneration Status - 1 check for each accessible forestland condition. If the coding is inaccurate, an error is recorded:

Tree Density - 1 check for each accessible forestland condition: Tree Density is unique in that it is only used when there are no changes in the other delineating variables. If a change is recorded in Tree Density in combination with a change in any other mapping variable, an error is recorded. If Tree Density was used to recognize a condition change, but the change was actually the result of changes in one of the other delineating variables, no check or error is recorded for Tree Density. An error will instead be recorded in one of the other Delineating variables that should have been used to identify the condition.

Ancillary

The scoring items under the Ancillary group are dependent on having matching conditions to allow for data comparison. For conditions that do not match, no scoring can be done. For example, if the production crew records two forested conditions but the inspection shows there to be only 1, the second condition cannot be scored because it does not exist. This error is already accounted for in the recognition group. The variables in this group are the ancillary variables and do not necessitate changes in condition.

Owner Class - 1 check for each accessible forestland condition. If the coding is inaccurate, an error is recorded.

Owner Subclass – 1 check for each accessible forestland condition: If the coding is inaccurate, an error is recorded.

Administratively Withdrawn Status – 1 check for each accessible forestland condition: If the coding is inaccurate, an error is recorded.

Reserved Area Name – 1 check for each accessible forestland condition: If the coding is inaccurate, an error is recorded.

Private Owner Industrial Status - 1 check for each accessible forestland condition when owner group = 40: If the coding is inaccurate, an error is recorded.

Artificial Regeneration Species - 1 check for each accessible forestland condition when regeneration status = 1: If the coding is inaccurate, an error is recorded.

Stand Age - 1 check for each accessible forestland condition. If the coding is inaccurate, an error is recorded.

Disturbance - 1 check for each accessible forestland condition. An error is recorded for each inaccurate code or missed Disturbance.

Disturbance Year - 1 check for each correct disturbance recorded by the production crew: If the coding is inaccurate, an error is recorded. Do not check Disturbance Year if no Disturbance was recorded.

Treatment - 1 check for each accessible forestland condition. An error is recorded for each inaccurate code or missed Treatment.

Treatment Year - 1 check for each correct treatment recorded by the production crew: If the coding is inaccurate, an error is recorded. If the coding is inaccurate, an error is recorded. Do not check Treatment Year if no Treatment was recorded.

Physiographic Class - 1 check for each accessible forestland condition: If the coding is inaccurate, an error is recorded.

Land Cover Class - 1 check for each condition: If the coding is inaccurate, an error is recorded.

Present NF Land Use - 1 check for each nonforest condition: If the coding is inaccurate, an error is recorded.

Canopy Cover Sample Method - 1 check for each Status 1 or 2 condition. The canopy cover sample method recorded must reflect what was actually used, regardless whether it was the appropriate sample method.

Live Canopy Cover – 1 check for each Status 1 or 2 condition when Live Canopy Cover is measured. If the Canopy Cover value is not within tolerance, an error is recorded.

Live Canopy Cover (ESTIMATED) - 1 check for each Status 1 or 2 condition when Live Canopy Cover is estimated. If the Canopy Cover value is not within tolerance, an error is recorded.

Live Plus Missing Canopy Cover - 1 check for each Status 1 or 2 condition When Live Plus Missing Canopy Cover is measured. If the Canopy Cover value is not within tolerance, an error is recorded.

Live Plus Missing Canopy Cover - 1 check for each Status 1 or 2 condition When Live Plus Missing Canopy Cover is estimated. If the Canopy Cover value is not within tolerance, an error is recorded.

Current Afforestation Code – 1 check for each Status 1 or 2 condition. Record an error if the code is incorrect.

Previous Afforestation Code – No previous Aforestation code exists. No inspection is necessary.

Total Stems – Total stems is calculated automatically based on the actual tally on the condition. No inspection is necessary.

Chaining Code – 1 check for each forest or nonforest condition: If the recorded value is inaccurate record an error.

Productivity Status - 1 check for each accessible forestland condition. If the coding is inaccurate, an error is recorded.

CHAPTER 3 - SUBPLOT

Some subplot variables are dependent on Condition Status. These subplot variables are not scored when there has been a failure to correctly assess the condition status(s) present.

Subplot

Subplot Number – Do not check

Subplot Status - 1 check for each subplot: Inspect on all subplots. If there is an error in subplot status resulting from a condition recognition error, do not record a check or error. Only record an error if the subplot status does not reflect the condition(s) when accurately identified by the production crew.

Subplot Nonsampled Reason – 1-check for each nonsampled subplot: Record an error only when the subplot is nonsampled but the wrong reason is recorded. Do not record an error if the there was a failure to properly recognize a nonsampled subplot.

Subplot center condition – 1-check for each subplot where production crew and inspector condition data match: Inspect all subplots. Record an error if the wrong condition is recorded.

Microplot center condition – 1-check for each microplot where production crew and inspector condition data match: Inspect all microplots. Record an error if the wrong condition is recorded.

Urban Microplot 11 center condition – 1-check for each microplot where production crew and inspector condition data match: Inspect all microplots. Record an error if the wrong condition is recorded.

Urban Microplot 12 center condition – 1-check for each microplot where production crew and inspector condition data match: Inspect all microplots. Record an error if the wrong condition is recorded.

Urban Microplot 13 center condition – 1-check for each microplot where production crew and inspector condition data match: Inspect all microplots. Record an error if the wrong condition is recorded.

Urban Microplot 14 center condition – 1-check for each microplot where production crew and inspector condition data match: Inspect all microplots. Record an error if the wrong condition is recorded.

Subplot Slope - 1 check for each subplot with accessible forestland: If the value is inaccurate, an error is recorded.

Subplot aspect – 1-check for each subplot with accessible forestland: If the value is inaccurate, an error is recorded.

Snow/water depth - 1 check for each subplot with accessible forestland: If the value is inaccurate, an error is recorded.

Urban Remaining Condition - 1 check for each Urban plot with multiple conditions. If the value is inaccurate, an error is recorded.

Crown Closure Class – MAINE ONLY – 1 check for each subplot with accessible forestland: Record an error if the class is incorrect.

Subplot Condition List - 1 check for each subplot: Inspect all subplots. If the value is inaccurate, an error is recorded.

Urban Non-tally Tree - 1 check for each plot: If the value is inaccurate, an error is recorded.

Urban Non-tally Tree Species - 1 check for each plot with a non-tally tree: If the value is inaccurate, an error is recorded.

Urban Subplot Condition Condition Number - 1 check for each plot: If the value is inaccurate, an error is recorded.

Urban Percent Tree/Sap Cover - 1 check for each plot: If the value is inaccurate, an error is recorded.

Urban Percent Shrub/Seedling Cover - 1 check for each plot: If the value is inaccurate, an error is recorded.

Urban Percent Buildings - 1 check for each plot: If the value is inaccurate, an error is recorded.

Urban Percent Impervious - 1 check for each plot: If the value is inaccurate, an error is recorded.

Urban Percent Permeable - 1 check for each plot: If the value is inaccurate, an error is recorded.
Urban Percent Low Woody/Veg/Herb - 1 check for each plot: If the value is inaccurate, an error is recorded.
Urban Percent Water - 1 check for each plot: If the value is inaccurate, an error is recorded.

REFERENCE TREE

Reference trees are only scored when required.

Subplot number - 1 check for each subplot when a reference tree is required: If the value is inaccurate, an error is recorded.
Species - 1 check for each subplot when a reference tree is required: If the value is inaccurate, an error is recorded.
DBH - 1 check for each subplot when a reference tree is required: If the value is inaccurate, an error is recorded.
Distance - 1 check for each subplot when a reference tree is required: If the value is inaccurate, an error is recorded.
Azimuth - 1 check for each subplot when a reference tree is required: If the value is inaccurate, an error is recorded.
Mark - 1 check for each subplot when a reference tree is required: If the value is inaccurate, an error is recorded.
Reference Tree Omitted – 1 check when there is no reference tree and there should have been: Record an error if a reference tree was available but was not used. Do not record an error if no reference trees were available.

CHAPTER 4 - BOUNDARY

Boundary data errors are to be recorded whenever boundaries are incorrectly omitted or included for existing conditions, or when boundary values are not within tolerance. Do not record a boundary error for conditions that the production crew failed to recognize or for conditions that the production crew recognized incorrectly. Those errors are captured in the condition recognition section.

Subplot Number - 1 check for each correctly identified boundary. If the value recorded is inaccurate, an error is recorded.
Urban Offset Point - 1 check for each correctly identified Urban boundary. If the value recorded is inaccurate, an error is recorded.

Plot Type - 1 check for each correctly identified boundary. If the value recorded is inaccurate, an error is recorded.

Boundary Change - 1 check for each correctly identified boundary. This item is scored only on remeasurement plots. If the value recorded is inaccurate, an error is recorded.

Contrasting condition - 1 check for each correctly identified boundary. Do not record a check or an error if the contrasting condition was misidentified. However, if the contrasting was correctly identified, but this code does not reflect that condition, a check and an error are recorded.

Left Azimuth - 1 check for each correctly identified boundary. If the value recorded is inaccurate, an error is recorded.

Corner azimuth - 1 check for each correctly identified boundary. If the value recorded is inaccurate or a corner was omitted or included, an error is recorded.

Corner distance - 1 check for each correctly identified boundary. If the value recorded is inaccurate or a corner was omitted or included, an error is recorded.

Right Azimuth - 1 check for each correctly identified boundary. If the value recorded is inaccurate, an error is recorded.

Percent Area – 1 check for each boundary. If the recorded value is not within 10% of the correct value, an error is recorded.

Crosses Urban Subplot Boundary - 1 check for each correctly identified boundary. If the value recorded is inaccurate, an error is recorded.

Number of Urban Nodes - 1 check for each correctly identified boundary. If the value recorded is inaccurate, an error is recorded.

Azimuths to Urban Nodes - 1 check for each correctly identified boundary corner. If the value recorded is inaccurate, an error is recorded.

Distances to Urban Nodes - 1 check for each correctly identified boundary corner. If the value recorded is inaccurate, an error is recorded.

Boundary Omitted/Included - 1 check and 1 error for each boundary omitted (or included) by the production crew. No other boundary data are scored for omitted or included boundaries. Do not record checks unless an error exists. Boundary omissions should not be confused with "failure to delineate" condition recognition errors. Boundary error stem from incorrect placement of the boundary while "failure to delineate" errors are the result of failing to recognize that the condition even exists.

Boundary Adjustment Error – 1 check and 1 error for each boundary adjusted when it should not have been. Do not record checks unless an error exists. Do not record boundary adjustment errors if there has been an true change to the boundary location.

The Tree Data group includes tree variables and other related inspection elements. Checks for most inspection elements can be filled automatically based on the number of comparable stems (stems tallied by both the production crew and the inspector). Many variables are only collected on certain trees, depending on DBH, Present Tree Status and other "trigger" variables. For instances where an error in one of the trigger variables results in the collection of non-matching data by either the production crew or inspector(s), no checks or errors are recorded on those subsequent discrepancies. For example, if a diameter error leads to the classification of a tree as a pole rather than a sawlog, no check or error would be entered for the resulting omission of Tree Grade. In such cases, it is customary to base the autofill data on the assessment by the production crew, then make manual corrections for errors in the trigger variables using the tally guides in Appendix H of Field Guide 6.0.

Tree count – 1 check per each inspected live and dead tree, including trees that should have been tallied but were not: Record 1 error for each omission or inclusion of live trees only. In cases of inclusions and omissions, those stems are included in the total and must be added manually to the number of checks. Omissions and inclusions should not be included in autofill data because the production and QA data do not match. Careful consideration must be given to stem count errors that arise from the application of the "measure low approach". Do not record an error unless you can demonstrate conclusively that the measure low approach should not have been utilized, or that the measure low approach was utilized and should not have been, resulting in discrepancies in the number of stems.

Dead tree count – 1 check per inspected live and dead tree, including trees that should have been tallied but were not: Record 1 error for each omission or inclusion of dead trees only. In cases of inclusions and omissions, those stems are included in the total and must be added manually to the number of checks. Omissions and inclusions should not be included in autofill data. Careful consideration must be given to stem count errors that arise from the application of the "measure low approach". Do not record an error unless you can demonstrate conclusively that the measure low approach should not have been utilized, or that the measure low approach was utilized and should not have been, resulting in discrepancies in the number of stems.

Sap count - 1 check per inspected live and dead sapling, including saplings that should have been tallied but were not. Record an error for each omission or inclusion of live saplings only. In cases of inclusions and omissions, those stems are included in the total and must be added manually to the number of checks. Omissions and inclusions should not be included in autofill data. Careful consideration must be given to stem count errors that arise from the application of the "measure low approach". Do not record an error unless you can demonstrate conclusively that the measure low approach should

not have been utilized, or that the measure low approach was utilized and should not have been, resulting in discrepancies in the number of stems.

Dead Sap Count - 1 check per inspected live and dead sapling including saplings that should have been tallied but were not. Record an error for each omission or inclusion of dead saplings only. In cases of inclusions and omissions, those stems are included in the total and must be added manually to the number of checks. Omissions and inclusions should not be included in autofill data. Careful consideration must be given to stem count errors that arise from the application of the "measure low approach". Do not record an error unless you can demonstrate conclusively that the measure low approach should not have been utilized, or that the measure low approach was utilized and should not have been, resulting in discrepancies in the number of stems.

Nontally/removed trees - 1 check per inspected live and dead tree including trees that should have been tallied but were not. Record an error for each omission or inclusion of nontally or removed trees only. In cases of inclusions and omissions, those stems are included in the total and must be added manually to the number of checks. Omissions and inclusions should not be included in autofill data.

Nontally/removed saps - 1 check per inspected live and dead sapling including saplings that should have been tallied but were not. Record an error for each omission or inclusion of nontally or removed trees only. In cases of inclusions and omissions, those stems are included in the total and must be added manually to the number of checks. Omissions and inclusions should not be included in autofill data.

Subplot number - 1 check for each matching tree/sap: If the value recorded is inaccurate, an error is recorded.

Tree Record number - 1 check for each matching tree/sap: If the value recorded is inaccurate, an error is recorded.

Condition Class Number - 1 check for each matching tree/sap: If the value recorded is inaccurate, an error is recorded. In cases where the condition was identified incorrectly, do not check or record errors for trees in that condition.

Azimuth/Offset Azimuth - 1 check for each matching tree/sap: If the value recorded is inaccurate, an error is recorded.

Horizontal Distance/Offset Distance - 1 check for each matching tree/sap: If the value recorded is inaccurate, an error is recorded. For trees at the perimeter of the plot, no tolerance is given for horizontal distance errors. However, +/- 0.2' tolerance is allowed for error due to slope and the inability to precisely estimate the center of the base of the tree.

Present Tree Status - 1 check for each matching tree/sap: If the value recorded is inaccurate, an error is recorded. In some cases, a tree may be improperly reconciled and listed as a dead and down or removed tree when the tree still exists. In such cases,

the tree in question is typically recorded as an ingrowth. In such cases, a present tree status error is recorded rather than an inclusion error in the live stem count.

Reconcile - 1 check for each matching tree/sap: If the value recorded is inaccurate, an error is recorded.

Urban Stump Removed - 1 check for each matching stem: If the value recorded is inaccurate, an error is recorded.

Standing Dead - 1 check for each matching tree/sap: If the value recorded is inaccurate, an error is recorded.

Species - 1 check for each matching tree and sapling where Species is recorded. An error is recorded for each live tree 5" DBH and greater only when there is an error between two specific epithets within the same genus. Do not record an error for misidentified saplings or dead stems.

Tree Genus – No entry is required for checks. An error is recorded for each live tree 5" DBH and greater only, when there is an error between two different genera. Do not record an error for misidentified saplings or dead stems.

Live Sapling ID – No entry is required for checks. An error is recorded for each live sapling less than 5" DBH only, when the sapling is misidentified. Do not record an error for misidentified dead stems.

Dead Tree/Sapling ID - No entry is required for checks. An error is recorded for each dead tree and sapling less when the stem is misidentified. **Previous DBH –** Do not score.

Diameter - 1 check for each matching tree/sap: If the value recorded is inaccurate, an error is recorded. DBH should be measured at the correct location, not necessarily at the location used by the production crew.

Appropriate Diameter mark - 1 check for each matching tree/sap: If the mark is done incorrectly, record an error. Most importantly, scribes should not be deep enough to damage the cambium.

Diameter Location - 1 check for each matching tree/sap: If the diameter is taken at an incorrect location, an error is recorded.

DRC - 1 check for each matching stem: If the value recorded is inaccurate, an error is recorded.

DRC Stem Diameter - 1 check for each matching stem: If the value recorded is inaccurate, an error is recorded.

DRC Stem Status - 1 check for each matching stem: If the value recorded is inaccurate, an error is recorded.

Current Number of Stems - 1 check for each matching stem: If the value recorded is inaccurate, an error is recorded.

Diameter check - 1 check for each matching tree/sap: If the value recorded is inaccurate, an error is recorded.

Rotten or Missing Cull (cu) - 1 check for each matching tree/sap: If the value recorded is inaccurate, an error is recorded.

Total Length - 1 check for each matching tree/sap: If the value recorded is inaccurate, an error is recorded.

Evaluated for Missing Top - 1 check for each matching tree/sap: Each stem should be evaluated to determine if there is a missing top that requires an Actual Length be taken. If the production crew recorded different Total and Actual Lengths, but there was no missing top, an error is recorded. If a missing top exists, but the production crew recorded only Total Length, an error is recorded.

Actual Length - 1 check for each matching tree/sap. If the production crew did not record an Actual Length, do not record an error.

Length Method - 1 check for each matching tree: If the value recorded is inaccurate, an error is recorded.

Crown Class - 1 check for each matching tree/sap: If the value recorded is inaccurate, an error is recorded.

Uncompacted Crown Ratio - 1 check for each matching tree/sap (P2+/P3 only): If the value recorded is inaccurate, an error is recorded.

Compacted Crown Ratio - 1 check for each matching tree/sap: If the value recorded is inaccurate, an error is recorded.

Dieback – 1 check for each matching tree. If the recorded percentage code differs from the correct value by more than 10% (2 classes), record an error. The same tolerance is applied to 0% dieback. Do not attempt to distinguish between the presence and absence of dieback unless the difference exceeds 10%.

Damage Agents 1, 2 & 3 – 1 check for each matching tree. If the recorded values are not within the specified tolerances related to the number of damages recorded, a single error is recorded.

Urban Crown Light Exposure - 1 check for each matching stem: If the value recorded is inaccurate, an error is recorded.

Crown Dieback - 1 check for each matching stem: If the value recorded is inaccurate, an error is recorded.

Urban Crown Diameter - 1 check for each matching stem: If the value recorded is inaccurate, an error is recorded.

Urban Foliage Absent - 1 check for each matching stem: If the value recorded is inaccurate, an error is recorded.

Urban Specific Damages - 1 check for each potential damage on every matching stem: If the values recorded are inaccurate, an error is recorded for each. Every stem will have 7 checks for stem girdling, bark inclusions, severe topping/pruning, excessive mulch, conflict with roots, conflict with crown, and improper planting.

Cause of Death - 1 check for each matching stem: If the value recorded is inaccurate, an error is recorded.

Decay Class - 1 check for each matching tree: If the value recorded is inaccurate, an error is recorded.

Length to Diameter - 1 check for each matching tree/sap where length is not monumented: If the value recorded is inaccurate, an error is recorded.

Urban Building - 1 check for each building associated with each matching stem: If the value recorded is inaccurate, an error is recorded. In cases where the crew recorded "0", consider the height of the tree before recording an error. If the height of the tree could reasonably be considered less than 20', do not record an error when the tree is within 60 feet of a building.

Urban Building Distances - 1 check for each building recorded by the crew: If the value recorded is inaccurate, an error is recorded. Do not record an error for omitted or included buildings.

Urban Building Azimuths - 1 check for each building recorded by the crew: If the value recorded is inaccurate, an error is recorded. Do not record an error for omitted or included buildings.

Maintained Area Tree - 1 check for each matching stem: If the value recorded is inaccurate, an error is recorded.

Riparian river/stream tree - 1 check for each matching stem: If the value recorded is inaccurate, an error is recorded.

Urban Street Tree - 1 check for each matching stem: If the value recorded is inaccurate, an error is recorded.

Urban Planted Tree - 1 check for each matching stem: If the value recorded is inaccurate, an error is recorded.

Urban Mother Tree Number - 1 check for each matching stem: If the value recorded is inaccurate, an error is recorded.

Urban Mother omission/inclusion – Record an error for each stem that is incorrectly included or omitted from a mother tree group. If trees are incorrectly included or excluded from the correct mother tree group, do not inspect additional tree variables that asses the entire group.

Tree Notes - 1 check for each matching tree/sap: If the important notes are omitted or the notes are clearly inaccurate, an error is recorded.

Tree Class - 1 check for each matching tree/sap: If the value recorded is inaccurate, an error is recorded. While both live and dead trees require Tree Class coding, the same codes are not available for each. Where the production and inspection Tree Status data do not agree, no check is made for Tree Class.

Tree Grade - 1 check for each matching tree/sap: If the value recorded is inaccurate, an error is recorded. In cases where discrepancies in diameter exist that create a mismatch between saw and pole designation, no check is made for Tree Grade.

CHAPTER 6 – SEEDLING/Regeneration

Unlike trees and saplings, seedlings are not tallied by individual stem, but by species group, referred to in the scoring process as "lines of data" for P2 plots, or "entries" for P2+. Because of this tally protocol, some find the scoring method confusing and encounter difficulty differentiating between the check and error associated with a given variable, and the value entered for that variable. In general, for P2, once a species has been identified on a microplot, it cannot be considered an omission. Conversely, any species that is not identified, but should have been, would be considered an omission in the Lines of Data scoring item, even if it were included in the stem count of another species. Under the P2+/P3 protocol, the collection of Seedling Data is incorporated into the Advanced Tree Seedling Regeneration (ATSR) protocol. Here, the data printout is structured in such a way that there may be multiple entries for stem counts by Species, Condition and Subplot, depending on the Seedling Source and Length Class. In these cases, each entry for stem count should be considered a line of data.

Lines of data - 1 check for each species group on a given microplot for P2 plots, including all omissions and inclusions: If there are no seedlings, 1 check is entered. The sole purpose for this entry is to activate seedling scoring and give credit for the effort of looking for seedlings. This is single entry is not used unless there are no seedlings and is not added into totals when seedlings are present. If the number of species groups (lines of data) differs between the production crew and inspector(s), an error is recorded for each individual discrepancy. The numbers of checks are then totaled across all inspected microplots. If a species group is incorrectly omitted on one microplot, but is tallied on another, it is still considered an error. The scoring is based on the presence or absence of those species groups on the individual microplots, not all inspected microplots combined. For P2+ plots, because there are multiple stem counts per line of data, the number of stem counts inspected should be used as a surrogate for lines of data.

Subplot number - 1 check for each matching line of data: If the value recorded is inaccurate, an error is recorded. If no seedlings are found, this will be the only variable inspected.

Species - 1 check for each Line of Data: If it can be determined conclusively that a line of data is misclassified as the wrong species within a genus (e.g. red oak vs. black oak), record an error.
Genus - 1 check for each Line of Data: If it can be determined conclusively that a line of data is misclassified as the wrong genus, record an error.
Condition Class - 1 check for each Line of Data: If it can be determined conclusively that a line of data is misclassified in the wrong condition class, record an error.
Seedling Count (P2 Only) - 1 check for each Line of Data: If the count is not within prescribed tolerances, record an error.
Advanced Count (P2+ Only) - 1 check for each Line of Data: If the count is not within prescribed tolerances, record an error.
Seedling Source - 1 check for each Line of Data: If it can be determined conclusively that a line of data is misclassified as the wrong seedling source, record an error.
Length Class - 1 check for each Line of Data: If it can be determined conclusively that a line of data is misclassified in the wrong length class, record an error.
Urban Maintained Area Seedling - 1 check for each Line of Data: If the recorded value is incorrect, record an error.
Urban Planted Seedling - 1 check for each Line of Data: If the recorded value is incorrect, record an error.
No Seedlings Present - 1 check for each plot with no seedlings. No errors are recorded.

Browse Impact - 1 check per condition: If the value recorded is not within one class, an error is recorded.
ATSR Subplot Status – Do not inspect ATSR Subplot Status.
Nonsampled Reason – Do not inspect Nonsampled Reason.
Subplot Site Limitation - 1 check for each inspected subplot: If the value recorded is inaccurate, an error is recorded.
Microplot Site Limitation - 1 check for each inspected microplot: If the value recorded is inaccurate, an error is recorded.

CHAPTER 7 - SITE TREES

Site Tree Selection - 1 check for each new site tree: If the value recorded is inappropriate, an error is recorded.

Condition Class List - 1 check for each site tree: If the value recorded is inaccurate, an error is recorded. Record a check for this variable on any plot where an old site tree is used.

Species - 1 check for each site tree: If the value recorded does not reflect the species that was actually used, an error is recorded. Do not record an error if the species selected was inappropriate.

Diameter - 1 check for each site tree: If the value recorded is inaccurate, an error is recorded.

Site Tree Length - 1 check for each site tree: If the value recorded is inaccurate, an error is recorded.

Tree Age at Diameter - 1 check for each site tree: If the value recorded is inaccurate, an error is recorded.

Site Tree Notes - 1 check for each site tree: If the information recorded is inaccurate, an error is recorded.

Subplot number - 1 check for each new site tree or site tree: If the value recorded is inaccurate, an error is recorded.

Azimuth - 1 check for each new site tree or site tree: If the value recorded is inaccurate, an error is recorded.

Horizontal Distance - 1 check for each new site tree or site tree: If the value recorded is inaccurate, an error is recorded.

Site Tree Collected When Needed - 1 check for each instance when a site tree is required: If site tree data are not collected when needed, an error is recorded. Record a check for this variable on any plot where an old site tree is used.

Site Tree Noted When Not Collected - 1 check whenever no site tree data exists and no site trees are available: Record an error if no explanation is given for the omission of a site tree.

Site Tree Meets Criteria - 1 check whenever no site tree data exists and no site trees are available: Record an error if no explanation is given for the omission of a site tree.

Vegetation Profile

All growth habits will be evaluated in all layers including the aerial assessment. Vegetation cold check data will be collected on all subplots where tree data are assessed using P2 cold check inspection protocols.

Status – Do not inspect Status.

Level of Detail – Do not inspect Level of Detail.

Vegetation Time – Do not inspect Vegetation Time.
Number of Persons – Do not inspect Number of Persons.
Subplot number – Do not inspect Subplot Number. Assume the recorded data are accurately associated with the subplot indicated and assess the data accordingly
Subplot Sample Status – Do not inspect Subplot Sample Status
Nonsampled Reason – Do not inspect Nonsampled Reason.
Condition Class - 1 check for each condition present on the subplot. If the data are associated with the incorrect Condition Class, record an error.
Subplot Notes - 1 check for inspected subplot. If the notes are inaccurate or omitted, record an error.
Tally Tree Species Cover Estimates - 5 checks, one for each layer on each inspected subplot. An error is recorded for each cover estimate that is not within tolerance of the correct value. Zero cover values are assumed to have a tolerance to include 1% cover.
Non-tally Tree Species Cover Estimates - 5 checks, one for each layer on each inspected subplot. An error is recorded for each cover estimate that is not within tolerance of the correct value. Zero cover values are assumed to have a tolerance to include 1% cover.
Shrub/Subshrub/Woody Vines Cover Estimates - 5 checks, one for each layer on each inspected subplot. An error is recorded for each cover estimate that is not within tolerance of the correct value. Zero cover values are assumed to have a tolerance to include 1% cover.
Forbs Cover Estimates - 5 checks, one for each layer on each inspected subplot. An error is recorded for each cover estimate that is not within tolerance of the correct value. Zero cover values are assumed to have a tolerance to include 1% cover.
Ferns Cover Estimates - 5 checks, one for each layer on each inspected subplot. An error is recorded for each cover estimate that is not within tolerance of the correct value. Zero cover values are assumed to have a tolerance to include 1% cover.
Graminoids Cover Estimates - 5 checks, one for each layer on each inspected subplot. An error is recorded for each cover estimate that is not within tolerance of the correct value. Zero cover values are assumed to have a tolerance to include 1% cover.

Invasive Plants

Invasive Plants cold check data will be collected on all subplots where tree data are assessed using P2 cold check inspection protocols.

Lines of Data - 1 check for each inspected unique Line of Data for both the production and QA data. In many cases, errors in species identification, seedling source and length class may result in the omission or inclusion of entire lines of data (e.g. the production

crew records 10% cover in common buckthorn when in reality 5% of that cover is in glossy buckthorn. If an entire line of data was misclassified (e.g. all 10% glossy buckthorn cover was misidentified as common buckthorn) do not record a line of data error, because there is no change to the lines of data that are recorded. Instead, record the error in with the specific incorrect variable. Be careful to apply tolerance correctly. If the inspection results in 1% cover for a given invasive, do not record an error if that invasive is omitted from the production data.

Sampling Status – Do not inspect Sampling Status.

Invasive Time – Do not inspect Invasive Time.

Number of Persons – Do not inspect Number of Persons.

Subplot number – Do not inspect Subplot Number. Assume the recorded data are accurately associated with the subplot indicated and assess the data accordingly

Subplot Status – Do not inspect Subplot Status

Nonsampled Reason – Do not inspect Nonsampled Reason.

Invasive Notes - Do not inspect Invasive Notes

Condition Class - 1 check for each condition present on the subplot. If the data are associated with the incorrect Condition Class, record an error.

Species - 1 check for each Line of Data. If it can be determined conclusively that a line of data is misclassified as the wrong species (e.g. CIAR4 vs. CIVU), record an error. Do not record an error if an unknown species was recorded and a sample submitted.

Unique Species Number – Do not inspect Unique Species Number

Species Canopy Cover - 1 checks for each species on each inspected subplot. An error is recorded for each cover estimate that is not within tolerance of the correct value. Zero cover values are assumed to have a tolerance to include 1% cover.

Subplots Inspected, no invasives - 1 checks for each subplot inspected without any invasives present.

Invasive Specimen Data - Do not inspect Invasive Specimen Data.

DWM (Down Woody Material)

DWM cold check data will be collected on all subplots where tree data are assessed using P2 cold check inspection protocols.

Transects:

Subplot number – Do not inspect Subplot Number. Assume the recorded data are accurately associated with the subplot indicated and assess the data accordingly

Transect Azimuth –. Do not inspect Transect Azimuth. Assume the recorded data are accurately associated with the transect indicated and assess the data accordingly
Condition Number – 1 check for each condition present on the each inspected transect. If the data are associated with the incorrect Condition Class, record an error.
Beginning Distance – 1 check for each transect segment. If the beginning distance varies by more than 1 ft., record an error.
Ending Distance - 1 check for each transect segment. If the ending distance varies by more than 1 ft., record an error.

CWD (Coarse Woody Debris):

Subplot number – Do not inspect Subplot Number. Assume the recorded data are accurately associated with the subplot indicated and assess the data accordingly
Transect Azimuth – 1 check for each piece of CWD. If it can be determined that the data for the two transects on the subplot have been reversed, assess the data where the debris exists and record an error for transect azimuth, otherwise assume the data are accurately associated with the correct transect and assess the data accordingly.
CWD Distance – 1 check for each piece of CWD. If the recorded distance differs from the correct distance by more than the prescribed tolerance, record an error.
Decay Class – 1 check for each piece of CWD. If the recorded decay class differs from the correct decay class by more than 1 class, record an error.
Species – 1 check for each piece of CWD. If the recorded species differs from the correct species, record an error. If the recorded species is only genus specific, do not record an error unless the exact species is obvious. If the recorded species is an unknown hardwood or softwood, do not record an error unless the genus or species is obvious. If the recorded species is recorded as an unknown, do not record an error unless the genus, species or hardwood/softwood classification is obvious.
Diameter at Intersection - 1 check for each piece of CWD. If the recorded diameter differs from the correct value by more than the prescribed tolerance, record an error.
Diameter of Hollow - 1 check for each piece of CWD. If the recorded diameter differs from the correct value by more than the prescribed tolerance, record an error.
Length Class - 1 check for each piece of CWD. If the recorded value is inaccurate, record an error.
Total Pieces Count – 1 check for every recorded piece and every omitted piece of CWD. For each omission or inclusion, record 1 error.
No Pieces Found – 1 check whenever no Coarse Woody pieces are found.

FWD (Fine Woody Debris):

Subplot number – Do not inspect Subplot Number. Assume the recorded data are accurately associated with the subplot indicated and assess the data accordingly.
Condition Number – 1 check for each FWD transect. If the value recorded does not accurately reflect the condition at the beginning of the FWD transect, record an error.
Small FWD Count – 1 check for each FWD transect. If the recorded value does not meet the prescribed tolerance, an error is recorded.
Medium FWD Count – 1 check for each FWD transect. If the recorded value does not meet the prescribed tolerance, an error is recorded.
Large FWD Count – 1 check for each FWD transect. If the recorded value does not meet the prescribed tolerance, an error is recorded.
Hi Count – 1 check whenever Small/Medium/Large FWD counts exceed 100. Do not check this variable unless both the recorded data and the inspection data indicate stem counts exceeding 100. If the recorded value does not reflect the actual reason for a high count, record an error.
None Found – 1 check whenever no fine debris is found.

Piles:

Subplot number – Do not inspect Subplot Number. Assume the recorded data are accurately associated with the subplot indicated and assess the data accordingly.
Condition Number – 1 check per inspected pile. If the recorded data do not reflect the condition at the pile beginning distance, record an error.
Pile Azimuth – 1 check for each pile. If it can be determined that the data for the two transects on the subplot have been reversed, assess the data where the pile exists and record an error for pile azimuth, otherwise assume the data are accurately associated with the correct transect and assess the data accordingly.
Pile Beginning Distance – 1 check for each pile. If the recorded distance exceeds the prescribed tolerance, record an error.
Pile Ending Distance – 1 check for each pile. If the recorded distance exceeds the prescribed tolerance, record an error.
Compacted Height - 1 check for each pile. If the recorded height exceeds the prescribed tolerance, record an error.
Decay Class - 1 check for each pile. If the recorded decay class exceeds differs from the correct value by more than 1 class, record an error.
Species - 1 check for each pile. If the recorded species differs from the correct species, record an error. If the recorded species is only genus specific, do not record an error unless the exact species is obvious. If the recorded species is an unknown hardwood or softwood, do not record an error unless the genus or species is obvious. If the recorded

species is recorded as an unknown, do not record an error unless the genus, species or hardwood/softwood classification is obvious.

Duff/Litter:

Subplot number – Do not inspect Subplot Number. Assume the recorded data are accurately associated with the subplot indicated and assess the data accordingly.
Transect Azimuth – 1 check for each sample. If it can be determined that the data for the two transects on the subplot have been reversed, assess the data where the sample was taken and record an error for transect azimuth, otherwise assume the data are accurately associated with the correct transect and assess the data accordingly.
Condition Number – 1 check per sample. If the recorded value does not reflect the correct recorded condition, consider it an error.
Sample Status – Do not inspect Sample Status.
Nonsampled Reason – Do not inspect Sample Status.
Duff Depth – 1 check per sample. If the recorded depth exceeds the tolerance of the correct value, an error is recorded.
Litter Depth - 1 check per sample. If the recorded depth exceeds the tolerance of the correct value, an error is recorded.
Method - 1 check per sample. If any recorded values were estimated when they should have been measured, or if the recorded value does not accurately reflect the method used, record an error.

Soils

Because much of the soil data are collected destructively, quality assessment is limited to the variables that can be inspected with reasonable accuracy. Soil blind and cold check data are collected only at subplot 2.

Percent Bare Soil – 1 check. If the recorded code is not within 10% of the correct value, an error is recorded. If a trace code of 1 is recorded, and the correct value is 15, an error is recorded.
Percent Compacted Area – 1 check. If the recorded code is not within 10% of the correct value, an error is recorded. If a trace code of 1 is recorded, and the correct value is 15, an error is recorded.

Type of Compaction: **Rutted Trail –** 1 check. If the recorded code is inaccurate, record an error.

Type of Compaction: **Compacted Trail –** 1 check. If the recorded code is inaccurate, record an error.

Type of Compaction: **Area –** 1 check. If the recorded code is inaccurate, record an error.

Type of Compaction: **Other –** 1 check. If the recorded code is inaccurate, record an error.

Soil Sample Status – 1 Check. If the recorded value does not reflect the proper coding, record an error. If the data indicate that a soil sample was taken, but there is no sign of sampling, record an error and do not check any additional soil sample data (other than bare soil and compaction data).

Condition Class Number – 1 check. If the recorded value does not reflect the correct condition, record an error.

Forest Floor Thickness (E/S/W/N) – Do not assess Forest Floor Thickness. The likelihood that the site has been disturbed is too high to allow for a reasonably accurate comparison between the production and QA data.

Litter Layer Thickness (E/S/W/N) – Do not assess Litter Layer Thickness. The likelihood that the site has been disturbed is too high to allow for a reasonably accurate comparison between the production and QA data.

Depth to Restrictive Horizon – 1 check. Although blind inspection data are collected from a different site, collect data for restrictive depth from the original production sample location to ensure comparability of the data. If the recorded value is not within 6 inches of the correct value, record an error.

Soil Texture 0-4 – 1 check. Compare the recorded soil texture to the soil texture from the blind inspection data. If the texture is within 1 class, do not record an error. However, if the data are not within 1 texture class, sample the texture from the original production sample location. If the correct data are still not within recorded 1 texture class, record an error.

Soil Texture 4-8 – 1 check. Compare the recorded soil texture to the soil texture from the blind inspection data. If the texture is within 1 class, do not record an error. However, if the data are not within 1 texture class, sample the texture from the original production sample location. If the correct data are still not within recorded 1 texture class, record an error.

Sample at Correct Location – 1 check. If the sample site is not at the proper location (according to the soil visit number), attempt to locate the sample location by moving east or west at 10 ft. increments to determine if the sample was actually taken. If the site can be found but it is in the wrong location, record an error for sample location and

continue to collect both blind and cold data at that location. If the sample location cannot be found, see "Soil Sample Status".

Crowns

The crown variables will be inspected along with the normal P2 tree data using the same protocols.

Uncompacted Live Crown Ratio - 1 check for each matching tree/sapling. If the recorded percentage differs from the correct value by more than 10%, record an error.

Dieback – 1 check for each matching tree. If the recorded percentage code differs from the correct value by more than 10% (2 classes), record an error. The same tolerance is applied to 0% dieback. Do not attempt to distinguish between the presence and absence of dieback unless the difference exceeds 10%.

Total Length - 1 check for each matching sapling. These values are added to any Total Length measurements evaluated in the cold check of the P2 tree data. If the value recorded is inaccurate, an error is recorded.

Actual Length - 1 check for each matching sapling. These values are added to any Actual Length measurements evaluated in the cold check of the P2 tree data. If the value recorded is inaccurate, an error is recorded.

Length Method - 1 check for each matching sapling. These values are added to any method records evaluated in the cold check of the P2 tree data. If the value recorded is inaccurate, an error is recorded.

QC REPORT REVIEW PROCESS

After entering inspection data into the *QA/QC Standard Scoring Workbook*, the inspector submits the electronic file to the supervisor(s) of the crew that was inspected. These reports should be submitted within 1 day of completing the inspection. An inspector must be available to discuss the report with the supervisor. The supervisor may require additional plot information or clarification from the inspector. The supervisor may also request or include additional clarifying notes to the report, if warranted. Therefore, it is important that a report is well documented. After the supervisor reviews the report and accepts the findings, the supervisor will provide a copy of the report to the production crew. This report includes, at a minimum, the summary score sheet and the narrative statement of findings from the inspector. Upon request, the detailed summary report and a photocopy of the markup may also be provided. The crew must then review the report and sign and return a hard copy of the report

to the supervisor. The signature does not imply agreement with the findings of the inspector; it only acknowledges receipt of the report. If the crew disagrees with the reported findings, the summary score sheet provides a block for a written response that can be returned with the copy of the report. Of course, he or she may discuss the report with the inspector, the reviewing supervisor or the FIA group leader directly as well.

The supervisor will keep and maintain copies of both the electronic file and the signed reports as documentation of crew and/or employee performance. Periodically the Quality Assurance Coordinator may request documentation from inspectors or supervisors. These reports serve to identify data collection errors determined during the blind/cold check that may be common to a region. An analysis of the cold check results will be performed to help assess the strengths and weaknesses of the program.

INSPECTOR COLD CHECKS

Cold checks are also used to monitor inspection quality to ensure consistency and accuracy between inspectors.

Inspector Cold Checks are selected at a minimum of 1 check per year for each inspector. The second inspector will assess the inspection results to determine if, 1) the original inspector recognized all errors by the production crew, and 2) the original inspector correctly assessed all inspection elements, and 3) the original inspector scored the plot properly, and 4) the narrative statement provided by the original inspector is thorough, accurate and professional.

COMMUNICATION DOCUMENTATION

UNDER DEVELOPMENT

TECHNICAL INQUIRIES

Throughout the year, the supervisory and QA staff field numerous questions related to data collection techniques. Many of these questions are resolved with a quick review of the Field Guide while others require extensive review. Efforts are currently being made to document these questions and make the questions and the answers available for viewing.

HOT CHECK REPORTS

In the future, this section will focus on specific instructions on what to include in all hot check reports.

COLD CHECK REPORTS

In the future, this section will focus on specific instructions on what to include in all cold check reports.

TECHNICAL ADVISORIES

NRS FIA currently posts to the web all Technical Advisories. These advisories, often referred to as clarification documents, provide direction on consistent application of specific protocols where the Field Guide is ambiguous.

OTHER

Feedback forms.
Pretraining survey forms.

ANALYSIS

UNDER DEVELOPMENT

BLIND ANALYSIS

INSPECTION REVIEW

COLD ANALYSIS

QUALITY CONTROLS

UNDER DEVELOPMENT

Documentation of logic controls through MIDAS.

GLOSSARY

UNDER DEVELOPMENT

Cascading errors: Errors that occur only because of an error in a preceding code. *Example: A Present Tree Status was coded as 1 (live) when it should have been 2 (dead). Consequently, there was a cascading error when Cause of Death was not recorded for this tree.* In most cases, errors are not recorded for cascading errors. *See also Dependent variable*

Dependent variable: A variable or scoring element, the coding of which is dependent on the assessment of another variable. *Example: The coding of Forest Type is dependent on the coding of Condition Class Status of 1, Accessible Forestland.*

Independent variable: A variable or scoring element that is not dependent on the coding of another variable. *Example: The coding of Condition Class Status does not depend on the coding of any preceding variable.*

Quality Assurance: The overall system of management activities designed to assure quality data are collected.

Quality Assessment: Application of statistical tools to determine that the uncertainty associated with the data is minimized and that the data are of sufficient quality to support programmatic decisions.

Quality Control: Operational techniques and activities that are used to control the data acquisition process.

INDEX

UNDER DEVELOPMENT