
Quality Assurance Guidelines: Describing Terrestrial Ecosystems in the Field (DTEIF)

Draft

Prepared by
Ministry of Sustainable Resource Management
Terrestrial Information Branch
for the
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Preface

The Government of British Columbia provides funding for the work of the Resources Information Standards Committee (RISC), including the preparation of this document. To support the effective, timely and integrated use of land and resource information for planning and decision-making, RISC develops and delivers focussed, cost-effective, common provincial standards and procedures for information collection, management and analysis. Representatives on the Committee and its Task Forces are drawn from the ministries and agencies of the Canadian and British Columbia governments, as well as academic, industry and First Nations stakeholders.

RISC evolved from the Resources Inventory Committee (RIC), which received funding from the Canada-British Columbia Partnership Agreement on Forest Resource Development (FRDA II), the Corporate Resource Inventory Initiative (CRII), and Forest Renewal BC (FRBC). RIC addressed concerns of the 1991 Forest Resources Commission.

For further information about RISC, please access the RISC website at:
<http://srmwww.gov.bc.ca/risc/>.

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Abbreviations

BGC	biogeoclimatic
CRII	Corporate Resource Inventory Initiative
CWD	coarse woody debris
DC	data capture
DDC	digital data capture
DTEIF	Describing Terrestrial Ecosystems in the Field
FRBC	Forest Renewal BC
FRDA II	Canada-British Columbia Partnership Agreement on Forest Resource Development
FTP	file transfer protocol
GIF	Ground Inspection Form
GIS	geographic information system
GPS	geographic positioning system
MENS	mensuration
MOE	Ministry of Environment
MSRM	Ministry of Sustainable Resource Management
PEM	predictive ecosystem mapping
QA	quality assurance
RIC	Resources Inventory Committee
RISC	Resources Information Standards Committee
SMR	soil moisture regime
SNR	soil nutrient regime
TAW	tree attributes for wildlife
TEM	terrestrial ecosystem mapping

VRI	vegetation resources inventory
WHA	Wildlife Habitat Assessment
WHR	Wildlife Habitat Rating
WI	Wildlife Inventory

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1. Quality Assurance Procedures

1.1. Scope

These DTEIF QA guidelines outline the required steps for completing a QA review of the digital-data capture component of a TEM project. The standards for this component are contained in the *Field Manual for Describing Terrestrial Ecosystems in the Field* (1998).

The following table lists a number of related QA guideline documents:

Document	Abbreviation
<i>Introduction to Quality Assurance Procedures</i>	Intro to QA
<i>Quality Assurance Guidelines: Describing Terrestrial Ecosystems in the Field (DTEIF)</i>	DTEIF QA
<i>Quality Assurance Guidelines: Terrestrial Ecosystem Mapping (TEM)</i>	TEM QA
<i>Quality Assurance Guidelines: Terrestrial Ecosystem Mapping – Digital Data Capture (TEM-DDC)</i>	TEM-DDC QA
<i>Quality Assurance Guidelines: Predictive Ecosystem Mapping (PEM)</i>	PEM QA
<i>Quality Assurance Guidelines: Predictive Ecosystem Mapping – Digital Data Capture (PEM-DDC)</i>	PEM-DDC QA
<i>Quality Assurance Guidelines: Vegetation Resources Inventory (VRI)</i>	VRI QA
<i>Quality Assurance Guidelines: Wildlife Habitat Rating (WHR)</i>	WHR QA
<i>Quality Assurance Guidelines: Wildlife Inventory</i>	WI QA

1.2. General Approach

A general approach to quality assurance (QA) on ecological data-collection projects is described in the document *Introduction to Quality Assurance Procedures* (RISC, 2002).

The stages of the QA process are parallel to the stages of DTEIF data-collection projects. However, no QA is required on any of the pre-field planning, which should be covered in the contract for the ecological inventory work.

Table 1 shows the relationships among the QA stages, steps, and DTEIF data and checklist forms. Table 2 lists the DTEIF summary checklist and sign-off forms required for each stage in the QA process.

Table 1. Checklists required for DTEIF QA by stage, step and form¹

QA Stage	Step	DTEIF Data Form	Checklist
1 Field	1 Personnel and Equipment	n/a	DTEIF Checklist 1
	2 Field Sampling	Site Form (SITE)	DTEIF Checklist 2
		Soil Form (SOIL)	DTEIF Checklist 3
		Vegetation Form (VEG)	DTEIF Checklist 4
		Mensuration Form (MENS)	DTEIF Checklist 5 ²
		Wildlife Habitat Assessment Form (WHA)	DTEIF Checklist 6
		Tree Attributes for Wildlife Form (TAW)	DTEIF Checklist 7 ²
		Coarse Woody Debris Form (CWD)	DTEIF Checklist 8 ²
		Ground Inspection Form (GIF)	DTEIF Checklist 9
		2 Post-Field	1 Manual Review of data on plot forms
	2 Data Entry into VENUS database	All FS882 and Ground Inspection Forms	DTEIF Checklist 11
	3 VENUS Data Validation	n/a	DTEIF Checklist 12
	4 Final Project QA and Sign-off	n/a	n/a

¹Depending on the project objectives, some checklists may not be required: e.g., Checklist 5 - 8)

²Available in the next version of these guidelines.

Table 2. Sign-off Forms required for DTEIF QA and the associated Checklists by stage

Stage	DTEIF Checklists	DTEIF Summary Checklists	DTEIF Sign-Off Form
Field QA	1 - 9	DTEIF Summary Checklist 1	DTEIF Sign-off Form 1
Post-Field QA	10 - 12	DTEIF Summary Checklist 2	DTEIF Sign-off Form 2

1.3. Guide to the QA Process for DTEIF

Before starting QA for a project, the QA contractors should be familiar with a) the terms of the inventory contract, and b) the project sampling plan. In addition, they will need several sets of QA forms (checklists and sign-off forms).

1.3.1. Stage 1: Field QA

The purpose of the Field QA is to check data collection in the field as soon as the inventory contractors start sampling, in order to help the inventory contractors correct any errors. The

objective is for the QA contractors to work with the inventory contractors to resolve problems found at the beginning of the field sampling stage.

The QA contractors should assess three to five FS882 and three to five GIF plots from each crew of inventory contractors. The FS882 and GIF plots that are selected for Field QA should represent the range of BGC units and structural stages found in the study area.

Step 1: Personnel and Equipment

1. The QA contractors check the qualifications, training and experience of each inventory contractor who is collecting data for the project
2. The QA contractors record their assessments by filling out DTEIF Checklist 1 (Training and Qualifications). Comments and recommendations must be included to support their assessments and provide documentation of the process.

Step 2: Field Sampling

1. The QA contractors accompany the inventory contractors to selected plots and compare the data recorded by the inventory contractors with the selected plot. Specifically, the QA contractors check that a) all the appropriate variables are being recorded for the type of plot, and b) correct information and codes are being recorded (e.g., species codes and identification, cover estimates, soil properties, site variables, etc.).
2. The QA contractors consult each other to determine whether soil moisture and nutrient regime, site series, and soil classifications are identified correctly and are consistent with supporting data. For example, the QA ecologist might check with the QA soil/bioterrain specialist to ensure that these data are consistent with the site series designation.
3. The QA contractors act as a resource to help the inventory contractors resolve any errors or inconsistencies in their sampling.
4. The QA contractors record their assessments by filling out DTEIF checklists 2–4 (FS882s) and 9 (GIFs), as appropriate. Comments and recommendations must be included to support their assessments and provide documentation of the process. (Note: DTEIF Checklists 5–8 will be available in the next version of this document.)
5. The QA contractors record their overall assessment of the plot by filling out DTEIF Field QA Summary checklist 1, including comments and recommendations.
6. The QA contractors should assess continue to assess plots until they are satisfied the inventory contractors are collecting data to DTEIF standards. If there are serious problems that can't be resolved (e.g., the inventory contractors are not qualified for the work), the QA contractors should notify the contract monitor immediately.
7. When the QA contractors are satisfied with the quality of the field sampling, they should each sign the DTEIF Sign-off Form 1.

1.3.2. Stage 2: Post-field QA

After field data collection is completed, the objectives of QA are to ensure that: a) project deliverables (plot cards and databases) are complete, and meet acceptable standards, and b) all project QA documentation is compiled and delivered to the Government (see Section XX for a list). Post-field QA has four steps.

Step 1: Manual review of data on plot forms

1. The QA contractors examine a percentage (typically 10 %; a minimum of 5% to maximum of 15%) of each type (i.e., FS882 and GIF) of plot form used in a project. They make sure all relevant fields have been filled out, fields have been coded correctly, and the soil moisture and nutrient regimes, site series and soil classifications are consistent with other supporting variables.

Note: for FS882 plots, all plot card types (e.g., site, soil, vegetation, mensuration, WHA, TAW, and CWD) used in the study must be reviewed.

2. The QA contractors record their assessment by filling out DTEIF Checklist 10, including comments and recommendations to support their assessments and provide documentation of the process.
3. If any errors are detected in codes or derivation of variables, the QA contractors should return all plot forms to the inventory contractors for correction. Each time plot forms are returned with errors, a new set of plot cards should be examined for errors, and a new set of checklists filled out by the QA contractors. This process should be repeated until no errors are found.

Step 2: Data entry into VENUS database.

1. The QA contractors compare a percentage (typically 10%; a minimum of 5% to maximum of 15%) of each type of plot form to the corresponding VENUS database entry to ensure that data on the plot form are correctly entered into the database. The same plot cards that were manually reviewed above should be used in comparison to VENUS.
2. The QA contractors record their assessment by filling out DTEIF Checklist 11, including comments and recommendations to support their assessments and provide documentation of the process.
3. If any errors are detected in data transfer, the QA contractors should return the VENUS database to the inventory contractors for correction. Each time the database is returned with errors, a new set of plot forms should be compared to the corrected database, and a new set of checklists filled out by the QA contractors. This process should be repeated until no errors are found.

Step 3: VENUS database validation.

1. Check that validation is turned on for all forms in the VENUS database.
2. If any form fails to pass validation or if validation is turned off for any form, the QA contractors return the VENUS database to the inventory contractors for correction.

Each time the database is returned with errors a new set of checklists is filled out by the QA contractors. This process should be repeated until no errors are found.

3. The QA contractors record their assessment by filling out DTEIF Checklist 12, including comments and recommendations to support their assessments and provide documentation of the process.

Step 4: Final Project QA and Sign-off.

1. The QA contractors record their overall assessment of the post-field work by filling out DTEIF QA Summary Checklist 2, including comments and recommendations.
2. QA contractors should not sign the post-field sign-off form until: a) there are no errors detected either on the plot forms or in the transfer of plot data to the VENUS database, and b) all forms run with the validation turned on in the VENUS database.
3. When the QA contractors are satisfied with the quality of the post-field inventory work, they should each sign the DTEIF Sign-off Form 2.

2. QA Forms

Stage 1: DTEIF Field Quality Assurance

Submission # _____ Date of Submission _____

Project Name _____

QA Contractors	Name	QA Role	Company

Inventory Contractors	Name	QA Role	Company

DTEIF Checklist 1: Personnel Qualifications and Training

1. Each member of the field crew has the appropriate expertise for the species to be inventoried.

Yes No

Comments/Recommendations:

2. Each member of the field crew has proper RISC training certification in accordance to the RISC policy on inventory training courses (<http://srmwww.gov.bc.ca/risc/wildlifet.pdf>).

Yes No

Comments/Recommendations:

DTEIF Checklist 2 Site Form FS882 (1)

1. Have all required fields been filled out (in accordance with the study objectives), using the correct fields and codes (according to RISC standards)? Yes No

Comments/Recommendations:

2. Site Diagram: Is slope, location in the landscape, and structure of the plot clearly illustrated? Yes No

Comments/Recommendations:

3. Plot Representing: Does the description adequately characterize the plot? Yes No

Comments/Recommendations:

4. Are Structural Stage and/or Successional Status consistent with the vegetation that has been recorded? Yes No

Comments/Recommendations:

5. Do the Notes provide useful information about the plot, such as support for unusual entries, further characterization of the plot, essential relocation information, etc.? Yes No

Comments/Recommendations:

6. Site Series: Has the site series been identified correctly? Yes No

Comments/Recommendations:

7. Site Series: Is the site series consistent with soil moisture regime (SMR), soil nutrient regime (SNR), vegetation data (species and abundance) slope, aspect, elevation, soil texture, and notes? Yes No

Comments/Recommendations:

DTEIF Checklist 3: Soil Form FS882 (2)

1. Have all required fields been filled out (in accordance with the study objectives), using the correct fields and codes (according to RISC standards)? Yes No

Comments/Recommendations:

2. Are soil horizons correctly identified? Yes No

Comments/Recommendations:

3. Are horizon depths to relevant features correctly measured and recorded? Yes No

Comments/Recommendations:

4. Do the data collected at the plot support the soil classification? Yes No

Comments/Recommendations:

5. Do the data collected at the plot support the terrain classification? Yes No

Comments/Recommendations:

6. Do the data collected at the plot support the indicated classification for humus form? Yes No

Comments/Recommendations:

7. Do the data collected at the plot support the rooting zone particle-size class? Yes No

Comments/Recommendations:

8. Do the data collected at the plot support the soil moisture regime (SMR) and soil nutrient regime (SNR) determination? Yes No

Comments/Recommendations:

DTEIF Checklist 4: Vegetation Form FS882 (3)

1. Have all required fields been filled out (in accordance with the study objectives), using the correct fields and codes (according to RISC standards)? Yes No

Comments/Recommendations:

2. Are vegetation species correctly identified? Yes No

Comments/Recommendations:

3. Have any vegetation species in any layers been missed? Yes No

Comments/Recommendations:

4. Is percent cover being consistently estimated? Yes No

Comments/Recommendations:

Note: add in lists 5-8 as placeholders for now.

☑ DTEIF Checklist 6: Wildlife Habitat Assessment Form FS882 (5)

1. Have all required fields been filled out (in accordance with the study objectives), using the correct fields and codes (according to RISC standards)? Yes No

Comments/Recommendations:

2. Has a separate row been used for every season/use combination for each species, as identified in the Preliminary Species Account? Yes No

Comments/Recommendations:



3. Are the seasons and life requisites being rated the same as those identified in the Preliminary Species Account? Yes No

Comments/Recommendations:

4. Are the ratings logical in relation to the species-habitat descriptions and the ratings assumptions in the Preliminary Species Account? For example: Yes No

- Have ecosystems identified as having high value in the Rating Assumptions been rated as such on the WHA forms?
- Where the field rating is lower, do the comments explain why the rating is lower than expected?
- Where high values appear on the WHA forms but not in the Species Account, ensure that comments are provided to support related changes to the preliminary ratings table and draft species account as described in question 3 above.

Comments/Recommendations:



5. Have the comments been correctly cross-referenced to the species they refer to and, where appropriate, to the information recorded on the Site, Soil or Vegetation forms? Yes No

Comments/Recommendations:

6. Do field crews meet on a regular basis to calibrate their consistency in applying the ratings among crews and to update the preliminary ratings tables, revise rating assumptions and sampling plans, and discuss the progress of work? Yes No

Comments/Recommendations:

DTEIF Checklist 9: Ground Inspection Form (GIF)

1. Have all required fields been filled out (in accordance with the study objectives), using the correct fields and codes (according to RISC standards)? Yes No

Comments/Recommendations:

2. Have the minimum site data been adequately collected? For example, have SMR, SNR, slope, aspect, and elevation been collected, and do they support the site series designation? Yes No

Comments/Recommendations:

3. Have the minimum soils data been adequately collected to support any classifications? Yes No

Comments/Recommendations:

4. Have all dominant vegetation species been adequately determined? Yes No

Comments/Recommendations:

5. Have all the minimum wildlife data been adequately collected to support wildlife ratings? For example, have the Plot Assessment, Evidence of Use, Simple Coarse Woody Debris, Abbreviated Tree Attributes for Wildlife, and Note portions of the form been completed? Yes No

Comments/Recommendations:

6. Notes? Do the notes support any unusual entries? Do they further characterize the plot? Will they help with relocation of the plot? Do they relay further information on the plot or for the project? Yes No

Comments/Recommendations:

DTEIF Summary Checklist 1: Field QA

Submission # _____ **Date of Submission:** _____

Training and Qualifications of Inventory Contractors

Acceptable Unacceptable (see recommendations below)

Comments/Recommendations:

Field QA of FS882 (1) Site forms

Acceptable Unacceptable (see recommendations below)

Comments/Recommendations:

Field QA of FS882 (2) Soil forms

Acceptable Unacceptable (see recommendations below)

Comments/Recommendations:

Field QA of FS882 (3) Vegetation forms

Acceptable Unacceptable (see recommendations below)

Comments/Recommendations:

Field QA of FS882 (5) WHA forms

Acceptable Unacceptable (see recommendations below)

Comments/Recommendations:

Field QA of Ground Inspection Form (GIF) forms

Acceptable

Unacceptable (see recommendations below)

Comments/Recommendations:

DTEIF Sign-off Form 1: Field QA

The training and qualifications of inventory contractors and field data collection meet acceptable standards.

Yes No

Print Name of QA Contractor

Signature

Date

QA Role

Print Name of QA Contractor

Signature

Date

QA Role

Print Name of QA Contractor

Signature

Date

QA Role

Print Name of QA Contractor

Signature

Date

QA Role

Print Name of QA Contractor

Signature

Date

QA Role

Print Name of QA Contractor

Signature

Date

QA Role

This form represents the final submission and is submission number ____ of ____ submissions received for this project.

Stage 2: Post-Field Quality Assurance

List of material the inventory contractors must submit to the QA contractors before the post-field QA can begin.

- Original or clearly legible copies of all plot forms
- Map of plot locations
- Digital copy of VENUS 5 database(s)

DTEIF Checklist 10: Manual Review of Field Plot Forms

Site Form FS882 (1)

1. Have the minimum data been adequately collected and recorded on the Site Form FS882 (1)? Yes No

Comments/Recommendations:

2. Do the site diagram, plot representing, soil moisture regime (SMR), soil nutrient regime (SNR), elevation, slope, aspect, mesoslope position, vegetation species and notes support the site series designation? Yes No

Comments/Recommendations:

Soil Form FS882 (2)

1. Have the minimum data been adequately collected and recorded on the Soil Form FS882 (2)? Yes No

Comments/Recommendations:

2. Do the data collected support the indicated classification for humus form? Yes No

Comments/Recommendations:

-
3. Do the data collected support the indicated classification for the Terrain Classification? Yes No

Comments/Recommendations:

4. Do the data collected support the indicated classification for the Soil Classification? Yes No

Comments/Recommendations:

5. Do the data collected support the indicated classification Rooting Zone Particle Size Class? Yes No

Comments/Recommendations:

Vegetation Form FS882 (3)

1. Have the minimum data been adequately collected and recorded on the Vegetation Form FS882 (3)? Yes No

Comments/Recommendations:

2. Is there any vegetation species that would not likely occur in the site series or geographic location recorded? Yes No

Comments/Recommendations:

Ground Inspection Form (GIF)

1. Have the minimum data been adequately collected and recorded on the Ground Inspection Form? Yes No

Comments/Recommendations:

2. Do the data collected support the indicated classification for site series? Yes No

Comments/Recommendations:

3. Are the vegetation species identified correctly coded? Are they identified in the correct layer? Yes No

Comments/Recommendations:

4. Are the vegetation species identified in the correct layer? Yes No

Comments/Recommendations:

5. If applicable does the data collected support the indicated classification for humus form? Yes No

Comments/Recommendations:

6. If applicable does the data collected support the indicated classification for the Terrain Classification? Yes No

Comments/Recommendations:

- 7 If applicable does the data collected support the indicated classification for the Soil Classification? Yes No

Comments/Recommendations:

- 8 If applicable does the data collected support the indicated classification for Rooting Zone Particle Size Class? Yes No

Comments/Recommendations:

DTEIF Checklist 11: Data Entry into VENUS

1. Are data captured in the most recent version of the VENUS data entry tool? Yes No

Comments/Recommendations:

2. Have the field data from the same FS882 plot cards reviewed above, been correctly entered from the FS882 plot cards into VENUS? Yes No

Comments/Recommendations:

3. Have the field data from the same GIF plot cards reviewed above, been correctly entered from the GIF plot cards into VENUS? Yes No

Comments/Recommendations:

DTEIF Checklist 12: VENUS Data Validation

1. Do all forms in the VENUS database have the validation turned on, indicating there are no errors in the database? Yes No

Comments/Recommendations:

DTEIF Summary Checklist 2: Post-Field QA

Submission # _____ **Date of Submission:** _____

Manual Review of Field Plot Forms

Acceptable

Unacceptable (see recommendations below)

Comments/Recommendations:

Data Entry

Acceptable

Unacceptable (see recommendations below)

Comments/Recommendations:

Data Validation

Acceptable

Unacceptable (see recommendations below)

Comments/Recommendations:

Additional Comments:

DTEIF Sign-off Form 2: Final Project QA

All project data forms and VENUS databases are complete and acceptable. Yes No

Print Name of QA Contractor Signature Date

QA Role

Print Name of QA Contractor Signature Date

QA Role

Print Name of QA Contractor Signature Date

QA Role

Print Name of QA Contractor Signature Date

QA Role

Print Name of QA Contractor Signature Date

QA Role

Print Name of QA Contractor Signature Date

QA Role

This form represents the final submission and is submission number ____ of ____
submissions received for this project.

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