Form T1: Project Planning QA

Date	April – May 2009			
Project Name	Islands Trust Terrestrial Ecosystem Mapping (TEM) for Howe Sound Islands: Bowen, Gambier, Keats, Anvil and Other Associated Islands			
QA Contractors	Ecologist	Bioterrain specialist	GIS specialist	Other specialists
	K. Dunster	Sid Tsang		
		Gordon Butt (Madrone)	Anna Jeffries Peter Berst	Corey Erwin (MOE) Jo-Anne Stacey (MOE)
Mappers	Tyler Innes (Madrone) Tania Tripp (Madrone) Jackie Churchill (Madrone)	Wanda Miller (Madrone) Sonia Meili (Madrone		

Materials checklist:

- ✓ List of background information
- ✓ Study area boundaries to be used
- ✓ List of project information including the total number of air photos, maps, area (ha), mapping team, contact information, etc
- ✓ Outline of the project plan and persons responsible for each role as outlined in the contract
- ✓ Project objectives as outlined in the contract

Project Planning QA Review Questions:

1. Study objectives are clearly defined and appropriate. ✓Yes ❑No
   Comments/Recommendations:
   IT Objectives include conservation evaluations, and SEI verifications
2. All relevant RISC standards are listed in the contract. ✓Yes ❑No
   Comments/Recommendations:
   Methods exceed RISC standards
3. The methods are appropriate for the stated objectives. ✓Yes ❑No
   Comments/Recommendations:
4. The mapping team has all necessary qualifications. ✓Yes ❑No
   Comments/Recommendations:
5.. Review of existing data sources adequately covers the information known to be available for the study area (i.e. research papers and reports). Any previous and/or related mapping, such as soils, forest cover, terrain or geology mapping has been identified. ✓Yes ❑No
   Comments/Recommendations:
6. Project and study area boundaries are appropriate and have been outlined on maps at the scale specified in the contract. Boundaries from adjacent areas that have been previously mapped have been taken into account. ✓Yes ❑No
   Comments/Recommendations:
   SEI
7. The TEM survey intensity levels, including the ratio of plot types (i.e. FS882's, GIFs, and visuals), and Terrain Survey Intensity Levels are appropriate for the stated objectives. ✓Yes ❑No
   Comments/Recommendations:
   1,200 polygons based on 1:16,000 mapping scale and a study area of 12,000 hectares
   Level 4 survey intensity (15-24%) as per the Provincial TEM Standards.
8. Other: ✓Yes ❑No
   Comments/Recommendations:
   Stratified sampling strategy was designed to collect field data from as many types of ecosystems as possible

QA Sign Off: (Please Print)

Name QA Contractor(s)	Signature	Acceptable?	Review Date
Katherine Dunster	K. Dunster	✓Yes ❑No	15 April 2009

Form T3: Bioterrain and Ecosystem Pretyping QA

Submission #	1 Date of Submission 13 May 2009
Project Name	Islands Trust Terrestrial Ecosystem Mapping (TEM) for Howe Sound Islands: Bowen, Gambier, Keats, Anvil and Other Associated Islands
QA Ecologist	Katherine Dunster,
QA Bioterrain Sp	Gordon Butt (Madrone), Sid Tsang (Tsang Geoscience Ltd)
Ecology Mapper(s)	Tyler Innes; Tania Tripp; Jackie Churchill
Bioterrain Mapper(s)	Wanda Miller; Sonia Meili

Materials checklist:

- ✓ An agreed upon, representative sample of air photos w/ preliminary terrain and ecosystem pretyping - this sample should represent the terrain and ecosystem diversity of the study area.
- ✓ Draft working legends and topographical sequences (site diagrams) for each subzone
- ✓ Small-scale map of study area w/ project boundary & flightlines clearly marked
- ✓ Topographic base maps at scale of mapping (TRIM or NTS)
- ✓ Forest cover maps relative to the study area
- ✓ Terrain/soil/geology maps used to develop the current mapping
- ✓ Relevant small scale BGC mapping
- ✓ A list indicating the areas mapped by each of the mappers (if more than one individual involved in the mapping)

Polygon Specific Comments:
All polygon specific comments and/or recommendations must be documented in a separate PDF or word file and included as part of the QA report. It is recommended that mapping corrections be numbered and/or indicated on the stereo-pair or on an overlay. Comments associated with each number can them be kept in a separate file.

Bioterrain and Ecosystem Pretyping QA Review Questions:

1. Is the level of detail being captured appropriate? (polygon size) ✓Yes ❑No
   Comments/Recommendations:
   average 7 ha polygon size
2. Is the linework precise and accurate? ✓Yes ❑No
   Comments/Recommendations:
3. Does polygon delineation and terrain labels represent the bioterrain attributes in the landscape? ✓Yes ❑No
   Comments/Recommendations:
4. Does the polygon delineation and ecosystem labelling (if available) represent the variability of the ecosystems and structural stages found in the study area? ✓Yes ❑No
   Comments/Recommendations:
5. Does the mapping reflect the project objectives? (i.e. is ecosystem variation in the study area and features relevant to the needs of the client captured) ✓Yes ❑No
   Comments/Recommendations:
6. Are there additional attributes that should be captured to meet the project objectives (e.g. slope classes)? ✓Yes ❑No
   Comments/Recommendations:
   Coastal Bluffs, Cliffs, Anthropogenic Units, SEI verification
7. Is the delineation of polygons consistent between mappers? Between airphotos? Between mapsheets? Over the study area? ✓Yes ❑No
   Comments/Recommendations:

Use of 3D Orthophoto improves consistency as can switch between bioterrain, ecosystem & SEI layers to check

8. Are the drainage classes consistent between mappers? Between airphotos? Between mapsheets? ✓Yes ❑No
   Over the study area? Do the drainage classes reflect the slope position, material, vegetation?
   Comments/Recommendations:

9. Are all codes and symbols used consistent with provincial mapping standards? ✓Yes ❑No
   Comments/Recommendations:

10. Have areas of uncertainty been marked for field verification? ✓Yes ❑No
    Comments/Recommendations:

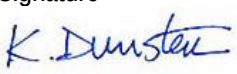
11. Was more than one person involved in the mapping? ✓Yes ❑No
    If yes, please list the areas mapped by each individual
    N/A – all worked on same orthophoto

12. Record the number of air photos reviewed _____ Record the number of air photos typed _____
    List the air photo numbers that were reviewed
    N/A - Orthophoto

13. Record the number of mapsheets reviewed 6 Record the number of mapsheets typed 6
    List the mapsheet numbers that were reviewed
    92G033; 92G034; 92G043; 92G044; 92G053, 92G054 (Islands Trust Area only)

14. Other: ❑Yes ✓No
    Comments/Recommendations:

QA Sign Off: (Please Print)

Name QA Contractor(s)	Signature	Acceptable?	Review Date
Katherine Dunster		✓Yes ❑No	13-15 May, 2009

Form T4: Fieldwork QA

Submission #	1 Date of Submission September 16, 2009
Project Name	Islands Trust Terrestrial Ecosystem Mapping (TEM) for Howe Sound Islands: Bowen, Gambier, Keats, Anvil and Other Associated Islands
QA Team	Katherine Dunster, Corey Erwin (MOE), Sid Tsang (Tsang Geoscience Ltd)
Field crew(s)	June: Tyler Innes, Jackie Churchill, Wanda Miller, and Sonia Meili August: Jackie Churchill, Tania Tripp, Kathy Dunster, and Sonia Meili
Fieldwork Dates	June 22-23, Aug 10, Aug 17-18
Method of review	Field inspections, field form reviews

Materials checklist:

- ✓Field work details including the total number of full, ground and visual sites, dates of field work, field crews,
- ✓Complete, edited field forms with field site locations marked on associated photos and/or maps
- ✓Map showing field traverses (foot, helicopter, road) to show coverage of the study area.

Plot Specific Comments:

All plot specific comments and/or recommendations must be documented in a separate PDF or word file and included as part of the QA report.

Sampling Plan QA Review Questions:

1. Does the sampling address all the objectives of the project (additional interpretive products e.g., WHR)? ✓Yes ❑No
   Comments/Recommendations: Conservation Evaluations
2. Does the sampling address bioterrain mapping needs (i.e. have all of the major terrain types been covered)? ✓Yes ❑No
   Comments/Recommendations:
   Iterative process allowed selection of final field sites to complete bioterrain coverage on Bowen
3. Does the sampling plan adequately address the ecological variation in the study area (i.e., subzone, site series, parent materials, slope, aspect, etc...) ✓Yes ❑No
   Comments/Recommendations:
4. Is there adequate rationale for the number and distribution of sampling types (i.e. where and why FS882's, ground or visual inspections will be completed)? ✓Yes ❑No
   Comments/Recommendations:
   Project restricted to private lands; some landowner permissions not attained; verification on Crown
5. Is the proposed timing of the sampling plan logical? Have all of the access issues been accounted for? Are there contingency plans in place? ✓Yes ❑No
   Comments/Recommendations: Late in season for coastal bluffs, spring ephemerals
6. Does the working legend account for all of the typical terrain types and environmental site conditions found in the study area? Are the ecological relationships outlined in the working legend logical? ✓Yes ❑No
   Comments/Recommendations:

Field work QA Review Questions:

General Mapping Questions

1. Have the DTEIF standards been followed? (see the QA guidelines for DTEIF) ✓Yes ❑No
   Comments/Recommendations:
2. Record the number of field sites visited/reviewed?
   Comments/Recommendations:
3. Have the minimum data collection requirements for the Ecosystem Field Forms (FS882) been met {Table 6.5 of the TEM standard (RISC, 1998)}? ✓Yes ❑No
   Comments/Recommendations:
   Field forms completed as per standard
4. Ecosystem Field Forms (FS882) How many completed? 8 How many reviewed? 8

Comments/Recommendations:

5. Record the number of ecosystem field forms in agreement (i.e. acceptable) 8
   Record the number of ecosystem field forms in disagreement (i.e. not acceptable) 0

6. Have the minimum data collection requirements for the Ground Inspection form been met {Table 6.6 of the TEM standard (RISC 1998)}? ✓Yes ❑No
   Comments/Recommendations:
   Field forms completed as per standard

7. Ground Inspections Forms (GIF) How many completed? 34 How many reviewed? 34
   Comments/Recommendations:

8. Record the number of ground inspection forms in agreement (i.e. acceptable) 34
   Record the number of ground inspection forms in disagreement (i.e. not acceptable) 0

9. Visual plots How many completed? 281 How many reviewed? 281
   Comments/Recommendations:
   Field forms completed as per standard

Field work QA Review Questions:

Field visit questions

1. Is there consistency in site description and classification between field crews? (e.g., soil classification, SMR, SNR, site series, etc.) ✓Yes ❑No
   Comments/Recommendations:

2. Do the mappers know where they are on the photo (i.e., which polygon, where in the polygon)? ✓Yes ❑No
   Comments/Recommendations:
   GPS checked to UTM coordinates on orthomaps to adjust plots away from polygon boundary lines

3. Is there adequate communication between specialists? ✓Yes ❑No
   Comments/Recommendations:
   Teams work as a team, verifying as plot data was recorded; telephone communication between team working on other islands to verify queries

4. Did the terrain mapper refine the terrain criteria in the field? Were the questions raised during pretyping investigated in the field? Were adequate mapping notes being kept to facilitate correction of bioterrain linework and labels? ✓Yes ❑No
   Comments/Recommendations:
   Notes scanned as pdfs, used to refine linework/interpretation

5. Did the mapping ecologist refine the working legend in the field? Were the questions raised during pretyping investigated in the field? Were adequate mapping notes being kept to facilitate correction of the linework and/or ecosystem labels? ✓Yes ❑No
   Comments/Recommendations:
   Notes scanned as pdfs, used to refine linework/interpretation

6. Does the mapping ecologist(s) have a consistent, clear view of BGC zonation concepts relative to the selection of their sample site locations? Are they able to distinguish BGC subzone changes on the ground? ✓Yes ❑No
   Comments/Recommendations:
   Some zonal sites are transitional between CWHxm and CWHdm, southwest end of Bowen transitional CWHxm to CDFmm

7. Have the definitions outlined in the DTEIF standard (RISC 1998) been correctly and consistently interpreted (i.e. structural stages, successional status, % cover, soil moisture regime, soil nutrient regime, etc…)? ✓Yes ❑No
   Comments/Recommendations:

8. Are the field ecologists interpretations of the sample site environmental conditions logical and consistent over the study area (i.e. are the site series / ecosystem unit designations logical and consistent?)? ✓Yes ❑No
   Comments/Recommendations:

9. Was relevant data collected for all additional interpretations (e.g., field verification of erosion potential classes, polygon slope classes, wildlife habitat attributes, SEI, etc.)? ❑Yes ✓No

Comments/Recommendations:
N/A

Other: ❑Yes ✓No

Comments/Recommendations:

QA Sign Off: (Please Print)

Name QA Contractor(s)	Signature	Acceptable?	Review Date
Katherine Dunster	K. Dunster	✓Yes ❑No	September 30, 2009

Form T5: Ecosection and BGC Boundaries QA

Submission #	1 Date of Submission Sept 16, 2009
Project Name	Islands Trust Terrestrial Ecosystem Mapping (TEM) for Howe Sound Islands: Bowen, Gambier, Keats, Anvil and Other Associated Islands
Reg. Ecologist	Corey Erwin (MOE) Jo-Anne Stacey (MOE)
Prov. Ecologist	Carmen Cadrin
Mapper(s)	Tyler Innes (Madrone); Tania Tripp (Madrone); Jackie Churchill (Madrone); Wanda Miller (Madrone) Sonia Meili (Madrone)

Materials checklist:

- ✓ Topographic maps/airphotos showing proposed BGC and ecosection linework changes and relevant lot locations
- ✓ All supporting field data

Ecosection and BGC Boundaries QA Review Questions:

1. Is the placement of the modified BGC lines supported by the field data? ✓Yes ❑No
   Comments/Recommendations:

2. Is the placement of BGC lines accurate and precise? ✓Yes ❑No
   Comments/Recommendations:

5. Is the placement of ecosection lines in accordance with the BGC linework, as depicted on the small scale BGC mapping? ✓Yes ❑No
   Comments/Recommendations:

Other: ❑Yes ✓No
Comments/Recommendations:

QA Sign Off: (Please Print)

Name QA Contractor(s)	Signature	Acceptable?	Review Date
Katherine Dunster	K. Dunster	✓Yes ❑No	September 30, 2009

Form T6: Site Series QA

Submission #	1 Date of Submission Sept 16, 2009
Project Name	Islands Trust Terrestrial Ecosystem Mapping (TEM) for Howe Sound Islands: Bowen, Gambier, Keats, Anvil and Other Associated Islands
Reg. Ecologist	Corey Erwin (MOE) Jo-Anne Stacey (MOE)
Prov. Ecologist	Carmen Cadrin
Mapper(s)	Tyler Innes (Madrone); Tania Tripp (Madrone); Jackie Churchill (Madrone); Wanda Miller (Madrone) Sonia Meili (Madrone)

Materials checklist:

- ✓ Completed plot forms and VENUS database for the entire study area
- ✓ Summary of proposed new ecosystem units (if any) – indicate relevant plot numbers and rationale.
- ✓ Plot location map with plots clearly marked
- ✓ Air photos with plot locations indicated (usually pin pricked and noted on the back of the photo
- ✓ A map of the study area showing study area boundaries and flight lines
- ✓ Topographic base map at the scale of mapping (TRIM of NTS)
- ✓ Forest cover maps

Ecosystem Unit QA Review Questions:

Assess each proposed new ecosystem unit relative to the following criteria (questions # 1-5 below): N/A

1. Is the proposed new unit supported by the field data? N/A ❑Yes ❑No
2. Given the scale of mapping, is the proposed unit mappable? N/A ❑Yes ❑No
3. Can the proposed new unit be amalgamated with any existing units? N/A ❑Yes ❑No
4. Is the proposed new mapcode unique within the given subzone (see provincial mapcodes list)? N/A ❑Yes ❑No
5. Does the proposed new mapcode duplicate any of the sparsely vegetated, non-vegetated, anthropogenic or generic small scale map units (see provincial mapcodes list)? N/A ❑Yes ❑No

BGC subzone	Mapcode	Ecosystem Name	Acceptable?	Comments/Recommendations
			❑Yes ❑No	N/A
			❑Yes ❑No	N/A

6. Have all of the new ecosystem units, listed above, been approved by the regional ecologist? N/A ❑Yes ❑No
   Comments/Recommendations:
7. Have all of the new mapcodes, listed above, been approved by the provincial ecologist? N/A ❑Yes ❑No
   Comments/Recommendations:
8. Other: N/A ❑Yes ❑No
   Comments/Recommendations:

QA Sign Off: (Please Print)

Name QA Contractor(s)	Signature	Acceptable?	Review Date
Katherine Dunster	K. Dunster	✓Yes ❑No	September 30, 2009

Form T7: Initial Ecosystem Mapping QA

Submission #	1 Date of Submission Sept 16, 2009
Project Name	Islands Trust Terrestrial Ecosystem Mapping (TEM) for Howe Sound Islands: Bowen, Gambier, Keats, Anvil and Other Associated Islands
QA Ecologist	Katherine Dunster
Mapping Team	Tyler Innes (Madrone); Tania Tripp (Madrone); Jackie Churchill (Madrone); Wanda Miller (Madrone) Sonia Meili (Madrone)

Materials checklist:

- ✓ A sample of draft ecosystem maps with completed labels (ecosystem, BGC, ecoregion) map legends and linework. This can include a portion of a single mapsheet or a representative sample from different portions of the study area and should include representative samples of mapping from each mapper (if more than one mapper involved).
- ✓ Draft map legends, and expanded legend/report if available, listing all mapped units (including both ecosystem unit two-letter codes and associated site series numbers, along with ecosystem unit names, descriptions, site modifiers and structural stages)
- ✓ Typed air photos (including standard terrain labeling)
- ✓ A small scale map of study area w/ project boundary & flightlines clearly marked
- ✓ Topographic base map at scale of mapping (TRIM or NTS)
- ✓ Plot data for submitted area
- ✓ Applicable forest cover mapping
- ✓ Working legend

Polygon Specific Comments:

All polygon-specific comments and/or recommendations must be documented in a separate PDF or Word file and included as part of the QA report. It is recommended that mapping corrections be numbered and/or indicated on the stereo-pair or on an overlay. Comments associated with each number can them be documented in a separate file.

Initial Ecosystem Mapping QA Review Questions:

1. Does the coding of ecosystem units follow RISC standards? ✓Yes ❑No
   Comments/Recommendations:
2. Is the format and content of the map legend to standard? Have all the required elements been included? Are all mapped ecosystem units listed in the legend? ✓Yes ❑No
   Comments/Recommendations:
3. Have ecosystem units been mapped consistently and accurately? ✓Yes ❑No
   Comments/Recommendations:
4. Is the photo interpretation of all ecosystem attributes consistent and accurate? ✓Yes ❑No
   Comments/Recommendations:
5. Is the ecosystem mapping consistent with respect to polygon size and the level of detail in the mapping? Have small but important features been pulled out in a consistent manner (e.g., wetlands)? Does the level of detail meet project objectives? ✓Yes ❑No
   Comments/Recommendations:
6. Have the non-vegetated, sparsely vegetated and anthropogenic units been mapped consistently and correctly? ✓Yes ❑No
   Comments/Recommendations:
7. Are ecosystem unit proportions (deciles) consistent with other polygons and with the terrain unit proportions, where applicable? ✓Yes ❑No
   Comments/Recommendations:
8. Have site series and other non-correlated ecosystem units been mapped consistently over the entire study area, between adjacent polygons, across biogeoclimatic boundaries, between mappers and relative to the legend? ✓Yes ❑No

Comments/Recommendations:

9. Have site series and other non-correlated ecosystem units been correctly mapped relative to existing knowledge (MOF regional field guides, previous mapping, adjacent mapping), terrain attributes, field data, forest cover attributes, topography and site conditions? ✓Yes ❑No
   Comments/Recommendations:

10. Have site modifiers been consistently and correctly mapped over the entire study are, within polygons, between adjacent polygons, across biogeoclimatic boundaries, and between ecosystem mappers? Have they been mapped alphabetically? ✓Yes ❑No
    Comments/Recommendations:

11. Have site modifiers been consistently and correctly mapped relative to the terrain attributes, plot data, topography, site conditions and the assumed site modifiers? ✓Yes ❑No
    Comments/Recommendations:

12. Have structural stages and structural stage modifiers been mapped consistently and correctly between polygons, over the study area, relative to the field data and relative to the forest cover maps or air photos? ✓Yes ❑No
    Comments/Recommendations:

13. Was the entire project area submitted for review? ✓Yes ❑No
    What percent of the study area was reviewed? 100%
    Comments/Recommendations:

14. Was more than one person involved in the mapping? ✓Yes ❑No
    If yes, please list the areas mapped by each individual
    See Madrone Final Report: Terrestrial Ecosystem Mapping (TEM) for Howe Sound Islands: Bowen, Gambier, Keats, Anvil and Other Associated Islands, Dossier 09.0096

15. Record the number of air photos reviewed N/A Record the number of air photos typed N/A
    List the air photo numbers that were reviewed
    Orthophoto used

16. Record the number of mapsheets reviewed 6 Record the number of mapsheets typed 6
    List the mapsheet numbers that were reviewed
    92G033; 92G034; 92G043; 92G044; 92G053, 92G054 (Islands Trust Area only)

17. Record the number polygons reviewed 2,017 Record the number of polygons typed 2,017
    Record the number of polygons in agreement (i.e. acceptable)
    Record the number of polygons in disagreement (i.e. not acceptable) 0

18. Other: ❑Yes ✓No
    Comments/Recommendations:

QA Sign Off: (Please Print)

Name QA Contractor(s)	Signature	Acceptable?	Review Date
Katherine Dunster	K. Dunster	✓Yes ❑No	September 30, 2009

Form T8: Final Bioterrain Mapping QA

Submission #	1 Date of Submission Sept 16, 2009
Project Name	Islands Trust Terrestrial Ecosystem Mapping (TEM) for Howe Sound Islands: Bowen, Gambier, Keats, Anvil and Other Associated Islands
QA Bioterrain Sp	
Mapper (s)	Tyler Innes (Madrone); Tania Tripp (Madrone); Jackie Churchill (Madrone); Wanda Miller (Madrone) Sonia Meili (Madrone)

Materials checklist:

- ✓ Terrain map legend
- ✓ typed air photos (including standard terrain labeling)
- ✓ a small scale map of study area w/ project boundary & flightlines clearly marked
- ✓ topographic base map at scale of mapping (TRIM or NTS)
- ✓ plot data for submitted area
- ✓ additional mapping information/notes (subtypes, mapping conventions, peculiarities, mapping criteria, etc.)
- ✓ Non special data base (if available).

Polygon Specific Comments:

All polygon specific comments and/or recommendations must be documented in a separate PDF or word file and included as part of the QA report. It is recommended that mapping corrections be numbered and/or indicated on the stereo-pair or on an overlay. Comments associated with each number can them be kept in a separate file.

Final Bioterrain mapping QA Review Questions:

1. Record the number of air photos reviewed N/A Record the number of air photos typed
   List the air photo numbers that were reviewed
   Orthophoto used
1. Record the number of mapsheets reviewed 6 Record the number of mapsheets typed 6
   List the mapsheet numbers that were reviewed
   92G033; 92G034; 92G043; 92G044; 92G053, 92G054 (Islands Trust Area only)
1. Record the number polygons reviewed Record the number of polygons typed
   Record the number of polygons in agreement (i.e. acceptable)
   Record the number of polygons in disagreement (i.e. not acceptable)
4. Was more than one person involved in the mapping? ✓Yes ❑No
   If yes, please list the areas mapped by each individual
   See Madrone Final Report: Terrestrial Ecosystem Mapping (TEM) for Howe Sound Islands: Bowen, Gambier, Keats, Anvil and Other Associated Islands, Dossier 09.0096
1. Was the entire project area submitted for review? ✓Yes ❑No
   What percent of the study area was reviewed? 36%
   Comments/Recommendations:
   Only Bowen Island reviewed
2. Were the field observations incorporated into the mapping (in the vicinity of the site and in similar polygons throughout the study area)? ✓Yes ❑No
   Comments/Recommendations:
3. Do the bioterrain labels reflect ecological splits? ✓Yes ❑No
   Comments/Recommendations:
4. Is the bioterrain mapping (air photo interpretation, labels and linework) adequately support TEM and any other deliverables? ✓Yes ❑No
   Comments/Recommendations:
5. Were the comments and recommendation from previous stages of review addresses? ✓Yes ❑No
   Comments/Recommendations:
6. Do the terrain labels follow Howes and Kenk 1997? ✓Yes ❑No

Comments/Recommendations:

7. Is the bioterrain mapping, drainage and any other terrain interpretations mapped consistently throughout the study area (between mappers and across mapsheets and flightlines)? ✓Yes ❑No
   Comments/Recommendations:

8. Is there consistency between the ecosystem mapping and the bioterrain mapping (e.g., site modifiers, drainage, percent rock)? ✓Yes ❑No
   Comments/Recommendations:

9. Has the bioterrain mapping been reassessed and updated in all areas where new polygons were created by the ecosystem mapper? ✓Yes ❑No
Comments/Recommendations:

9. Is the bioterrain mapping consistent with respect to polygon size and the level of detail in the mapping? Have small but important features been pulled out in a consistent manner (e.g., wetlands)? Does the level of detail meet project objectives? ✓Yes ❑No
   Comments/Recommendations:

10. Is the format and content of the bioterrain map legend to RISC standard? Have all subtypes used in the mapping been included in the legend? ✓Yes ❑No
    Comments/Recommendations:

11. Does the non-spatial database have any anomalies or errors (perform unique sorts and use the auto filter function)? ❑Yes ✓No
    Comments/Recommendations:

12. If a stand alone terrain map or terrain interpretive maps are produced, do they meet all RISC standards? ❑Yes ❑No
    Comments/Recommendations: N/A

13. Does the bioterrain mapping conform to all relevant RISC standards? ✓Yes ❑No
    Comments/Recommendations:

14. Have all project objectives relating to bioterrain been met? ✓Yes ❑No
    Comments/Recommendations:

Other: ✓Yes ❑No
Comments/Recommendations:
One misplaced bioterrain file from another project removed from Bowen Island data folder

QA Sign Off: (Please Print)

Name QA Contractor(s)	Signature	Acceptable?	Review Date
Katherine Dunster	K. Dunster	✓Yes ❑No	October 15, 2009

Form T9: Final Ecosystem Mapping QA

Submission #	1	Date of Submission	Sept 16, 2009
Project Name	Islands Trust Terrestrial Ecosystem Mapping (TEM) for Howe Sound Islands: Bowen, Gambier, Keats, Anvil and Other Associated Islands		
QA Ecologist	Katherine Dunster		
Mapper(s)	Tyler Innes (Madrone); Tania Tripp (Madrone); Jackie Churchill (Madrone); Wanda Miller (Madrone) Sonia Meili (Madrone)		

Materials checklist:

- ✓ A sample of draft ecosystem maps with completed labels (ecosystem, BGC, ecoregion) map legends and linework. This can include a portion of a single mapsheet or a representative sample from different portions of the study area and should include representative samples of mapping from each mapper (if more than one mapper involved)..
- ✓ Draft map legends, and expanded legend/report if available, listing all mapped units (including both ecosystem unit two-letter codes and associated site series numbers, along with ecosystem unit names, descriptions, site modifiers and structural stages)
- ✓ Typed air photos (including standard terrain labeling)
- ✓ A small scale map of study area w/ project boundary & flightlines clearly marked
- ✓ Topographic base map at scale of mapping (TRIM or NTS)
- ✓ Plot data for submitted area
- ✓ Applicable forest cover mapping
- ✓ Working legend

Polygon Specific Comments:

All polygon specific comments and/or recommendations must be documented in a separate PDF or word file and included as part of the QA report. It is recommended that mapping corrections be numbered and/or indicated on the stereo-pair or on an overlay. Comments associated with each number can them be kept in a separate file.

Final Ecosystem Mapping QA Review Questions:

1. Does the coding of ecosystem units follow RISC standards? Yes
   Comments/Recommendations:

2. Is the format and content of the map legend to standard? Have all the required elements been included? Are all mapped ecosystem units listed in the legend? ✓Yes ❑No
   Comments/Recommendations:

3. Have ecosystem units been mapped consistently and accurately? ✓Yes ❑No
   Comments/Recommendations:

4. Is the photo interpretation of all ecosystem attributes consistent and accurate? ✓Yes ❑No
   Comments/Recommendations:

5. Is the ecosystem mapping consistent with respect to polygon size and the level of detail in the mapping? Have small but important features been pulled out in a consistent manner (e.g., wetlands)? Does the level of detail meet project objectives? ✓Yes ❑No
   Comments/Recommendations:

6. Have the non-vegetated, sparsely vegetated and anthropogenic units been mapped consistently and correctly? ✓Yes ❑No
   Comments/Recommendations:

7. Are ecosystem unit proportions (deciles) consistent with other polygons and with the terrain unit proportions, where applicable? ✓Yes ❑No
   Comments/Recommendations:

8. Have site series and other non-correlated ecosystem units been mapped consistently over the entire study area, between adjacent polygons, across biogeoclimatic boundaries, between mappers and relative to the legend? ✓Yes ❑No
Comments/Recommendations:

9. Have site series and other non-correlated ecosystem units been correctly mapped relative to existing knowledge (MOF regional field guides, previous mapping, adjacent mapping), terrain attributes, field data, forest cover attributes, topography and site conditions? ✓Yes ❑No
Comments/Recommendations:

10. Have site modifiers been consistently and correctly mapped over the entire study are, within polygons, between adjacent polygons, across biogeoclimatic boundaries, and between ecosystem mappers? Have they been mapped alphabetically? ✓Yes ❑No
Comments/Recommendations:

11. Have site modifiers been consistently and correctly mapped relative to the terrain attributes, plot data, topography, site conditions and the assumed site modifiers? ✓Yes ❑No
Comments/Recommendations:

12. Have structural stages and structural stage modifiers been mapped consistently and correctly between polygons, over the study area, relative to the field data and relative to the forest cover maps or air photos? ✓Yes ❑No
Comments/Recommendations:

13. Was the entire project area submitted for review? ✓Yes ❑No
What percent of the study area was reviewed? 100%
Comments/Recommendations:

14. Was more than one person involved in the mapping? ✓Yes ❑No
If yes, please list the areas mapped by each individual
See Madrone Final Report: Terrestrial Ecosystem Mapping (TEM) for Howe Sound Islands: Bowen, Gambier, Keats, Anvil and Other Associated Islands, Dossier 09.0096

15. Record the number of air photos reviewed N/A Record the number of air photos typed
List the air photo numbers that were reviewed
Orthophoto used

16. Record the number of mapsheets reviewed 6 Record the number of mapsheets typed 6
List the mapsheet numbers that were reviewed
92G033; 92G034; 92G043; 92G044; 92G053, 92G054 (Islands Trust Area only)

17. Record the number polygons reviewed 2017 Record the number of polygons typed 2017
Record the number of polygons in agreement (i.e. acceptable) 2017
Record the number of polygons in disagreement (i.e. not acceptable) 0

18. Other: ❑Yes ✓No
Comments/Recommendations:

QA Sign Off: (Please Print)

Name QA Contractor(s)	Signature	Acceptable?	Review Date
Katherine Dunster	K. Dunster	✓Yes ❑No	October 15, 2009

Form T10: Final Deliverables QA

Submission #	1 Date of Submission September 16, 2009
Project Name	Islands Trust Terrestrial Ecosystem Mapping (TEM) for Howe Sound Islands: Bowen, Gambier, Keats, Anvil and Other Associated Islands
QA Ecologist	Katherine Dunster
QA Bioterrain Specialist	Gordon Butt (Madrone); Sid Tsang (Tsang Geoscience Ltd)
QA GIS specialist	N/A
Mapping Team	Tyler Innes (Madrone); Tania Tripp (Madrone); Jackie Churchill (Madrone); Wanda Miller (Madrone) Sonia Meili (Madrone)

Materials checklist:

- ✓ Final TEM spatial and non-spatial data in standard format, including spatial plot files
- ✓ Final map legend
- ✓ Final typed air photos
- ✓ Final expanded legend and report
- ✓ Final plot data (original or copies of plot cards)
- ✓ Final VENUS database for GIF and FS882 field plots (field data for visual plots can either be submitted in VENUS format or as a separate Excel file)

Final Deliverables QA Review Questions:

Data:

1. Does the spatial data meet the standards? See the QA guidelines for TEM Digital Datacapture in B.C. (RISC, 2000). ✓Yes ❑No
   Comments/Recommendations:
   The final 1:10,000 product mapped a total of 2,017 forested, non-forested and anthropogenic polygons for the Howe Sound study area, covering 13,968 hectares.
2. Does the nonspatial data meet the standards? See the QA guidelines for TEM Digital Datacpature in B.C. (RISC, 2000). ✓Yes ❑No
   Comments/Recommendations:
3. Has all the required plot data been entered into VENUS? Does it pass validation (see the QA guidelines for DTEIF)? ✓Yes ❑No
   Comments/Recommendations:
4. Have all the original (or copies) field plot cards been submitted? ✓Yes ❑No
   Comments/Recommendations:
5. Have all of the airphotos been submitted? ✓Yes ❑No
   Comments/Recommendations: Orthophoto
10. Other ❑Yes ✓No
    Comments/Recommendations:

Legends and Reports:

1. Has the final map legend been submitted? Does it meet the standards? ✓Yes ❑No
   Comments/Recommendations:
2. Has the final expanded legend been submitted? Is it acceptable? ✓Yes ❑No
   Comments/Recommendations:
   Disclaimer to the maps in the expanded legend to make it more clear what the maps are actually depicting
3. Does the vegetation description for each ecosystem unit include a listing of the dominant and associate plant species for each of the potential structural stages? ✓Yes ❑No

Comments/Recommendations:

4. If a number of site modifiers have been mapped, have the compositional and/or structural differences been noted and if necessary, described in a separate vegetation table? ✓Yes ❑No

Comments / Recommendations:

5. Has the final report been submitted? Is it acceptable? ✓Yes ❑No

Comments/Recommendations:

6. Have the project objectives been clearly stated? ✓Yes ❑No

Comments/Recommendations:

7. Have all of the data sources and background information been identified, including any existing mapping or inventory that was used, field guides, personnel, etc…? ✓Yes ❑No

Comments/Recommendations:

8. Has the physiography of the area been described, including topography, bedrock geology, and geomorphological (including glacial) history? ✓Yes ❑No

Comments/Recommendations:

9. Has each surficial material been described, including a description of the most common textures, expressions, geomorphological processes, and drainages? ✓Yes ❑No

Comments/Recommendations:

10. Have the bioterrain and ecosystem mapping methods been described, including the use of different terrain and ecosystem attributes (i.e. surficial materials, textures, site modifiers, structural stages, etc…? ✓Yes ❑No

Comments/Recommendations:

11. Have the methods for field sampling been described, including the numbers and types of plots that were completed? ✓Yes ❑No

Comments/Recommendations:

12. Have the aspects of map reliability been discussed, including discussions regarding the limitations of photo interpretation (i.e. poor resolution and scale), limitations due to the survey intensity level, difficulties encountered during field sampling (i.e. access issues), and/or limitations in the classification (i.e. poorly classified subzones or ecosystem units)? ✓Yes ❑No

Comments/Recommendations:

13. If interpretative products have been created, have the methods of production (including any assumptions made), the results, and the recommendations been outlined? ✓Yes ❑No

Comments/Recommendations:

14. Are the attributes listed in the expanded legend, report and map legend consistent with one another and with attributes found in the nonspatial database? A unique sort of the non-spatial data is recommended to ensure that all attributes mapped have been described. ✓Yes ❑No

Comments/Recommendations:

15. Other ❑Yes ✓No

Comments/Recommendations:

QA Sign Off: (Please Print)

Name QA Contractor(s)	Signature	Acceptable?	Review Date
Katherine Dunster	K. Dunster	✓Yes ❑No	November 2, 2009

Form T11: QA Summary and Sign-off

This section is intended to track project status relative to the final sign-off of each stage of review. The QA contractor(s) must provide a date and signature on this form once a particular review stage has been deemed complete and acceptable. Any additional comments not covered in the forms above should be included at this time. Also, please record the total number of submissions reviewed for each of QA stages in the space provided. Note this form must be submitted in electronic format as part of the QA report (see QA deliverables section).

1. Project Planning QA: The project planning stage has been completed to an acceptable standard.

Print Name QA Contractor(s)	Signature	Date
Katherine Dunster	K. Dunster	April 15, 2009
Additional Comments/Recommendations:		

✓ This represents the final signoff, and represents submission number _1__of_1__ submissions received for the project planning stage.

2. Alpine and Parkland Boundaries QA: N/A

The alpine and parkland boundaries have been completed to an acceptable standard.

Print Name QA Contractor(s)	Signature	Date
Additional Comments/Recommendations:	N/A	

N/A This represents the final signoff, and represents submission number ___of___ submissions received for the alpine and parkland boundaries review stage.

3. Bioterrain and Ecosystem Pretyping QA: The bioterrain and ecosystem pretyping has been completed to an acceptable standard.

Print Name QA Contractor(s)	Signature	Date
Katherine Dunster	K. Dunster	May 15, 2009
Additional Comments/Recommendations:		

✓ This represents the final signoff, and represents submission number _1__of_1__ submissions received for the bioterrain and ecosystem pretyping stage.

Fieldwork QA: The fieldwork has been completed to an acceptable standard.

Print Name QA Contractor(s)	Signature	Date
Katherine Dunster	K. Dunster	September 30, 2009
Additional Comments/Recommendations:		

✓ This represents the final signoff, and represents submission number _3__of_3__ submissions received for the fieldwork stage.

4. Ecosection and Biogeoclimatic boundaries QA: The Ecosection and Biogeoclimatic boundaries have been completed to an acceptable standard.

Print Name QA Contractor(s)	Signature	Date
Katherine Dunster	K. Dunster	September 30, 2009
Additional Comments/Recommendations:		

✓ This represents the final signoff, and represents submission number _1__of_1__ submissions received for the ecosection and BGC boundaries review stage.

5. Site Series and Ecosystem Unit QA: The site series and ecosystem units have been completed to an acceptable standard.

Print Name QA Contractor(s)	Signature	Date
Katherine Dunster	K. Dunster	September 30, 2009

Additional Comments/Recommendations:	

✓ This represents the final signoff, and represents submission number _2__of_2__ submissions received for the site series and ecosystem unit review stage.

6. Initial Ecosystem Mapping QA: The initial ecosystem mapping has been completed to an acceptable standard.

Print Name QA Contractor(s)	Signature	Date
Katherine Dunster	K. Dunster	September 30, 2009
Additional Comments/Recommendations:		

✓ This represents the final signoff, and represents submission number _1__of__1_ submissions received for the initial ecosystem mapping review stage.

7. Final Bioterrain Mapping QA: The final bioterrain mapping has been completed to an acceptable standard.

Print Name QA Contractor(s)	Signature	Date
Katherine Dunster	K. Dunster	October 15, 2009
Additional Comments/Recommendations:		

✓ This represents the final signoff, and represents submission number _1__of_1__ submissions received for the final ecosystem mapping review stage.

8. Final Ecosystem Mapping QA: The final ecosystem mapping has been completed to an acceptable standard.

Print Name QA Contractor(s)	Signature	Date
Katherine Dunster	K. Dunster	October 15, 2009
Additional Comments/Recommendations:		

✓ This represents the final signoff, and represents submission number _1__of_1__ submissions received for the final bioterrain mapping review stage.

9. Final Deliverables QA: All of the final deliverables meet RISC standards.

Print Name QA Contractor(s)	Signature	Date
Katherine Dunster	K. Dunster	November 2, 2009
Additional Comments/Recommendations:		
Minor typos noted.		

✓ This represents the final signoff, and represents submission number _1__of__1_ submissions received for the final deliverables review stage.