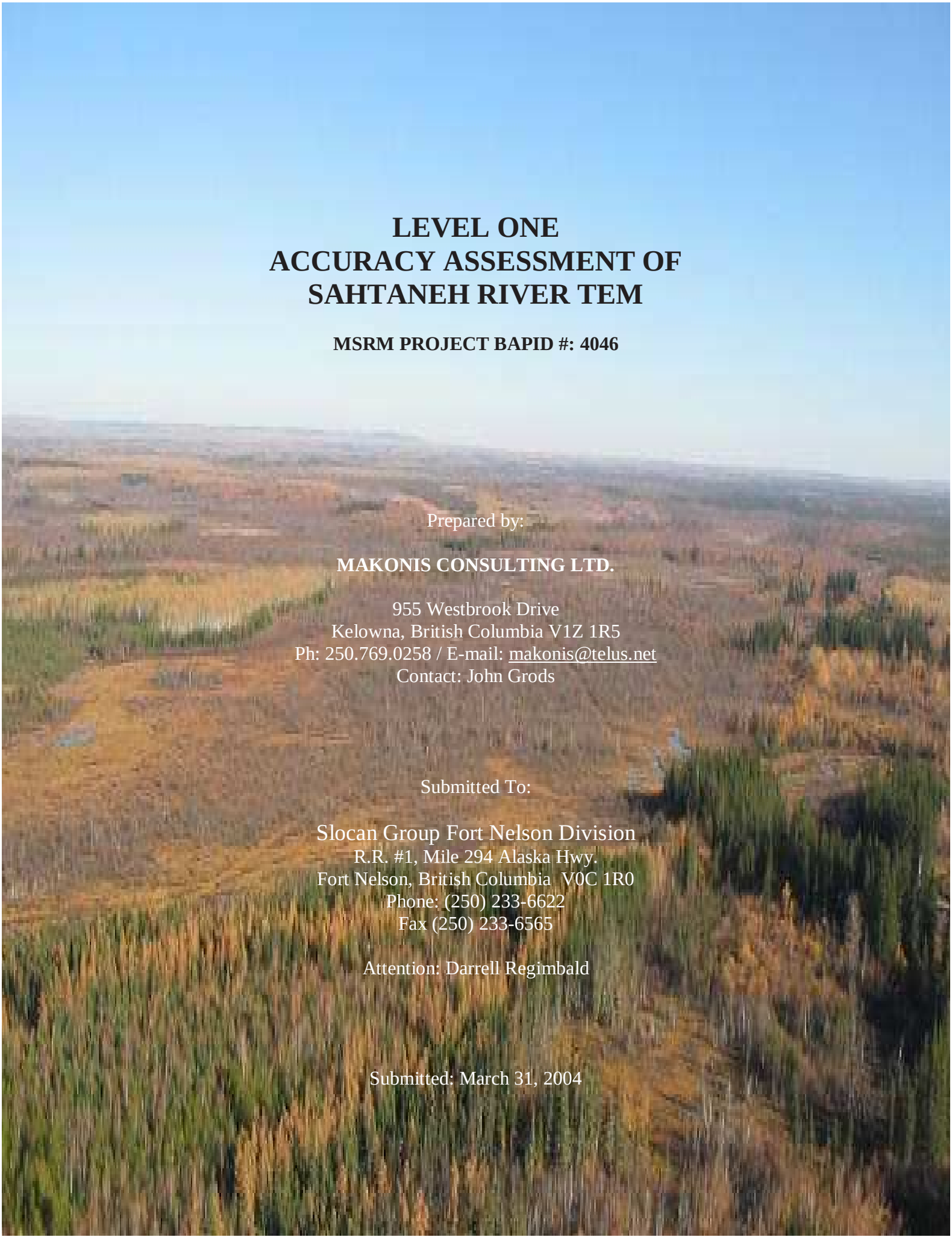

LEVEL ONE ACCURACY ASSESSMENT OF SAHTANEH RIVER TEM

MSRM PROJECT BAPID #: 4046

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1.0 INTRODUCTION

1.1 Overview of Accuracy Assessment

Slocan Group Fort Nelson Division (Slocan) chose to complete an accuracy assessment for the Sahtaneh Terrestrial Ecosystem Mapping (TEM) project. Standards for completing the accuracy assessment follow prescribed outlines recommended for a level one Quality Assurance as described in the "*Protocol for Quality Assurance and Accuracy Assessment for Ecosystem Maps*" (Meidinger, 2000) and recently released updated version "*Protocol for Accuracy Assessment of Ecosystem Maps* "(Meidinger, 2003). Other applicable standards for this project were: Standard for Terrestrial Ecosystem Mapping in British Columbia (RIC 1998), Standards for Predictive Ecosystem Mapping (RIC 1999), Standard for Terrestrial Ecosystem Mapping – Digital Data Capture in British Columbia (RIC 2000), and Describing Ecosystems in the Field (RIC, 1998), to mention a few.

Outputs from this ecosystem mapping assessment project provide important thematic accuracy information for resource users, developers and other stakeholders assessing reliability the underlying ecosystem mapping for particular planning and interpretative products. This approach is recognized as unbiased, statistically evaluating the overall thematic map accuracy, thus supporting requirements in Timber Supply Review, Sustainable Forest Management (SFM) certification and other compliance audits. (*Note: Timber Supply Review and other processes require higher levels of map evaluation than presently undertaken*)

Slocan undertook two ecosystem mapping projects, Patry Lake and Sahtaneh River, concurrently in adjacent areas located in the Fort Nelson Forest District. Patry Lake ecosystem project undertaken by Shamaya Consulting (Shamaya) of Vernon, followed Predictive Ecosystem Mapping (PEM) techniques and Sahtaneh River ecosystem project undertaken by Shearwater Mapping (Shearwater) of Victoria, followed Terrestrial Ecosystem Mapping (TEM) protocols. Project timing made effective use for ecosystem accuracy assessment work to be completed for both projects simultaneously by Makonis Consulting Ltd. (Makonis) of Kelowna. Final reporting for the ecosystem projects are completed separately.

1.2 Study Area

The ecosystem map accuracy assessment project is located in north eastern British Columbia, north of Fort Nelson, and covers an area of approximately 849,241 hectares within the Fort Nelson Forest District. The entire study area extends across a total of sixty-nine 1:20,000 TRIM mapsheets and divided by two ecosystem mapping projects, Sahtaneh River TEM (36 TRIM) and Patry Lake PEM (33 TRIM). Sahtaneh River TEM area is an estimated 431,088 hectares in size and contains portions of the Liard River and Fort Nelson River Watersheds. The Study Area falls within the Taiga Plains Ecoprovince and in the Hay River Lowland,

Muskwa Plateau and Northern Alberta Upland Ecoregions, and the Maxhamish Uplands (MAU), Muskwa Plateau (MUP), Etsho Plateau (ETP) and Fort Nelson Lowlands (FNL) Ecosections.

The Sahtaneh River TEM accuracy assessment project located in the Fort Nelson moist warm Boreal White and Black Spruce biogeoclimatic subzone variant, BWBSmw2 occurring at lower elevations of the region (DeLong et al 1990), and is characterized by a northern continental climate of long cold winters and short warm summers. (Meidinger and Pojar, 1991). Ecosystems are reflective of the varied landscape and historical influences, such as fires as the underlying ecological precursors to the present conditions. Outlined in table one is a brief overview of the subzone within the study area.

Table 1. BEC Zone found in the Sahtaneh River TEM Study Area.

BEC Zone	Subzone/ Variant	Elevation (m)	Description
BWBS	mw2 – Fort Nelson moist warm	300 to 1050 [1]	Climax zonal forests are comprised of White Spruce and Aspen with a dominantly stepmoss understory. Seral stands containing pine and aspen are very common.

[1] These elevational ranges are overall ranges for Subzones/Variants taken from literature.

Road access for the entire accuracy assessment project was very limited to the portions of the study area along the western boundary by Highway 77. Other road access to the area was predominantly winter roads, seismic – logging inaccessible at the time of sampling.

Summer – fall access to the study area is mainly by helicopter, as was done for sampling in this accuracy assessment project.

Previous ecosystem mapping projects found in adjacent areas are the Snake / Sahtaneh TEM to the east, Dunedin TEM, Muskwa – Kechika PEM to the west, Besa – Prophet TEM and NE Burn TEM to the south and Sandy Creeek TEM, Labiche TEM to the north. All these projects were done under different years of provincial mapping standards and at mapping scales of 1:50,000. Further information on these projects can be found at:

http://srmwww.gov.bc.ca/ecology/tem/index.html

A concurrent ecosystem mapping project was underway along the western study boundary, Patry Lake PEM.

2.0 METHODS

2.1 Stratification of Sampling

Processes for selecting the accuracy sample set in the Sahtaneh River TEM followed prescribed protocols as described in "*Protocol for Accuracy Assessment of Ecosystem Maps"* (Meidinger, 2003). Selection for accuracy assessment sample sets were randomly conducted utilizing GIS applications, as a polygon had been selected it was ranked in sequence and removed from the sample so as not to be selected again. The process design was to select a sample set greater than the minimum number of 86 polygons required. Rationales in choosing more than the minimum 86 polygons were important for two reasons:

1. Increase precision: If time in the field allowed for further sampling to increase the overall precision of the Accuracy Assessment,
2. Safety: If a polygon or a portion of polygon is clearly unsafe to be sampled in the field then the next ranked polygon was chosen as a replacement to achieve the final minimum count of 86 polygons per ecosystem mapping project.

Prior to obtaining ecosystem mapping for the Sahtaneh River TEM (Shearwater), Makonis generated 160 random points for the study area (Appendix A). This sequential point selection was used in determining sample polygons for the study area once the digital datasets were acquired. Points were intersected with the corresponding ecosystem mapping project and polygons were chosen in sequence. Multiple points occurring within a polygon were only selected on the first occurrence; duplicated points were discarded and replaced with the next sequential occurrence. Random stratification points along with selected polygons are illustrated in Figure 1.

In a level one assessment, 100% of the polygons are to be sampled by photo interpretation, while only 10- 25% of the selected sampled are to be assessed by air and ground calls. Our objective was to obtain a 25% field sample, or 21 polygons per ecosystem mapping project.

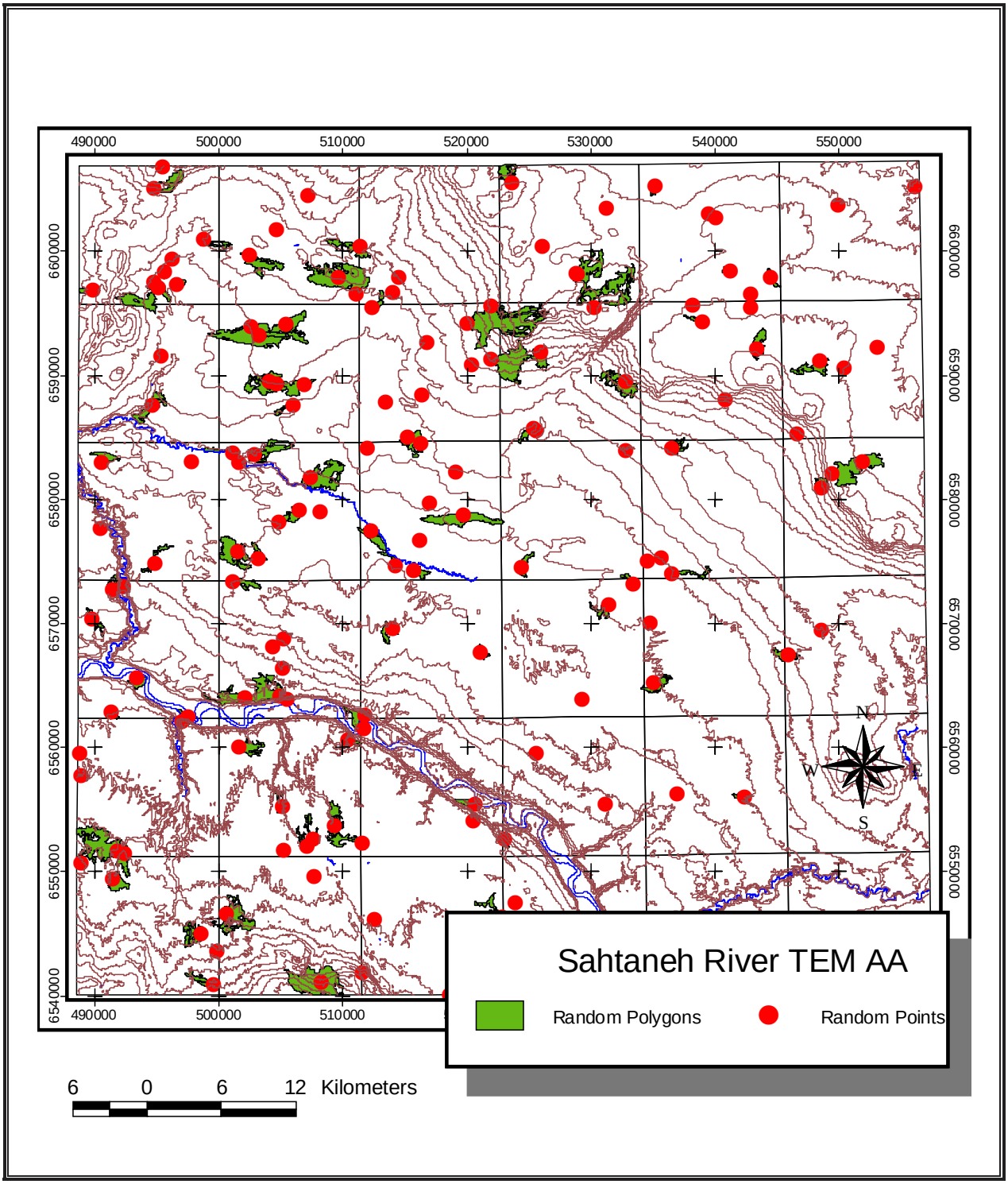

FIGURE 1. **Map of Sahtaneh River TEM study area illustrating location of random sample points and selected polygons for photo interpretation and aerial – ground truthing.**

2.2 *Data Review*

For the stratification and establishment of a baseline, spatial and non-spatial data was brought together and used in an ongoing manner for the office based interpretations and field work. The following key maps and materials were used in an ongoing manner:

- TRIM (1:20,000),
- Forest Cover mapping,
- Vegetation Resource Inventory mapping (where available),
- Orthophotography,
- 1:20,000 b/w aerial photographs complete with bioterrain (Shearwater),
- Blank ecosystem polygons of entire study, microstation (Shearwater),
- Preliminary map legend for Sahtaneh River TEM (Shearwater), and
- Provincial ecosystem map codes.

Part of the data review was an assessment of the base datasets intended to be used for this accuracy assessment project. Makonis had previously developed a suite of GIS tools to assess the quality of some digital datasets in accordance with the Provincial standards, which were applied during the course of this project to identify potential areas of concern that could affect the outcome of this project.

Upon receiving the Sahtaneh River TEM polygons (without ecosystem data) a review of this dataset was undertaken and several conditions were noted of the mapping and relayed the information to Slocan. Most notable were the microstation files (.dgn) delivered as two separate coverages in an un-projected format for the entire study. Due to time constraints, Makonis seamed up, converted and reprojected the Sahtaneh River TEM project, so accuracy assessment work could continue within the original schedule. Other notes included the aspect the preliminary ecosystem mapping was seamless as desired by Slocan.

Shearwater used a straight forward incorporation of the Biogeoclimatic Ecosystem Classification (BEC) to achieve their list of potential ecosystems for the project; as opposed to incorporation of non-forested units from the most recently released Wetland and Riparian Ecosystem Classification (WREC) for British Columbia. Forested site series as defined in the corresponding guide books were used in the mapping as individual site series, or unique map entities. Non-forested units for the mapping project followed units delineated by British Columbia's Provincial ecosystem list. Table 2, provided by Shearwater, is an excerpt of the map legend and ecosystem units used in the map accuracy assessment.

Table 2. Preliminary map legend provided for the Sahtaneh TEM.

Site Series	Map Codes	Ecosystem Name	Drainage	SMR	SNR
01	AM	SwAt - Step moss	i-w	4-5	C
02	LL	Pl - Lignonberry - Velvet-leaved blueberry	r	1	A
03	BK	Sb - Lignonberry - Knight's plume	w	3	B
04	BL	Sb - Lignonberry - Coltsfoot	w-m	3-4	B-C
05	SH	Sw - Currant - Horsetail	w (p)	5	C-D
06	BB	Sb - Feathermoss - Bluebells	i-p	5-7	B-C
07	TH	Lt - Horsetail	p (v)	7-8	D
08	BS	Sb - Cloudberry - Sphagnum	p-v	6-7	A-B
09	BW	Sb - Willow	p-v	6-7	A-B
10	TB	Lt - Buckbean	v-p	7-8	D
00	SB	Sw - Currant - Bluebell	m-i	5-6	D
00	AB	Bebb's willow - Mountain alder - Bluejoint swamp	p (i)	6-7	C-D
00	LB	Labrador tea bog	p	7	B
00	SS	Scrub birch - Willow - Water sedge fen	p-v	7-8	D-E
00	WB	Drummond's willow - Bluejoint low bench/swamp	p-v	7-8	D
00	ES	Exposed Soil			
00	GB	Gravel Bar			
00	LA	Lake			
00	OW	Open Water			
00	PD	Pond			
00	RI	River			

Once the field session was completed, further review of field data was undertaken to establish a baseline working legend for the photo interpretation process.

2.3 *Field Sampling*

Field sampling for the Sahtaneh River TEM accuracy assessment was from September 28 until October 3, 2003, beginning in Prince George with the acquisition and familiarization training of the Trimble XT Geoexplorer GPS unit from CANSEL. Three days were devoted to field work on the Tuesday, Wednesday and Thursday and weather conditions were cooperative with sunny light cloud and temperatures above freezing. Staff of Makonis, John Grods – Project Lead Ecologist and Wayne Darlington – GIS and GPS Technician was accompanied and assisted by Craig Delong – Ministry of Forests Regional Ecologist during this session.

As outlined in the sampling plan, initial field session was devoted to developing consistent, repeatable and reliable results. This entailed two days of ground sampling of random sample sets within the Patry PEM study, including many side excursions to investigate various other

ecological conditions while on route. This particular aspect provided cross referencing of sites not encountered during actual accuracy assessment sampling and support for the photo interpretation portions of the project. Ground sampling of the Sahtaneh River TEM was limited to a few helicopter landings during the aerial assessments of the random polygons.

Maps of the 21 selected sample sites were produced from the datasets provided as referencing materials, which included the sample polygon linework, TRIM water and contour features, and VRI / FC road networks over laid onto ortho-images with UTM coordinates (NAD 83 zone 10). One of a smaller scale ortho-map for navigation purposes to the site, 1:20,000 – 1:50,000 and the second a larger scale ortho-map of the 21 individual sample site and surrounding area, 1:5,000 – 1:20,000 produced as 11x17 sheets, figure 2. Two sets of these larger scale maps were produced and carried in the field by John Grods and Craig Delong.

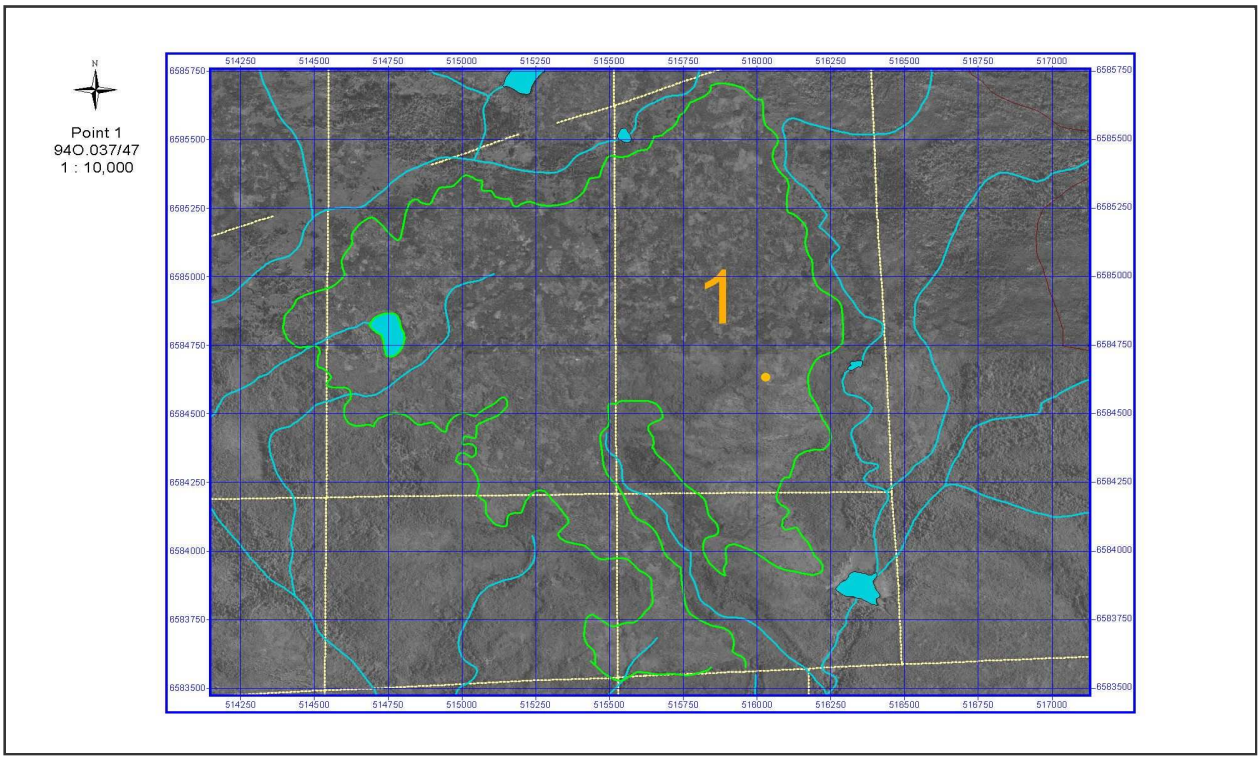

FIGURE 2. Example Field Map of Sahtaneh TEM accuracy assessment polygon.

Proper georeferencing of field plots was paramount. Conventions consistently employed included efforts to accurately locate all field sampling sites on field copies of ortho-maps that were carried during the sampling. Specific directions to the plot were also provided, wherever possible, on field data forms, hand-held (Trimble Explorer XT) GPS units and lap top computer with all digital information was consistently used (RIC, 1995) in the project as a back-up to the random sample locations on ortho-maps.

Sets of marked ortho-maps maps were carried into the field during site visitation and sampling. The small scale maps and GPS were generally used to navigate to the sample locations.

Once in the vicinity of the sample polygon, large scale ortho-maps and GPS assisted in identifying the polygon extents of the sample sites. At that point, each polygon was reviewed to identify the ecosystems and determine the proportions found within the identifiable extents.

2.4 Photo Sampling

The methods for photo interpretation assessments are similar to the initial photo-interpretation work delineation, classification, and mapping of Terrestrial Ecosystems. This work is normally aimed at delineating BEC Subzones/Variant lines as well as bioterrain units, Alpine and Parkland boundaries, and preliminary TEM pre-typing linework, and most preliminary TEM annotation development.

Classification is based upon BEC principles to derive site series which are characterized via field programs and installed field plots. Interpretation is done on 1:20 000 scale air photos, in association with other data/information, to produce typed air photos for input into a GIS.

The approach taken for this project is similar to the above described methods for TEM photo interpretation. Although in this project delineation of ecosystem polygons has already been accomplished in some form. Focus of reliability assessment is then directed toward using the derived polygon linework and corollary data to interpret ecosystems and structural stages for each sample polygon. These methods are similar standards and protocols used in TEM mapping (RIC 1998).

Using the ecosystem list provided by the mapping contractor along with the provincial ecosystem list, *"A Field Guide for Identification and Interpretation of Ecosystems of the Northeast Portion of the Prince George Forest Region"* (Delong et al, 1990), field notes and prior experience assisted in consistent photo interpretations. As mentioned previously, many side excursions into various other ecosystems; while in the field, with Craig Delong provided invaluable insights on interpretative aspects for ecosystems of this subzone as a foundation for photo sampling.

During the photo interpretation of polygons, a concurrent image was delineated on screen using GIS, in Arcview, with Sahtaneh River TEM linework, TRIM, Forest Cover or VRI over laid onto the ortho images to assist in referencing the polygon on the actual air photo. This process worked well, in light of the fact that the ecosystem polygons were derived from un-projected microstation files and provided confirmation of the polygon delineation against the original delineation found on the air photos. The overall process also provided a quick reference for accessing the corollary information attached to each of these data sets to support the ecosystem interpretation for the sampling.

In addition to protocols outlined in previously mentioned Provincial standards, samples were assigned a rating during the interpretation process towards the overall confidence of the assigned map assessment. Used previously by Craig Delong (MOF), Corey Erwin (MSRM) and others in map assessment projects, this procedure provides distinction of the quality level

of each assessment. A rating of "P" for poor was assigned to the assessment call if the interpretation was in any way unsure of aspects such as polygon delineation, ecosystem proportions, or ecosystems themselves. A good rating was assigned a "G" when the confidence of the interpretation of polygon delineation, ecosystem proportions or ecosystems was high. When the assessment did not fit either of these situations and possessed elements of both on different aspects, the rating was considered medium, or "M". For example, all ground plots scored a good rating since all aspects mentioned were comfortably met.

Makonis developed a specific sampling protocol for the photo interpretation. Details of each polygon were noted for specifics pertaining to the interpretation or condition of polygon assessed. The final accuracy assessments were completed on 89 randomly selected polygons. A table summary of accuracy assessment plots are found in Appendix B.

2.5 *Data Analysis*

Most of the reporting aspects of "*Protocol for Accuracy Assessment of Ecosystem Maps"* (Meidinger, 2003) lends well to automated processing and Makonis implemented an automated analysis within Excel® for this project. Results were also checked by hand methods to ensure accurate reporting.

Previously mentioned in the prior sections, the assessment level applied to the interpretations for this project was used in determining the number of samples for analysis. In the end, 78 samples out of the 89 were considered in good condition, with 18 of these as aerial sampling and 4 of these as spot ground checks, thus meeting requirements of a level 1 accuracy assessment.

3.0 ACCURACY ASSESSMENT

3.1 Overview

As of March 20, 2004 the Accuracy Assessment results for the Sahtaneh River TEM are as follows:

Dominant Entity Correct:	41.67 %
Percent Overlap Correct:	39.36 %
Acceptable Overlap Correct:	60.19 %
Total are sampled:	11,617 ha.
Weighted Dominant Entity Correct:	51.81 %
Weighted Overlap Correct:	44.65 %
Weighted Acceptable Overlap Correct:	63.21 %

A total of 78 polygons were included in this assessment with 18 of these samples as direct aerial and ground visitation checks, completing this accuracy assessment as a level 1 under current MOF and MSRM standards.

Aerial and ground visitation plots were correlated by Craig Delong, Ministry of Forest Regional Ecologist, whom participated in the field sampling.

3.2 Data Summary

Following the prescribed analysis and summary as outlined in "*Protocol for Accuracy Assessment of Ecosystem Maps"* (Meidinger, 2003) this section will provide map users with a detailed overview comparison of the map summary (assessment) and map data.

Appendix C is a compilation of map entities and proportions for the map polygon data (TEM) and from the sampling assessment. As described previously, a procedure was employed for each polygon assessed rating the condition of the overall interpretation: illustrated in field "*Condition*". Given too, various types of sampling techniques were employed for this and associated projects, such as ground checks (G), air calls (A) and photo interpretation (P) an additional field labelled "*Method*" provides map users with further levels of confidence. One last additional piece of information provided during the sampling phase was a note toward the polygon as support for the assessment call, provided in the field "*Comments*", due to the character length of this particular field viewed on actual plot forms or in the digital files (Appendix B).

Replacing the chi-squared test in the earlier protocol (Meidinger 2000) is a simple graphing comparison of map entity proportions (Meidinger 2003) as illustrated in figure 3. Table 3 presents an overall evaluation of the ecosystem proportions of the entire Sahtaneh River TEM map compared to the sample proportions.

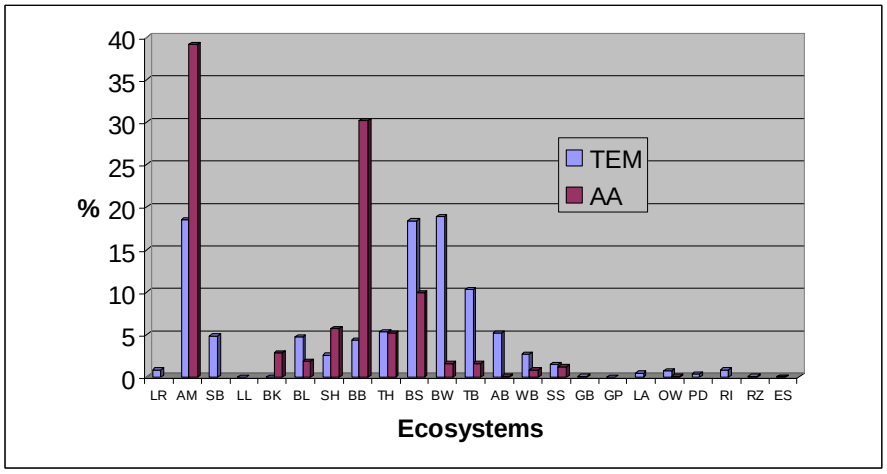

FIGURE 3. Graph of ecosystem proportions for the Sahtaneh River TEM (TEM) and Sahtaneh Accuracy Assessment (AA) within the BWBSmw2.

Table 3. Evaluations of percent overlap for Sahtaneh River TEM study and Accuracy Assessment.

Map Code	Site Series	TEM Count	TEM Area	TEM Percent	AA Count	AA Area	AA Percent	% Overlap
LR	00	237	3389.2426	0.83				0
AM	01	2507	75102.8416	18.45	47	5651.59	39.14	18.45
SB	00	1023	19554.0386	4.8				0
LL	02	2	3.891	0.0009				0
BK	03				7	406.49	2.81	0
BL	04	1052	18885.376	4.64	7	256.31	1.77	1.77
SH	05	546	10644.1769	2.61	16	818.24	5.66	2.61
BB	06	1410	17677.8066	4.34	62	4358.11	30.18	4.34
TH	07	1121	21331.0024	5.29	34	739.97	5.12	5.12
BS	08	3475	75075.5065	18.44	30	1432.03	9.92	9.92
BW	09	4147	76764.6959	18.85	8	233.62	1.61	1.61
TB	10	1658	42027.0136	10.32	4	226.40	1.57	1.57
AB	00	920	20927.076	5.14	1	16.11	0.11	5.14
WB	00	730	10709.706	2.63	8	113.86	0.79	0.79
SS	00	372	6061.2658	1.49	9	172.07	1.19	1.49
GB	gravel bar	12	44.7834	0.011				0
GP	gravel pit	1	2.4465	0.0006				0
LA	lake	47	1754.862	0.431				0
OW	open water	755	2665.4073	0.65	1	12.27	0.08	0.08
PD	pond	429	1255.4004	0.31				0
RI	river	64	3111.8859	0.76				0
RZ	road	41	101.906	0.025				0
ES	soil	3	14.038	0.003				0
		20552	407104	100	234	14437	100	52.89

Evaluation of the dominant scoring was calculated for the Sahtaneh TEM using only sample polygons rated as “good” and is presented in Appendix D. A slight deviation of the current protocols on these calculations for”scoring ties” was put in place with approval from Del Meidinger. In scoring ties, instead of alternating the full score marks for ties in a progressive fashion, each tie was scored as half marks. This aspect plays in favour of the map when scores are even numbered, as well, when contributing to the overall weighted area calculations. Large polygons only scoring half marks still would contribute a significant portion of area under this method, rather than the possibility of no contribution, which is dependent on the original sorting order of the dataset.

Percent overlap determination is presented in Appendix E and described in detail in "*Protocol for Accuracy Assessment of Ecosystem Maps"* (Meidinger, 2003). Results are based on the proportions of ecosystems encountered in comparison to the mapped ecosystems, thus reflecting what is considered as the overall indicator of map accuracy. Similar to the previous analysis, half marks again were given to ties.

Acceptable overlap score is an analysis providing half marks to ecosystems deemed as an acceptable alternative to the correctly assigned ecosystem (Appendix F). Under the current protocols (Meidinger 2003) an acceptable alternative is one that lies adjacent on the Edatopic grid as presented in the field guides. It is further pointed out that not all adjacent sites are acceptable since all adjacent sites are not ecologically similar, so units must be scrutinized and placed accordingly. Although presented as an optional calculation within the current protocols, this analysis can be mis-interpreted depending on how the matrix for acceptable units is determined and is an adhoc attempt at lumping units, which is better suited for the mapping process not accuracy assessments. The strength of this analysis lies in conjunction with other analysis and review of the datasets to best determine where the actual deficiencies are in the map data.

Since the polygons were complex in nature on both the mapping and the assessment, the confusion matrix could not be developed for this project.

4.0 QUALITY MANAGEMENT

Project quality control was maintained throughout the project, to ensure that milestones were met and the work was undertaken efficiently and to the highest possible quality. Constant reassessment of data and procedures were correlated to current Provincial standards. Deviations from these standards were made aware to Slocan, MOF and MSRM as the conditions were found, so proper attention could be applied at the earliest time in the project direction.

Quality control (QC), as it relates to ecosystem mapping, can be considered as two parts:

1. Development of procedures that are well-documented, rigorous and validated; and,
2. Assurance of implementation of those procedures (RIC 1998a, b, 2000a, b).

As a critical step in the accuracy assessment, QC efforts were focused to ensure that the procedures were well-documented, consistent with Government requirements, and conducted in such a way as to ensure future map users are aware of all known conditions.

A main product of the QC effort was to define and document the approach and methodology, as described in the Methods section of this final report, appendix and in the associated files which accompany the digital outputs.

In the field, correlation exercises were conducted to help calibrate team members on ecosystem features. Craig Delong, Regional Ecologist, participated in the field session and was instrumental in establishing a solid baseline for determination of ecosystem features for the study area.

Other quality control protocols were conducted at each step of the Accuracy Assessment process. The following highlights illustrate examples of these protocols for each work plan component:

1. Reviewed Sahtaneh River TEM polygons at the initial stages and determined that the aerial review would be adequate for a sampling procedure as originally proposed.
2. Upon review of the initial condition of the polygons, random points were chosen over actual polygon number selection as a means of tracking the assessment data. Sahtaneh River TEM map compilation had not yet occurred and changes were likely from general observations. Thus tracking the polygon spatially from the random points was determined as the best method.

Makonis during internal QC reviews and constant monitoring of project direction with regards towards Provincial standards, generally observed conditions within the Sahtaneh River TEM. Some aspects of these findings are presented in the following section as discussion points.

5.0 PROJECT ASSESSMENT

5.1 Overview of Accuracy Assessment

When considering the following discussion and conclusions it is important to consider the context of sampling for this accuracy assessment project. Sampling was directed toward a sampling level one where the primary application is Quality Assurance, described further in "*Protocol for Accuracy Assessment of Ecosystem Maps"* (Meidinger, 2003).

Assessment for the Sahtaneh River TEM was completed using two means of evaluation, photo interpretation and air calls. Both are viable procedures for a level one assessment and both are less rigorous means of evaluation to actual ground sampling techniques.

5.1.1 Dominance Correct

The dominant correct score in the accuracy assessment provides map users with an overall confidence reporting toward the most prominent ecosystems within each polygon. This scoring only occurs if the dominant decile of the sample data set agrees with the dominant decile of the map data set. Ties receive only half marks and further discussion of ties are found in *Protocol for Accuracy Assessment of Ecosystem Maps* (Meidinger, 2003).

Score	Area (ha)	Contributing Area (ha)	Average Score Contribution	Weighted Average Contribution
32.5 of 78	11,617	6018.29	41.67%	51.81%

The initial low results of the dominant correct as illustrated in the results of 41.67 % is believed to culminate from a number of aspects; most of which will not be evident without considerations of other analysis results.

Firstly, a sample size of 89 polygons, even though randomly selected from the entire map, represents a small fraction of the available 11,062 ecosystem polygons. Making an assessment of all mapped ecosystems and conditions difficult and when further considering some ecosystems are only found under very localised conditions.

Other considerations can be attributed to the following general observations between the sample and map data sets.

- Over emphasis on the wetter forested conditions such as 08 - BS, 09 - BW and 10 - TB. Field exercises and baseline correlation from Regional Ecologist indicate a good proportion of these units are 06 - BB and 07 - TH.
- Over emphasis of the less abundantly distributed ecosystems. Similar to the previous point with the exception the map 09 - BW units were more likely to be 06 - BB or 08 -BS.
- Under emphasis of common ecosystems. The 03 - BK unit, described as a very common ecosystem, was not map within the Sahtaneh River TEM, but ground sampling in the adjacent Patry Lake PEM indicated otherwise. This unit was observed in many locations throughout the study area and encounter everyday during the field exercises.

5.1.2 Overlap Correct

The overlap score analysis provides the map users the ecosystem accuracy on the entire polygon (Previously on dominant ecosystems). Where scoring can occur toward the lesser extent of map or sample proportions, see "*Protocol for Accuracy Assessment of Ecosystem Maps"* (Meidinger, 2003) for further details.

Overlap Score	Area (ha)	Contributing Area (ha)	Average Score Contribution	Weighted Average Contribution
3070 of 7800	11,617	5,187	39.36%	44.65%

As mentioned previously, the condition of the map plays a major role. The overall resulting score has not changed significantly and is reported at 39.36% correct (in relation to 41.67% in the prior dominant analysis).

What changed significantly, and not evident in the table above, was where ecosystems were contributing to report this value. Previous low dominance reporting may indicate complexes are a common feature in the landscape and the secondary or tertiary ecosystems in the map and sample sets are now contributing to the scoring. Although, all three deciles are now contributing to scoring, the score is now weighted proportionally to the deciles. Even though results are similar as previously illustrated in the dominance correct analysis, there is an increase in the actual number of contributions to scoring. Examination of the entire overlap table illustrates this aspect and supports earlier discussions points made previously in section 5.1.1.

5.1.3 Acceptable Overlap Correct

Acceptable overlap score is an analysis providing half marks to ecosystems deemed as an acceptable alternative to the correctly assigned ecosystem. Scoring not only occurs on all three deciles, but direct and alternative ecosystems, see "*Protocol for Accuracy Assessment of Ecosystem Maps"* (Meidinger, 2003) for further details.

Acceptable Overlap Score	Area (ha)	Contributing Area (ha)	Average Score Contribution	Weighted Average Contribution
4695 of 7800	11,617	7,343	60.19%	63.21%

The overall resulting score has changed significantly and is reported at 60.19% correct (in relation to 41.67% in the prior dominant analysis and 39.36% in the overlap analysis). Where this increase is evident corresponds to contributions of the alternative ecosystems, in comparison to previous overlap analysis; most significantly those mentioned earlier 08 - BS, 09 - BW and 10 – TB.

5.2 Overview of Sahtaneh River TEM

Makonis Consulting Ltd indicated as the project developed an overview of the ecosystem mapping towards other Quality Assurance would be reported to Slocan on observable features. Below are the general comments indicated to Slocan.

- No 03 –BK unit mapped when Makonis encountered it during field sample in many different locations and is considered a significant portion of the landscape.
- Preliminary mapping for the entire study area is seamless and corresponding digital data sets delivered to Makonis, look to be in relatively good condition.

APPENDIX A

Randomly generated sample points for the Sahtaneh River TEM study area. Points can be projected in Provincial B.C. Albers or Universal Transverse Mecrator (UTM – Zone 10).

	BC Albers		UTM Zone 10	
UNIQUE_ID	RND_X_CRD	RND_Y_CRD	Northing	Easting
1	1186849.6932444	1606056.4274236	516208.28948	6584518.45483
2	1209157.9888311	1616761.8303448	538901.43453	6594289.98650
3	1160849.3336720	1571027.9390603	488792.62867	6550594.70143
4	1181949.3173210	1581936.1766999	510305.48298	6560605.23372
5	1198813.7131854	1620263.3981133	528733.42903	6598226.43773
6	1207191.7752480	1606513.3393153	536513.83744	6584120.78258
7	1175608.9281457	1615169.0440307	505383.09396	6594108.40761
8	1190500.6140606	1600385.5957205	519611.19928	6578692.96394
9	1183096.9970556	1598839.7816569	512162.21571	6577459.23084
10	1163304.9352174	1593525.5119725	492197.34012	6572983.44986
11	1220831.8406221	1613473.7728062	550405.59603	6590513.49927
12	1192111.6965559	1617310.5516354	521927.59793	6595554.09988
13	1173428.3366500	1604559.7207128	502760.81956	6583588.77979
14	1192514.4671798	1577226.1410309	520647.88649	6555450.79693
15	1204868.2651438	1627501.3949029	535071.71527	6605214.13790
16	1160896.9732082	1590734.9332692	489677.11991	6570295.40385
17	1165128.2301920	1617650.0329007	495038.22215	6597034.83353
18	1173424.0057830	1614165.5459507	503162.19021	6593197.11347
19	1166594.2286454	1617961.7578362	496513.04962	6597284.39685
20	1198937.1428927	1620165.1834076	528852.38890	6598122.99900
21	1194961.4070574	1574450.5080437	522972.79703	6552573.02021
22	1162525.3791712	1593267.1645944	491408.83746	6572758.25700
23	1202542.5896061	1593638.6723943	531339.45105	6571439.66084
24	1164478.6001535	1625607.5591647	494727.66786	6605023.55542
25	1180656.5535445	1562271.8845369	508186.41322	6541002.51940
27	1168952.3856850	1583240.7242038	497394.80048	6562459.80727
28	1183320.0367022	1583945.3079621	511757.56686	6562556.10031
29	1195032.8663616	1568235.2252547	522783.29992	6546356.98064
31	1173185.8081023	1581015.9476095	501523.95230	6560055.96543
32	1175673.8911495	1599192.0735360	504773.64122	6578125.39647
33	1181332.1687845	1621657.6199137	511362.70674	6600357.50014
34	1177263.3193103	1600204.1120252	506401.53705	6579070.24841
35	1222553.3602240	1606058.5625258	551815.14762	6583024.58880
36	1172419.2446569	1596668.3826200	501420.99132	6575739.43540
37	1219285.7211306	1603716.3553051	548459.06092	6580818.06692
38	1165829.8306335	1595444.9689382	494797.05434	6574795.59688
39	1214497.9477472	1620622.0952993	544386.35289	6597928.71915
40	1174365.9693388	1610482.4944869	503945.93864	6589473.08513
41	1164385.4865147	1571995.1404012	492361.91601	6551411.18396
42	1211299.6025245	1620961.5765647	541211.51242	6598401.93793
43	1190203.9496763	1615858.6820729	519964.55176	6594182.01312

44	1175041.5845788	1610268.9842572	504610.61923	6589230.90776
45	1207555.5680695	1596457.0074925	536457.37425	6574047.98812
46	1176433.9582945	1589851.0009179	505137.42390	6568752.16678
47	1178047.2062234	1602937.0429664	507298.57629	6581770.32544
48	1195942.3484154	1607557.4043389	525338.83353	6585636.94377
49	1163718.5330085	1572202.2453241	491705.24980	6551646.56295
50	1165591.6329527	1618937.4995863	495554.77136	6598303.11581
51	1159887.8812151	1617210.2018274	489794.83906	6596817.73491
52	1185210.4601141	1590952.7137036	513938.31859	6569482.91219
53	1214164.4709941	1578712.1722302	542310.80642	6556028.51058
54	1192224.2990959	1612950.6727432	521857.14885	6591187.99045
55	1168660.0521677	1621655.4848115	498728.95068	6600891.96169
56	1213644.7669633	1614765.5096964	543292.36229	6592105.42345
57	1171756.6220177	1604638.7194978	501097.04494	6583738.64051
58	1164744.9484693	1586182.8951703	493322.30226	6565580.17959
59	1161152.4943566	1603340.5773007	490467.10559	6582890.68836
60	1181169.7612749	1617810.1655731	511038.86493	6596515.30013
61	1174142.9296923	1596177.3090915	503119.41179	6575175.31404
62	1165087.0869562	1608106.1256295	494592.84670	6587489.79457
63	1183486.7750787	1573696.8169326	511492.21296	6552303.12959
64	1170797.3349942	1565799.0735329	498497.09546	6544945.42166
65	1179584.6639810	1619138.1992023	509514.39081	6597910.85041
66	1168478.1557569	1582826.5143581	496904.17457	6562065.79879
67	1190669.5178706	1612527.9224883	520289.08080	6590830.56315
68	1172835.0078815	1567485.8043482	500601.75302	6546545.03516
69	1181202.2427768	1574980.0134136	509266.92423	6553682.41481
70	1172741.8942427	1614765.5096964	502507.40506	6593826.17752
71	1217239.3865095	1590269.4809683	545859.42185	6567455.75960
72	1203166.2344431	1611740.0697404	532717.43259	6589517.44241
73	1206433.8735365	1587536.5500271	534966.24770	6565174.78410
74	1176919.0153899	1576389.1809301	505052.94184	6555272.28598
75	1177306.6279795	1610279.6597686	506869.67773	6589145.71310
76	1162791.7274870	1583330.3985004	491252.85075	6562811.16031
77	1176386.3187584	1585219.9640339	504894.38612	6564123.67298
78	1185171.4823118	1596042.7976468	514113.57610	6574574.55348
79	1193326.5047278	1627285.7495708	523556.55865	6605482.82260
80	1172133.4074400	1594251.4467537	501033.72791	6573334.58278
81	1209876.9127403	1625195.4844212	539969.11451	6602697.37936
82	1171923.3603942	1561763.7301900	499449.92789	6540864.27789
83	1176475.1015303	1608586.5236465	505969.09128	6587487.35251
84	1182430.0435495	1616766.1005494	512251.49603	6595417.60650
85	1218828.8146702	1614022.4940967	548430.93059	6591145.86670
86	1172438.7335580	1620530.2859005	502448.62045	6599606.00249
87	1163482.5007612	1569924.0911723	491373.06458	6549379.28391
88	1192323.9090352	1589447.4665836	520970.77713	6567677.98507
89	1195409.6517839	1596435.6564696	524341.74911	6574536.20225
90	1178978.3426118	1573192.9327903	506972.66282	6551989.92265
91	1196226.0201989	1613755.6063095	525881.13974	6591824.88732
92	1204465.4945200	1595459.9146543	533333.56832	6573180.29845
93	1173525.7811557	1584948.8060421	502029.36213	6563973.68882

94	1186730.5944041	1595758.8290411	515656.70840	6574224.81035
95	1161267.2623301	1598056.1991136	490357.26399	6577600.89722
96	1176955.8277588	1584931.7252237	505450.34025	6563811.37599
97	1165035.1165531	1627439.4769363	495360.03418	6606832.80002
98	1174485.0681792	1622757.1975971	504582.74798	6601747.21665
99	1217228.5593421	1608037.8023559	546586.77283	6585226.17239
100	1177170.2056715	1572825.6951951	505153.08201	6551699.29709
101	1209344.2161088	1625402.5893441	539446.64226	6602926.86708
102	1179753.5677910	1570831.5096489	507646.51653	6549596.56065
103	1178956.6882772	1600246.8140712	508092.18032	6579041.32686
105	1175556.9577426	1589146.4171596	504232.87052	6568084.76522
106	1182542.6460895	1605435.1126549	511886.96644	6584078.78237
107	1212971.3171568	1619138.1992023	542802.54588	6596507.92162
108	1168445.6742550	1603788.9487833	497759.26048	6583029.18184
109	1213086.0851303	1618111.2149971	542874.30697	6595475.71970
110	1219827.0794960	1592329.8546857	548526.39178	6569408.13811
111	1164764.4373704	1618068.5129511	494693.24357	6597468.93561
112	1206637.4242819	1597631.3137563	535590.56666	6575260.79601
113	1189807.6753529	1603806.0296016	519063.68251	6582143.00817
114	1172187.5432765	1603861.5422614	501493.93444	6582943.07434
115	1187761.3407317	1601307.9599132	516917.95456	6579730.84193
116	1203454.2370934	1606135.4262086	532770.69440	6583899.36245
117	1160405.4198124	1579946.2613583	488728.58188	6559529.23222
118	1223352.4051713	1615228.8268950	552991.77410	6592164.22551
119	1196102.5904916	1607354.5696206	525490.14211	6585427.33058
120	1179439.5799391	1573807.8422521	507458.80929	6552585.12387
122	1220115.0821464	1604965.3901494	549338.04393	6582032.75912
123	1195944.5138489	1622227.6922273	525954.91802	6600312.12721
124	1187098.7180925	1598241.9530135	516128.25065	6576692.51008
125	1172168.0543753	1564458.2292899	499808.13698	6543547.08232
126	1192323.9090352	1575791.3522867	520397.51562	6554024.43631
127	1197176.6454885	1581498.4807288	525478.48777	6559526.03434
128	1211329.9185930	1610544.4124536	540808.49477	6587979.72319
129	1166158.9765196	1619970.8890985	496164.16728	6599312.82909
131	1202949.6910969	1577640.3508767	531076.69787	6555426.42888
132	1219718.8078229	1626527.7882551	549836.58294	6603619.66023
133	1183268.0662991	1582892.7025293	511661.38803	6561505.87675
135	1208300.4771803	1618083.4586672	538101.42075	6595648.00153
136	1184062.7803795	1618049.2970304	513933.38454	6596632.35557
137	1186836.7006437	1609923.0976849	516357.78853	6588386.52606
138	1186990.4464194	1614174.0863599	516689.65834	6592632.25875
140	1176882.2030211	1625577.6677326	507091.45339	6604467.59800
141	1200372.8252777	1617592.3851387	530176.36897	6595488.89378
142	1183973.9976075	1563275.3826169	511539.25699	6541865.38357
143	1205942.3201407	1592368.2865270	534677.59928	6570026.79708
144	1196011.6422862	1569439.4229507	523810.49573	6547519.53588
145	1160567.8273220	1578084.4521546	488811.51980	6557660.96967
146	1176457.7780626	1587525.8745156	505063.02608	6566426.25410
148	1225844.8190855	1628331.9496967	556018.69177	6605169.94964
149	1184766.5462545	1567620.3157930	512513.18535	6546174.88531

150	1205561.2038515	1597276.8867749	534502.32657	6574951.42670
151	1184482.8744710	1619364.5200459	514407.51813	6597930.37620
152	1165559.1514508	1612122.2530517	495233.71646	6591486.88847
153	1208709.7441045	1578690.8212072	536867.55436	6556235.28260
154	1185738.8258787	1606425.8001211	515116.00857	6584934.74974
155	1191057.1304602	1561810.7024406	518546.06085	6540102.74280
156	1191927.6347117	1567731.3411125	519663.56459	6545983.98199
157	1200782.0922019	1585935.2233037	529261.15881	6563810.61404
158	1201093.9146204	1625569.1273234	531228.34522	6603439.02184
159	1183898.2074364	1609244.1351542	513399.02367	6587831.36727

APPENDIX B

Summary of sample polygon data for the Sahtaneh River TEM.

ECP_TAG	HECTARES	UNIQUE_ID	Sahtaneh AA_BGC	Photo	Mapsheet	Rating	Method	Sahtaneh AA_Sdec_1	Sahtaneh AA_SiteMC_S1	Sahtaneh AA_Strct_S1	Strct_M1	Stand_A1	Sahtaneh AA_Sdec_2	Sahtaneh AA_SiteMC_S2	Sahtaneh AA_Strct_S2	Strct_M2	Stand_A2	Sahtaneh AA_Sdec_3
094O047_7465	199.532	1	BWBSmw2	10-094	094O.048	G	A	8	BB	3	b	C	2	BS	3	b	C	
094O049_5456	22.774	2	BWBSmw2	6-060	094O.049	G	G	7	BB	3	b	C	2	SS	2	b		1
094O005_335	18.216	3	BWBSmw2	24-120	094O.005	G	A	7	BB	3	b	C	3	BS	3	b	C	
094O016_3603	44.573	4	BWBSmw2	20-058	094O.016	M	A	5	AM	5		B	5	AM	3	b	B	
094O039_7630	80.556	6	BWBSmw2	10-080	094O.039	M	A	7	BB	3	b	C	2	AB	3	b	C	1
094O046_5295	128.274	7	BWBSmw2	6-006	094O.046	G	A	6	BB	3	b	C	3	BS	3	b	C	1
094O037_10425	388.59	8	BWBSmw2	13-142	094O.037	G	A	10	AM	5		B						
094O037_10403	157.616	9	BWBSmw2	13-136	094O.037	G	A	9	AM	5		B	1	AM	5		C	
094O025_7850	19.679	10	BWBSmw2	15-178	094O.025	G	A	10	SH	7		C						
094O050_6287	21.365	11	BWBSmw2	8-198	094O.050	G	A	9	BB	3	b	C	1	TH	5		C	
094O048_5360	125.299	12	BWBSmw2	6-016	094O.048	G	A	9	AM	5		B	1	BB	3	b	C	
094O036_7409	219.579	13	BWBSmw2	10-102	094O.036	G	G	10	BB	3	b	C						
094O017_9219	78.012	14	BWBSmw2	22-112	094O.016	G	A	10	SH	7		C						
094O059_11255	22.934	15	BWBSmw2	2-156	094O.059	M	A	8	BW	3	a	B	2	BS	3	b	C	
094O025_8120	70.668	16	BWBSmw2	16-090	094O.025	G	G	10	TH	5		B						
094O055_4809	333.636	17	BWBSmw2	5-024	094O.055	G	A	9	BB	3	b	C	1	BS	3	b	C	
094O046_5290	70.919	18	BWBSmw2	6.-006	094O.046	G	A	10	TH	6		C						
094O055_4827	33.576	19	BWBSmw2	5-022	094O.055	G	A	10	AM	6		B						
094O058_4576	778.762	20	BWBSmw2	5-142	094O.056	M	A	7	BB	3	b	C	2	BS	3	b	C	1
094O018_1770	18.737	21	BWBSmw2	23-134	094O.018	G	A	10	AM	6		C						
094O025_7844	44.72	22	BWBSmw2	15-178	094O.025	G	A	5	BB	6		C	4	TH	6		C	1
094O028_8306	81.807	23	BWBSmw2	16-126	094O.028	G	G	6	BB	3	b	C	4	BS	3	b	C	
094O055_4058	169.286	24	BWBSmw2	1-082	094O.055	G	P	8	AM	5		B	2	BK	5		C	
094O006_165	700.777	25	BWBSmw2	28-158	094O.006	M	P	4	AM	5		B	4	AM	6		C	2
094O025_2984	18.731	27	BWBSmw2	19-154	094O.025	G	P	10	SH	5		B						
094O016_3607	113.286	28	BWBSmw2	19-004	094O.026	G	P	10	SH	4		B						
094O007_1235	122.77	29	BWBSmw2	26-200	094O.007	G	P	6	WB	3	b	B	3	SS	2	b		1
094O016_3530	146.968	31	BWBSmw2	20-052	094O.016	G	P	4	BK	5		B	4	BB	5		B	2
094O036_10356	47.161	32	BWBSmw2	13-132	094O.036	G	P	5	AM	6		B	5	AM	6		C	
094O056_4474	177.372	33	BWBSmw2	4-088	094O.056	G	P	7	BB	3	b	C	2	BS	3	b	C	1
094O036_9869	89.291	34	BWBSmw2	13-134	094O.036	G	P	5	BB	3	b	C	5	BS	3	b	C	

094O040_9683	488.752	35	BWBSmw2	11-160	094O.040	G	P	5	BB	3	b	C	3	BW	3	b	C	2
094O036_10326	355.746	36	BWBSmw2	14-084	094O.036	G	P	6	AM	6		C	3	AM	5		B	1
094O040_10164	79.443	37	BWBSmw2	12-054	094O.040	G	P	10	AM	5		B						
094O035_10681	81.197	38	BWBSmw2	14-088	094O.035	G	P	6	AM	5		C	3	BB	5		C	1
094O059_5089	31.063	39	BWBSmw2	5-152	094O.059	G	P	5	BW	3	b	C	4	WB	3	a	B	1
094O046_5989	97.808	40	BWBSmw2	8-168	094O.046	M	P	6	BB	3	b	C	2	BW	3	b	C	2
094O005_416	123.802	41	BWBSmw2	24-118	094O.015	G	P	6	BS	3	b	C	3	BB	3	b	C	1
094O059_4667	24.541	42	BWBSmw2	4-110	094O.059	G	P	8	BB	3	b	C	2	BS	3	b	C	
094O048_5357	878.022	43	BWBSmw2	6-016	094O.047	G	P	4	AM	6		C	4	AM	5		B	2
094O046_5983	202.627	44	BWBSmw2	8-168	094O.046	G	P	7	AM	5		B	2	AM	6		C	1
094O039_10967	88.798	45	BWBSmw2	14-062	094O.039	G	P	6	BS	3	b	C	3	BB	3	b	C	1
094O026_8471	22.326	46	BWBSmw2	17-082	094O.026	G	P	10	AM	6		C						
094O036_9417	439.855	47	BWBSmw2	11-132	094O.036	G	P	5	BB	3	b	C	4	BS	3	b	C	1
094O048_7537	57.563	48	BWBSmw2		094O.048	G	P	5	BB	5		C	3	WB	3	b	B	2
094O015_319	537.603	49	BWBSmw2	24-118	094O.015	G	P	6	AM	6		B	2	AM	6		C	2
094O055_4380	8.96	50	BWBSmw2	4-078	094O.055	G	P	8	WB	3	b	B	2	SS	2	b		
094O055_4782	51.262	51	BWBSmw2	5-026	094O.055	G	P	8	BB	3	b	C	2	TH	5		C	
094O027_8265	74.77	52	BWBSmw2	16-114	094O.027	G	P	9	BB	6		C	1	TH	6		C	
094O019_2392	28.494	53	BWBSmw2	22-126	094O.018	G	P	6	BB	6		C	4	BL	6		C	
094O056_6876	67.99	55	BWBSmw2	3-092	094O.055	G	P	9	AM	5		C	1	BB	3	b	C	
094O049_5807	147.04	56	BWBSmw2	7-014	094O.049	G	P	6	BB	3	b	C	3	BS	3	b	C	1
094O035_7373	45.442	57	BWBSmw2	10-104	094O.036	G	P	6	AM	5		C	2	BK	5		C	2
094O025_8731	88.749	58	BWBSmw2	18-100	094O.025	G	P	10	SH	7		C						
094O035_7303	99.924	59	BWBSmw2	10-110	094O.035	G	P	7	BB	3	b	C	2	BS	3	b	C	1
094O056_4899	10.252	60	BWBSmw2	5-012	094O.056	G	P	10	SH	5		B						
094O036_10730	54.115	61	BWBSmw2	14-084	094O.036	G	P	8	BS	3	b	C	2	BB	3	b	C	
094O045_5948	177.043	62	BWBSmw2	9-042	094O.045	G	P	7	AM	6		C	2	BB	6		C	1
094O016_3286	138.256	63	BWBSmw2	23-126	094O.016	G	P	6	BB	3	b	C	2	BS	3	b	C	1
094O005_436	173.043	64	BWBSmw2	26-124	094O.005	G	P	6	BB	3	b	C	4	BS	3	b	C	
094O056_4459	701.836	65	BWBSmw2	4-088	094O.056	G	P	7	AM	6		C	2	BK	6		C	1
094O015_3204	22.112	66	BWBSmw2	19-154	094O.015	G	P	7	AM	6		B	3	AM	5		C	
094O006_582	357.361	68	BWBSmw2	26-122	094O.006	G	P	7	AM	6		C	2	BL	6		C	1
094O016_3290	159.983	69	BWBSmw2	23-126	094O.016	M	P	6	AM	4		B	2	BK	4		B	2
094O046_5277	708.592	70	BWBSmw2	6-004	094O.046	M	P	4	BS	3	b	C	3	TB	3	b	C	3
094O030_8661	106.409	71	BWBSmw2	17-056	094O.030	M	P	5	BB	6		C	5	TH	6		C	
094O048_6176	269.24	72	BWBSmw2	8-186	094O.048	G	P	7	AM	6		C	2	AM	5		B	1
094O029_8930	112.398	73	BWBSmw2	18-072	094O.029	G	P	6	BB	3	b	C	3	BS	3	b	C	1
094O016_3363	31.444	74	BWBSmw2	22-102	094O.016	G	P	6	AM	6		B	2	BB	6		C	2
094O046_6003	165.733	75	BWBSmw2	8-170	094O.046	G	P	6	BB	3	b	C	2	BS	3	b	C	2
094O025_2941	37.88	76	BWBSmw2	19-158	094O.025	G	P	5	BB	6		C	4	BL	6		C	1
094O026_3615	16.549	77	BWBSmw2	18-092	094O.026	G	P	6	BK	5		C	3	AM	6		C	
094O037_10793	47.415	78	BWBSmw2	14-076	094O.037	G	P	9	BB	3	b	C	1	TH	5		C	
094O058_4190	145.183	79	BWBSmw2	1-066	094O.056	G	P	7	BB	3	b	C	2	TH	5		C	1
094O026_7909	97.303	80	BWBSmw2	15-186	094O.026	G	P	5	BB	3	b	C	3	BB	6		C	2
094O059_7130	29.671	81	BWBSmw2	3-066	094O.059	G	P	6	BW	3	b	C	3	BB	3	b	C	1
094O005_84	112.14	82	BWBSmw2	28-164	094O.005	G	P	6	BB	6		C	2	BB	3	b	C	2
094O046_6444	33.386	83	BWBSmw2	9-008	094O.046	G	P	7	BB	5		C	2	SS	2	b		1
094O057_4915	58.145	84	BWBSmw2	5-012	094O.056	M	P	7	TH	5		C	3	AM	6		C	

094O050_6261	164.138	85	BWBSmw2	8-196	094O.050	G	P	4	BS	3	b	C	4	BB	3	b	C	2
094O056_4441	206.923	86	BWBSmw2	4-084	094O.056	G	P	6	BB	3	b	C	3	TH	5		C	1
094O005_380	136.483	87	BWBSmw2	25-194	094O.005	G	P	7	BB	3	b	C	2	TH	4		C	1
094O027_8560	51.801	88	BWBSmw2	17-072	094O.028	G	P	4	AM	6		C	4	BB	6		C	2
094O038_10880	78.759	89	BWBSmw2	14-070	094O.038	M	P	8	BS	3	b	C	2	BW	3	b	C	
094O016_3282	104.062	90	BWBSmw2	23-124	094O.016	G	P	6	SH	5		B	4	BB	6		C	
094O048_5711	612.338	91	BWBSmw2	7-028	094O.048	G	P	6	AM	6		C	2	BK	6		C	2
094O038_8024	32.52	92	BWBSmw2	15-170	094O.038	G	P	8	AM	5		B	2	BB	5		C	
094O026_3212	545.09	93	BWBSmw2	18-094	094O.026	G	P	10	AM	5		B						
094O037_10814	89.568	94	BWBSmw2	14-076	094O.037	G	P	4	BB	6		C	4	BL	6		C	2

APPENDIX C

Summary of map entity proportions and accuracy assessment entity proportions for the Sahtaneh River TEM.

ECP_TAG	HECTARES	Sahtaneh TEM BGC	Sahtaneh TEM_Sdec_1	Sahtaneh TEM_SiteMC_S1	Sahtaneh TEM_Sdec_2	Sahtaneh TEM_SiteMC_S2	Sahtaneh TEM_Sdec_3	Sahtaneh TEM_SiteMC_S3	UNIQUE_ID	Sahtaneh AA_BGC	Rating	Method	Sahtaneh AA_Sdec_1	Sahtaneh AA_SiteMC_S1	Sahtaneh AA_Sdec_2	Sahtaneh AA_SiteMC_S2	Sahtaneh AA_Sdec_3
094O028_8306	81.807	BWBSmw2	7	TB	3	BS	0		23	BWBSmw2	G	G	6	BB	4	BS	
094O025_8120	70.668	BWBSmw2	8	AB	2	BB	0		16	BWBSmw2	G	G	10	TH			
094O027_8265	74.77	BWBSmw2	5	TH	3	TB	2	BB	52	BWBSmw2	G	P	9	BB	1	TH	
094O026_8471	22.326	BWBSmw2	8	AM	2	SB	0		46	BWBSmw2	G	P	10	AM			
094O027_8560	51.801	BWBSmw2	4	TB	4	BB	2	BW	88	BWBSmw2	G	P	4	AM	4	BB	2
094O030_8661	106.409	BWBSmw2	6	AM	2	AB	2	TH	71	BWBSmw2	M	P	5	BB	5	TH	
094O026_3212	545.09	BWBSmw2	8	AM	2	SB	0		93	BWBSmw2	G	P	10	AM			
094O029_8930	112.398	BWBSmw2	4	BW	4	TB	2	TH	73	BWBSmw2	G	P	6	BB	3	BS	1
094O025_8731	88.749	BWBSmw2	10	SH	0		0		58	BWBSmw2	G	P	10	SH			
094O026_3615	16.549	BWBSmw2	7	BL	3	BB	0		77	BWBSmw2	G	P	6	BK	3	AM	
094O016_3607	113.286	BWBSmw2	10	SH	0		0		28	BWBSmw2	G	P	10	SH			
094O025_2984	18.731	BWBSmw2	7	SH	3	SH	0		27	BWBSmw2	G	P	10	SH			
094O025_2941	37.88	BWBSmw2	8	BW	2	BS	0		76	BWBSmw2	G	P	5	BB	4	BL	1
094O015_3204	22.112	BWBSmw2	10	BL	0		0		66	BWBSmw2	G	P	7	AM	3	AM	
094O016_3603	44.573	BWBSmw2	5	BL	3	AB	2	BB	4	BWBSmw2	M	A	5	AM	5	AM	
094O058_4190	145.183	BWBSmw2	5	BS	3	BS	2	BW	79	BWBSmw2	G	P	7	BB	2	TH	1
094O055_4058	169.286	BWBSmw2	8	AM	2	SB	0		24	BWBSmw2	G	P	8	AM	2	BK	
094O059_11255	22.934	BWBSmw2	8	BS	2	TB	0		15	BWBSmw2	M	A	8	BW	2	BS	
094O059_7130	29.671	BWBSmw2	6	BW	4	BS	0		81	BWBSmw2	G	P	6	BW	3	BB	1
094O056_4474	177.372	BWBSmw2	6	BW	2	BS	2	TB	33	BWBSmw2	G	P	7	BB	2	BS	1
094O056_6876	67.99	BWBSmw2	5	AM	3	AM	2	BS	55	BWBSmw2	G	P	9	AM	1	BB	
094O058_4576	778.762	BWBSmw2	6	BW	2	BS	2	BW	20	BWBSmw2	M	A	7	BB	2	BS	1
094O056_4441	206.923	BWBSmw2	5	BS	3	TH	2	BW	86	BWBSmw2	G	P	6	BB	3	TH	1

094O056_4459	701.836	BWBSmw2	7	AM	2	SB	1	AB	65	BWBSmw2	G	P	7	AM	2	BK	1
094O059_4667	24.541	BWBSmw2	10	BS	0		0		42	BWBSmw2	G	P	8	BB	2	BS	
094O059_5089	31.063	BWBSmw2	7	WB	3	OW	0		39	BWBSmw2	G	P	5	BW	4	WB	1
094O055_4380	8.96	BWBSmw2	10	WB	0		0		50	BWBSmw2	G	P	8	WB	2	SS	
094O055_4827	33.576	BWBSmw2	10	AM	0		0		19	BWBSmw2	G	A	10	AM			
094O055_4809	333.636	BWBSmw2	4	BS	4	BW	2	BS	17	BWBSmw2	G	A	9	BB	1	BS	
094O055_4782	51.262	BWBSmw2	4	BS	4	BW	2	BS	51	BWBSmw2	G	P	8	BB	2	TH	
094O056_4899	10.252	BWBSmw2	10	WB	0		0		60	BWBSmw2	G	P	10	SH			
094O057_4915	58.145	BWBSmw2	6	BW	2	BW	2	BS	84	BWBSmw2	M	P	7	TH	3	AM	
094O048_5360	125.299	BWBSmw2	6	AM	2	BW	2	BB	12	BWBSmw2	G	A	9	AM	1	BB	
094O048_5357	878.022	BWBSmw2	5	AM	3	AB	2	SB	43	BWBSmw2	G	P	4	AM	4	AM	2
094O046_5295	128.274	BWBSmw2	6	BS	2	TH	2	LR	7	BWBSmw2	G	A	6	BB	3	BS	1
094O049_5456	22.774	BWBSmw2	5	TB	5	BS	0		2	BWBSmw2	G	G	7	BB	2	SS	1
094O046_5277	708.592	BWBSmw2	5	TB	3	BW	2	TH	70	BWBSmw2	M	P	4	BS	3	TB	3
094O049_5807	147.04	BWBSmw2	6	BS	2	BW	2	TB	56	BWBSmw2	G	P	6	BB	3	BS	1
094O046_5290	70.919	BWBSmw2	5	BB	4	BW	1	TH	18	BWBSmw2	G	A	10	TH			
094O048_5711	612.338	BWBSmw2	6	AM	2	SB	2	AB	91	BWBSmw2	G	P	6	AM	2	BK	2
094O050_6261	164.138	BWBSmw2	5	BS	3	BW	2	TB	85	BWBSmw2	G	P	4	BS	4	BB	2
094O050_6287	21.365	BWBSmw2	7	BS	2	BW	1	TB	11	BWBSmw2	G	A	9	BB	1	TH	
094O048_6176	269.24	BWBSmw2	8	AM	1	AB	1	SB	72	BWBSmw2	G	P	7	AM	2	AM	1
094O046_5983	202.627	BWBSmw2	7	AM	2	AM	1	BW	44	BWBSmw2	G	P	7	AM	2	AM	1
094O046_5989	97.808	BWBSmw2	8	TB	2	BS	0		40	BWBSmw2	M	P	6	BB	2	BW	2
094O046_6003	165.733	BWBSmw2	6	BW	2	BS	2	TH	75	BWBSmw2	G	P	6	BB	2	BS	2
094O045_5948	177.043	BWBSmw2	6	AM	3	SB	1	BW	62	BWBSmw2	G	P	7	AM	2	BB	1
094O046_6444	33.386	BWBSmw2	7	BB	2	WB	1	WB	83	BWBSmw2	G	P	7	BB	2	SS	1
094O048_7537	57.563	BWBSmw2	8	TB	2	OW	0		48	BWBSmw2	G	P	5	BB	3	WB	2
094O047_7465	199.532	BWBSmw2	6	BS	2	BW	2	LR	1	BWBSmw2	G	A	8	BB	2	BS	
094O039_7630	80.556	BWBSmw2	4	BW	4	WB	2	TB	6	BWBSmw2	M	A	7	BB	2	AB	1
094O036_7409	219.579	BWBSmw2	6	BS	4	BW	0		13	BWBSmw2	G	G	10	BB			
094O035_7373	45.442	BWBSmw2	6	AM	2	BB	2	BW	57	BWBSmw2	G	P	6	AM	2	BK	2
094O035_7303	99.924	BWBSmw2	7	BS	3	BW	0		59	BWBSmw2	G	P	7	BB	2	BS	1
094O040_9683	488.752	BWBSmw2	5	BS	3	BW	2	TH	35	BWBSmw2	G	P	5	BB	3	BW	2
094O036_9417	439.855	BWBSmw2	6	BW	2	BW	2	BS	47	BWBSmw2	G	P	5	BB	4	BS	1
094O040_10164	79.443	BWBSmw2	10	AB	0		0		37	BWBSmw2	G	P	10	AM			
094O036_9869	89.291	BWBSmw2	4	BS	4	LR	2	TB	34	BWBSmw2	G	P	5	BB	5	BS	
094O037_10425	388.59	BWBSmw2	7	AM	2	AB	1	BW	8	BWBSmw2	G	A	10	AM			
094O036_10356	47.161	BWBSmw2	6	AM	3	BW	1	TB	32	BWBSmw2	G	P	5	AM	5	AM	
094O037_10403	157.616	BWBSmw2	5	AM	3	AB	2	BW	9	BWBSmw2	G	A	9	AM	1	AM	

094O036_10326	355.746	BWBSmw2	4	AM	4	SB	2	AB	36	BWBSmw2	G	P	6	AM	3	AM	1
094O036_10730	54.115	BWBSmw2	7	SS	3	TB	0		61	BWBSmw2	G	P	8	BS	2	BB	
094O035_10681	81.197	BWBSmw2	5	AM	3	BW	2	BB	38	BWBSmw2	G	P	6	AM	3	BB	1
094O037_10793	47.415	BWBSmw2	8	TB	2	BS	0		78	BWBSmw2	G	P	9	BB	1	TH	
094O038_10880	78.759	BWBSmw2	8	TB	2	OW	0		89	BWBSmw2	M	P	8	BS	2	BW	
094O037_10814	89.568	BWBSmw2	5	AM	3	SB	2	BW	94	BWBSmw2	G	P	4	BB	4	BL	2
094O039_10967	88.798	BWBSmw2	5	BS	3	BW	2	TB	45	BWBSmw2	G	P	6	BS	3	BB	1
094O025_7844	44.72	BWBSmw2	6	AM	2	BW	2	SB	22	BWBSmw2	G	A	5	BB	4	TH	1
094O038_8024	32.52	BWBSmw2	6	AM	2	BB	2	BW	92	BWBSmw2	G	P	8	AM	2	BB	
094O026_7909	97.303	BWBSmw2	6	AM	2	TB	2	BW	80	BWBSmw2	G	P	5	BB	3	BB	2
094O025_7850	19.679	BWBSmw2	10	SH	0		0		10	BWBSmw2	G	A	10	SH			
094O016_3530	146.968	BWBSmw2	4	BL	3	TH	3	BW	31	BWBSmw2	G	P	4	BK	4	BB	2
094O016_3363	31.444	BWBSmw2	7	AM	3	TH	0		74	BWBSmw2	G	P	6	AM	2	BB	2
094O019_2392	28.494	BWBSmw2	5	BB	3	AB	2	BW	53	BWBSmw2	G	P	6	BB	4	BL	
094O017_9219	78.012	BWBSmw2	8	SH	2	SH	0		14	BWBSmw2	G	A	10	SH			
094O016_3290	159.983	BWBSmw2	6	AM	2	SB	2	BW	69	BWBSmw2	M	P	6	AM	2	BK	2
094O016_3282	104.062	BWBSmw2	6	AM	3	BW	1	BS	90	BWBSmw2	G	P	6	SH	4	BB	
094O015_319	537.603	BWBSmw2	5	SB	3	AM	2	AB	49	BWBSmw2	G	P	6	AM	2	AM	2
094O016_3286	138.256	BWBSmw2	4	TB	4	BS	2	TH	63	BWBSmw2	G	P	6	BB	2	BS	1
094O018_1770	18.737	BWBSmw2	10	BL	0		0		21	BWBSmw2	G	A	10	AM			
094O005_416	123.802	BWBSmw2	6	BW	3	BS	1	BW	41	BWBSmw2	G	P	6	BS	3	BB	1
094O005_335	18.216	BWBSmw2	8	BS	2	BW	0		3	BWBSmw2	G	A	7	BB	3	BS	
094O005_380	136.483	BWBSmw2	7	BS	3	BW	0		87	BWBSmw2	G	P	7	BB	2	TH	1
094O007_1235	122.77	BWBSmw2	8	TB	2	SS	0		29	BWBSmw2	G	P	6	WB	3	SS	1
094O006_582	357.361	BWBSmw2	8	AM	2	SB	0		68	BWBSmw2	G	P	7	AM	2	BL	1
094O005_436	173.043	BWBSmw2	4	BS	4	BW	2	TH	64	BWBSmw2	G	P	6	BB	4	BS	
094O006_165	700.777	BWBSmw2	5	AB	3	SB	2	AM	25	BWBSmw2	M	P	4	AM	4	AM	2
094O005_84	112.14	BWBSmw2	6	BW	4	BS	0		82	BWBSmw2	G	P	6	BB	2	BB	2

APPENDIX D

Calculation of Dominant scoring using only the samples rated as good for the Sahtaneh River TEM.

ECP_TAG	UNIQUE_ID	Rating	Method	Score	Contributing Area (ha)	Average Score Contribution	Weighted Average Contribution
094O055_4827	19	G	A	1	33.576	0.012821	0.00289
094O055_4809	17	G	A	0	0	0	0
094O048_5360	12	G	A	1	125.299	0.012821	0.010786
094O046_5295	7	G	A	0	0	0	0
094O046_5290	18	G	A	0	0	0	0
094O050_6287	11	G	A	0	0	0	0
094O047_7465	1	G	A	0	0	0	0
094O037_10425	8	G	A	1	388.59	0.012821	0.03345
094O037_10403	9	G	A	1	157.616	0.012821	0.013568
094O025_7844	22	G	A	0	0	0	0
094O025_7850	10	G	A	1	19.679	0.012821	0.001694
094O017_9219	14	G	A	1	78.012	0.012821	0.006715
094O018_1770	21	G	A	0	0	0	0
094O005_335	3	G	A	0	0	0	0
094O028_8306	23	G	G	0	0	0	0
094O025_8120	16	G	G	0	0	0	0
094O049_5456	2	G	G	0	0	0	0
094O036_7409	13	G	G	0	0	0	0
094O027_8265	52	G	P	0	0	0	0
094O026_8471	46	G	P	1	22.326	0.012821	0.001922
094O027_8560	88	G	P	0	0	0	0
094O026_3212	93	G	P	1	545.09	0.012821	0.046921
094O029_8930	73	G	P	0	0	0	0
094O025_8731	58	G	P	1	88.749	0.012821	0.00764
094O026_3615	77	G	P	0	0	0	0
094O016_3607	28	G	P	1	113.286	0.012821	0.009752
094O025_2984	27	G	P	1	18.731	0.012821	0.001612
094O025_2941	76	G	P	0	0	0	0
094O015_3204	66	G	P	0	0	0	0
094O058_4190	79	G	P	0	0	0	0
094O055_4058	24	G	P	1	169.286	0.012821	0.014572
094O059_7130	81	G	P	1	29.671	0.012821	0.002554
094O056_4474	33	G	P	0	0	0	0
094O056_6876	55	G	P	1	67.99	0.012821	0.005853
094O056_4441	86	G	P	0	0	0	0
094O056_4459	65	G	P	1	701.836	0.012821	0.060414

094O059_4667	42	G	P	0	0	0	0
094O059_5089	39	G	P	0	0	0	0
094O055_4380	50	G	P	1	8.96	0.012821	0.000771
094O055_4782	51	G	P	0	0	0	0
094O056_4899	60	G	P	0	0	0	0
094O048_5357	43	G	P	1	878.022	0.012821	0.07558
094O049_5807	56	G	P	0	0	0	0
094O048_5711	91	G	P	1	612.338	0.012821	0.05271
094O050_6261	85	G	P	1	164.138	0.012821	0.014129
094O048_6176	72	G	P	1	269.24	0.012821	0.023176
094O046_5983	44	G	P	1	202.627	0.012821	0.017442
094O046_6003	75	G	P	0	0	0	0
094O045_5948	62	G	P	1	177.043	0.012821	0.01524
094O046_6444	83	G	P	1	33.386	0.012821	0.002874
094O048_7537	48	G	P	0	0	0	0
094O035_7373	57	G	P	1	45.442	0.012821	0.003912
094O035_7303	59	G	P	0	0	0	0
094O040_9683	35	G	P	0	0	0	0
094O036_9417	47	G	P	0	0	0	0
094O040_10164	37	G	P	0	0	0	0
094O036_9869	34	G	P	0.5	44.6455	0.00641	0.003843
094O036_10356	32	G	P	1	47.161	0.012821	0.00406
094O036_10326	36	G	P	1	355.746	0.012821	0.030623
094O036_10730	61	G	P	0	0	0	0
094O035_10681	38	G	P	1	81.197	0.012821	0.006989
094O037_10793	78	G	P	0	0	0	0
094O037_10814	94	G	P	0	0	0	0
094O039_10967	45	G	P	1	88.798	0.012821	0.007644
094O038_8024	92	G	P	1	32.52	0.012821	0.002799
094O026_7909	80	G	P	0	0	0	0
094O016_3530	31	G	P	0	0	0	0
094O016_3363	74	G	P	1	31.444	0.012821	0.002707
094O019_2392	53	G	P	1	28.494	0.012821	0.002453
094O016_3282	90	G	P	0	0	0	0
094O015_319	49	G	P	0	0	0	0
094O016_3286	63	G	P	0	0	0	0
094O005_416	41	G	P	0	0	0	0
094O005_380	87	G	P	0	0	0	0
094O007_1235	29	G	P	0	0	0	0
094O006_582	68	G	P	1	357.361	0.012821	0.030762
094O005_436	64	G	P	0	0	0	0
094O005_84	82	G	P	0	0	0	0

APPENDIX E

Calculation of Overlap scoring using only the samples rated as good for the Sahtaneh River TEM.

ECP_TAG	UNIQUE_ID	Overlap Score	Contributing Area (ha)	Average Score Contribution	Weighted Average Contribution
094O055_4827	19	100	33.576	1.282051	0.289025
094O055_4809	17	10	333.636	0.128205	0.287196
094O048_5360	12	70	125.299	0.897436	0.755008
094O046_5295	7	40	128.274	0.512821	0.441677
094O046_5290	18	10	70.919	0.128205	0.061048
094O050_6287	11	0	0	0	0
094O047_7465	1	20	199.532	0.25641	0.343517
094O037_10425	8	70	388.59	0.897436	2.341508
094O037_10403	9	50	157.616	0.641026	0.678385
094O025_7844	22	10	44.72	0.128205	0.038495
094O025_7850	10	100	19.679	1.282051	0.169398
094O017_9219	14	100	78.012	1.282051	0.671533
094O018_1770	21	0	0	0	0
094O005_335	3	30	18.216	0.384615	0.047041
094O028_8306	23	30	81.807	0.384615	0.21126
094O025_8120	16	0	0	0	0
094O049_5456	2	0	0	0	0
094O036_7409	13	0	0	0	0
094O027_8265	52	30	74.77	0.384615	0.193088
094O026_8471	46	80	22.326	1.025641	0.153747
094O027_8560	88	40	51.801	0.512821	0.178363
094O026_3212	93	80	545.09	1.025641	3.75374
094O029_8930	73	10	112.398	0.128205	0.096753
094O025_8731	58	100	88.749	1.282051	0.763958
094O026_3615	77	0	0	0	0
094O016_3607	28	100	113.286	1.282051	0.975174
094O025_2984	27	100	18.731	1.282051	0.161238
094O025_2941	76	0	0	0	0
094O015_3204	66	0	0	0	0
094O058_4190	79	10	145.183	0.128205	0.124975
094O055_4058	24	80	169.286	1.025641	1.165781
094O059_7130	81	70	29.671	0.897436	0.178787
094O056_4474	33	20	177.372	0.25641	0.305366
094O056_6876	55	80	67.99	1.025641	0.46821
094O056_4441	86	40	206.923	0.512821	0.712483
094O056_4459	65	70	701.836	0.897436	4.22902

094O059_4667	42	20	24.541	0.25641	0.04225
094O059_5089	39	40	31.063	0.512821	0.106957
094O055_4380	50	80	8.96	1.025641	0.061703
094O055_4782	51	0	0	0	0
094O056_4899	60	0	0	0	0
094O048_5357	43	50	878.022	0.641026	3.779039
094O049_5807	56	30	147.04	0.384615	0.379719
094O048_5711	91	60	612.338	0.769231	3.162631
094O050_6261	85	40	164.138	0.512821	0.565165
094O048_6176	72	80	269.24	1.025641	1.85411
094O046_5983	44	90	202.627	1.153846	1.569805
094O046_6003	75	40	165.733	0.512821	0.570657
094O045_5948	62	60	177.043	0.769231	0.9144
094O046_6444	83	80	33.386	1.025641	0.229911
094O048_7537	48	0	0	0	0
094O035_7373	57	60	45.442	0.769231	0.234701
094O035_7303	59	20	99.924	0.25641	0.172031
094O040_9683	35	50	488.752	0.641026	2.103607
094O036_9417	47	20	439.855	0.25641	0.757261
094O040_10164	37	0	0	0	0
094O036_9869	34	40	89.291	0.512821	0.307449
094O036_10356	32	60	47.161	0.769231	0.243579
094O036_10326	36	40	355.746	0.512821	1.224915
094O036_10730	61	0	0	0	0
094O035_10681	38	70	81.197	0.897436	0.489265
094O037_10793	78	0	0	0	0
094O037_10814	94	0	0	0	0
094O039_10967	45	50	88.798	0.641026	0.38219
094O038_8024	92	80	32.52	1.025641	0.223948
094O026_7909	80	0	0	0	0
094O016_3530	31	0	146.968	0	0
094O016_3363	74	80	31.444	1.025641	0.216538
094O019_2392	53	50	28.494	0.641026	0.122639
094O016_3282	90	0	0	0	0
094O015_319	49	30	537.603	0.384615	1.388318
094O016_3286	63	30	138.256	0.384615	0.357035
094O005_416	41	30	123.802	0.384615	0.319709
094O005_380	87	10	136.483	0.128205	0.117486
094O007_1235	29	20	0	0.25641	0.211363
094O006_582	68	70	357.361	0.897436	2.153333
094O005_436	64	40	173.043	0.512821	0.002347
094O005_84	82	0	0	0	0

APPENDIX F

Calculation of Acceptable Overlap scoring using only the samples rated as good for the Sahtaneh River TEM.

ECP_TAG	UNIQUE_ID	Acceptable Overlap Score	Contributing Area (ha)	Average Score Contribution	Weighted Average Contribution
094O055_4827	19	100	33.576	1.282051	0.289025
094O055_4809	17	55	333.636	0.705128	1.57958
094O048_5360	12	70	125.299	0.897436	0.755008
094O046_5295	7	60	128.274	0.769231	0.662515
094O046_5290	18	50	70.919	0.641026	0.305238
094O050_6287	11	50	21.365	0.641026	0.091956
094O047_7465	1	50	199.532	0.641026	0.858793
094O037_10425	8	80	388.59	1.025641	2.676009
094O037_10403	9	65	157.616	0.833333	0.881901
094O025_7844	22	45	44.72	0.576923	0.173229
094O025_7850	10	100	19.679	1.282051	0.169398
094O017_9219	14	100	78.012	1.282051	0.671533
094O018_1770	21	50	18.737	0.641026	0.080645
094O005_335	3	65	18.216	0.833333	0.101923
094O028_8306	23	35	81.807	0.448718	0.24647
094O025_8120	16	10	70.668	0.128205	0.060832
094O049_5456	2	35	22.774	0.448718	0.068614
094O036_7409	13	50	219.579	0.641026	0.945076
094O027_8265	52	65	74.77	0.833333	0.418357
094O026_8471	46	80	22.326	1.025641	0.153747
094O027_8560	88	40	51.801	0.512821	0.178363
094O026_3212	93	80	545.09	1.025641	3.75374
094O029_8930	73	55	112.398	0.705128	0.532142
094O025_8731	58	100	88.749	1.282051	0.763958
094O026_3615	77	50	16.549	0.641026	0.071228
094O016_3607	28	100	113.286	1.282051	0.975174
094O025_2984	27	100	18.731	1.282051	0.161238
094O025_2941	76	25	37.88	0.320513	0.081518
094O015_3204	66	50	22.112	0.641026	0.095171
094O058_4190	79	55	145.183	0.705128	0.68736
094O055_4058	24	80	169.286	1.025641	1.165781
094O059_7130	81	85	29.671	1.089744	0.217099
094O056_4474	33	60	177.372	0.769231	0.916099
094O056_6876	55	90	67.99	1.153846	0.526737
094O056_4441	86	70	206.923	0.897436	1.246846
094O056_4459	65	75	701.836	0.961538	4.531092

094O059_4667	42	60	24.541	0.769231	0.12675
094O059_5089	39	40	31.063	0.512821	0.106957
094O055_4380	50	80	8.96	1.025641	0.061703
094O055_4782	51	50	51.262	0.641026	0.220634
094O056_4899	60	0	0	0	0
094O048_5357	43	65	878.022	0.833333	4.912751
094O049_5807	56	65	147.04	0.833333	0.822725
094O048_5711	91	60	612.338	0.769231	3.162631
094O050_6261	85	60	164.138	0.769231	0.847747
094O048_6176	72	80	269.24	1.025641	1.85411
094O046_5983	44	95	202.627	1.217949	1.657017
094O046_6003	75	70	165.733	0.897436	0.998649
094O045_5948	62	70	177.043	0.897436	1.0668
094O046_6444	83	80	33.386	1.025641	0.229911
094O048_7537	48	0	0	0	0
094O035_7373	57	60	45.442	0.769231	0.234701
094O035_7303	59	60	99.924	0.769231	0.516092
094O040_9683	35	75	488.752	0.961538	3.15541
094O036_9417	47	55	439.855	0.705128	2.082468
094O040_10164	37	50	79.443	0.641026	0.341926
094O036_9869	34	45	89.291	0.576923	0.345881
094O036_10356	32	60	47.161	0.769231	0.243579
094O036_10326	36	50	355.746	0.641026	1.531144
094O036_10730	61	0	0	0	0
094O035_10681	38	80	81.197	1.025641	0.55916
094O037_10793	78	15	47.415	0.192308	0.061223
094O037_10814	94	50	89.568	0.641026	0.385504
094O039_10967	45	75	88.798	0.961538	0.573285
094O038_8024	92	90	32.52	1.153846	0.251941
094O026_7909	80	50	97.303	0.641026	0.418796
094O016_3530	31	50	146.968	0.641026	0.632556
094O016_3363	74	90	31.444	1.153846	0.243605
094O019_2392	53	55	28.494	0.705128	0.134903
094O016_3282	90	50	104.062	0.641026	0.447887
094O015_319	49	40	537.603	0.512821	1.851091
094O016_3286	63	55	138.256	0.705128	0.654565
094O005_416	41	65	123.802	0.833333	0.692703
094O005_380	87	55	136.483	0.705128	0.646171
094O007_1235	29	20	122.77	0.25641	0.211363
094O006_582	68	75	357.361	0.961538	2.307143
094O005_436	64	70	173.043	0.897436	1.042697
094O005_84	82	50	112.14	0.641026	0.482655