

**Vegetation Resources Inventory  
Photo Interpretation (Phase 1)  
Project Implementation Plan  
for  
Haida Gwaii**

June 20, 2011

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## **1.0 Introduction**

### **1.1 Background Information**

The primary objective of this project is to create a reliable photo interpreted vegetation inventory (Phase 1) that meets provincial Vegetation Resources Inventory (VRI) standards and the needs of the Council of the Haida Nation and Parks Canada, who are partners with the Province in implementing this work.

The existing vegetation inventory data covering Haida Gwaii is comprised of six different inventories with varying data standards, all of which are out-of-date and do not meet current Ministry standards. Section 2.4 of the Haida Gwaii VRI Strategic Inventory Plan (VSIP) describes these existing inventories and outlines their deficiencies.

Implementation of Phase I of this VRI project is the responsibility of the Ministry of Forests, Lands and Natural Resource Operations (MFLNRO), in partnership with the Council of the Haida Nation (CHN) and Parks Canada through their office in Skidegate on Haida Gwaii. As noted in Sections 2.2 and 2.4.6 of the VSIP, a portion of Gwaii Haanas National Park Reserve/Haida Heritage Site ("Gwaii Haanas") had Phase I VRI completed in 2009-2010 through a contract funded and administered by Parks Canada. Completion of a VRI on the rest of Haida Gwaii will be undertaken by the MFLNRO in partnership with both CHN and Parks Canada. Parks Canada and the MFLNRO are currently discussing possible funding support in fiscal 2012-2013 for Phase I work in Park areas. A budget request to the Federal government will be made for this purpose.

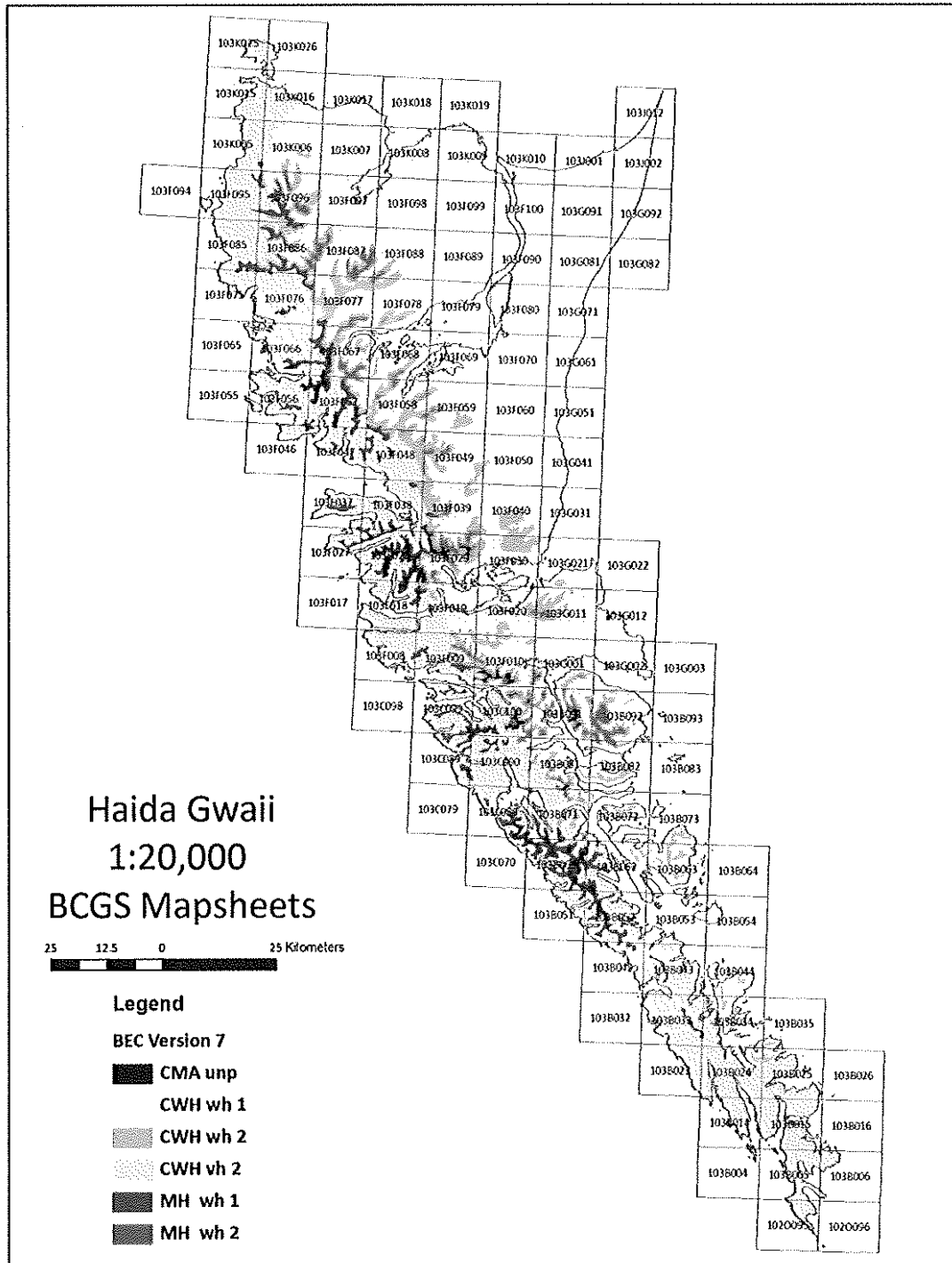
It is important to note that in Section 3.5 Roles and Responsibilities the communications and working relationships identified apply to all stages in this plan.

### **1.2 Project Land Base**

As described in the VSIP, the total project area covers all 1.004 million hectares of Haida Gwaii and involves 127 BCGS 1:20,000 map sheets (see Appendix 1). This area is equivalent to 67 full map sheets of 15,000 hectares each. Accounting for the area of Lyell Island already photo-interpreted in 2009-2010, the remaining area to be completed is 987,000 hectares or 66 full map sheet equivalents, including delineation and attribution on fee simple lands.

**Figure 1: Overview map of Haida Gwaii** (note: updated version will be included in final version)

**Figure 2: Map of Haida Gwaii showing BCGS Map Sheets and BEC Units**



## **2.0 Photo Interpretation Plan**

### **2.1 Project Objectives**

The primary objective of this project is to produce a consistent, accurate, seamless Phase I inventory for Haida Gwaii to support land use plan implementation, timber supply analysis and other needs as described in section 3.0 of the Haida Gwaii VSIP. Other data needs which may be identified by CHN and Parks Canada will be addressed to the extent that is practicable. The project partners will have an active role in the planning and implementation of this project.

A field calibration program will be designed and implemented to provide additional data to add to that available from existing inventories. Other data sources which are identified as reliable for calibration purposes will supplement new and existing inventory calibration points. Those sources identified to date are listed below in Section 2.4.

The most current VRI Phase I Standards and Procedures will be followed and these can be accessed and downloaded from the following MFLNRO web site:

<http://www.for.gov.bc.ca/hts/vri/standards/index.html#photo>

- *VRI Photo Interpretation Procedures*
- *VRI Photo Interpretation Quality Assurance Procedures and Standards*
- *VRI Field Calibration Procedures for Photo Interpretation*
- *Digital Data Standards for VRI Map File Production*
- *VRIMS Personal Geodatabase Structure and Use*
- *VRIMS Vegetation Cover Polygon Validation Rules*
- *VRI Contract Source Data*

### **2.2 Aerial Photographs and Base Mapping**

#### **2.2.1 New Photography**

In anticipation of a future VRI project, 1:20,000 scale colour photography was flown for all of Haida Gwaii in 2007. The photos were scanned at a resolution of 12 microns, aerial triangulation (AT) completed, and Digital Image Analytical Photogrammetry (DiAP) models produced. The photos are available in softcopy format as well as in hard copy as a reference source. The total number of photo frames and thus digital stereo models covering Haida Gwaii is 1748. Subtracting those photo frames already utilized for the Lyell Island work from the total leaves +/- 1675 photo frames to be handled in future contracts.

Subsequent to processing and delivery to GeoBC in 2007 by the photo flying contract manager, a subset of these photos were found to have been flown at a sun angle below the minimum allowed value of 38 degrees. Most of the non-conforming photos were flown within 1 degree of the critical sun angle and those that further exceeded this threshold were over subdued terrain where shadowing was not a concern. Review of this photo set by FAIB cleared all photos in the set as suitable for VRI purposes.

### **2.2.2 Base Mapping**

Base mapping is available for all project map sheets from GeoBC in TRIM NAD83 format. These map bases meet TRIM I specifications and were constructed from 1:65,000 scale black and white photography flown in 1986. No upgrading of these bases has been done since they were produced circa 1989 and there are known deficiencies which are largely a result of the use of small scale photography. Roads not identified in the current TRIM file will be captured through this Phase I project by the interpreters and will be made available as an Arc shape file to the CHN, the MFLNRO, and to GeoBC.

### **2.3 Existing Calibration Data Sources**

There are two broad types of existing calibration data covering Haida Gwaii:

- a) inventory ground and air calls located within the current and previously existing areas of the TSA, together with all areas which are now or were previously within the boundaries of the three TFL units.
- b) other types of ground data including cruise plots, growth and yield plot measurements, second growth samples, previous audit and Phase II samples, silviculture surveys (see RESULTS section below), site index adjustment samples (including SIBEC)

A significant number of air and ground calls collected for earlier inventories, growth and yield sample data, operational cruise plot data, and inventory ground samples exist in the TSA, the TFLs, and the Gwaii Haanas Park, and will serve as useful calibration data. These data will be available prior to preparation of the field calibration plans. Any additional data that can be provided prior to the completion of a calibration plan can be considered as well.

### **2.4 Integrating RESULTS Information**

The inclusion of RESULTS Forest Cover spatial and attribute data will be carried out in accordance with the "Photo Interpretation Guidelines for Integrating RESULTS Information – Version 2, March 2011". Approximately 6000 RESULTS silviculture openings were identified for integration into the Haida Gwaii VRI inventory of which approximately 2000 are Free Growing.

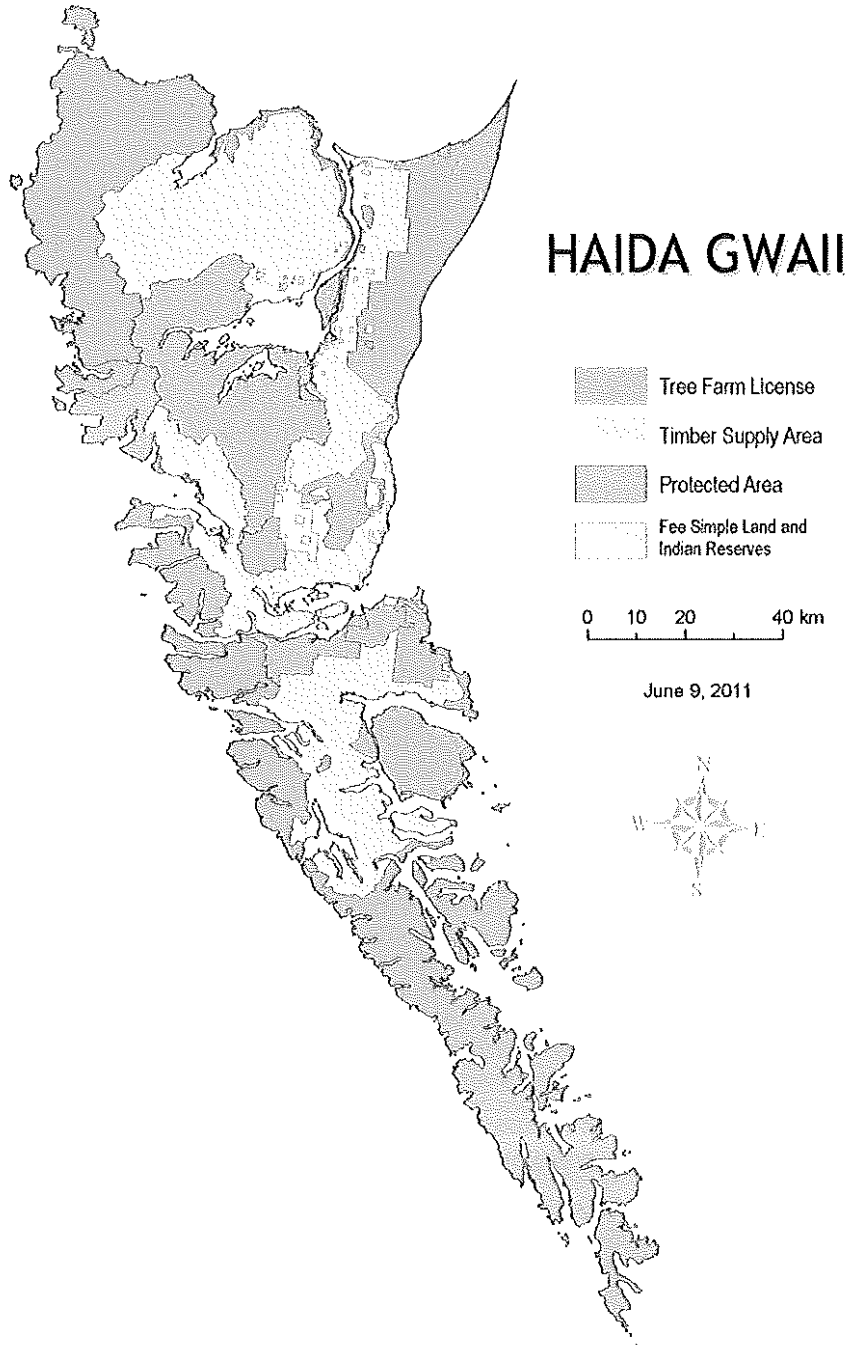
To complete an effective field calibration plan, the integration of the RESULTS spatial files must be completed during the delineation stage of the project.

## 2.5 New Field Calibration

A data source review will need to be completed to determine the type, number and locations for new calibration data. An increased intensity of ground/air calibration will be targeted in areas that lack existing valid data sources, areas of uncertainty, and where enhanced information is required.

The guideline set out for new calibration in the Standards is for the establishment of 10 ground calls and 20 air calls per full map sheet equivalent. The exact number and distribution of calls will be finalized once existing data sources have been accessed and evaluated as part of preparing the field calibration plan. Funding availability will also influence the final number of calls which will be established.

Prior to the initiation of the field calibration program, a Field Calibration Plan (FCP) will be prepared in accordance with MFLNRO guidelines and submitted by the contractor to the Project Manager for approval. This plan should include a map of the unit documenting the general location and distribution of the calibration points.





## **3.0 Project Implementation**

### **3.1 Pre-work meeting**

A Pre-work meeting is required as part of this project. At a minimum, the Pre-work meeting will include the VRI Project Manager, the Phase I contractor and the Phase 1 Quality Assurance (QA) contractor. If the CHN Technical Representative is unable to attend this meeting, he will be consulted and will be included in all decisions coming out of this meeting. A Project Pre-work Checklist will be provided by MFLNRO and signed-off by all attendees at the meeting.

### **3.2 Scheduling and Costs**

Phase I work will proceed over three fiscal years according to the following proposed schedule, starting in June, 2011 and completing in December, 2013:

#### **Project Delivery Schedule**

##### **Year One Mapsheets – 2011-2012:**

There are 31 mapsheets which represent 16.5 full mapsheet equivalents (FMEs):

- 103F085, 086, 094-100
- 103G061, 071, 081-082, 091-092
- 103J 001-002, 012
- 103K 005-010, 015-019, 025-026

The 16.5 FMEs represent 247,945ha or about 25% of the Haida Gwaii land base.

The Year 1 priorities are as follows:

1. Delineation (inclusive of data source transfer and incorporation of RESULTS spatial files with emphasis on external opening boundaries) on the entire Haida Gwaii land base (127 maps);
2. Calibration in the 31 maps (16.5 FMEs); and
3. Attribution of maximum number of calibrated maps without compromising delineation of the entire land base in year 1 – estimate 16.5 FME maps to be attributed.

##### **Year One Project Schedule – 2011-2012:**

Project Component	Milestone date	Comments
Pre-work Meeting	TBD	
Polygon delineation, data source transfer	March 31, 2012	127 maps for 66 full map equivalents (FMEs)
Field calibration data collection	September 30, 2011	For 16.5 FMEs
Polygon attribution and digital mapping	March 2, 2012	For 16.5 FMEs
Final delivery of maps	March 31, 2012	Polygon delineation and data source transfer for 66 FMEs and polygon attribution and digital mapping for 16.5 FMEs

### Year Two Project Schedule – 2012-2013:

Project Component	Milestone Date	Comments
Pre-work meeting	April 5, 2012	
Field calibration data collection	August 31, 2012	For 49.5 full map equivalents (FMEs)
Polygon attribution and digital mapping	March 2, 2013	For 36 FMEs
Final delivery of maps	March 31, 2013	For 36 FMEs

### Year Three Project Schedule – 2013-2014:

Project Component	Milestone Date	Comments
Pre-work meeting	April 5, 2013	
Polygon attribution and digital mapping and QA	December 2, 2013	For 13.5 FMEs
Final delivery of maps	December 31, 2013	For remaining 13.5 FMEs

Appendix A lists all maps and areas included in the project.

### 3.3 Quality Assurance

Approximately 10% of the total budget will be required for the QA component. It will be the responsibility of the Project Manager to ensure that all VRI Phase I Standards and Procedures are followed. To this end, an agreed upon independent third party photo interpretation company or individual will be hired to conduct all required QA. The QA contractor will be in place before the project starts and will attend the Pre-work meeting.

The QA contractor will conduct the QA for the field data collection, polygon delineation and attribute estimation. Efforts must be made to sample a portion of the work done by each crew or photo interpreter. In addition to providing a QA role, the intent is that he will also provide project technical support and mentoring and monitor the work to ensure that the procedures and standards for VRI work are being followed as detailed in the contract.

The QA contractor will develop a schedule for the work that is designed to 'shadow' the photo interpretation contractor's delivery. Timely follow up by the QA contractor and good communication with all project team members will be a condition of this contract.

The QA contractor will be responsible for providing complete records of QA activities to the Project Manager.

### 3.4 Deliverables

The following is a list of products that will be delivered to MFLNRO. At each stage, project coordination, photo interpretation and quality control work, and all project deliverables will be signed off by an agreed upon Registered Professional Forester. Two (2) copies of each deliverable are required:

- Complete VRI data files in the format specified in “VRI Phase 1 Digital Data Deliverables Format” Standards;
- VegCap validation reports;
- Hardcopy tally sheets or digital equivalent for each ground and air calibration point;
- Digital field summary for all calibration points per MFLNRO VRI requirements. (This is for the VRI “Calibration Tile”);
- Photo Interpretation Contractor Project Completion Report. Detailed requirements will be verified at the Pre-Work meeting for this project. It should be noted that the Project Completion Report is the responsibility of the proponent, but may be written by the Contract Administrator or VRI Contractor, with input from the MFLNRO VRI Staff and QA Contractor;
- QA Contractor documentation for each phase of the VRI project
- Update new roads previously not in TRIM – shape file

### 3.5 Roles and Responsibilities:

1. Ministry of Forests, Lands, and Natural Resources and Council of Haida Nation Technical Representatives through the Solutions Table:
  - Review and approve the Vegetation Resources Inventory Strategic Inventory Plan, Vegetation Resources Inventory Implementation Plan, Letter of Understanding, and all contract tender documents.
2. CHN Technical Representative (Nick Reynolds):
  - With the Project Manager, the CHN Technical Representative is responsible for project monitoring, communications to the Haida co-chair for the Solutions table and ensuring project updates for the Haida Gwaii Solutions Table.
  - Ensures LoU Principles are respected, adhered to, updated where required. Any variances to these Principles would require recommendation and approval through the Solutions Table and the MFLNR;
  - Jointly participate in project planning, information session, tender evaluation, pre-work sessions, review of field calibration plans. CHN decisions regarding contract evaluations and awarding to be directed through the Haida co-chair of the Solutions table.
  - Ensures Haida staff are identified and available for the planning and field work identified in the LoU and Field Calibration plans;

- Assists in coordinating technical expertise where required
3. Ministry of Forests, Lands and Natural Resource Operations (MFLNRO) Project Manager (Roman Bilek)
    - The Project Manager is the technical specialist and single point of contact for the MFLNRO
    - With the CHN Technical Representative, the Project Manager provides overall communication and coordination of inventory activities with, contractors, and MFLNRO staff
    - With the CHN Technical Representative, the Project Manager provides adequate time for plans and decisions requiring review by the Haida Gwaii Solutions Table
    - The Project Manager ensures all inventory activities completed to VRI standards, Quality Assurance is completed and reporting meets the needs of the CHN Technical Representative, contractors, and MFLNRO staff
    - The Project Manager ensures deliverables received and provided to the Forest Analysis and Inventory Branch Update staff for validation and acceptance
  4. Ministry of Forests, Lands and Natural Resource Operations, Haida Gwaii district staff (Alvin Cober)
    - Jointly participate in project planning, information session, tender evaluation, pre-work sessions, review of field calibration plans.
    - Assists in coordinating technical expertise where required.
  5. VRI Contractor
    - Works with the Project Manager to ensure the planning, coordination, production and delivery of all VRI products to the current VRI standards
    - Works with the Project Manager to ensure the LoU Principles and specific arrangements identified in the LoU are implemented as defined
    - Delivers all VRI products to the Project Manager for Quality Assurance and Ministry validation and acceptance, and corrects as required
  6. VRI QA Contractor
    - Works with VRI Contractor and Project Manager to ensure all VRI activities Quality Assured using current VRI standards
    - Works with Project Manager to ensure that Quality Assurance reports meet VRI standards, and makes corrections as required



## Appendix 1: Map Sheet List with Area by Map

DIST	MOE_REG	Map No.	Sheet	F_AREA	Area_ha
DQC	R6	103K.025	25	20032615.8600	2003.26
DQC	R6	103K.026	26	8625154.9043	862.52
DQC	R6	103K.015	15	43486029.6865	4348.60
DQC	R6	103K.016	16	73932378.6643	7393.24
DQC	R6	103K.017	17	57320634.3720	5732.06
DQC	R6	103K.018	18	2395079.0540	239.51
DQC	R6	103K.019	19	6121243.4643	612.12
DQC	R6	103J.012	12	14957309.1150	1495.73
DQC	R6	103K.005	5	51651049.9835	5165.10
DQC	R6	103K.006	6	145804448.4490	14580.44
DQC	R6	103K.007	7	141079863.0180	14107.99
DQC	R6	103K.008	8	98313604.6220	9831.36
DQC	R6	103K.009	9	118488074.5510	11848.81
DQC	R6	103K.010	10	41759736.9513	4175.97
DQC	R6	103J.001	1	71040411.8963	7104.04
DQC	R6	103J.002	2	78389234.5734	7838.92
DQC	R6	103F.094	94	8486.6840	0.85
DQC	R6	103F.095	95	98593561.6096	9859.36
DQC	R6	103F.096	96	146151864.5510	14615.19
DQC	R6	103F.097	97	126691987.7500	12669.20
DQC	R6	103F.098	98	142641791.3090	14264.18
DQC	R6	103F.099	99	146151864.5510	14615.19
DQC	R6	103F.100	100	128264600.5250	12826.46
DQC	R6	103G.091	91	146151864.5510	14615.19
DQC	R6	103G.092	92	51346177.2106	5134.62
DQC	R6	103F.085	85	88864160.5269	8886.42
DQC	R6	103F.086	86	146498816.2230	14649.88
DQC	R6	103F.087	87	146498816.2230	14649.88
DQC	R6	103F.088	88	146498803.0030	14649.88
DQC	R6	103F.089	89	145571324.6410	14557.13
DQC	R6	103F.090	90	128736035.8570	12873.60
DQC	R6	103G.081	81	128155439.2020	12815.54
DQC	R6	103G.082	82	2765679.1299	276.57
DQC	R6	103F.075	75	30811078.4559	3081.11
DQC	R6	103F.076	76	140056801.2610	14005.68
DQC	R6	103F.077	77	146845302.4450	14684.53

DQC	R6	103F.078	78	133848898.2550	13384.89
DQC	R6	103F.079	79	53798509.5809	5379.85
DQC	R6	103F.080	80	136379341.0210	13637.93
DQC	R6	103G.071	71	89836860.3475	8983.69
DQC	R6	103F.065	65	2649696.3018	264.97
DQC	R6	103F.066	66	111980601.9580	11198.06
DQC	R6	103F.067	67	141251398.5260	14125.14
DQC	R6	103F.068	68	85665227.5318	8566.52
DQC	R6	103F.069	69	81710826.2869	8171.08
DQC	R6	103F.070	70	143081034.3300	14308.10
DQC	R6	103G.061	61	63925584.8442	6392.56
DQC	R6	103F.055	55	619460.4019	61.95
DQC	R6	103F.056	56	97905627.1925	9790.56
DQC	R6	103F.057	57	143981446.1970	14398.14
DQC	R6	103F.058	58	143182759.2060	14318.28
DQC	R6	103F.059	59	147536874.4560	14753.69
DQC	R6	103F.060	60	147536874.4560	14753.69
DQC	R6	103G.051	51	44243424.2438	4424.34
DQC	R6	103F.046	46	18175189.8398	1817.52
DQC	R6	103F.047	47	66607124.2824	6660.71
DQC	R6	103F.048	48	138360813.7340	13836.08
DQC	R6	103F.049	49	147881958.2100	14788.20
DQC	R6	103F.050	50	147881958.2100	14788.20
DQC	R6	103G.041	41	55276756.9939	5527.68
DQC	R6	103F.037	37	50295958.9396	5029.60
DQC	R6	103F.038	38	97964433.6787	9796.44
DQC	R6	103F.039	39	148226572.4430	14822.66
DQC	R6	103F.040	40	148226572.4430	14822.66
DQC	R6	103G.031	31	43428632.7428	4342.86
DQC	R6	103F.027	27	30689799.9401	3068.98
DQC	R6	103F.028	28	136914491.9990	13691.45
DQC	R6	103F.029	29	135606194.3360	13560.62
DQC	R6	103F.030	30	93471786.6686	9347.18
DQC	R6	103G.021	21	54556641.8757	5455.66
DQC	R6	103G.022	22	2769789.7972	276.98
DQC	R6	103F.017	17	94152.5689	9.42
DQC	R6	103F.018	18	92480403.8732	9248.04
DQC	R6	103F.019	19	129386926.3480	12938.69
DQC	R6	103F.020	20	115608331.9070	11560.83
DQC	R6	103G.011	11	148830343.9360	14883.03
DQC	R6	103G.012	12	48689274.1636	4868.93
DQC	R6	103F.008	8	71534425.2711	7153.44

DQC	R6	103F.009	9	121168076.5540	12116.81
DQC	R6	103F.010	10	146624735.7450	14662.47
DQC	R6	103G.001	1	107864515.5500	10786.45
DQC	R6	103G.002	2	79818390.2658	7981.84
DQC	R6	103G.003	3	1.6923	0.00
DQC	R6	103C.098	98	2242.3919	0.22
DQC	R6	103C.099	99	86909120.6458	8690.91
DQC	R6	103C.100	100	130876197.6640	13087.62
DQC	R6	103B.091	91	134376997.6920	13437.70
DQC	R6	103B.092	92	127587275.7140	12758.73
DQC	R6	103B.093	93	407098.0371	40.71
DQC	R6	103C.089	89	47858598.1491	4785.86
DQC	R6	103C.090	90	139379854.3250	13937.99
DQC	R6	103B.081	81	114336133.6770	11433.61
DQC	R6	103B.082	82	57969097.8615	5796.91
DQC	R6	103B.083	83	2599523.6069	259.95
DQC	R6	103C.079	79	640714.1541	64.07
DQC	R6	103C.080	80	71523600.5826	7152.36
DQC	R6	103B.071	71	121756522.8240	12175.65
DQC	R6	103B.072	72	66282328.0986	6628.23
DQC	R6	103B.073	73	27813274.1088	2781.33
DQC	R6	103C.070	70	8913573.6281	891.36
DQC	R6	103B.061	61	115769224.1240	11576.92
DQC	R6	103B.062	62	108515093.1600	10851.51
DQC	R6	103B.063	63	85164531.2804	8516.45
DQC	R6	103B.064	64	22291.5394	2.23
DQC	R6	103B.051	51	28095642.4553	2809.56
DQC	R6	103B.052	52	116615054.4810	11661.51
DQC	R6	103B.053	53	31735258.2279	3173.53
DQC	R6	103B.054	54	11686441.1336	1168.64
DQC	R6	103B.042	42	34766747.3175	3476.67
DQC	R6	103B.043	43	105490712.0860	10549.07
DQC	R6	103B.044	44	40848672.9186	4084.87
DQC	R6	103B.032	32	72758.7906	7.28
DQC	R6	103B.033	33	118670036.1310	11867.00
DQC	R6	103B.034	34	65074742.6541	6507.47
DQC	R6	103B.035	35	8778819.7543	877.88
DQC	R6	103B.023	23	37186432.9496	3718.64
DQC	R6	103B.024	24	126318752.5880	12631.88
DQC	R6	103B.025	25	80560874.9534	8056.09
DQC	R6	103B.026	26	40206.2080	4.02
DQC	R6	103B.014	14	46186372.4244	4618.64



DQC	R6	103B.015	15	96050034.5019	9605.00
DQC	R6	103B.016	16	1704685.7481	170.47
DQC	R6	103B.004	4	1429204.5354	142.92
DQC	R6	103B.005	5	55366790.9863	5536.68
DQC	R6	103B.006	6	15866801.7290	1586.68
DQC	R6	1020.095	95	20193329.8921	2019.33
DQC	R6	1020.096	96	102329.0278	10.23

		map count = 127		TOTAL	1004981.40
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Appendix 2: Distribution of Existing Growth and Yield PSPs on Haida Gwaii

