



ES 441 Design Project:

Human Legacy Transect Geodatabase

DL57, Galiano Island B.C.

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Introduction:

This report seeks to show and summarize the ES/ER 441 class's contribution to conservati of the DL57 property. DL57 is a 188 acre property owned by the Galiano Conservancy Association (GCA) which fosters an extensive biodiversity and a unique history. It's located within the Coastal-Douglas Fir Biogeoclimatic zone, which is known to be at risk provincially and globally (Collaborative Conservation Planning Resource Guide, 2013), thus making conservation a priority in this region. This property was purchased to fulfill a number of goals including: To Practice ecological stewardship, to create opportunities and provide facilities for learning, to enable research and innovation, to contribute to local food security, to contribute to local economic development, to provide public access, and to create opportunities for recreation (Keith Erickson, conservation coordinator). This property allows the GCA to fulfill its conservation education mandates, as well as to try new sustainable ideas, such as food security, infrastructure for water energy and water. The unique history of this property includes: residential use, food gardens, livestock grazing, subsistence fishing and hunting. These uses continued on the land right up to the acquisition by the Galiano Conservancy Association, with an increase in intensity of small-scale forest harvesting and milling occurring over the past two decades (Collaborative Conservation Planning Resource Guide, 2013). As a result of this, there are several ecosystem structural changes within the property. Conservation planning "...is the process of locating, configuring, implementing and maintaining areas that are managed to promote the persistence of biodiversity and other natural values" (Pressey, Robert L et al., 2007). One of our class's contributions to conservation of the Galiano Learning Centre was the Legacy transect project. The goal of this project was to locate and describe anthropogenic and environmental legacies within the property in order to use this data for future use and planning. The data from the Human Legacy Project was compiled into an ESRI ArcGIS geodatabase (.gdb) which stores and displays the spatial data and its attributes.

Methods:

Expected

There were three groups of 4-5 students involved in the Human Legacy Transect Project. Each group worked on one transect at a time, all started at a location pre-determined by the GCA. In total, 7 transects were completed within the given time period. The transects started at the east end of the

DL57 property along Porlier Pass, and ran from north to south. Transects were spaced 100 m apart and were approximately 30m in width. A map of the DL57 property was given to students beforehand as a reference for their location within the transect 

In order for the transect process to function, students were to split up all the necessary tasks to work more efficiently. The tasks involved were: staying on the projected southward transect line by using a compass, marking waypoints of any important features or ecosystem changes with a GPS, taking a photo of each legacy, and recording all the information into a data sheet. To maintain a due-south direction, groups would keep the same Easting UTM unit on the GPS, use the map as a guide, and set the magnetic declination of the compass accordingly. By group members being spaced out approximately 10 meters each, groups were able to cover a transect 30 meters wide. The note takers responsibility was to fill out the data sheet, which included: meta data, waypoint number, waypoint coordinates, photo number, keyword or structural change, health rating and other comments. Each legacy recorded was coded as either an Artifact, Infrastructure, Land-Use Activity, Modification, Vegetation, Non-Human Legacy, or a structural change, as well all were given a secondary description. Each change in ecosystem structure, and their health rating were categorized according to the 'Field Manual for Describing Terrestrial Ecosystems 2nd Edition' (2010. B.C. Ministry of Forests and Range & B.C. Ministry of Environment).

Actual:

The total area actually covered in each transect is inaccurate due to the terrain conditions at DL57. Groups stopped their transect at the cliff edge before they hit the ocean, making the actual transect shorter than their projections. As well, throughout the transect the terrain made it difficult to maintain 10m apart from each other at times.

ArcGIS Methodology:

Importing all Legacy Data into the ESRI ArcGIS geodatabase was the next major component of mapping out the transects. As a variety of GPS units were used during field work, each group's data was imported and converted using a different method. In order for data to be imported into an ArcGIS geodatabase, it must be in a shapefile format (.shp). All of our data was recorded in either a Garmin specific format (.gpx), or a Trimble specific format (.ssf). Data from each GPS device was imported with

GPS Babel, and converted into a shapefile by using Expert GPS. In the exception of the Trimble which Keith Erickson imported himself. Conversion methods for each GPS device specifically are shown in table 1. Once this was complete, data was imported into the ER411_DL57_Transect_GDB.mxd as separate files for each transect. All missing waypoints were added manually with Expert GPS, and added to each transect file. The coordinate system of the Geodatabase was already set to NAD1983 (North American Datum, 1983), and the projection was using NAD1983 UTM zone 10N. Waypoints could only be imported into ExpertGPS in WGS84 (World Geodetic System 1984), so these points then needed to be transformed to NAD83 when they were added to the ER411_DL57_Transect_GDB.mxd document. The geodatabase was already set up with background shapefiles specific to the DL57 property; the only change that needed to be made was updating the 2011 orthophoto with the 2013 one.

Table 1: Method Used to Import and Convert Spatial Data per Transect

Transect	GPS Device	Import	Conversion
Transect 1	Garmin	GPS Babel	.gpx ->.shp via Expert GPS
Transect 2	Trimble	Trimble software	Added directly to geodatabase
Transect 3	Garmin	GPS Babel	.gpx->shp via Expert GPS
Transect 4	Garmin	GPS Babel	.gpx
Transect5	Garmin/Iphone GPS	Download via email	.gpx/.kml->.shp via Expert GPS
Transect 6	Garmin	GPS Babel	.gpx->.shp
Transect 7	Garmin	GPS Babel	.gpx-> .shp via Expert GPS

Discussion and recommendations:

With many difficulties and sources of error encountered from start to finish in this Legacy Transect Project, a number of recommendations are made to increase accuracy and efficiency for future projects. These recommendations consider the field-based data collection, geodatabase production, and future field work at DL57.

Field Data Collection

- It would be beneficial if students were given a list of the specific codes that are used in the geodatabase (Appendix B). If groups were to record both primary and secondary codes during the field work it would make organizing the data a more efficient process.
- Groups should communicate frequently with the 2-way radios during the field work should they come across legacy with no pre-determined code. This way a new code can be established and all groups will be aware of it.
- Certain changes could be made to the data sheet in order to ensure that Meta data and Legacy data are as specific and accurate as possible. Changes should include which GPS unit is used and the serial # (both Garmin GPS units used for this project were labelled UVic 1 which made importing waypoints confusing at times); Start and end coordinates should be recorded separately from other waypoints; a box for a secondary keyword; which group members camera is used, and which group member is performing each task. If all of these were added to the data recording sheet, the process of organizing the data and importing way points would be significantly easier.
- Groups should be informed ahead of time to record one waypoint per each Legacy or structural change.

GPS and Geodatabase

- It would be beneficial for all GPS units to be the same type of device, rather than a few different types. This would enable data to be imported and converted in the same way, and at the same time.
- Endpoint coordinates could be determined from the projected transect using ArcGis. An end waypoint could then be created on the GPS, which would be used as a target to ensure groups are on track.
- Confirm with groups that their GPS has acquired enough satellites before they start. This will increase the accuracy of waypoint locations.
- Create new legacy category codes when new legacies are discovered, and continue to keep the geodatabase up to date with the new domains so that future data entry is made easier.

References:

B.C. Ministry of Forests and Range. 2010. *Field Manual for Describing Terrestrial Ecosystems, 2nd Edition*. Site Description, Site Disturbance (pp.27---30). Research Branch, B.C. Ministry of ForestsAnd Range, Ministry of Environment. Victoria,B.C.

Collaborative Conservation Planning Resource Guide. Galiano Conservancy Association July 2013
Pressey, Robert L et al. (2007). "Conservation Planning in a Changing World" 22:11 Trends in Ecology and Evolution 583.

Erickson, Keith. Conservation Coordinator, Galiano Conservancy Association. Personal communication. Date: August 2014.

Galiano Learning Centre Management Committee.
2013. Galiano Learning Centre Management Plan. Galiano Conservancy Association.
49 pp.

Appendix A: Geodatabase Steps

Files already on the Geodatabase

1. Transect start points (Point_ge.shp)
2. Transect lines (Line_ge.shp)
3. DL57 Boundaries (Property_Boundaries.shp)
4. Roads (Roads.shp)
5. Streams (streams.shp)
6. 2013 orthophoto
7. waypoint and transect results from

Importing Data from GPS

1. Download data from each device separately, this includes both Garmins, the Trimble, and Eric's iPhone. Waypoint data was imported using GPS Babel as a .gpx file.
2. The .gpx files were opened in ExpertGPS software which allowed for manipulation of the data (ie. Add waypoint that were accidentally deleted, and remove waypoints that were on the GPS device from a previous project)
3. Waypoints in each transect were then converted into a .shp file so that they could be opened up in ArcGis

Importing Data into the Geodatabase

1. All data for the 7 transects was imported separately into the geodatabase using the function 'Add data'. T1.shp, T2.shp, T3.shp, T4.shp, T5.shp, T6.shp, and T7.shp were added individually to the layer *transect_layer*. This allowed for each transect to be separately visible or invisible, which was useful in the initial analysis phase.

Setting up the Geodatabase domain categories

- 1) All points were given an assigned a category, primary keyword, and a secondary keyword based on the table in Appendix B.
- 2) All 7 transects were merged, which combined all the waypoints into one shapefile.
- 3) New fields were added to the attribute table so that all data could be categorized. The new fields included:

Point_ID	Categ_code	Categ_desc	Legac_1_cd	Legac_1_ds	Legac_2_cd
Legac_2_ds	Comment	Studnt_grp	Trans_NO	Photo #	

Appendix B: Category Codes & Descriptions

PRIMARY CODE & DESCRIPTION	SECONDARY CODE & DESCRIPTION	*SHAPE	PRIMARY CODE & DESCRIPTION	SECONDARY CODE & DESCRIPTION	*SHAPE
TBD (To Be Determined)			ART (Artifact)		
TBD To Be Determined	TBD To Be Determined	●	ART-GRB Garbage/disposals/debris	GRB-GRB Garbage/disposals/debris	●
NHL (Non-Human Legacy)			ART-SRV Survey artifacts	SRV-STK Survey stake/pin	●
NHL-TRN Transect Point	TRN-SOT Start of Transect	●		SRV-FLG Survey flagging	●
	TRN-EOT End of Transect	●		SRV-OTH Survey (other)	●
NHL-BIO Biotic effects	BIO-DOM Domestic grazing/browsing	●	INF (Infrastructure)		
	BIO-WLF Wildlife grazing/browsing	●	INF-BLD Building	BLD-EDU Education facility	●
	BIO-BVR Beaver activity	●		BLD-HUT Hut or cabin	●
	BIO-OTH Biotic effects (other)	●		BLD-SHD Shed or lean-to	●
NHL-WFR Wildfire	WFR-WFR Wildfire evidence	●		BLD-COP Animal coop	●
NHL-GEO Geological feature	GEO-BLF Natural bluff	●		BLD-OUT Outhouse	●
	GEO-H2O Open water, stream, spring	●		BLD-OTH Building (other)	●
	GEO-OTH Geological feature (other)	●	INF-BRG Bridge	BRG-VEH Vehicle bridge	●
NHL-OTH Other Non-Human-Legacy	NHL-OTH Other Non-Human-Legacy	●		VRG-PED Pedestrian bridge	●
VEG (Vegetation)			INF-RD Road (≥ 2m)	RD-RDX Road intersection	●
VEG-EXO Exotic species	EXO-INV Invasive species	●		RD-PRK Parking area	●
	EXO-HOR Horticultural species	●		RD-DIT Road ditch	●
	EXO-AGR Agricultural species	●		RD-PAV Paved road	∫
VEG-NAT Native species	NAT-SIG Native species (significant)	●		RD-GVL Gravel road	∫
	NAT-DMG Native species damaged	●		RD-DRT Dirt road (rough access)	∫
	NAT-CMT Culturally modified tree	●		RD-SKD Skid Road	∫
LUA (Land Use Activity)				RD-OLD Old skid road (overgrown)	∫
LUA-AGR Agricultural activities	AGR-MDW Agricultural meadow	●		RD-OTH Road (other)	●
	AGR-GDN Garden	●	INF-TRL Trail (< 2m)	TRL-TRX Trail intersection	●
	AGR-OTH Agricultural (other)	●		TRL-HUM Human foot trail (dirt)	∫
LUA-FOR Forest harvesting	FOR-CLS Clearcut stump area (start)	○		TRL-STR Trail stairs	●
	FOR-CLE Clearcut stump area (end)	○		TRL-MRK Trail marker	●
	FOR-STP Stump or stump cluster	●		TRL-EDU Trail educational point	●
	LOGS / coarse woody debris (>7.5cmØ)	●		TRL-WLD Wildlife trail	∫
	FOR-CWD	●		TRL-OTH Trail (other)	●
	FOR-SLS Slash pile	●	INF-HYD Hydrology infrastructure	HYD-WEL Dug well	●
	FOR-PWD Processed wood	●		HYD-CLV Culvert	●
	FOR-FWD Firewood	●		HYD-DIT Irrigation Ditch	∫
	FOR-FIR Fire/burning evidence	●		HYD-PIP Semi-buried pipe	∫
	FOR-OTH Forest harvesting (other)	●		HYD-OTH Hydrology infrastructure (other)	●
LUA-ENV Environmental restoration	ENV-PLT Restoration planting	●	INF-FEN Fence	FEN-WIR Wire fence	∫
	ENV-OTH Restoration (other)	●		FEN-WOD Wooden fence	∫
LUA-CLR Clearing (not FOR or AGR)	CLR-OTH Clearing (not forestry or agriculture)	●		FEN-OTH Fence (other)	∫
MOD (Site Modification)				FEN-RCK Rock wall	∫
MOD-PIT Pit/hole	PIT-PER Percolation test pit	●		FEN-GAT Gate	●
	PIT-OTH Pit (other)	●		FEN-FNX Fence intersection	●
MOD-SOL Soil modification	SOL-FIL Fill	●	INF-REC Recreational Amenities	REC-FPT Fire pit	●
	SOL-COM Compaction	●		REC-PAD Camping pad	●
	SOL-ERO Erosion	●		REC-FST Firewood storage	●
	SOL-OTH Soil modification (other)	●		REC-SHT Shooting range	●

*SHAPE SYMBOLS: ● = point feature, ∫ = linear feature, ○ = polygon feature

Group 1

Map T1

ER 411/ES 441 Spring 2013: DL57 Transect Assignment Fieldnote Template

Group Details:

Date:

GPS Unit:

Camera:

Transect No.:

Starting Coordinates:

Bearing:

Waypoint No.	Waypoint Coordinates	Photo No's:	Keyword or Structural Stage	Health Rating (1-6)	Notes and Remarks
198	465820 5419824		Road & ditch		
299	465816 5419811	221 -223	Fence, wire, young forest		
3100	817 806	224 -225	Shift in structural change shrubland wetland, low shrub	poor (2)	height varying grass, ^{flat ground} shrub invasive ^{hydrology} alteration little woody debris
4101	818 791				Stumps, very old log
5102	816 775	226	Rewire fence		
6103	816 774		Roadend, gate		
7104	817 762		young forest	good	

**Appendix C: Group Transect
Results Sheets**

point_ID	CATEG_COD	CATEG_DESC	LEGAC_1_CI	LEGAC_1_D!	LEGAC_2_CI	LEGAC_2_D!	COMMENTS	STUDNT_GR	TRANS_NO	photo #
7_0	NHL	Non-Human Legacy	NHL-Geo	geologic fe	GEO-BLF	bluff	ridge	2	7	
7_1	STC	Structural Change		3-M-m				2	7	
7_2	INF	Infrastructure	INF-FEN	Fence	FEN-WIR	wire fence		2	7	492
7_3	VEG	Vegetation	VEG-EXO	exotic spec	EXO-INV	Himalayan Blackberry		2	7	
7_4	ART	Artifact	ART-GRB	garbage	GRB-GRB	garbage pil		2	7	
7_5	INF	Infrastructure	INF-BLD	building	BLD-EDU	field house		2	7	493
7_6	NHL	Non-Human Legacy	NHL-Geo	Geologic fe	GEO-BLF	bluff		2	7	494
7_7	STC	Structural Change		2b-h				2	7	
7_8	INF	Infrastructure	INF-RD	road	RD-DRT	dirt road		2	7	
7_9	INF	Infrastructure	INF-RD	road	RD-DRT	dirt road		2	7	
7_10	INF	Infrastructure	INF-RD	road	RD-DRT	dirt road		2	7	
7_11	LUA	Land Use Activity	LUA-For	forest harv	FOR-SLS	slash pile		2	7	947
7_12	NHL	Non-Human Legacy	NHL-Geo	geologic fe	GEO-BLF	ocean bluff		2	7	
7_13	VEG	Vegetation	VEG-EXO	exotic spec	EXO-INV	Himalayan Blackberry		2	7	948
7_14	INF	Infrastructure	INF-FEN	Fence	FEN-WIR	wire fence		2	7	483
7_15	ART	Artifact	ART-GRB	Garbage	GRB-GRB	garbage		2	7	484
7_16	NHL	Non-Human Legacy	NHL-Geo	geologic fe	GEO-BLF	bluff		2	7	485
7_17	ART	Artifiact	ART-GRB	garbage	GRB-GRB	old toolbox		2	7	
7_18	LUA	Land Use Activity	LUA-For	forest harv	FOR-CLS	clear cut		2	7	
7_19	MOD	Modification	MOD-PIT	pit/hole	PIT-OTH	dugout		2	7	
7_20	LUA	Land Use Activity	LUA-For	forest harv	FOR-SLS	slash pile		2	7	486
7_21	INF	Infrastructure	INF-RD	road	RD-DRT	dirt road		2	7	487
7_22	INF	Infrastructure	INF-RD	road	RD-DRT	dirt road		2	7	488
7_23	ART	Artifact	ART-GRB	garbage	GRB-GRB	glass bottle		2	7	498
7_24	STC	Structural Change		2b/3-h				2	7	
7_25	NHL	Non-Human Legacy	NHL-Geo	gelologic feal	GEO-BLF	bluff		2	7	
7_26	VEG	Vegetation	Structural C	3-M-m				2	7	
7_27	INF	Infrastructure	INF-RD	road	RD-DRT	dirt road		2	7	490
7_28	LUA	Land Use Activity	LUA-FOR	forest harv	FOR-SLS	slash pile		2	7	491
7_29	STC	Structural Change		2b-h				2	7	
7_30										
6-021	MOD	Modification	MOD-PIT	pit/hole	PIT-OTH	roadside ditch		2	6	185
6-022	INF	Infrasturcture	INF-PWR	power	PWR	powerlines		2	6	186

6-023	INF	Infrasturcture	INF-FEN	fence	FEN-WIR	wire fence	2	6	187
6-024	INF	Infrasturcture	INF-RD	road	RD-OLD	overgrown road	2	6	188
6-025	INF	Infrasturcture	INF-RD	road	RD-OLD	overgrown road	2	6	189
6-026	INF	Infrasturcture	INF-RD	road	RD-GVL	gravel road end of mat	2	6	191
6-028	STC	Structural change		young forest			2	6	
6-029	INF	Infrasturcture	INF-BLD	building	BLD-HUT	greenhouse	2	6	194-195
6-030	STC	Structural change		2b		graminoid dominated	2	6	
6-031	VEG	vegetation	VEG-EXO	exotic spec	EXO-INV	English Holly	2	6	196
6-032	STC	Structural change		young forest, 5			2	6	
6-033	VEG	vegetation	Structural s	2c	health=4		2	6	
6-034	INF	Infrasturcture	INF-RD	road	RD-RDX	road intersection	2	6	199
6-035	INF	Infrasturcture	INF-RD	road	RD-DRT	dirt road	2	6	200
6-036	ART	Artifact	ART-GRB	Garbage	GRB-GRB	old building materials	2	6	201
6-037	STC	Structural change		young fore	health=3		2	6	
6-038	INF	Infrasturcture	INF-RD	road	RD-DRT	dirt road	2	6	204
6-039	INF	Infrasturcture	INF-RD	road	RD-DRT	dirt road	2	6	205
6-040	INF	Infrasturcture	INF-TRL	trail	TRL-HUM	human foot trail	2	6	207
6-041	VEG	vegetation	VEG-EXO	exotic spec	EXO-INV	multiple in old growth	2	6	
5_0	INF	Infrastructure	INF-RD	Porlier Pas	INF-FEN	wire fence road and fe	1	5	246, 247-248
5_1	INF	Infrastructure	INF-RD	road	RD-OLD	overgrown road	1	5	249
5_2	STC	structural change		mature forest		health=me	1	5	250
5_3	INF	Infrastructure	INF-RD	road	RD-OLD	old road	1	5	252
5_4	STC	structural change		young forest		health=me	1	5	253-254
5_5	INF	Infrastructure	INF-RD	road	RD-OLD	old road	1	5	255
5_6	STC	structural change		mature forest		health=goc	1	5	256-257
5_7	STC	structural change		wetland/forest in poor health		lotsof thistl	1	5	258-260
5_8	STC	structural change		saplings		good	1	5	276
5_9	LUA	Land Use Activity	LUA-FOR	Forest Harv	FOR-SLS	slash pile	1	5	277
5_10	STC	structural change		2b		health=poc	1	5	278
5_11	Inf	Infrastructure	INF-RD	road	RD-OLD	old road	1	5	279
5_12	INF	Infrastructure	INF-RD	road	RD-OLD	old road	1	5	280
5_13	ART	Artifact	ART-SRV	survey artif	SRV-FLG	flaging tape	1	5	281
5_14	STC	structural change		mature forest		health=me	1	5	286-287
4_0	NHL	Non-Human Legacy	NHL-TRN	transect	TRN-SOT	start of T4	2	4	

4_1	INF	Infrastructure	INF-FEN	fence	FEN-WIR	wire fence	2	4	454
4_2	INF	Infrastructure	INF-RD	road	RD-OLD	overgrown road	2	4	455
4_3	INF	Infrastructure	INF-RD	road	RD-OLD	overgrown road	2	4	456
4_4	STC	structural change		6-c-M-h		health=4	2	4	
4_5	INF	Infrastructure	INF-RD	road	RD-OLD	overgrown road	2	4	457
4_6	STC	structural change		3ah		health=4	2	4	
4_7	INF	Infrastructure	INF-TRL	trail	TRL-WLD	wildlife trail	2	4	458
4_8	NHL	Non-Human Legacy	NHL-Geo	geologic fe	GEO-BLF	bluff	2	4	
4_9	INF	Infrastructure	INF-RD	road	RD-DRT	dirt road	2	4	460
4_10	STC	structural change		4MmH		health=4	2	4	
4_11	INF	Infrastructure	INF-RD	road	RD-OLD	overgrown road	2	4	
4_12	STC	structural Change		3ah		health=poor	2	4	
4_13	STC	structural change		5M		health=3	2	4	
4_14	INF	Infrastructure	INF-TRL	trail	TRL-WLD	sheep trail	2	4	460
4_15	INF	Infrastructure	INF-RD	road	RD-OLD	overgrown road	2	4	461
4_16	MOD	Modification	MOD-PIT	hole	PIT-OTH	manmade hole	2	4	462
4_17	STC	structural change		2a-2b		health=2	2	4	
4_18	INF	infrastructure	INF-RD	road	RD-OLD	overgrown road	2	4	464
4_19	INF	Infrastructure	INF-RD	road	RD-OLD	overgrown road	2	4	465
4_20	NHL	Non-Human Legacy	NHL-Geo	geologic fe	GEO-BLF	bluff	2	4	
4_21	INF	Infrastructure	INF-TRL	trail	TRL-WLD	sheep trail	2	4	466
4_22	VEG	vegetation	VEG-EXO	exotic spec	EXO-INV	invasive sp scotch broom	2	4	
4_23	STC	structural change		6Mm		health=4 end transect	2	4	
3_0	MOD	Modification	MOD-PIT	Ditch	PIT-OTH		3	3	35
3_1	INF	Infrastructure	INF-FEN	fence	FEN-WIR	wire fence	3	3	36-37
3_2	STC	Structural change		young forest		health=4	3	3	
3_3	MOD	Modification	MOD-PIT	pit	PIT-OTH	test pit	3	3	39
3_4	VEG	Vegetation	Veg-EXO	exotic spec	EXO-INV	scotch broom	3	3	40
3_5	LUA	Land-Use Activity	LUA-FOR	forest hare	FOR-SLS	slash pile	3	3	41
3_6	VEG	Vegetation	Veg-EXO	exotic spec	EXO-INV	foxglove	3	3	42
3_7	INF	Infrastructure	INF-RD	road	RD-OLD	overgrown road	3	3	43
3_8	LUA	Land-Use Activity	LUA-FOR	forest hare	FOR-SLS	slash pile disturbed	3	3	44
3_9	VEG	Vegetation		end of disturbed area		health=1	3	3	
3_10	VEG	Vegetation		disturbed area in cedar forest			3	3	47

3_11	LUA	Land-Use Activity	LUA-FOR	forest hare FOR-FIR	burnt stump	3	3	50
3_12	STC	Structural change		young forest	health=4 doug fir/ce	3	3	51
3_13	INF	Infrastructure	INF-RD	road RD-GVL	gravel road	3	3	
3_14	INF	Infrastructure	inf-HYD	hydrology i HYD-WEL	3 wells solar panel	3	3	53-55
3_15	STC	Structural change		disturbed	health=2	3	3	
3_16	MOD	Modification	Mod-For	forest hare For-Oth	slashed tree	3	3	60
3_17	VEG	Vegetation	Veg-EXO	exotic spec EXO-INV	Holly	3	3	63
3_18	INF	Infrastructure	INF-RD	road RD-OLD	overgrown road	3	3	65
3_19	LUA	Land-Use Activity	LUA-FOR	forest hare FOR-CLS	health=ver	3	3	
3_20	INF	Infrastructure	INF-BLD	building BLD-OUT	outhouse	3	3	181_nat
3_21	INF	Infrastructure	INF-RD	road RD-OLD	overgrown road	3	3	182
3_22	INF	Infrastructure	INF-RD	road RD-OLD	overgrown road	3	3	185
3_23	STC	Structural change		5- young forest	health=3	3	3	
3_24	STC	Structural change		7-old growth	health=5	3	3	
2_10	STC	sturctural change		3a-h	health=1	2	2	
2_11	ART	artifiact	ART-GRB	garbage GRB-GRB	garbage and wood det	2	2	438
2_12	VEG	sturctural change		1a-h	health=1	2	2	
2_13	LUA	Land Use Activity	LUA-FOR	foresest ha FOR-PWD	processed wood chip p	2	2	440
2_14	INF	Infrastructure	INF-RD	road RD-OLD	overgrown road	2	2	441
2_15	INF	Infrastructure	INF-HYD	hydrology i HYD-PIP	irrigation pipe	2	2	443
2_16	STC	sturctural change		3a	health=2	2	2	
2_17	NHL	Non-Human Legacy	NHL-GEO	geologic fe geo-BLF	bluff	2	2	444
2_18		point needs to be deleted on shapefile				2	2	
2_19	INF	Infrastructure	INF-RD	road RD-OLD	overgrown road	2	2	
2_20	MOD	Modification	MOD-SED	modified sc SED-RCK	rock pile	2	2	445
2_21	NHL	Non-Human Legacy	NHL-GEO	geologic fe GEO-BLF	bluff	2	2	446
2_22	STC	sturctural change		5-c-m-h	health=3	2	2	
2_23	INF	Infrastructure	INF-BLD	building BLD-EDU	learning centre constru	2	2	447
2_24	INF	Infrastructure	INF-REC	recreation; REC-PAD	camping pad	2	2	448
2_25	STC	sturctural change		2a-h	health=1 many invas	2	2	
2_26	inf	Infrastructure	INF-RD	road RD-OLD	overgrown road	2	2	449
2_27	STC	sturctural change		6-c-2	health=4	2	2	
2_28	NHL	Non-Human Legacy	NHL-GEO	geologic fe GEO-BLF	bluff	2	2	452
2_29	STC	sturctural change		6-M-M	health=5	2	2	

1-098	INF	Infrastructure	INF-RD	road	RD-PAV	paved road	poirlier pas	1	1
1-099	INF	Infrastructure	INF-FEN	fence	FEN-WIR	wire fence	also young	1	1 221-223
1-100	STC	Sturctural change		wet region	EXO-INV	invasive s	health=2	1	1 224-225
1-101	LUA	Land Use Activity	LUA-FOR	Forest harv	FOR-SLS	slash pile		1	1
1-102	INF	Infrastructure	INF-FEN	fence	FEN-WIR	wire fence		1	1 226
1-103	INF	Infrastructure	INF-FEN	fence	FEN-GAT	gate		1	1
1-104	STC	Sturctural change		young forest			health=goc	1	1
1-105	LUA	Land Use Activity	LUA-FOR	Forest harv	FOR-CLC	clear cut area		1	1 229-230
1-106	VEG	VEG	vegetation	VEG-EXO	exotic spec	EXO-INV	thistle patc	1	1 231
1-107	STC	Sturctural change		regenerating area			health=ver	1	1 232-234
1-108	NHL	Non-Human Legacy	NHL-TRN	transect	TRN-EOT	end point for the day		1	1
1-109	LUA	Land Use Activity	LUA-FOR	Forest harv	FOR-FIR	burnt trees		1	1 235-236
1-110		delete from shapefile						1	1
1-111	STC	Sturctural change		young forest			health=me	1	1
1-112	STC	Sturctural change		early mature forest			health=goc	1	1 241-242
1-113	STC	Sturctural change		mature forest			health=goc	1	1 243
1-114	LUA	Non-Human Legacy	NHL-GEO	geological	GEO-BLF	bluff/ocean		1	1 244-245

Appendix D: Student Transect Data

	8 105	811 701	229 -230	-historical logging -recently cut down trees young-mature forest	Medium	
	9106	820 682	231	thistle patch		
S-7	10107	817 661	232 -234	regenerating area, a few young trees PIPE, hoard, invasive species some logged, water tank	very poor	path (trail?)
S-12	11108 (ending point)	820 631				
S-13	129 12	465823 5419560	235- 236	burned trees		
S-14	10 13 111	827 532 558	237- 238	Young forest	medium	many stumps, nurse/fallen logs
S-9	14 112	827 517	239 241-242	mature forest (clear)	good	lots of native plants but salal w/ blight
S-10 6	15 113	829 460	243	mature forest	good	
S-11	(ending) 16 114	828 445	244 - 245	ocean		lots of slash burn
	17					

group 2 - T2

ER 411/ES 441 Spring 2013: DL57 Transect Assignment Fieldnote Template

Group Details: Richelle Brittain, Brianna Knox, Kian Schaepe, Kelly Toles, Jill Calder

Date: August 18, 2014

GPS Unit:

Camera:

Transect No. 1

Starting Coordinates: N 541 9869

Bearing:

Waypoint No.	Waypoint Coordinates	Photo No's:	Keyword or Structural Stage	Health Rating (1-6)	Notes and Remarks
1		432 435	Fence (FN)		
2			Young forest (YF) SA B-C-M 3		
3		436	Rock pile - Mod SED		
4			^{Dead} Pik of broom		
5			Cultural modification mill site restoration project.		
6			RD - un maintained, dirt, overgrown.		
7		437	- went back North bc missed this. geological character site. rock face.		

P2

8			Kiosk - BLDG		
9			Road - main road, dirt. in use.		
10			(structural stage part) 3a-h #1	1	
11		438	garbage & wood debris.		
12			(struct. change.) 1a-h	1	
13		(431 deleted) 440	Cedar wood chip piles		
14		441	(struct. Δ) 3a-h RD - not main rd. more vegetation.	1	
15		443	- Black irrigation pipe.		
16			(Struct. Δ) 3a-	2	
17		444	cliff edge.		

P. 3

no change yet.

18			(st. A) ^{mult. stored} 5-C-M-L ^{big}	3	
19			Rd. - very overgrown. broken bricks across		
20		445	- Rock pile, large, old. use if natural anthro		
21		446	- cliff edge.		
22			(st. A) ^{mult. stored} 5-C-M-h ^{big}	3	
23		447	Learning Centre construction area.		
24		448	Camp site - h		
25			(st. A) 2a - h * mix of grasses and ferns	1	- lots of massive spp.
26		449	Rd - old rd. not in use.		- nursing tree/stump 3m south of this point.
27			(st. A) 6-C-2-	4	
28		452	^{2 story} CLIFF face + sheep tail		
29			(st. A) ^{mix of r + b + red} 6-M-M ^{mult. stored}	5	

T3

ER 411/ES 441 Spring 2013: DL57 Transect Assignment Fieldnote Template

Group Details: # 3

Date:

GPS Unit: Garmin 1

Camera:

Transect No:

Starting Coordinates: N 54119944 0465656

Bearing:

Waypoint No	Waypoint Coordinates	Photo No's:	Keyword or Structural Stage	Health Rating (1-6)	Notes and Remarks
1	N 0465656 N 54119944	0035	firm mud chitex		
2	0465653 54119933	0036 031	firm - Bent near firm		
3	0465656 54119945		young forest - to 17atlon?	4	termites - chitex strong edge effect
4	0465658 54119981	031			Ditch (last part)
5	0465656 54119984	035	Bloom plant		
6	0465653 54119979	41	slender plant ³⁵ in reg. stage		
7	0465656 54119980	42	Fern-like patches mixed with grass + mushrooms		

8	0465661 5419866	43	old road / track?		veg = Bucken, grasses, must thistle,
9	0465673 5419878	44	piece of smaller lumber (cedar) section.		vegetation coming from edge
10	0465664 5419843		area of old road rem	1	veg present
11	0465666 5419823	47	distribution opening in road (not (road))		no vegetation, with grasses + smaller lumber being
12	0465662 5419776	50	Drop for stump with high base matches floor		- fire scar - steep slope - rubble - CWD.
13	0465613 5419776	51	Drop for ledge 5' long	54	- some edge effect
14	"		pinnae road 3M with cut slope.		
15	0465615 5419756	53 54 55			new disturbance - no post, soil 3 walls + 1 side pinnae, that hole - west side hole.
16	0465673 5419886	5	step - 2 modified + marked - postmarked N.W.C.	2	- step pinnae, thistles, grasses Bucken for some cedar regrowth
17	0465673 5419882	57 60	remains of old cut slope - 10' long		

18 - 20

on separate sheet

ER 411/ES 441 Spring 2013: DL57 Transect Assignment Fieldnote Template

Group Details:

Date:

GPS Unit:

Camera:

Transect No.:

Starting Coordinates:

Bearing:

Waypoint No	Waypoint Coordinates	Photo No's:	Keyword or Structural Stage	Health Rating (1-6)	Notes and Remarks
1 19	6165 692 8419 633	63	old healthy Bass / tree		2 nd plant number
2 19	6165 690 8419 603	65	(new) tree 3m wide - grass can		
3 19	6165 686 8419 580		shrub herb	1 v Poor	grass meadow, steep, thick, few cedars
4					
5					
6					
7					

T3

ER 411/ES 441 Spring 2013: DL57 Transect Assignment Fieldnote Template

Group Details: # 3

Date:

GPS Unit: Garmin 4

Camera:

Transect No.:

Starting Coordinates: N 54119944 E 465656

Bearing:

Waypoint No.	Waypoint Coordinates	Photo No's:	Keyword or Structural Stage	Health Rating (1-6)	Notes and Remarks
1	N 0465654 E 5419940	030 035	1st m mark at fence		
2	0465653 5419933	036 031	fence fence corner		
3	0465656 5419935		young plant - to 17th row?	4	terminal - ditto strong edge effect
4	0465658 5419931	031			Ditto (last part)
5	0465656 5419934	030	Brown plant		
6	0465653 5419931	41	slender plant ³⁰ 41 marginal		
7	0465660 5419930	412	Fragile patches mix with grass + bushes		

T4 - Group 2

ER 411/ES 441 Spring 2013: DL57 Transect Assignment Fieldnote Template

Group Details: *Brianne K... Kelly Te...*
 Date: *Aug 19 2011* GPS Unit: Camera: *Sony*
 Transect No.: Starting Coordinates: Bearing:

Waypoint No.	Waypoint Coordinates	Photo No's:	Keyword or Structural Stage	Health Rating (1-6)	Notes and Remarks
1	465568E 5119987N				
2	465567E 5119989N	454	IN		
3	574E 945N	455	RD		old overgrown
4	583E 932N	456	RD		old overgrown
5	581E 914N		Structural Stage 6-CM1 (Hoggar)	4 (good)	
6	581E 912N	457	RD		also old overgrown
7	576E 904N		Structural Stage 3c H	4 (good)	small overgrown
8	581E 916N	458	overgrown		

	coordinates	pts	veg	health	Notes
9	5391E 8351N		geological feature start of steep slope		
10	5391E 763N	459	RD		large, still in use
11	564E 75-1N		Structural A 4M thin	4	in old logging
12	561E 750N		4M RD		overgrown invasive grasses
13	567E 750N		Structural A 3a	2 (poor)	lots of invasives
14	562E 711N		Structural A 5M 2 +	3 (med)	FF
15	562E 702N	460	overgrown		overgrown but still driveable
16	561E 661	461	RD		
17	564E 662N	462	Flats		large, manmade

18 575E
622N Structural A
steep

	cont. 2021	prod	topog. & l	height	notes
19	5110 5111	464	Rb		ridge road
20	5120 5121	465	Rb		ridge road II
21	5122 522A		sharp slope Δ ground		down slope (to ocean)
22	5151 519A	466	sharp road		
23	5101 4811		lot of water broom		
24	5101 4811		end of road / structure	+	cliff / forest to ocean
25			↑ 6Mm	↑	
26					
27					

Group 1

TS

ER 411/ES 441 Spring 2013: DL57 Transect Assignment Fieldnote Template					
Group Details:					
Date:		GPS Unit:		Camera:	
Transect No.:		Starting Coordinates:		Bearing:	
Waypoint No.	Waypoint Coordinates	Photo No's:	Keyword or Structural Stage	Health Rating (1-6)	Notes and Remarks
1 115	542 0034 465 466	246			actual start: 542 0034 465 485
2 116	0021 495	247 - 248	road + fence		
3 117	541 9974 465 491	249	road (very old)		
4 118	541 9929 465 488	250	mature	medium	
5 119	541 9937 465 490	252	road		
6 120	9918 491	253 - 254	young forest (open due to road)	medium	open due to road
7 121	9789 493	255	road		road

8 122	9771 499	256- 257	mature	good	fungus on tree
ending 123	9723 498	258- 260	mix of wetland + forest	poor	lots of thistle
10 3	541 9713 465 493	276	Pole/sapling	good	dense patch
11 4	541 9713 465 493	277	woody debris piles		
12 5	541 9695 465 502	278	ab	poor	road
13 6	541 9632 465 498	279	road		
14 7	541 9601 465 497	280	road		
15 8	541 9601 465 497	281	flagging tape mature	good	
(end pt) 16 9	541 9531 465 494	286- 287	mature	medium	
17					

(photo
C13)

T6

ER 411/ES 441 Spring 2013: DL57 Transect Assignment Fieldnote Template

Group Details:

Date:

GPS Unit:

Camera:

Transect No.:

Starting Coordinates: N: 5420058 E 405356 Bearing:

Waypoint No.	Waypoint Coordinates	Photo No's:	Keyword or Structural Stage	Health Rating (1-6)	Notes and Remarks
1	0465344 5420078	185	...		
2	0465344 5420078	186	...		
3	0465344 5420078	187	...		
4	0465344 5420078	188
5	0465344 5420078	189	...		
6	0465344 5420078	190	...	4	...
7	0465344 5420078	N/A	...	1	...

ER 411/ES 441 Spring 2013: DL57 Transect Assignment Fieldnote Template

Group Details:

Date:

GPS Unit:

Camera:

Transect No. :

Starting Coordinates:

Bearing:

Waypoint No.	Waypoint Coordinates	Photo No's:	Keyword or Structural Stage	Health Rating (1-6)	Notes and Remarks
1	0465367 54119771	171 172
2	0465367 54119771		...	2	...
3	0465367 54119771	173	...		
4	0465367 54119771		...	5	...
5	0465367 54119771		...	4	...
6	0465367 54119771	174	...		
7	0465367 54119771	20	...		

ER 411/ES 441 Spring 2013: DL57 Transect Assignment Fieldnote Template

Group Details:					
Date:		GPS Unit:		Camera:	
Transect No. :		Starting Coordinates:		Bearing:	
Waypoint No.	Waypoint Coordinates	Photo No's:	Keyword or Structural Stage	Health Rating (1-6)	Notes and Remarks
1	011111	551	multistage		1st stage
2	011111		1st stage	1	
3	011111	551	1st stage		
4	011111	553	1st stage		
5	011111	554	1st stage		
6	011111		1st stage	4	1st stage
7					

T7 - Group 2

ER 411/ES 441 Spring 2013: DL57 Transect Assignment Fieldnote Template

Group Details:					
Date:		GPS Unit:		Camera:	
Transect No. :		Starting Coordinates: N 54.2 D 18.8 E 96.5 13.5		Bearing:	
Waypoint No.	Waypoint Coordinates	Photo No's:	Keyword or Structural Stage	Health Rating (1-6)	Notes and Remarks
25 1	156E 198N	483	FN		
26 2	160E 199N	484	Gravel ridge		
27 3	159E 189N	485	Small ridge		
28 4	147E 187N		Tool box		
29 5	162 160		b-c-m-n	4	Logging
30 6	152 156		deeper hole		
31 7	163 157	486	wood pile		
32 8	157 149	481	RD		

33	9	157 119	488	RD		
34	10	152 109	489	Glass Bottle		
35	11	156 096		2013-h	1	wood piles + roads
36	12	154 045		Ridge		
37	13	152 014		3-M-M		
38	14	153 005	490	RD		
39	15	157 004	491	wood pile		
40	16	155 5410974		20-h	3	roads + wood piles
41	17	155 964		ridge line		

ER 411/ES 441 Spring 2013: DL57 Transect Assignment Fieldnote Template

Group Details:

Date:

GPS Unit:

Camera:

Transect No. :

Starting Coordinates:

Bearing:

Waypoint No.	Waypoint Coordinates	Photo No's:	Keyword or Structural Stage	Health Rating (1-6)	Notes and Remarks
42 18	155 916		3-M-M	5	
43 19	151 893	492	FN		
44 20	150 878		field INVASIVE Burdberries		
45 21	152 871		pile of garbage		
46 22	149 864	493	field house		
47 23	149 853		up slope		
48 24	145 848	494	pile of wood on slope		
49 25	149 856		Zb-n		house, pile of wood + road

SS	1226	146 834		RD		
SS	1227	151 779		RD		
SS	1228	146 772		RD		
SS	1229	146 761	947	pile of wood		
SS	1230	730 144 730 730		ocean / rocks		
SS	1231	146 755	948	invasive blackberry		
	15					
	16					
	17					