CONTRACT # EN15TAH414

FISH PASSAGE CULVERT INVESTIGATIONS 2015

Babine TSA

Prepared By:
MarLim Ecological Consulting Ltd.

February 2016

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Prepared By:
M.C. Gollner, BSc, RPBio
Robijn Cain, BSc, BiT
Jeffrey Gollner

MARLIM ECOLOGICAL CONSULTING LTD.

12676 19A AVENUE
SOUTH SURREY, B.C.
V4A 9G6
TEL/FAX: (604) 531-4338

650 THIRD AVENUE
PRINCE GEORGE, BC
V2L 3C4
TEL: (250) 564-4338

E-MAIL: mail@MarlimEcological.com

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THE CONTENTS OF THIS REPORT ARE MEANT TO PROVIDE A SUMMARY OF THE FISH PASSAGE CULVERT INVESTIGATIONS COMPLETED BY MARLIM ECOLOGICAL CONSULTING LTD. IN JULY AND AUGUST 2015, FOR BURNS LAKE CONTRACT # EN15TAH414. ANY CHANGES SINCE THE DOCUMENTED DATE OF THE LAST SITE VISIT ON ***AUGUST 31ST, 2015*** *ARE NOT ACCOUNTED FOR IN THIS REPORT. THE CONTENTS OF THIS REPORT SHOULD NOT BE SUBSTANTIALLY MODIFIED WITHOUT PRIOR CONSENT FROM MARLIM ECOLOGICAL CONSULTING LTD. THIS IS TO ENSURE THAT THE INTEGRITY OF THE DATA AND ANY OBSERVATIONS MADE IN THIS REPORT ARE MAINTAINED. A COMPLETE COPY OF THIS REPORT HAS BEEN RETAINED IN THE OFFICES OF MARLIM ECOLOGICAL CONSULTING LTD. FOR FUTURE REFERENCE.*

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EXECUTIVE SUMMARY

Marlim Ecological Consulting Ltd. completed a Fish Passage Culvert Investigation (FPCI) contract in the Babine Timber Sales Area, Bulkley Watershed Group, for BC Timber Sales. This project involved the assessment of all designated fish-stream crossings in the priority watersheds within the study area to determine which stream crossing structures were barriers and preventing fish passage. Recommendations were made for each stream crossing structure and seven sites were selected and recommended for restoration projects. The site assessments involved obtaining standardized information at each location and keeping photographic documentation for each site. The field data collected for all structures assessed on fish streams was entered and submitted into the Provincial Stream Crossing Inventory System (PSCIS). The PSCIS has a scoring system which automatically produces results when the data collected in the field is entered into the program. This scoring system determines whether a stream crossing structure is classified as unknown, passable, potential or barrier and aided in determining which sites were selected and recommended for restoration.

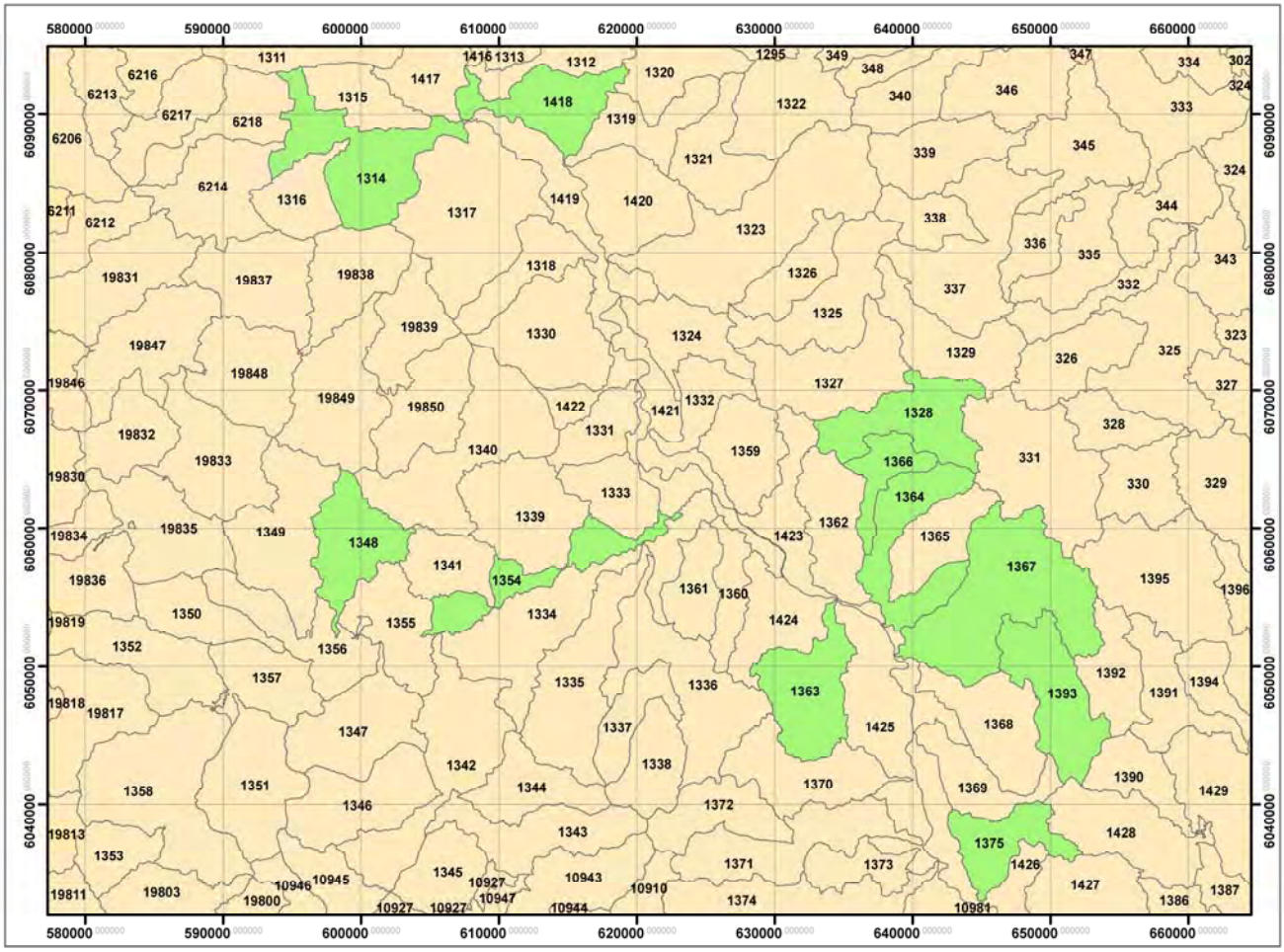
A total of 87 sites were visited and assessed throughout the duration of this study. Out of those, 25 sites did not exist. Photographs were taken at these sites to verify that while they were identified on the mapping provided, they were in fact non-existent.

A total of 4 stream crossings had open bottom structures in place: 1 bridge, and 3 wood box culverts. A total of 29 stream crossings had closed bottom structures installed: 28 round culverts, and 1 oval culvert. A total of 29 sites were classified as “other” and had fords in place at the stream crossing locations. Out of the 62 existing sites assessed, 5 were classified as passable, 28 sites were classified as barriers to fish passage and 29 sites were classified as unknown.

Following analysis of the crossing barrier results, seven stream crossing structures were selected and are being recommended to BC Timber Sales for restoration in this report.

STUDY AREA

The study area for this contract was the Babine Timber Sales Area, Bulkley Watersheds. The sites assessed were located on BC map sheets 93L and 93M. Sites assessed were in the area of Houston, Telkwa, and Smithers BC. Watersheds to be assessed were selected from the general study area by the contract manager at BCTS. For the works completed in 2015, the watersheds and sites assessed were those which remained unfinished from the works completed in 2012, 2013, and 2014. These watersheds were: 1328, 1348, 1354, 1363, 1364, 1366, 1367, 1375, 1393, and 1418. Watersheds containing sites assessed (in 2015) are outlined below on the study area map.



SCOPE OF WORKS COMPLETED

The scope of works completed is outlined in the table below:

Table 1: Overall Summary of Sites for Burns Lake FPCI - 2015 Work

NOTE: As the mapsheets overlap significantly along the edges, overlapping numbers have been counted on the mapsheet with the largest area of the watershed, and not on adjacent mapsheets.

Watershed #	Mapsheet #	# of Sites Mapped*	# of Mapped Sites Assessed 2015	# of Unmapped Sites Assessed 2015	# of Sites Unassessed (See Individual Reasoning Attached)	# of Sites Remaining
1328*	93L. 076	3	3	1	0	0
1335*	93L.065	1	0	0	0	1
1348*	93L.063	1	1	0	0	0
	93L.073	1	1	2	0	0
1354*	93L.065	25	6	1	0	19
1363*	93L.056	14	13	0	1	0
1364*	93L.066	13	11	0	2	0
1365*	93L.066	2	0	0	0	2
1366*	93L.066	1	1	0	0	0
1367*	93L.056	5	4	0	1	0
	93L.066	2	0	0	2	0
	93L.067	12	11	2	1	0
1375	93L.047	19	11	3	8	0
1393*	93L.057	6	6	5	0	0
1414*	93M.023	4	0	0	0	4
1418*	93L.095	1	3	2	0	0
TOTAL:		**110**	**71**	**16**	**15**	**26**

*Watersheds that were previously started - 'Number of Sites Mapped' is the number of mapped sites remaining in the unfinished watershed at the beginning of works in 2015.

METHODS

Full size hardcopy maps and PDF copies of the map sheets for the study area were obtained from BC Timber Sales Burns Lake office. Road and stream layers for ArcGIS were obtained through the Land and Resource Data Warehouse (LRDW).

The methodology followed for this survey follows the methods described in the Field Assessment for Determining Fish Passage Status of Closed Bottom Structures, which is the standardized methodology for FPCI surveys. The scoring and data collection sheets from the document have been included in Appendix IV.

A photographic log was kept throughout the duration of the survey, to provide an accurate and standardized record of the physical characteristics of each stream crossing and crossing structure. A minimum of five photos were taken at each crossing structure site which included photos of the stream in the upstream and downstream direction from the crossing structure taken outside the influence of the road, a photo of the barrel of the structure and a photo of the inlet and outlet. Additional photos were taken if necessary to document additional or unusual features at the site such as beaver activity or concerns about road stability.

Stream widths were determined by recording and averaging the width of three locations on the downstream end of the crossing structure, the locations being the most representative of the channel configuration. The measurements were taken from the high water mark on both banks.

Stream gradient was determined using a clinometer. This measurement was taken on the downstream end of the crossing structure and on the longest sighting within the stream reach as possible. Culvert gradient was also measured using a clinometer, the sighting taken through the barrel of the culvert on the downstream end.

Other information recorded during each crossing assessment included UTM coordinates, stream and road name, crossing type, culvert diameter and length, inlet and outlet drop, habitat value and recommendations for the crossing structure. Each crossing structure assessed was marked using flagging tape which had assessment date, crew, and site number written on it for identification purposes.

Following completion of field assessments, all data was entered into the PSCIS excel data template, and submitted to the PSCIS database along with the photographs from each site. As per the standardized methodology for crossings which have two culverts with the same outlet elevation, the measurements used for barrier determination were the combined diameter, longest culvert, and highest gradient slope. The fill depth was recorded for the smaller culvert (if different size culverts were present) as it was the deeper measurement.

The barrier classifications produced by the scoring matrix were used in conjunction with site notes and photographs to select the seven sites which would provide the most benefit from removal or replacement. The seven sites recommended in this report were selected based on fisheries habitat value (limited to the immediate vicinity upstream and downstream from the crossing), barrier severity, potential upstream habitat gained if fish passage is restored, and cost of crossing structure replacement.

RESULTS

In all, 87 mapped sites were assessed through this contract in 2015. Tables 2 and 3 below outline the total number of sites assessed by each structure type and subtype, as well as the scoring matrix barrier classifications. Of the 87 sites assessed, 4 were Open Bottom Structures (OBS) 1 bridge, and 3 wood box culverts, 29 were Closed Bottom Structures (CBS) 28 round culverts, and 1 oval culvert, 29 were Other-Fords, and 25 did not exist (DNE).

Table 2: Structures Assessed

Structure Type	Structure Subtype	# Assessed	Total	%
Open Bottom Structure	Bridge	1	4	5
	Wood Box Culvert	3		
Closed Bottom Structure	Round Culvert	28	29	33
	Oval Culvert	1		
Other	Ford	29	29	33
Do Not Exist	No Crossing at or Near Mapped Location	25	25	29
		Total	87	100

Of the 4 OBS assessed, all structures were classed as Passable by the scoring matrix; however, all 3 of the wood box culverts were collapsed, and were in fact complete barriers to fish passage.

Of the 29 CBS assessed, 1 round culvert was classed as Passable, while the remaining 28 round culverts, and 1 oval culvert were classed as Barriers. However, the round culvert classed as passable was in fact a barrier to fish passage.

All 29 Ford structures assessed were classified as Unknown by the scoring matrix; however, all Fords assessed were passable to fish.

Table 3: Assessment Statistics

Structure Type	Structure Subtype	# Existing Assessed	Passable	Potential	Barrier	Unknown
Open Bottom Structure	Bridge	1	1	-	-	-
	Wood Box Culvert	3	3*	-	-	-
Closed Bottom Structure	Round Culvert	28	1**	0	27	-
	Oval Culvert	1	0	0	1	-
Other	Ford	29	-	-	-	29***
	Total	62	4	0	29	29
	%		6	0	47	47

*All 3 wood box culverts were classed as Passable by the FPCI spreadsheet; however, all 3 of these were collapsed, and were in fact complete barriers.

**The round culvert classed as Passable by the matrix is in fact a barrier.

***All 29 fords were classed as Unknown by the FPCI spreadsheet; however, all 29 were in fact Passable.

The following paragraphs contain detailed summaries of the seven sites selected for removal or replacement based on the results of the site assessments conducted in 2015. Only seven sites have been recommended for replacement and/or restoration in 2015 as only seven of the relevant sites assessed were deemed to be suitable for recommendation following a detailed review of all sites assessed in 2015. This was due to the comparatively low number of sites assessed in 2015 compared to previous years, the high number of sites assessed that were located on private land, and a culvert on Highway 16 which is a barrier to fish passage and effectively cuts off fish access to almost an entire watershed. Tables 4 and 5 below summarize the assessment results of the seven structures. The order in which the crossing structures are presented and described is numerical, and does not indicate any priority for replacement.

Table 4: Assessment Parameters

Row	My Crossing Reference	Crossing Type	Crossing Subtype	Diameter or Span (meters)	Length or Width (meters)	Continuous Embeddedment? Yes/No	Average Depth Embeddedment (meters)	Resemble Channel? Yes / No	Backwatered? Yes / No	Percentage Backwatered	Fill Depth (meters)	Outlet Drop (meters)	Outlet Pool Depth (0.01m)	Inlet Drop? Yes / No	Culvert Slope (%)	Downstream Channel Width (meters)	Stream Slope (%)	Beaver Activity? Yes / No	Fish Observed? Yes / No	Valley Fill	Habitat Value
1	M15-001	Closed Bottom Structure	Round Culvert	0.40	6.20	No		No	No		1.20	0.6	0.37	No	4.00	1.50	15	No	No	Deep Fill	Medium
2	M15-002	Open Bottom Structure	Wood Box Culvert	0.45	8.00													No	No		
3	M15-005	Closed Bottom Structure	Round Culvert	1.20	23.00	No		No	No		4.00	0.38	0.23	No	9.00	1.60	9	No	No	Deep Fill	High
4	M15-008	Open Bottom Structure	Wood Box Culvert	0.80	14.00													No	No		
5	M15-033	Closed Bottom Structure	Round Culvert	0.90	8.00	Yes	0.40	No	No		1.60	0	0.15	Yes	2.00	1.80	8	No	No	Deep Fill	High
6	M15-044	Closed Bottom Structure	Round Culvert	1.65	12.00	No		No	Yes	10.00	1.90	0	0.18	Yes	5.50	1.23	4	No	Yes	Deep Fill	High
7	M15-045	Closed Bottom Structure	Round Culvert	1.20	25.00	No		No	No		8.50	0.22	0.07	No	3.00	1.27	5	No	Yes	Deep Fill	High

Table 5: Scoring Matrix

Row	My Crossing Reference	Stream Width Ratio	Culvert Length Score	Embed Score	Outlet Drop Score	Culvert Slope Score	Stream Width Ratio Score	Final Score	Barrier Result
1	M15-001	3.75	0	10	10	10	6	36	Barrier
2	M15-002	0.00	0	0	0	0	0	0	Passable
3	M15-005	1.33	3	10	10	10	6	39	Barrier
4	M15-008	0.00	0	0	0	0	0	0	Passable
5	M15-033	2.03	0	0	0	5	6	11	Passable
6	M15-044	0.75	0	10	0	10	0	20	Barrier
7	M15-045	1.06	3	10	5	10	3	31	Barrier

NOTE: While both M15-002 & M15-008 are classed by the matrix as Passable, with a final score of 0, both are in fact collapsed wood box culverts, and barriers to fish passage. Although M15-033 is classed by the matrix as Passable with a final score of 11, it is also a barrier to fish passage.

TRIBUTARY TO DEEP CREEK

MAP NO.: 287109 **MARLIM NO.:** M15-001

STREAM NAME: TRIBUTARY TO DEEP CREEK **ROAD NAME:** UNNAMED ROAD

UTM COORDINATES: ZONE 9N 648954E 6057843N

Marlim Site No.: M15-001 was assessed on July 12th, 2015. The site was located at 2.65km on an unnamed branch of the R9050 02 0 Road in the Babine Timber Sales Area, Bulkley Watershed Group**.**

The crossing structure at this site was a closed-bottom structure (round culvert) with a diameter of 400mm, a length of 6.20m and a gradient of 4.0%. This culvert was not embedded and had a fill depth of 1.20m. There was no substrate inside the culvert, and the culvert was not backwatered. There was no inlet drop, although the culvert had an outlet drop of 0.60m.

The stream had an average channel width of 1.50m and a gradient of 15.0%. The outlet pool depth was 0.37m. There was no presence of beaver activity at this site, and no fish were observed. The valley fill at the site was deep and it was determined that this stream had medium habitat value.

Photo 2: M15-001

Description: Outlet

Direction: Upstream

TRIBUTARY TO DEEP CREEK

MAP NO.: 287113 **MARLIM NO.:** M15-002

STREAM NAME: TRIBUTARY TO DEEP CREEK **ROAD NAME:** UNNAMED ROAD

UTM COORDINATES: ZONE 9N 647870E 6057702N

Marlim Site No.: M15-002 was assessed on July 12th, 2015. The site was located at 1.22km on an unnamed branch of the R9050 02 0 Road in the Babine Timber Sales Area Bulkley Watershed Group**.**

The crossing structure at this site was an open bottom structure (wood box culvert - WBC) that had collapsed. The wood box culvert had a diameter of 450mm, a length of 8.0m and a gradient of 3.0%. The structure had a natural substrate, and was backwatered approximately 20%. The fill depth was 1.30m. The structure had settled, creating an inlet drop, and there was an outlet drop of 0.04m.

The stream had an average channel width of 1.90m and a gradient of 8.0%. The outlet pool depth was 0.36m. There was no presence of beaver activity at this site and no fish were observed. The valley fill at the site was deep and it was determined that this stream had high habitat value.

Photo 6: M15-002

Description: Barrel

Direction: Upstream

TRIBUTARY TO DEEP CREEK

MAP NO.: 284631 **MARLIM NO.:** M15-005

STREAM NAME: TRIBUTARY TO DEEP CREEK **ROAD NAME:** SOUTH DEEP CREEK ROAD

UTM COORDINATES: ZONE 9N 648711E 6056732N

Marlim Site No.: M15-005 was assessed on July 12th, 2015. The site was located at 2.02km on the South Deep Creek Road in the Babine Timber Sales Area Bulkley Watershed Group**.**

The crossing structure at this site was a closed bottom structure (round culvert) with a diameter of 1200mm, a length of 23.00m and a gradient of 9.0%. This culvert was not embedded and had a fill depth of 4.00m. There was no substrate inside the culvert, and the culvert was not backwatered. There was no inlet drop, although the culvert had an outlet drop of 0.38m.

The stream had an average channel width of 1.60m and a gradient of 9.0%. The outlet pool depth was 0.23m. There was no presence of beaver activity at this site and no fish were observed. The valley fill at the site was deep and it was determined that this stream had high habitat value.

Photo 12: M15-005

Description: Outlet

Direction: Upstream

TRIBUTARY TO DEEP CREEK

MAP NO.: 287144 **MARLIM NO.:** M15-008

STREAM NAME: TRIBUTARY TO DEEP CREEK **ROAD NAME:** UNNAMED ROAD

UTM COORDINATES: ZONE 9N 645958E 6056982N

Marlim Site No.: M15-008 was assessed on July 12th, 2015. The site was located at 0.84km on an unnamed branch of the R9050 02 0 Road in the Babine Timber Sales Area Bulkley Watershed Group**.**

The crossing structure at this site was an open bottom structure (wood box culvert - WBC) that had collapsed. The wood box culvert had a diameter of 800mm, a length of 14.0m and a gradient of 10.0%. The structure had a natural substrate, and was not backwatered. The fill depth was 8.00m. There was no inlet drop, and there was an outlet drop of 0.46m.

This crossing location also had an overflow culvert installed above the original wood box culvert. The overflow culvert was a closed-bottom structure (round culvert) with a diameter of 1200mm, a length of 7.00m and a gradient of 13.0%. This culvert was not embedded and had a fill depth of 2.00m. There was no substrate present in the culvert, and the culvert was not backwatered. There was an inlet drop of 0.30m, and there was an outlet drop of 4.80m.

The stream had an average channel width of 1.70m and a gradient of 10.0%. The outlet pool depth was 0.36m. There was no presence of beaver activity at this site and no fish were observed. The valley fill at the site was deep and it was determined that this stream had high habitat value.

Photo 16: M15-008

Description: Barrel (WBC)

Direction: Upstream

Photo 18: M15-008

Description: Outlet (WBC)

Direction: Upstream

TRIBUTARY TO MCQUARRIE CREEK

MAP NO.: 284922 **MARLIM NO.:** M15-033

STREAM NAME: TRIBUTARY TO MCQUARRIE CREEK **ROAD NAME:** HIDDEN LAKE FSR

UTM COORDINATES: ZONE 9N 650648E 6044329N

Marlim Site No.: M15-033 was assessed on July 16th, 2015. The site was located at 5.85km on the Hidden Lake Forest Service Road in the Babine Timber Sales Area Bulkley Watershed Group**.**

The crossing structure at this site was a closed-bottom structure (round culvert) with a diameter of 900mm, a length of 8.00m and a gradient of 2.0%. This culvert was embedded an average depth of 0.40m and had a fill depth of 1.60m. The substrate present in the channel included large cobble and debris, and did not closely resemble the channel. The culvert was not backwatered. There was an inlet drop present, and no outlet drop.

The stream had an average channel width of 1.80m and a gradient of 8.0%. The outlet pool depth was 0.15m. There was no presence of beaver activity at this site and no fish were observed. The valley fill at the site was shallow and it was determined that this stream had high habitat value.

Photo 28: M15-033

Description: Inlet

Direction: Downstream

STOCK CREEK

MAP NO.: 288066 **MARLIM NO.:** M15-044

STREAM NAME: STOCK CREEK **ROAD NAME:** SEINEN ROAD

UTM COORDINATES: ZONE 9N 645128E 6034596N

Marlim Site No.: M15-044 was assessed on August 18th, 2015. The site was located at 0.79km on the Seinen Road in the Babine Timber Sales Area Bulkley Watershed Group**.**

The crossing structure at this site was a closed-bottom structure (2 round culverts) with a combined diameter of 1650mm (450mm right, 1200mm left), a length of 12.00m and a gradient of 5.5%. This culvert was not embedded and had a fill depth of 3.50m. There was no substrate present in the culvert, and the culvert was backwatered 10%. There was an inlet drop, and no outlet drop.

The stream had an average channel width of 1.23m and a gradient of 4.0%. The outlet pool depth was 0.18m. There was no presence of beaver activity at this site and fish were observed, though the species was not identified. The valley fill at the site was deep and it was determined that this stream had high habitat value.

Photo 32: M15-044

Description: Outlet

Direction: Upstream

STOCK CREEK

MAP NO.: 288063 **MARLIM NO.:** M15-045

STREAM NAME: STOCK CREEK **ROAD NAME:** SEINEN ROAD

UTM COORDINATES: ZONE 9N 645104E 6034612N

Marlim Site No.: M15-045 was assessed on August 18th 2015. The site was located at 0.02km on the Seinen Road in the Babine Timber Sales Area Bulkley Watershed Group**.**

The crossing structure at this site was a closed-bottom structure (round culvert) with a diameter of 1200mm, a length of 25.00m and a gradient of 3.0%. This culvert was not embedded and had a fill depth of 8.50m. There was no substrate present in the culvert, and the culvert was not backwatered. There was no inlet drop; however, there was an outlet drop of 0.22m.

The stream had an average channel width of 1.27m and a gradient of 5.0%. The outlet pool depth was 0.07m. There was no presence of beaver activity at this site and fish were observed, though the species was not identified. The valley fill at the site was deep and it was determined that this stream had high habitat value.

Photo 39: M15-045

Description: Outlet

Direction: Upstream

ANALYSIS AND RECOMMENDATIONS

The following section contains recommendations for the stream crossing structures assessed during the course of this study. It is important to note that site assessments were completed during the summer, and stream characteristics may vary seasonally. It will be important to determine any seasonal differences in channel flow prior to confirming that a recommended site is in fact a high priority for replacement. In addition, fish sampling has not been carried out to confirm fish presence at any of the recommended crossing sites, and no field assessments have been carried out to determine the value of mapped upstream habitat. Recommendations and upstream habitat to be gained has been determined from the mapping data obtained through the Land and Resource Data Warehouse. Prior to restoration, each stream crossing should be assessed by a hydrologist and/or an engineer to determine if the recommended crossing structure will be adequately sized to convey the stream flow and to determine if any design/construction constraints exist. The species potentially present at each site have been determined from the provincial Fisheries Inventory Summary System (FISS) known species locations layer on the maps provided by BCTS. Species listed in the table below are either found in the subject channel, or in the water body the subject channel flows into.

Table 6 on the following page outlines the recommendations provided by Marlim for each selected site.

Table 6: Recommendations

Row	My Crossing Reference	Final Score	Barrier Result	Crossing Fix	Recommended Diameter or Span (meters)	Assessment Comment	Species Potentially Present
1	M15-001	36	Barrier	Removal		Active ATV rd - remove and install ford	C, CO, DV, PK, RB, SK
2	M15-002	0	Passable			Blocked in middle, needs to be removed	C, CO, DV, PK, RB, SK
3	M15-005	39	Barrier	Streambed Simulation	1.60	Culvert should be embedded	C, CO, DV, PK, RB, SK
4	M15-008	0	Passable			Box CV collapsed, overflow CV present, not passable	C, CO, DV, PK, RB, SK
5	M15-033	11	Passable	Streambed Simulation	1.80	CV blocked, water flowing under CV - Barrier	CH, CO, LNC, RB, SST, ST
6	M15-044	20	Barrier	Streambed Simulation	1.20	Currently 2 CVs, no access at low water, fish OBS	C, CC, CH, CO, SU
7	M15-045	31	Barrier	Backwater		No access at low water, fish OBS	C, CC, CH, CO, SU

BT - Bull trout (*Salvelinus confluentus*)
C - Minnow (general) (*Cyprinidae sp.*)
CC - Sculpin (general) (*Cottus spp.*)
CH - Chinook salmon (*Oncorhynchus tshawytscha*)
CO - Coho salmon (*Oncorhynchus kisutch*)
CT - Cutthroat trout (*Oncorhynchus clarkii*)
DV - Dolly varden (*Salvelinus malma malma*)
LNC - Longnose dace (*Rhinichthys cataractae*)
MW - Mountain whitefish (*Prosopium williamsoni*)
PCC - Peamouth chub (*Mylocheilus caurinus*)
PK - Pink salmon (*Oncorhynchus gorbuscha*)
RB - Rainbow trout (*Oncorhynchus mykiss*)
SA - Salmon (general) (*Ocorhynchus sp.)*
SK - Sockeye salmon (*Oncorhynchus nerka*)
SP - Unidentified species
SST - Steelhead (summer run) (*Oncorhynchus mykiss*)
ST - Steelhead (*Oncorhynchus mykiss*)
SU - Sucker (general) (*Catostomus spp.*)

TRIBUTARY TO DEEP CREEK

MAP NO.: 287109 **MARLIM NO.:** M15-001

STREAM NAME: TRIBUTARY TO DEEP CREEK **ROAD NAME:** UNNAMED ROAD

UTM COORDINATES: ZONE 9N 648954E 6057843N

Marlim Site No. M15-001 had a stream width ratio of 3.75 and a stream width ratio score of 6. The culvert length score was 0, the culvert slope score was 10, the embed score was 10 and the outlet drop score was 10.

This site received a final score of 36 and was classed as a Barrier by the scoring matrix. The potential upstream habitat length to be gained is 3.068km. The fish species potentially present at this site include Minnows (general), Coho salmon, Dolly varden, Pink salmon, Rainbow trout, and Sockeye salmon.

It is recommended that the current culvert be removed and the natural channel at the crossing site restored as the road is no longer active, and is only used by ATV traffic. It is important to note that this crossing is located 1.375km upstream of M15-005, which has also been recommended as a priority site in this report. M15-001 should only be repaired if M15-005 is repaired as well, to restore fish access from downstream.

TRIBUTARY TO DEEP CREEK

MAP NO.: 287113 **MARLIM NO.:** M15-002

STREAM NAME: TRIBUTARY TO DEEP CREEK **ROAD NAME:** UNNAMED ROAD

UTM COORDINATES: ZONE 9N 647870E 6057702N

Marlim Site No. M15-002 had a stream width ratio of 0.00 and a stream width ratio score of 0. The culvert length score was 0, the culvert slope score was 0, the embed score was 0 and the outlet drop score was 0. These scores are the automatic result of the crossing being entered into the submission spreadsheet as an open bottom structure.

This site received a final score of 0 and was classed as Passable by the scoring matrix. This is because the matrix 'assumes' that all open bottom structures must be passable – there is no option in the submission sheet to indicate that the structure has collapsed and is no longer passable. The potential upstream habitat length to be gained is 8.975km. The fish species potentially present at this site include Minnows (general), Coho salmon, Dolly varden, Pink salmon, Rainbow trout, and Sockeye salmon.

It is recommended that the current wood box culvert be removed and the natural channel restored as the road is no longer active, and is only used by ATV traffic.

TRIBUTARY TO DEEP CREEK

MAP NO.: 284631 **MARLIM NO.:** M15-005

STREAM NAME: TRIBUTARY TO DEEP CREEK **ROAD NAME:** SOUTH DEEP CREEK ROAD

UTM COORDINATES: ZONE 9N 648711E 6056732N

Marlim Site No. M15-005 had a stream width ratio of 1.33 and a stream width ratio score of 6. The culvert length score was 3, the culvert slope score was 10, the embed score was 10 and the outlet drop score was 10.

This site received a final score of 39 and was classed as a Barrier by the scoring matrix. The potential upstream habitat length to be gained is 4.375km. The fish species potentially present at this site include Minnows (general), Coho salmon, Dolly varden, Pink salmon, Rainbow trout, and Sockeye salmon.

It is recommended that the current culvert be replaced with a properly embedded round culvert with a minimum diameter of 1.60m.

TRIBUTARY TO DEEP CREEK

MAP NO.: 287144 **MARLIM NO.:** M15-008

STREAM NAME: TRIBUTARY TO DEEP CREEK **ROAD NAME:** UNNAMED ROAD

UTM COORDINATES: ZONE 9N 645958E 6056982N

Marlim Site No. M15-008 had a stream width ratio of 0.00 and a stream width ratio score of 0. The culvert length score was 0, the culvert slope score was 0, the embed score was 0 and the outlet drop score was 0. These scores are the automatic result of the crossing being entered into the submission spreadsheet as an open bottom structure.

This site received a final score of 0 and was classed as Passable by the scoring matrix. This is because the matrix 'assumes' that all open bottom structures must be passable – there is no option in the submission sheet to indicate that the structure has collapsed and is no longer passable. The potential upstream habitat length to be gained is 20.829km. The fish species potentially present at this site include Minnows (general), Coho salmon, Dolly varden, Pink salmon, Rainbow trout, and Sockeye salmon.

It is recommended that the current wood box culvert and secondary overflow round culvert be removed and the natural channel restored as the road is no longer active, and is only used by ATV traffic.

TRIBUTARY TO MCQUARRIE CREEK

MAP NO.: 284922 **MARLIM NO.:** M15-033

STREAM NAME: TRIBUTARY TO MCQUARRIE CREEK **ROAD NAME:** HIDDEN LAKE FSR

UTM COORDINATES: ZONE 9N 650648E 6044329N

Marlim Site No. M15-033 had a stream width ratio of 2.03 and a stream width ratio score of 6. The culvert length score was 0, the culvert slope score was 5, the embed score was 0 and the outlet drop score was 0.

This site received a final score of 11 and was classed as Passable by the scoring matrix. However, the matrix result does not accurately reflect the situation at the site. The channel is no

longer flowing through the culvert, and instead is flowing underneath it, creating the potential for the road to collapse. The potential upstream habitat length to be gained is 2.310km. The fish species potentially present at this site include Chinook salmon, Coho salmon, Longnose dace, Rainbow trout, Steelhead, Steelhead (summer run).

It is recommended that the current culvert be replaced with an open bottom structure or properly embedded oval culvert with a minimum diameter of 1.80m

STOCK CREEK

MAP NO.: 288066 **MARLIM NO.:** M15-044

STREAM NAME: STOCK CREEK **ROAD NAME:** SEINEN ROAD

UTM COORDINATES: ZONE 9N 645128E 6034596N

Marlim Site No. M15-044 had a stream width ratio of 0.75 and a stream width ratio score of 0. The culvert length score was 0, the culvert slope score was 10, the embed score was 10 and the outlet drop score was 0.

This site received a final score of 20 and was classed as a Barrier by the scoring matrix. The potential upstream habitat length to be gained is 9.604km. The fish species potentially present at this site include Minnows (general), Sculpin (general), Chinook salmon, Coho salmon, and Suckers (general).

The existing primary culvert is potentially passable at high water. However, the barrel is beginning to rot out and the secondary culvert is blocked and non-functional, and is also rotted out. Fish (unidentified species) were observed at the culvert, and it is located on a red (fish bearing) channel. It is recommended that these two culverts be replaced with a properly embedded round culvert with a minimum diameter of 1.2m. Note that this crossing is located immediately downstream of M15-045 (also recommended in this report) and should only be replaced if the fish passage issues at M15-045 are addressed as well.

STOCK CREEK

MAP NO.: 288063 **MARLIM NO.:** M15-045

STREAM NAME: STOCK CREEK **ROAD NAME:** SEINEN ROAD

UTM COORDINATES: ZONE 9N 645104E 6034612N

Marlim Site No. M15-045 had a stream width ratio of 1.06 and a stream width ratio score of 3. The culvert length score was 3, the culvert slope score was 10, the embed score was 10 and the outlet drop score was 5.

This site received a final score of 31 and was classed as a Barrier by the scoring matrix. The potential upstream habitat length to be gained is 9.604km. The fish species potentially present at this site include Minnows (general), Sculpin (general), Chinook salmon, Coho salmon, and Suckers (general).

The existing culvert is adequately sized for the channel, but is creating a barrier to fish passage primarily due to its length, and the fact it is not embedded. It is recommended that the culvert be backwatered, and baffles installed if necessary to facilitate fish passage at this location. Fish were observed at the site, and the crossing is located on a red (fish bearing) channel. Note that this crossing is located immediately upstream of M14-044 (also recommended in this report) and should only be replaced if the fish passage issues at M15-044 are addressed as well.

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CONCLUSIONS

A total of 87 crossing sites were assessed for this contract in 2015. Of the 62 sites that existed, 29 (47%) were classed as barriers by the scoring matrix. A total of 25 of the sites assessed (29%) did not exist as mapped. The 7 sites recommended in this report for removal or replacement are considered to be the top 7 most beneficial for restoring fish access if removed, replaced, or upgraded as recommended in this report. Stream crossing structures, especially closed bottom structures and collapsed wood box culverts appear to be a significant issue for fish passage in the Babine Timber Sales Area, while mapping records need to be updated to remove crossings that do not in fact exist.

APPENDIX I

PHOTOGRAPHIC LOG

M15-001, Row 1 - All Tables

Photo 1: M15-001

Description: Barrel

Direction: Upstream

Photo 2: M15-001

Description: Outlet

Direction: Upstream

M15-001, Row 1 - All Tables

Photo 3: M15-001

Description: Downstream channel

Direction: Downstream

Photo 4: M15-001

Description: Inlet

Direction: Downstream

M15-001, Row 1 - All Tables

Photo 5: M15-001

Description: Upstream channel

Direction: Upstream

M15-002, Row 2 - All Tables

Photo 6: M15-002

Description: Barrel

Direction: Upstream

Photo 7: M15-002

Description: Outlet

Direction: Upstream

M15-002, Row 2 - All Tables

Photo 8: M15-002

Description: Downstream channel

Direction: Downstream

Photo 9: M15-002

Description: Inlet

Direction: Downstream

M15-002, Row 2 - All Tables

Photo 10: M15-002

Description: Upstream channel

Direction: Upstream

M15-005, Row 3 - All Tables

Photo 11: M15-005

Description: Barrel

Direction: Upstream

Photo 12: M15-005

Description: Outlet

Direction: Upstream

M15-005, Row 3 - All Tables

Photo 13: M15-005

Description: Downstream channel

Direction: Downstream

Photo 14: M15-005

Description: Inlet

Direction: Downstream

M15-005, Row 3 - All Tables

Photo 15: M15-005

Description: Upstream channel

Direction: Upstream

M15-008, Row 4 - All Tables

Photo 16: M15-008

Description: Barrel (WBC)

Direction: Upstream

Photo 17: M15-008

Description: Barrel (overflow culvert)

Direction: Upstream

M15-008, Row 4 - All Tables

Photo 18: M15-008

Description: Outlet (WBC)

Direction: Upstream

Photo 19: M15-008

Description: Outlet (overflow culvert)

Direction: Upstream

M15-008, Row 4 - All Tables

Photo 20: M15-008

Description: Downstream channel

Direction: Downstream

Photo 21: M15-008

Description: Inlet (WBC)

Direction: Downstream

M15-008, Row 4 - All Tables

Photo 22: M15-008

Description: Inlet (overflow culvert)

Direction: Downstream

Photo 23: M15-008

Description: Upstream channel, impacted by cattle use

Direction: Upstream

M15-008, Row 4 - All Tables

Photo 24: M15-008

Description: Upstream channel, undisturbed

Direction: Upstream

M15-033, Row 5 - All Tables

Photo 25: M15-033

Description: Barrel

Direction: Upstream

Photo 26: M15-033

Description: Outlet

Direction: Upstream

M15-033, Row 5 - All Tables

Photo 27: M15-033

Description: Downstream channel

Direction: Downstream

Photo 28: M15-033

Description: Inlet

Direction: Downstream

M15-033, Row 5 - All Tables

Photo 29: M15-033

Description: Upstream channel

Direction: Upstream

M15-044, Row 6 - All Tables

Photo 30: M15-044

Description: Barrel, left

Direction: Upstream

Photo 31: M15-044

Description: Barrel, right

Direction: Upstream

M15-044, Row 6 - All Tables

Photo 32: M15-044

Description: Outlet

Direction: Upstream

Photo 33: M15-044

Description: Downstream channel

Direction: Downstream

M15-044, Row 6 - All Tables

Photo 34: M15-044

Description: Inlet, left

Direction: Downstream

Photo 35: M15-044

Description: Inlet, right

Direction: Downstream

M15-044, Row 6 - All Tables

Photo 36: M15-044

Description: Upstream channel

Direction: Upstream

M15-045, Row 7 - All Tables

Photo 37: M15-045

Description: Barrel

Direction: Upstream

Photo 38: M15-045

Description: Outlet

Direction: Upstream

M15-045, Row 7 - All Tables

Photo 39: M15-045

Description: Downstream channel

Direction: Downstream

Photo 40: M15-045

Description: Inlet

Direction: Downstream

M15-045, Row 7 - All Tables

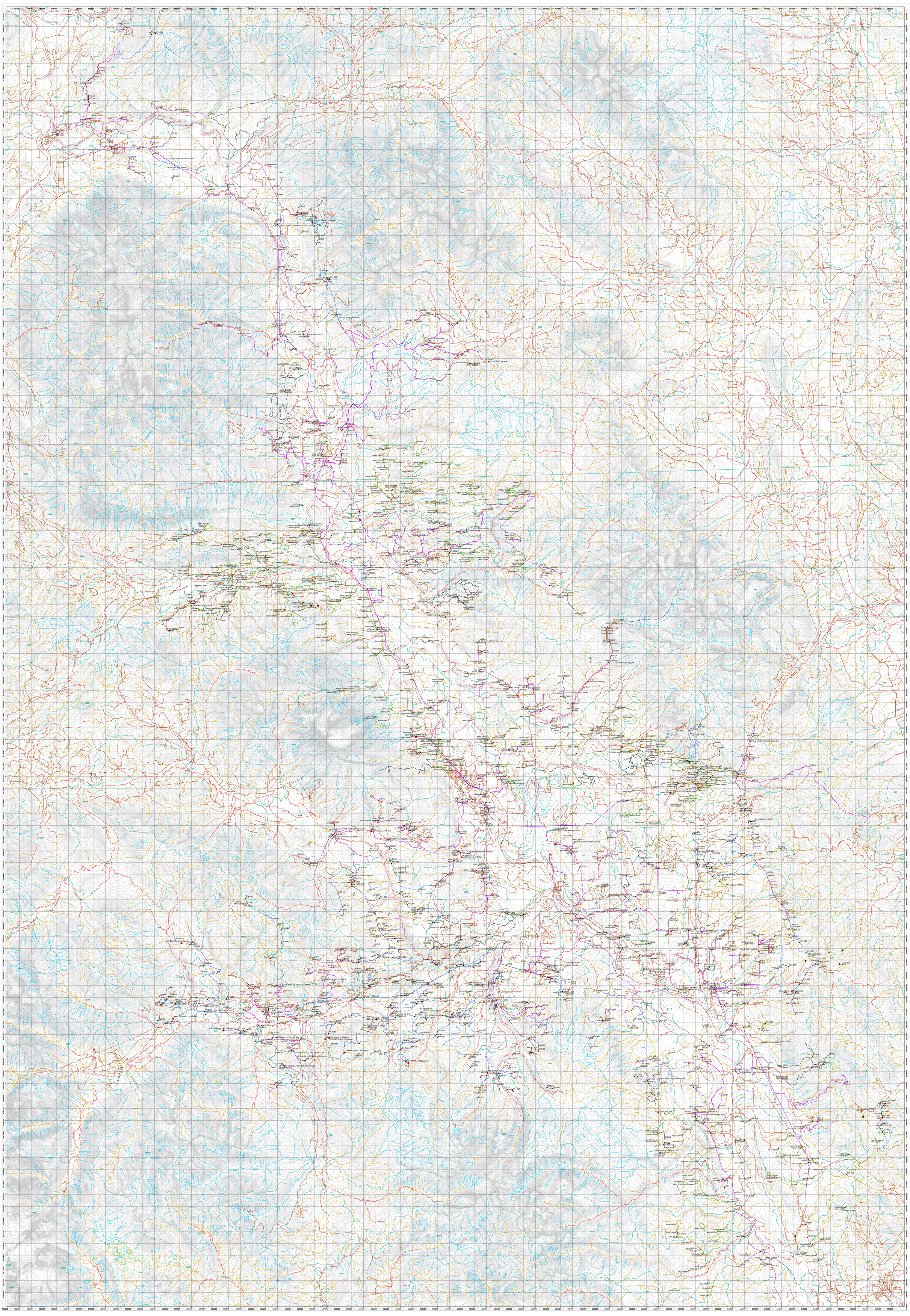
Photo 41: M15-045

Description: Upstream channel

Direction: Upstream

APPENDIX II

OVERVIEW MAP
DIGITAL VERSION ONLY



Legend

Crossing Status by Year

2012	2013	2014	2015
Barrier	Barrier	Barrier	Barrier
Priority	Priority	Priority	Priority
Passable	Passable	Passable	Passable
Potential	Potential	Potential	Potential
Unknown	Unknown	Unknown	Unknown
DNE	DNE	DNE	DNE

DNB
No Assessment Required*
Access Data

Roads
- Unassessed
- Inaccessible
- Assessed 2012
- Assessed 2013
- Assessed 2014
- Assessed 2015

Fish Habitat
- None
- Inferred
- Observed
- Lakes

Watersheds
- Boundary
- 5005 Label

N

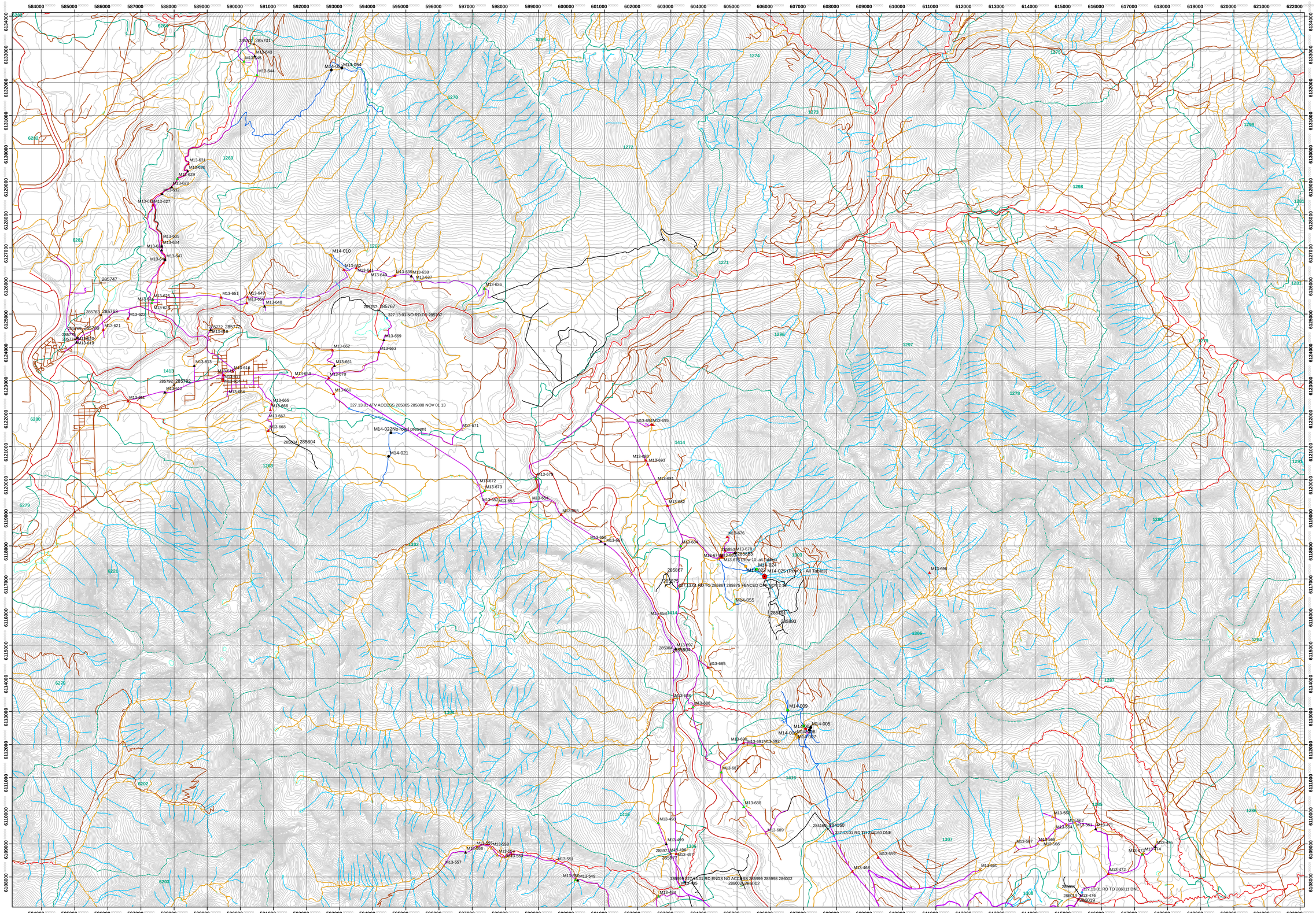
0 345690 1,380 2,070 2,760 Meters

1:50,000

*Sites that are either: inaccessible due to overgrown roads or denied permission from landowner, or have no downstream channel.

PLEASE NOTE Data points as mapped correspond to field data while road and stream layers were obtained through the Land and Resource Data Warehouse. Field data points do not always match up exactly with mapped streams and roads. Duplicate road layers in the maps created by Marlim are due to using both FTEN and DRA road layers, in order to map the complete road network. Some overlap is present between the layers.

MARLIM ECOLOGICAL CONSULTING LTD.	Fish Passage Culvert Investigations - Babine TSA Contract: EN15TAH414	Date: November 2015	Map Title: Overview
	MarLim Ecological Consulting Ltd. Phone/Fax: 604-531-4338 Web: www.marlimecological.com Email: mail@marlimecological.com	Project: 327.14.01	Page: 1



Legend

Crossing Status by Year

2012	2013	2014	2015
Barrier	Barrier	Barrier	Barrier
Priority	Priority	Priority	Priority
Passable	Passable	Passable	Passable
Potential	Potential	Potential	Potential
Unknown	Unknown	Unknown	Unknown
DNE	DNE	DNE	DNE

All Years: Access Data; No Assessment Required*

Roads
- Unassessed
- Inaccessible
- Assessed 2012
- Assessed 2013
- Assessed 2014
- Assessed 2015

Fish Habitat
- None
- Inferred
- Observed
- Lakes

Contours
- 20m Interval

Watersheds
- Boundary
- 5005 Label

N

0 375 750 1,500 2,250 3,000 Meters

1:50,000

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Contract: EN15TAH414

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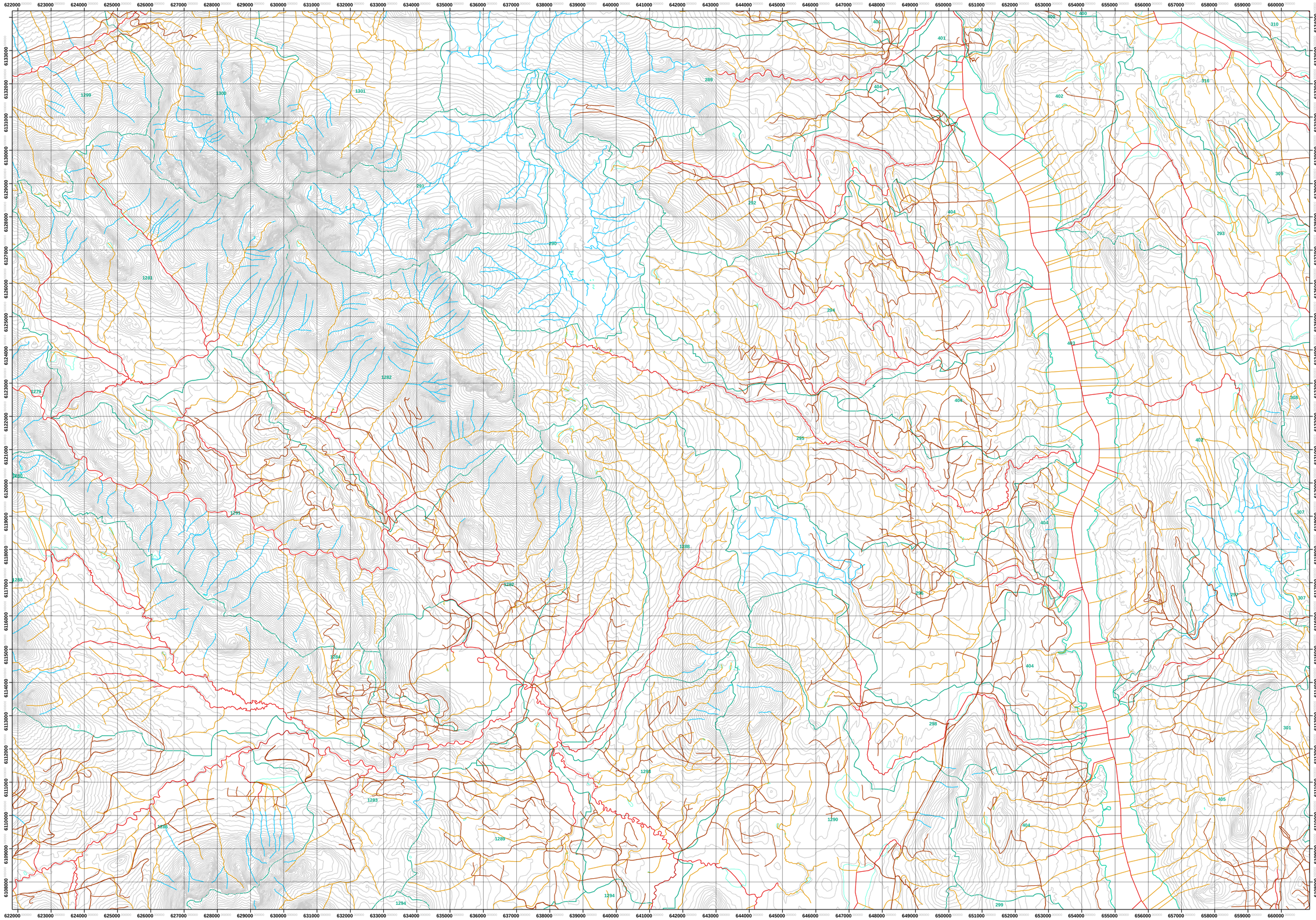
Date: November 2015	Map Title: Overview Tile A
Project: 327.15.01	Page: 2



Legend

Crossing Status by Year

2012	2013	2014	2015
Barrier	Barrier	Barrier	Barrier
Potential	Potential	Potential	Potential
Priority	Priority	Priority	Priority
Unknown	Unknown	Unknown	Unknown
Passable	Passable	Passable	Passable
DNE	DNE	DNE	DNE

All Years: Access Data; No Assessment Required*

Roads
- Unassessed
- Inaccessible
- Assessed 2012
- Assessed 2013
- Assessed 2014
- Assessed 2015

Fish Habitat
- None
- Inferred
- Observed
- Lakes

Contours
- 20m Interval

Watersheds
- Boundary
- 5005 Label

N

0 375 750 1,500 2,250 3,000 Meters

1:50,000

PLEASE NOTE Data points as mapped correspond to field data while road and stream layers were obtained through the Land and Resource Data Warehouse. Field data points do not always match up exactly with mapped streams and roads.
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Date: November 2015

Map Title: Overview Tile B

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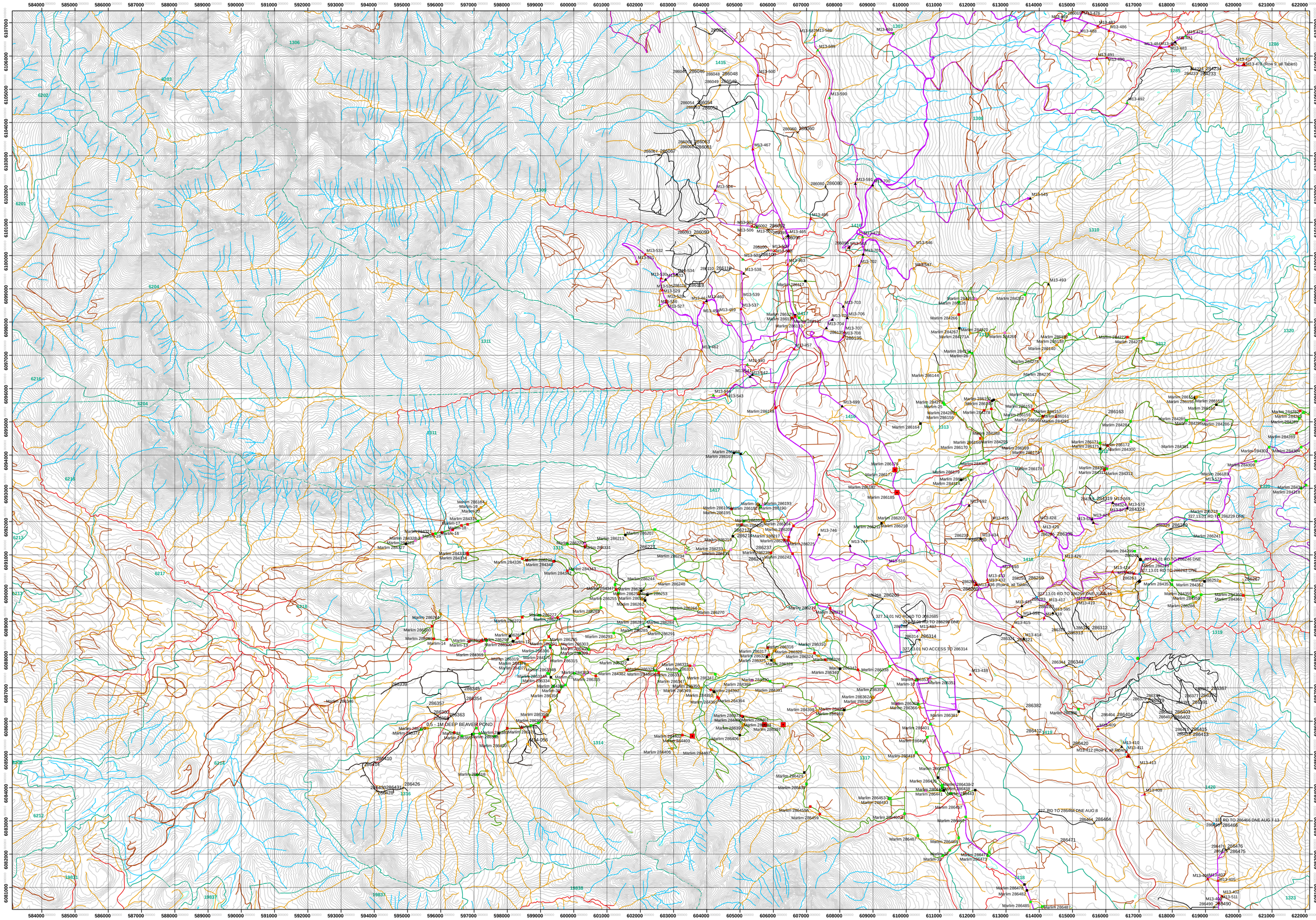
Page: 3



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Crossing Status by Year

2012	2013	2014	2015
Barrier	Barrier	Barrier	Barrier
Priority	Priority	Priority	Priority
Passable	Passable	Passable	Passable
Potential	Potential	Potential	Potential
Unknown	Unknown	Unknown	Unknown
DNE	DNE	DNE	DNE

All Years: Access Data; No Assessment Required*

Roads

- Unassessed
- Inaccessible
- Assessed 2012
- Assessed 2013
- Assessed 2014
- Assessed 2015

Fish Habitat

- None
- Inferred
- Observed
- Lakes

Contours

- 20m Interval

Watersheds

- Boundary
- 5005 Label

N

0 375 750 1,500 2,250 3,000 Meters

1:50,000

PLEASE NOTE Data points as mapped correspond to field data while road and stream layers were obtained through the Land and Resource Data Warehouse. Field data points do not always match up exactly with mapped streams and roads.
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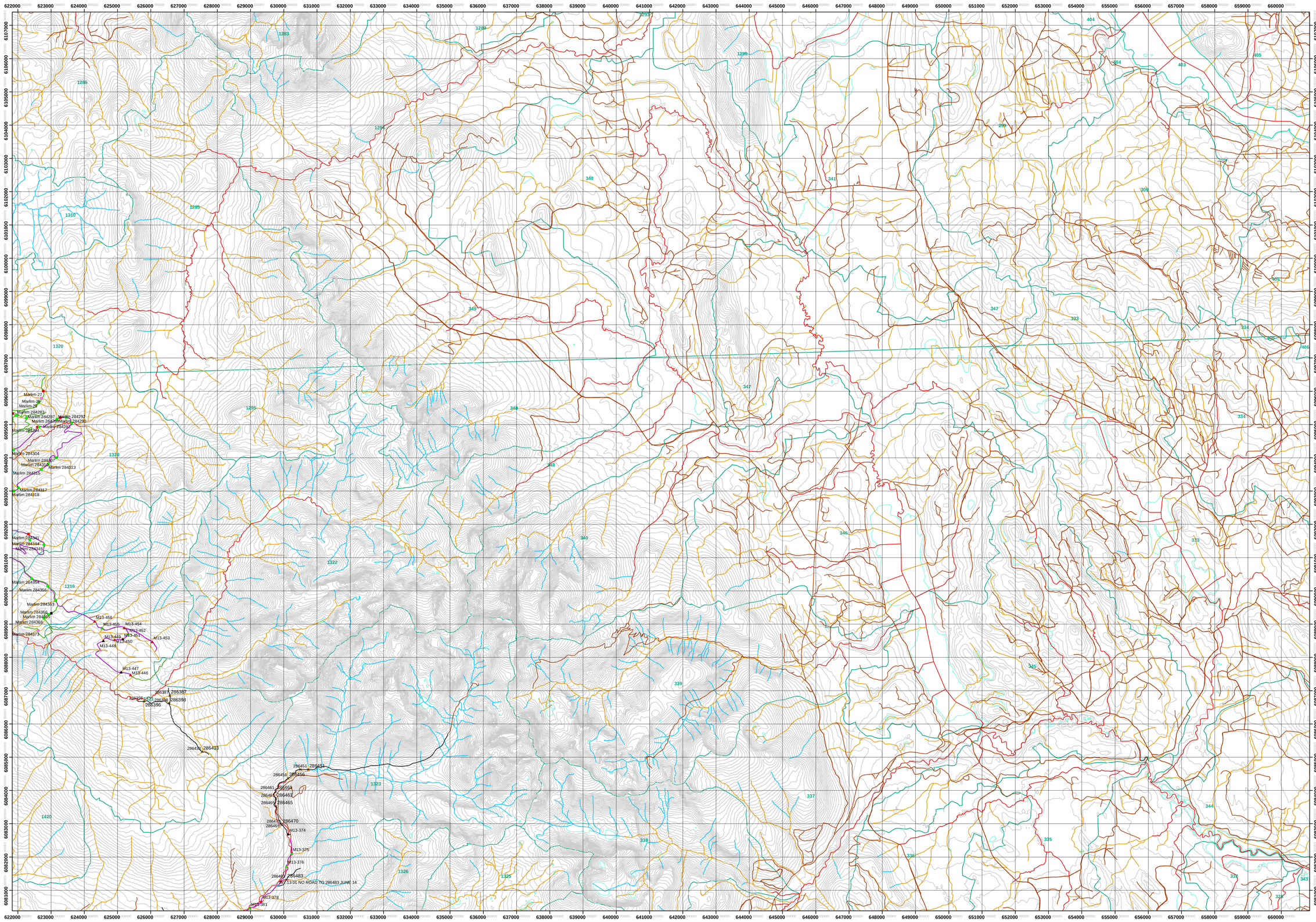
Date: November 2015

Map Title: Overview Tile C

Project: 327.15.01



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Crossing Status by Year

2012	2013	2014	2015
Barrier	Barrier	Barrier	Barrier
Potential	Potential	Potential	Potential
Priority	Priority	Priority	Priority
Unknown	Unknown	Unknown	Unknown
Passable	Passable	Passable	Passable
DNE	DNE	DNE	DNE

All Years: Access Data; No Assessment Required*

Roads
- Unassessed
- Inaccessible
- Assessed 2012
- Assessed 2013
- Assessed 2014
- Assessed 2015

Fish Habitat
- None
- Inferred
- Observed
- Lakes

Contours
- 20m Interval

Watersheds
- Boundary
- 5005 Label

N

0 375 750 1,500 2,250 3,000 Meters

1:50,000

PLEASE NOTE Data points as mapped correspond to field data while road and stream layers were obtained through the Land and Resource Data Warehouse. Field data points do not always match up exactly with mapped streams and roads.
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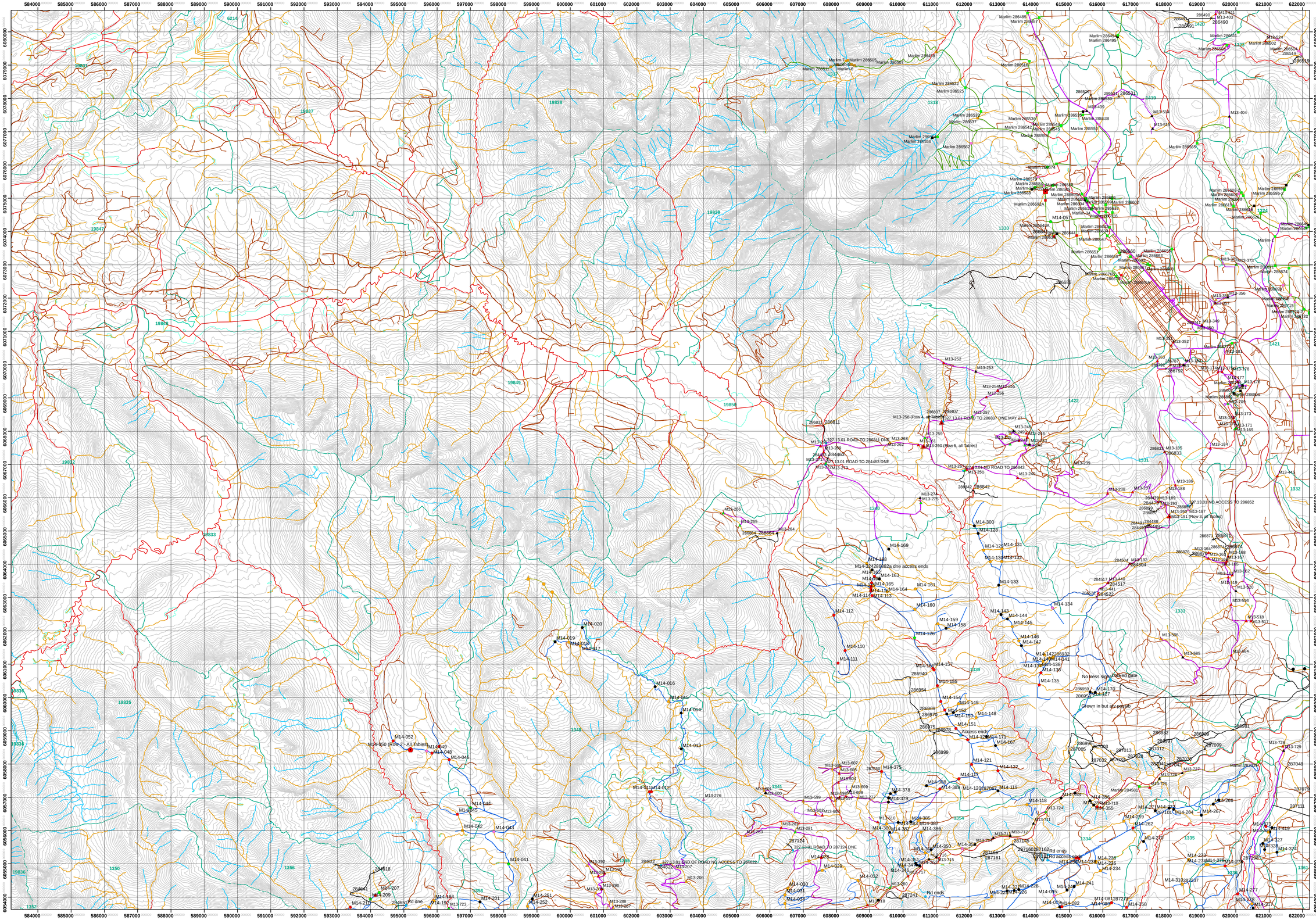

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Crossing Status by Year

	2012	2013	2014	2015
	Barrier	Barrier	Barrier	Barrier
	Potential	Potential	Potential	Potential
	Priority	Priority	Priority	Priority
	Unknown	Unknown	Unknown	Unknown
	Passable	Passable	Passable	Passable
	DNE	DNE	DNE	DNE

All Years: Access Data; No Assessment Required*

Roads
- Unassessed
- Inaccessible
- Assessed 2012
- Assessed 2013
- Assessed 2014
- Assessed 2015

Fish Habitat
- None
- Inferred
- Observed
- Lakes

Contours
- 20m Interval

Watersheds
- Boundary
- 5005 Label

0 375 750 1,500 2,250 3,000 Meters

1:50,000

PLEASE NOTE Data points as mapped correspond to field data while road and stream layers were obtained through the Land and Resource Data Warehouse. Field data points do not always match up exactly with mapped streams and roads.
Duplicate road layers in the maps created by Marlim are due to using both FTEN and DRA road layers, in order to map the complete road network. Some overlap is present between the layers.

*Sites that are either: inaccessible due to overgrown roads or denied permission from landowner, or have no downstream channel.

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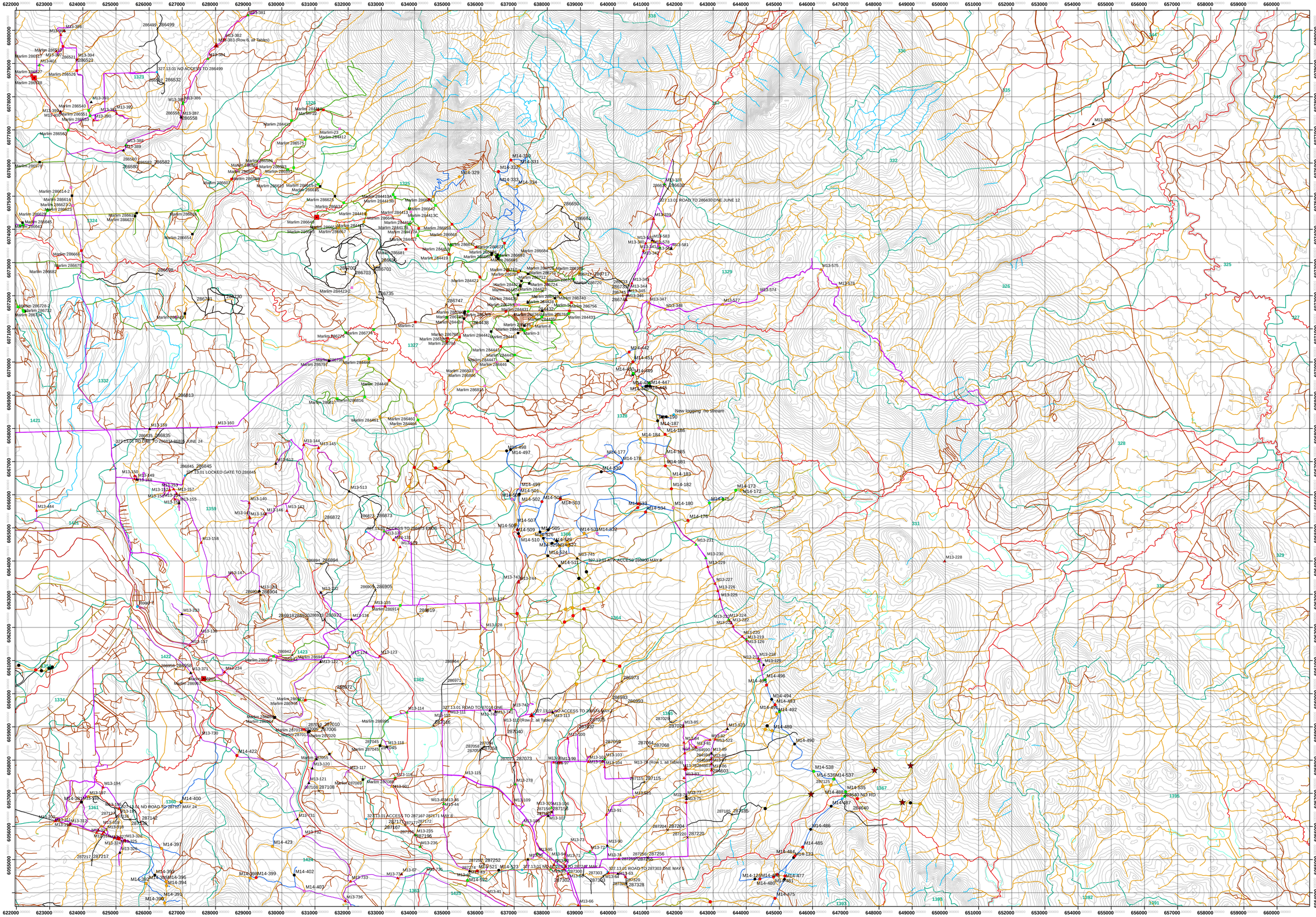
Map Title: Overview Tile E

Project: 327.15.01

Page: 6



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Crossing Status by Year

	2012	2013	2014	2015
Barrier	Potential	Barrier	Potential	Barrier	Potential	Barrier	Potential
Priority	Unknown	Priority	Unknown	Priority	Unknown	Priority	Unknown
Passable	DNE	Passable	DNE	Passable	DNE	Passable	DNE

All Years: Access Data; No Assessment Required*

Roads
- Unassessed
- Inaccessible
- Assessed 2012
- Assessed 2013
- Assessed 2014
- Assessed 2015

Fish Habitat
- None
- Inferred
- Observed
- Lakes

Contours
- 20m Interval

Watersheds
- Boundary
- 5005 Label

N

0 375 750 1,500 2,250 3,000 Meters

1:50,000

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*Sites that are either: inaccessible due to overgrown roads or denied permission from landowner, or have no downstream channel.

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Contract: EN15TAH414

Date: November 2015

Map Title: Overview Tile F

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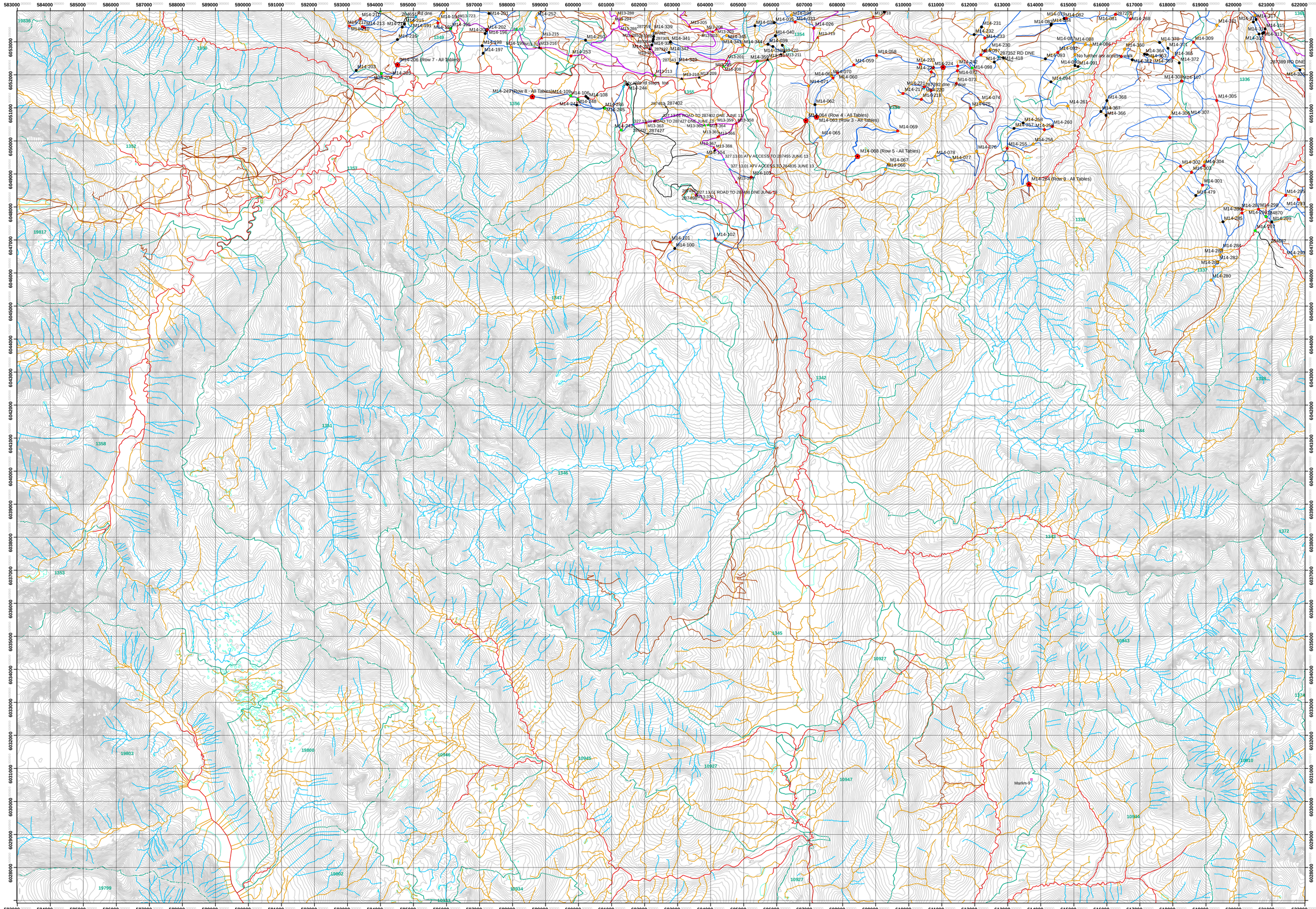
Page: 7



Legend

Crossing Status by Year

2012	2013	2014	2015
Barrier	Barrier	Barrier	Barrier
Priority	Priority	Priority	Priority
Passable	Passable	Passable	Passable
Potential	Potential	Potential	Potential
Unknown	Unknown	Unknown	Unknown
DNE	DNE	DNE	DNE

All Years: Access Data; No Assessment Required*

Roads
- Unassessed
- Inaccessible
- Assessed 2012
- Assessed 2013
- Assessed 2014
- Assessed 2015

Fish Habitat
- None
- Inferred
- Observed
- Lakes

Contours
- 20m Interval

Watersheds
- Boundary
- 5005 Label

0 375 750 1,500 2,250 3,000 Meters

1:50,000

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Fish Passage Culvert Investigations - Babine TSA

Contract: EN15TAH414

Date: November 2015

Map Title: Overview Tile G

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Project: 327.15.01

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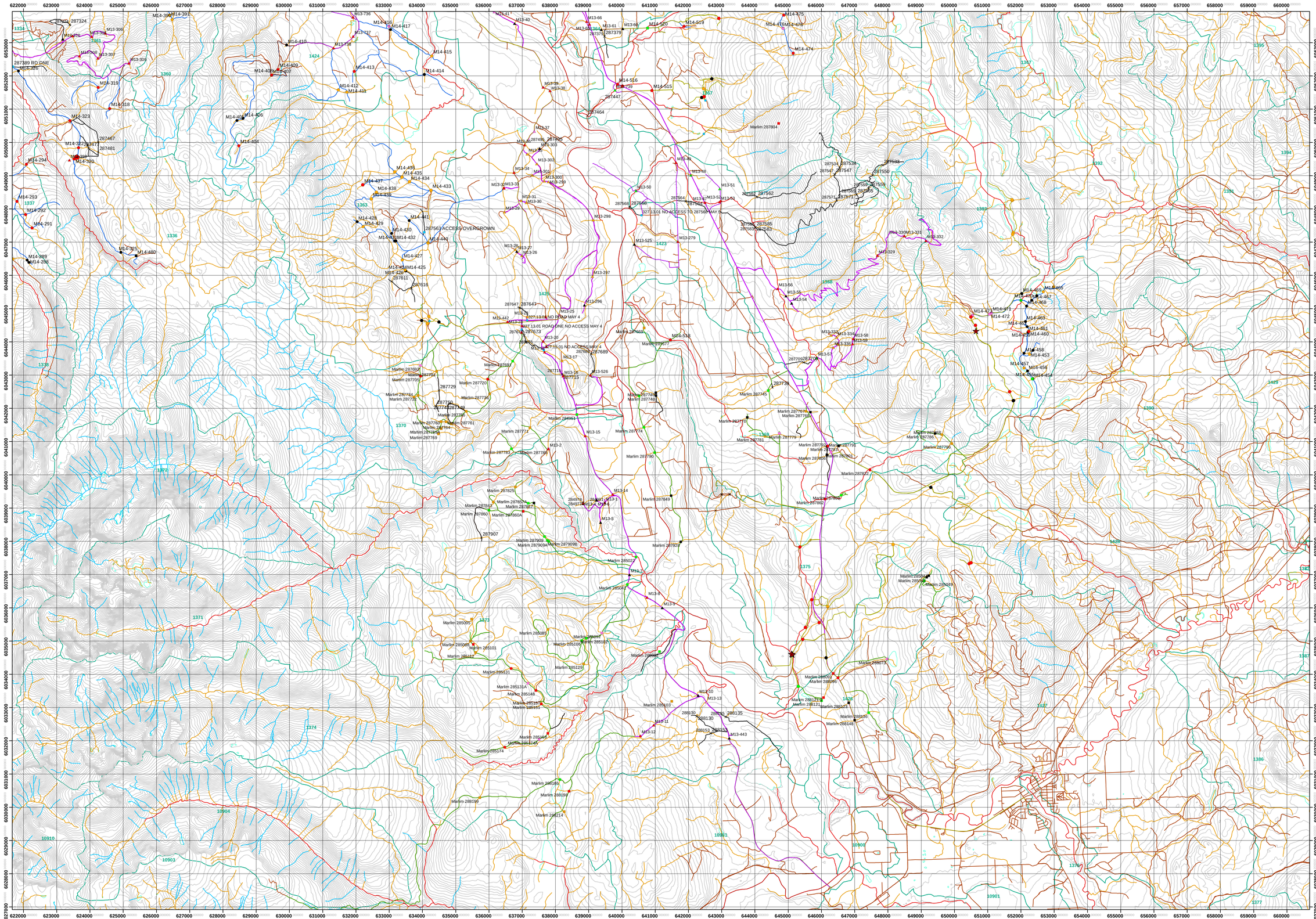

Legend

Crossing Status by Year

2012	2013	2014	2015
Barrier	Barrier	Barrier	Barrier
Priority	Priority	Priority	Priority
Passable	Passable	Passable	Passable
Potential	Potential	Potential	Potential
Unknown	Unknown	Unknown	Unknown
DNE	DNE	DNE	DNE

All Years: Access Data; No Assessment Required*

Roads
- Unassessed
- Inaccessible
- Assessed 2012
- Assessed 2013
- Assessed 2014
- Assessed 2015

Fish Habitat
- None
- Inferred
- Observed
- Lakes

Contours
- 20m Interval

Watersheds
- Boundary
- 5005 Label

N

0 375 750 1,500 2,250 3,000 Meters

1:50,000

PLEASE NOTE Data points as mapped correspond to field data while road and stream layers were obtained through the Land and Resource Data Warehouse. Field data points do not always match up exactly with mapped streams and roads.
Duplicate road layers in the maps created by Marlim are due to using both FTEN and DRA road layers, in order to map the complete road network. Some overlap is present between the layers.

*Sites that are either: inaccessible due to overgrown roads or denied permission from landowner, or have no downstream channel.

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Fish Passage Culvert Investigations - Babine TSA

Contract: EN15TAH414

Date: November 2015

Map Title: Overview Tile H

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Project: 327.15.01

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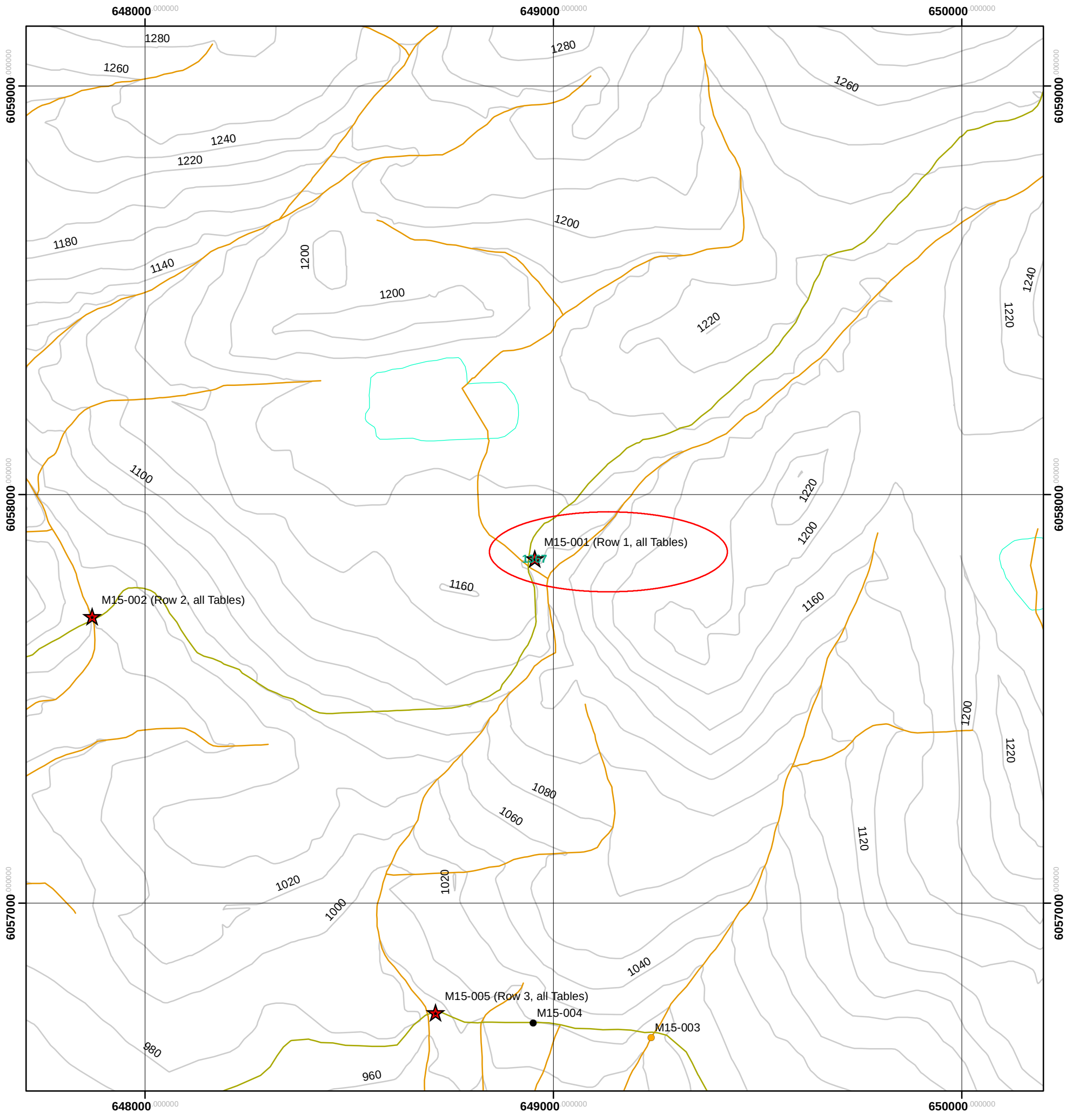
APPENDIX III

SITE MAPS



PLEASE NOTE Data points as mapped correspond to field data while road and stream layers were obtained through the Land and Resource Data Warehouse. Field data points do not always match up exactly with mapped streams and roads. Duplicate road layers in the maps created by Marlim are due to using both FTEN and DRA road layers, in order to map the complete road network. Some overlap is present between the layers.

Legend

Crossing Status by Year

2012	2013	2014	2015
Barrier	Barrier	Barrier	Barrier
Priority	Priority	Priority	Priority
Passable	Passable	Passable	Passable
Potential	Potential	Potential	Potential
Unknown	Unknown	Unknown	Unknown
DNE	DNE	DNE	DNE

*Sites that are either: inaccessible due to overgrown roads or denied permission from landowner, or have no downstream channel.

× No Assessment Required*

Access Data

Roads

- Unassessed
- Inaccessible
- Assessed 2012
- Assessed 2013
- Assessed 2014
- Assessed 2015

Fish Habitat

- None
- Inferred
- Observed
- Lakes

Watersheds

- Boundary
- 5005 Label

Contours

- 20m Interval

N

0 75 150 300 450 600 Meters

1:10,000

MARLIM ECOLOGICAL CONSULTING LTD

Fish Passage Culvert Investigations - Babine TSA

Contract: EN15TAH414

Date: November 2015

Map Title: M15-001

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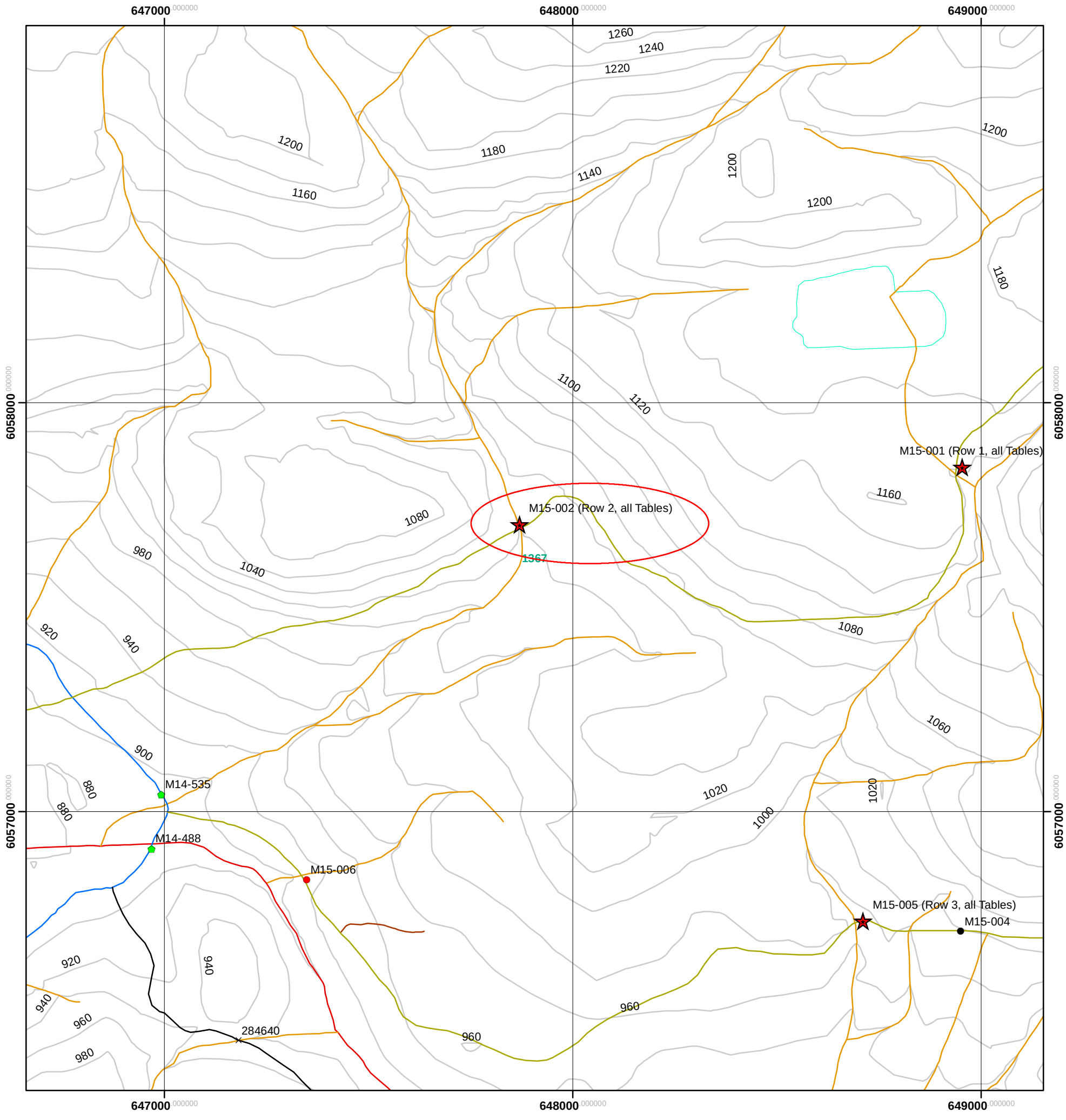

PLEASE NOTE Data points as mapped correspond to field data while road and stream layers were obtained through the Land and Resource Data Warehouse. Field data points do not always match up exactly with mapped streams and roads. Duplicate road layers in the maps created by Marlim are due to using both FTEN and DRA road layers, in order to map the complete road network. Some overlap is present between the layers.

Legend

Crossing Status by Year

2012	2013	2014	2015
Barrier	Barrier	Barrier	Barrier
Priority	Priority	Priority	Priority
Passable	Passable	Passable	Passable
Potential	Potential	Potential	Potential
Unknown	Unknown	Unknown	Unknown
DNE	DNE	DNE	DNE

*Sites that are either: inaccessible due to overgrown roads or denied permission from landowner, or have no downstream channel.

× No Assessment Required*

Access Data

Roads

- Unassessed
- Inaccessible
- Assessed 2012
- Assessed 2013
- Assessed 2014
- Assessed 2015

Fish Habitat

- None
- Inferred
- Observed
- Lakes

Watersheds

- Boundary
- 5005 Label

Contours

- 20m Interval

N

0 75 150 300 450 600 Meters

1:10,000

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Fish Passage Culvert Investigations - Babine TSA

Contract: EN15TAH414

Date: November 2015

Map Title: M15-002

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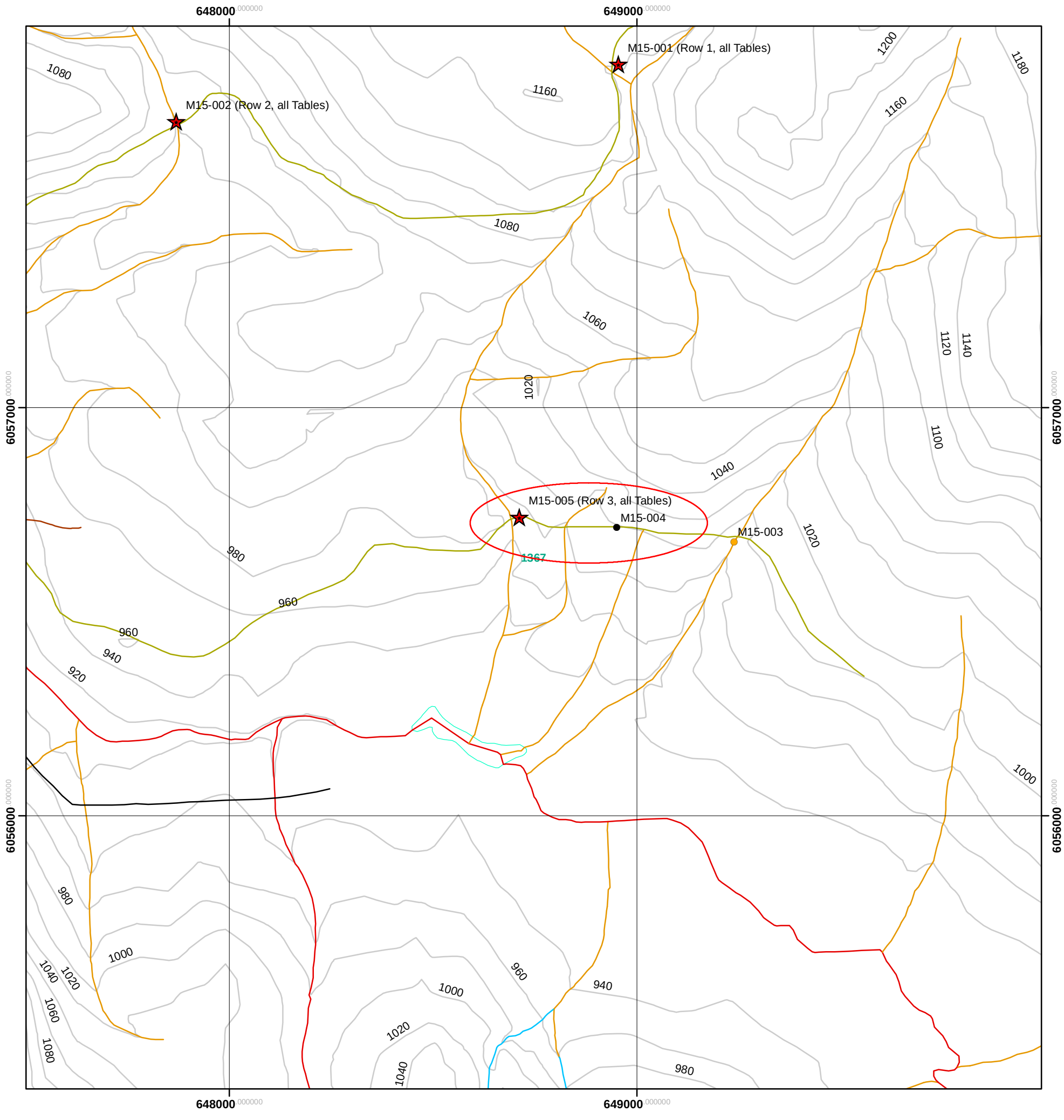

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Legend

Crossing Status by Year

2012	2013	2014	2015
Barrier	Barrier	Barrier	Barrier
Priority	Priority	Priority	Priority
Passable	Passable	Passable	Passable
Potential	Potential	Potential	Potential
Unknown	Unknown	Unknown	Unknown
DNE	DNE	DNE	DNE

*Sites that are either: inaccessible due to overgrown roads or denied permission from landowner, or have no downstream channel.

× No Assessment Required*

Access Data

Roads

- Unassessed
- Inaccessible
- Assessed 2012
- Assessed 2013
- Assessed 2014
- Assessed 2015

Fish Habitat

- None
- Inferred
- Observed
- Lakes

Watersheds

- Boundary
- 5005 Label

Contours

- 20m Interval

N

0 75 150 300 450 600 Meters

1:10,000

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Fish Passage Culvert Investigations - Babine TSA

Contract: EN15TAH414

Date: November 2015

Map Title: M15-005

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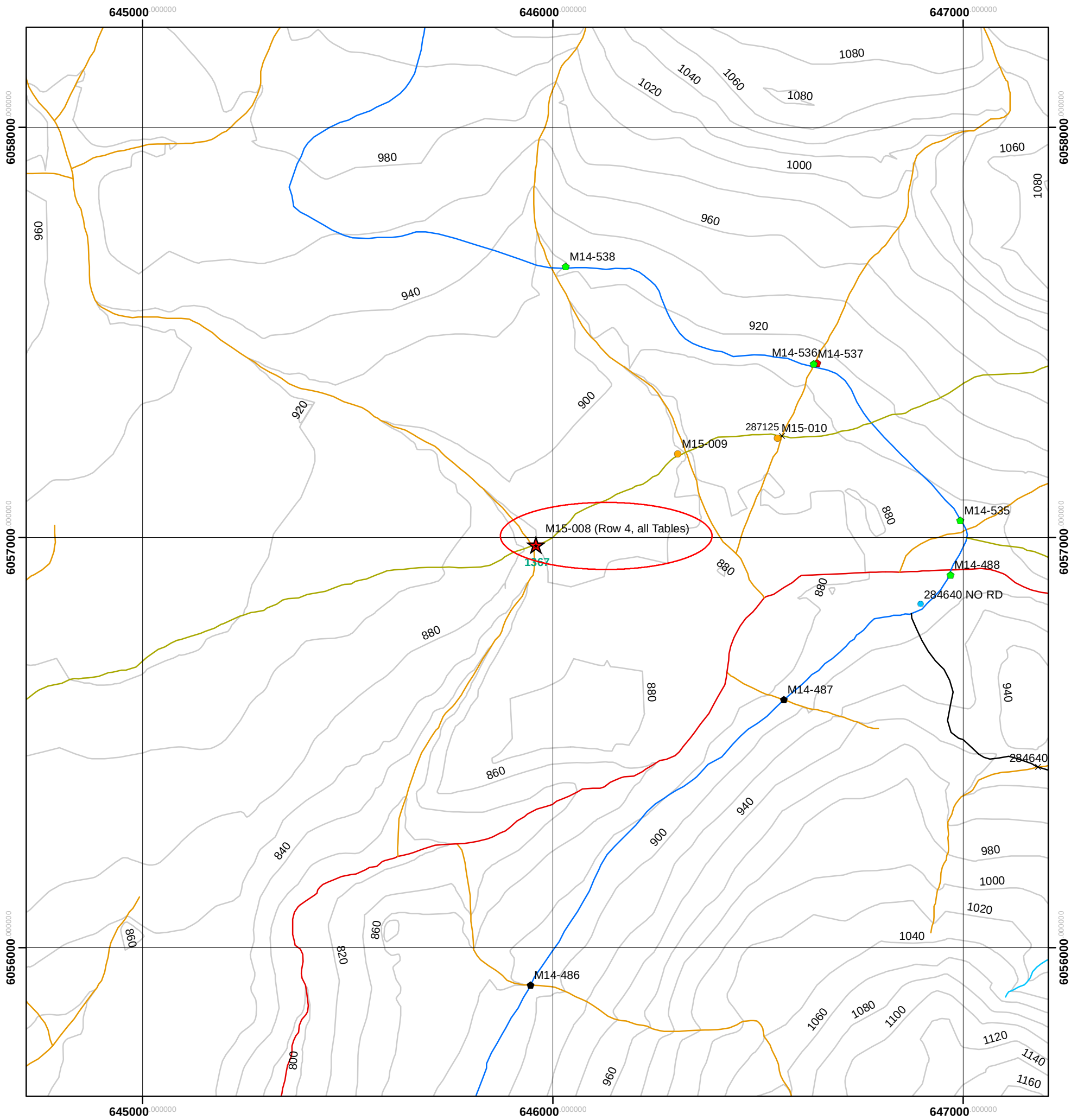

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Legend

Crossing Status by Year

2012	2013	2014	2015
Barrier	Barrier	Barrier	Barrier
Priority	Priority	Priority	Priority
Passable	Passable	Passable	Passable
Potential	Potential	Potential	Potential
Unknown	Unknown	Unknown	Unknown
DNE	DNE	DNE	DNE

*Sites that are either: inaccessible due to overgrown roads or denied permission from landowner, or have no downstream channel.

× No Assessment Required*

Access Data

Roads

- Unassessed
- Inaccessible
- Assessed 2012
- Assessed 2013
- Assessed 2014
- Assessed 2015

Fish Habitat

- None
- Inferred
- Observed
- Lakes

Watersheds

- Boundary
- 5005 Label

Contours

- 20m Interval

N

0 75 150 300 450 600 Meters

1:10,000

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Fish Passage Culvert Investigations - Babine TSA

Contract: EN15TAH414

Date: November 2015

Map Title: M15-008

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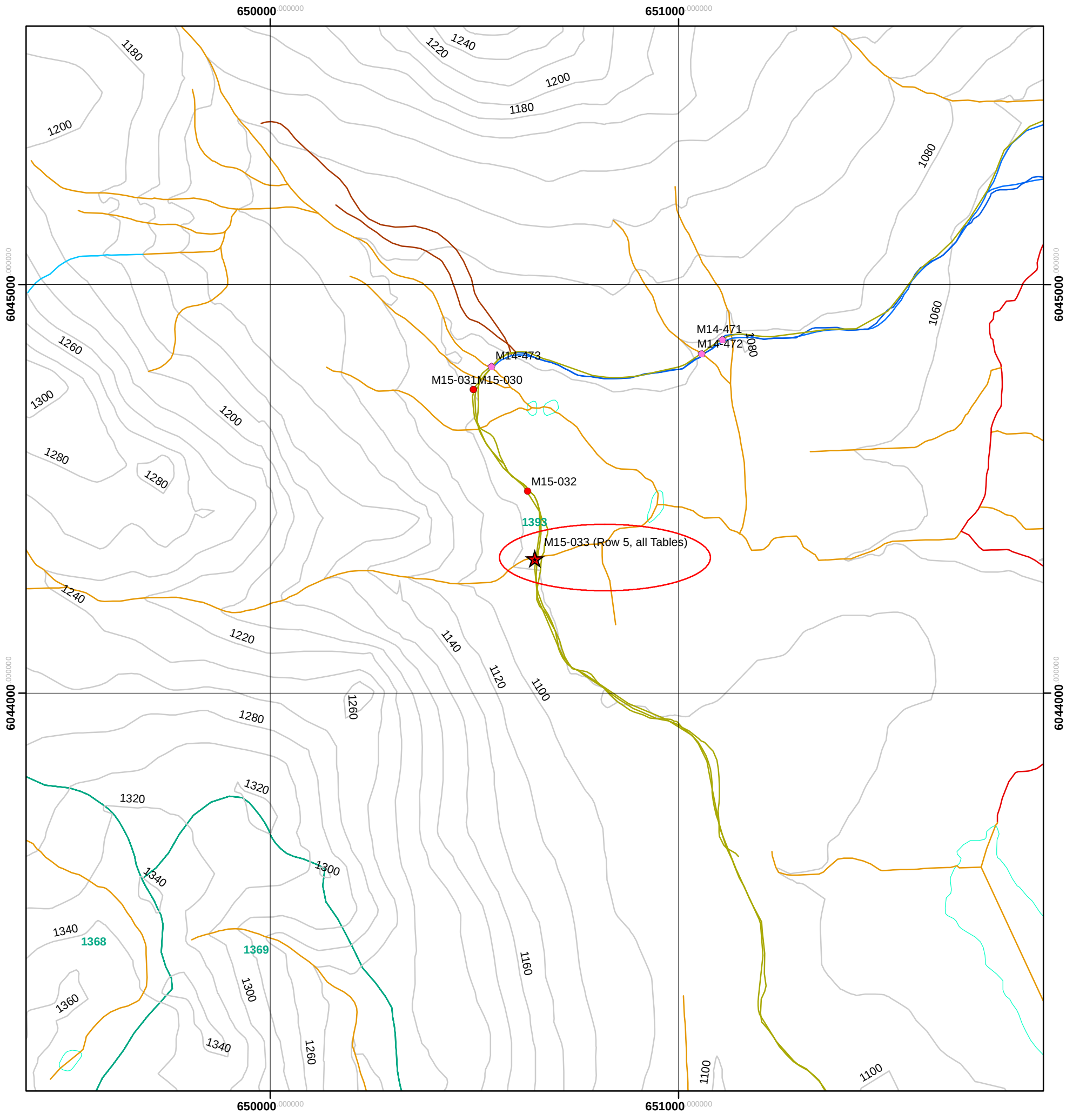

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Legend

Crossing Status by Year

2012	2013	2014	2015
Barrier	Barrier	Barrier	Barrier
Priority	Priority	Priority	Priority
Passable	Passable	Passable	Passable
Potential	Potential	Potential	Potential
Unknown	Unknown	Unknown	Unknown
DNE	DNE	DNE	DNE

*Sites that are either: inaccessible due to overgrown roads or denied permission from landowner, or have no downstream channel.

× No Assessment Required*

Access Data

Roads

- Unassessed
- Inaccessible
- Assessed 2012
- Assessed 2013
- Assessed 2014
- Assessed 2015

Fish Habitat

- None
- Inferred
- Observed
- Lakes

Watersheds

- Boundary
- 5005 Label

Contours

- 20m Interval

N

0 75 150 300 450 600 Meters

1:10,000

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Fish Passage Culvert Investigations - Babine TSA

Contract: EN15TAH414

Date: November 2015

Map Title: M15-033

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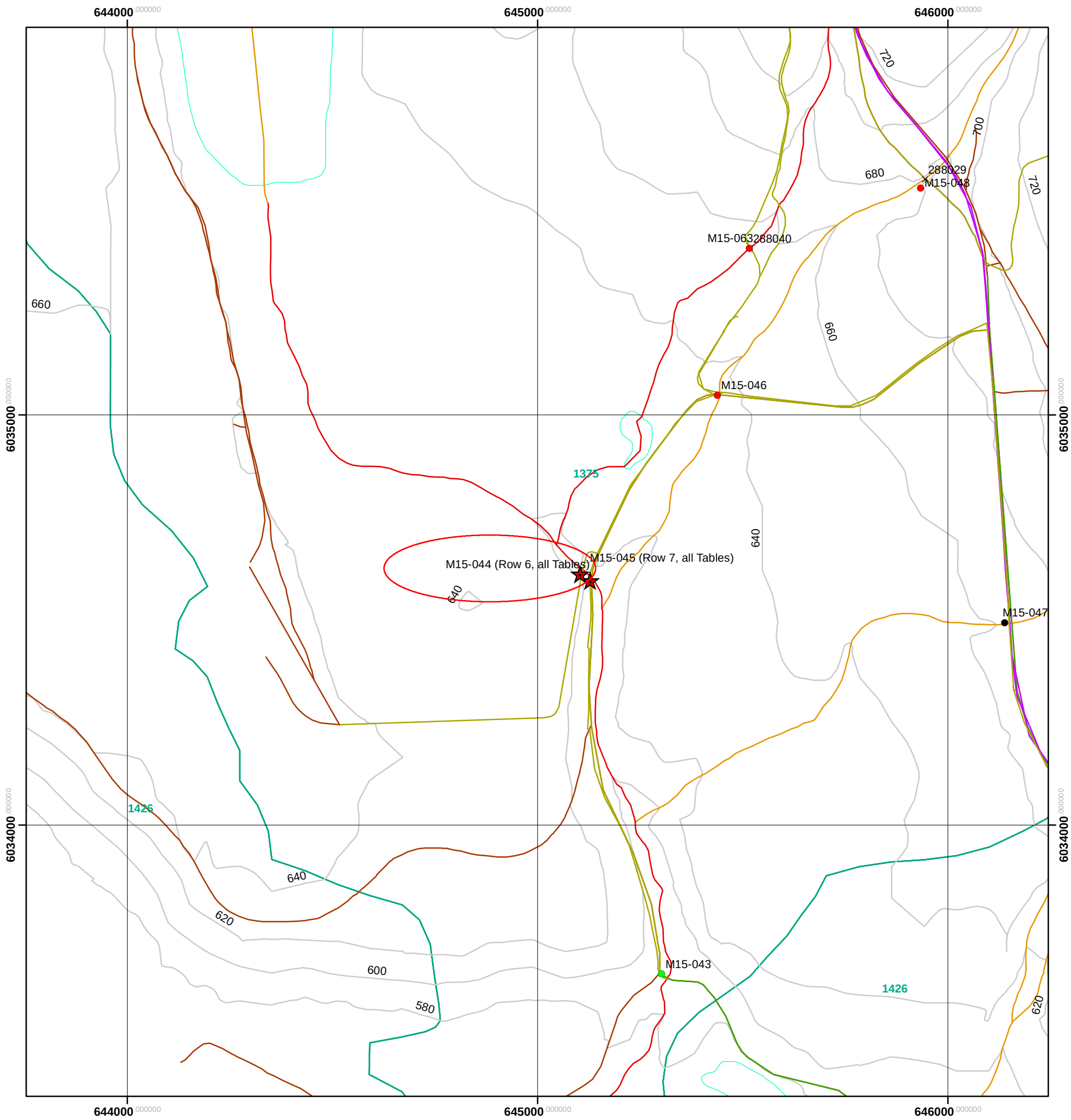

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Legend

Crossing Status by Year

2012	2013	2014	2015
Barrier	Barrier	Barrier	Barrier
Priority	Priority	Priority	Priority
Passable	Passable	Passable	Passable
Potential	Potential	Potential	Potential
Unknown	Unknown	Unknown	Unknown
DNE	DNE	DNE	DNE

*Sites that are either: inaccessible due to overgrown roads or denied permission from landowner, or have no downstream channel.

× No Assessment Required*

Access Data

Roads

- Unassessed
- Inaccessible
- Assessed 2012
- Assessed 2013
- Assessed 2014
- Assessed 2015

Fish Habitat

- None
- Inferred
- Observed
- Lakes

Watersheds

- Boundary
- 5005 Label

Contours

- 20m Interval

N

0 75 150 300 450 600 Meters

1:10,000

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Fish Passage Culvert Investigations - Babine TSA

Contract: EN15TAH414

Date: November 2015

Map Title: M15-044

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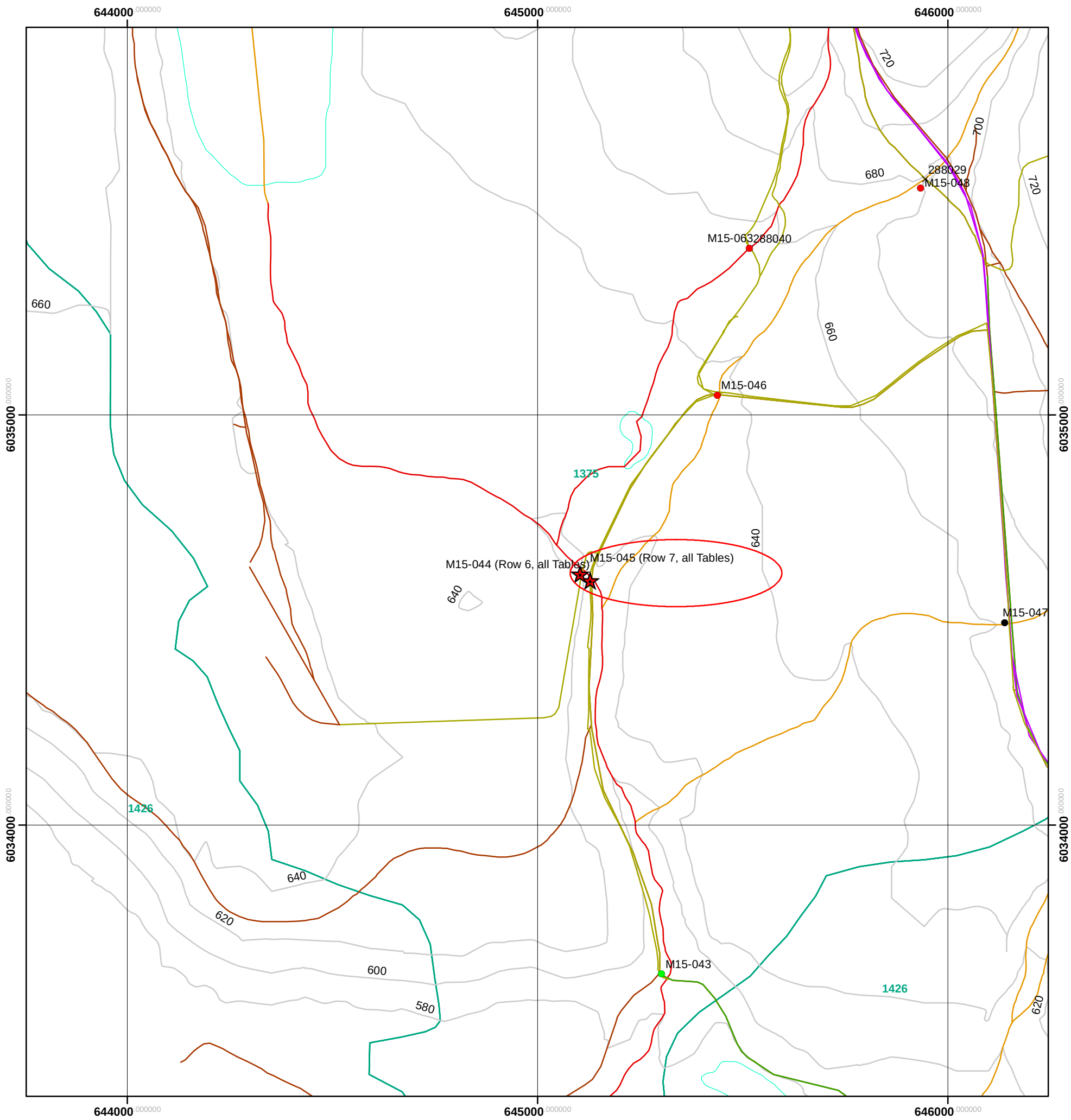

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Legend

Crossing Status by Year

2012	2013	2014	2015
Barrier	Barrier	Barrier	Barrier
Priority	Priority	Priority	Priority
Passable	Passable	Passable	Passable
Potential	Potential	Potential	Potential
Unknown	Unknown	Unknown	Unknown
DNE	DNE	DNE	DNE

*Sites that are either: inaccessible due to overgrown roads or denied permission from landowner, or have no downstream channel.

× No Assessment Required*

Access Data

Roads

- Unassessed
- Inaccessible
- Assessed 2012
- Assessed 2013
- Assessed 2014
- Assessed 2015

Fish Habitat

- None
- Inferred
- Observed
- Lakes

Watersheds

- Boundary
- 5005 Label

Contours

- 20m Interval

N

0 75 150 300 450 600 Meters

1:10,000

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Fish Passage Culvert Investigations - Babine TSA

Contract: EN15TAH414

Date: November 2015

Map Title: M15-045

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APPENDIX IV

FIELD ASSESSMENT FOR DETERMINING FISH PASSAGE STATUS OF CLOSED BOTTOM STRUCTURES – SCORING AND DATA COLLECTION SHEETS

Appendix 1: Closed Bottom Structure (CBS) Field Measurement Form

Closed Bottom Structure (CBS) Field Measurement Form

Location and Overview Data					**Field Observations and Assessment Measurements**			
Date of Assessment					*Crossing Type*	*OBS CBS Other*		
PSCIS Crossing ID *(only needed if this is a re-assessment)*					*Crossing Subtype*	*Bridge, Pipe Arch, Wood Box Culvert, Round Culvert, Oval Culvert, Concrete Box, Ford*		
My Crossing Reference					*Culvert Diameter or Span for OBS (m)*			
Crew Members					*Culvert Length or Width for OBS (m)*			
UTM/GPS (NAD 83)	*Zone*	*Easting*	*Northing*		*Continuous Embeddedment?*	*Yes No*		
Stream Name					*If Embedded, Average Depth of Embeddedment*	*Inlet* _____m	*Outlet* _____m	*Average* _____m
Road Name								
Road Km Mark					*Resemble Channel?*	*Yes No*		
Road Tenure					*Backwatered?*	*Yes No*		
					If Backwatered, to what Percentage			
Stream Information					*Fill Depth (m)*			
Channel Width *Stream Width Ratio*	*Avg. Channel Width*	*Culvert Dia.*	*SWR*		*Outlet Drop (A+B)*	*Invert-ToP (A)*	*ToP – BoC (B)*	*OD*
Stream Slope (%)					*Outlet Pool Depth (m) (C-B)*	*ToP –BoP (C)*	*ToP – BoC (B)*	*OPD*
Beaver Activity	*Yes No*				*Inlet drop*	*Yes No*		
Fish Sighted?	*Yes No*				*Culvert Slope (%)*			
Valley Fill	*DF SF BR*				**Recommendations**			
Habitat Value	*Low Medium High*				*Culvert Fix*	*RM OBS SS ASM BW*		
					Recommended Diameter or Span (m)			

Comments:

Fish Barrier Scoring[1]

Risk	Embedded[2]	value	Outlet drop	value	Slope	value	SWR	value	Length	value
low	> 30 cm. or > 20% of Diameter and continuous	0	< 15	0	< 1	0	< 1.0	0	< 15	0
mod	< 30 cm. or 20% of Diameter but continuous	5	15 - 30	5	1 - 3	5	1.0 - 1.3	3	15 – 30	3
high	No embeddment or discontinuous	10	> 30	10	> 3	10	> 1.3	6	> 30	6

Notes

1. For the barrier determination of multiple culverts, use the metrics from the pipe lowest in elevation at the outlet. For pipes installed at the same elevation at the outlet, add diameters for SWR criteria and use the highest slope, and length measurement.

2 Properly embedded culverts are considered passable as per natural stream channel. No further consideration of other surrogates is required.

Cumulative Score	Result
0 - 14	passable
15 - 19	potential barrier
> 20	barrier

APPENDIX V

PSCIS DATA TABLES

Location and Overview Information											Field Observations and Assessment Measurements									
Date of Assessment (YYYY-MM-DD)	PSCIS Crc	My Crossing Reference	Crew Members	UTM Zone	Easting	Northing	Stream Name	Road Name	Road KM Mark	Road Tenure	Crossing Type	Crossing Subtype	Diameter or Span (meters)	Length or Width (meters)	Continuous Embeddedment? Yes/No	Average Depth Embededdment (meters)	Resemble Channel? Yes / No	Backwatered? Yes / No	Percentage Backwatered	Fill Depth (meters)
2015-07-12		M15-001	JG	9	648954.00	6057843.00	Tributary to Deep Creek	Unnamed road	2.65		Closed Bottom Structure	Round Culvert	0.40	6.20	No		No	No		1.20
2015-07-12		M15-002	JG	9	647870.00	6057702.00	Tributary to Deep Creek	Unnamed road	1.22		Open Bottom Structure	Wood Box Culvert	0.45	8.00						
2015-07-12		M15-003	JG	9	649239.00	6056671.00	Tributary to Deep Creek	S Deep Creek Road	2.55		Other	Ford								
2015-08-19		M15-052	JG	9	645354.00	6037825.00	Dunalter Creek	Unnamed road	0.10		Closed Bottom Structure	Round Culvert	0.45	15.00	No		No	Yes	50.00	3.45
2015-07-12		M15-005	JG	9	648711.00	6056732.00	Tributary to Deep Creek	S Deep Creek Road	2.02		Closed Bottom Structure	Round Culvert	1.20	23.00	No		No	No		4.00
2015-07-12		M15-006	JG	9	647349.00	6056833.00	Tributary to Deep Creek	S Deep Creek Road	0.42		Closed Bottom Structure	Round Culvert	0.70	8.00	No		No	No		1.00
2014-10-24		M14-440	MG	9	634171.00	6046972.00	Tributary to Coffin Lake	Unnamed road	0.55		Other	Ford								
2015-07-12		M15-008	JG	9	645958.00	6056982.00	Tributary to Deep Creek	Unnamed road	0.84		Open Bottom Structure	Wood Box Culvert	0.80	14.00						
2015-07-12		M15-009	JG	9	646305.00	6057204.00	Tributary to Deep Creek	Unnamed road	0.35		Other	Ford								
2015-07-12		M15-010	JG	9	646548.00	6057242.00	Tributary to Deep Creek	Unnamed road	0.14		Other	Ford								
2015-07-12		M15-011	JG	9	644572.00	6058924.00	Tributary to Deep Creek	Unnamed road	0.83		Other	Ford								
2015-08-19		M15-053	JG	9	646194.00	6036027.00	Tributary to Stock Creek	Unnamed road	0.73		Other	Ford								
2015-07-13		M15-013	JG	9	639542.00	6063176.00	Tributary to Robin Creek	Unnamed road	1.34		Closed Bottom Structure	Round Culvert	1.00	7.00	No		No	No		2.00
2015-08-18		M15-043	JG	9	645303.00	6033636.00	Stock Creek	Seinen Road	1.06		Open Bottom Structure	Bridge	11.00	5.00						
2015-08-18		M15-044	JG	9	645128.00	6034596.00	Stock Creek	Seinen Road	0.79		Closed Bottom Structure	Round Culvert	1.65	12.00	No		No	Yes	10.00	1.90
2015-08-18		M15-045	JG	9	645104.00	6034612.00	Stock Creek	Seinen Road	0.02		Closed Bottom Structure	Round Culvert	1.20	25.00	No		No	No		8.50
2015-07-13		M15-018	JG	9	634641.00	6066801.00	Tributary to Canyon Creek	R11559 2-1	0.84		Closed Bottom Structure	Round Culvert	0.60	8.00	No		No	No		1.20
2015-07-13		M15-019	JG	9	633834.00	6066251.00	Tributary to Canyon Creek	Unnamed road	0.16		Other	Ford								
2015-07-13		M15-020	JG	9	633999.00	6066823.00	Tributary to Canyon Creek	R11559 2-1	0.35		Closed Bottom Structure	Round Culvert	1.00	8.00	No		No	Yes	10.00	3.00
2015-07-14		M15-021	JG	9	616470.00	6089787.00	Tributary to Bulkley River	R09533904-4	0.14		Other	Ford								
2015-07-14		M15-022	JG	9	616963.00	6087882.00	Tributary to Bulkley River	R09533904	1.12		Open Bottom Structure	Wood Box Culvert	0.08	4.00						
2015-07-14		M15-023	JG	9	616397.00	6089890.00	Tributary to Bulkley River	R09533904	0.63		Other	Ford								
2015-07-15		M15-026	JG	9	651772.00	6047282.00	McQuarrie Creek	Unnamed road	1.24		Other	Ford								
2015-08-18		M15-046	JG	9	645439.00	6035047.00	Stock Creek	Seinen Road	0.61		Closed Bottom Structure	Oval Culvert	2.30	10.00	No		No	No		2.76
2015-08-18		M15-048	JG	9	645934.00	6035552.00	Tributary to Stock Creek	Highway 16 W			Closed Bottom Structure	Round Culvert	1.80	99.00	No		No	No		9.99
2015-07-15		M15-029	JG	9	651755.00	6047231.00	Tributary to McQuarrie Creek	Unnamed road	1.10		Other	Ford								
2015-07-16		M15-031	JG	9	650498.00	6044743.00	Tributary to McQuarrie Creek	Hidden Lake FSR	6.32		Closed Bottom Structure	Round Culvert	0.50	8.00	No		No	No		2.00
2015-07-16		M15-032	JG	9	650631.00	6044494.00	Tributary to McQuarrie Creek	Hidden Lake FSR	6.17		Closed Bottom Structure	Round Culvert	0.50	8.00	No		No	No		1.00
2015-07-16		M15-033	JG	9	650648.00	6044329.00	Tributary to McQuarrie Creek	Hidden Lake FSR	5.85		Closed Bottom Structure	Round Culvert	0.90	8.00	Yes	0.40	No	No		1.60
2015-07-16		M15-034	JG	9	651660.00	6042498.00	Tributary to McQuarrie Creek	Hidden Lake FSR	3.67		Closed Bottom Structure	Round Culvert	0.50	12.00	No		No	Yes	75.00	3.00
2015-07-15		M15-027	JG	9	651736.00	6048254.00	Tributary to McQuarrie Creek	Unnamed road	2.10		Other	Ford								
2015-08-17		M15-039	JG	9	622589.00	6060717.00	Tributary to Telkwa River	Tatlow Road	15.59		Closed Bottom Structure	Round Culvert	0.45	5.00	No		No	No		1.10
2015-08-19		M15-049	JG	9	650441.00	6037322.00	Tributary to Stock Creek	R089212	2.38		Closed Bottom Structure	Round Culvert	0.60	8.00	No		No	Yes	40.00	1.50
2015-08-19		M15-050	JG	9	650503.00	6037350.00	Tributary to Stock Creek	R089212	2.30		Closed Bottom Structure	Round Culvert	0.60	7.00	No		No	Yes	50.00	1.00
2015-08-20		M15-054	JG	9	637091.00	6062411.00	Vanderven Creek	Unnamed road	0.79		Closed Bottom Structure	Round Culvert	1.40	8.00	No		No	No		1.70
2015-08-20		M15-055	JG	9	638521.00	6062159.00	Robin Creek	Unnamed road	2.49		Closed Bottom Structure	Round Culvert	1.10	8.00	No		No	No		1.60
2015-08-20		M15-056	JG	9	640188.00	6060829.00	Robin Creek	Unnamed road	4.28		Closed Bottom Structure	Round Culvert	1.60	5.50	No		No	No		1.60
2015-08-20		M15-057	JG	9	639709.00	6060989.00	Tributary to Robin Creek	Unnamed road	3.29		Closed Bottom Structure	Round Culvert	0.50	8.00	No		No	No		2.00
2015-08-20		M15-058	JG	9	638889.00	6060282.00	Robin Creek	Unnamed road	1.47		Other	Ford								
2015-08-20		M15-059	JG	9	638759.00	6062585.00	Robin Creek	Unnamed road	2.61		Other	Ford								
2015-08-20		M15-060	JG	9	639111.00	6062559.00	Tributary to Robin Creek	Unnamed road	2.97		Closed Bottom Structure	Round Culvert	0.45	4.00	No		No	No		1.30
2015-08-20		M15-061	JG	9	638551.00	6062541.00	Tributary to Robin Creek	Unnamed road	2.38		Other	Ford								
2015-08-20		M15-062	JG	9	638780.00	6062351.00	Tributary to Robin Creek	Unnamed road	0.26		Closed Bottom Structure	Round Culvert	0.20	4.00	No		No	No		1.00
2015-08-20		M15-063	JG	9	645517.00	6035406.00	Dunalter Creek	Unnamed road	0.18		Closed Bottom Structure	Round Culvert	1.00	5.00	No		No	No		1.30
2015-08-20		M15-064	JG	9	648156.00	6037900.00	Tributary to Stock Creek	R1031501	5.24		Other	Ford								
2015-08-20		M15-065	JG	9	645711.00	6036237.00	Dunalter Creek	Unnamed road	0.96		Closed Bottom Structure	Round Culvert	0.90	12.00	No		No	Yes	10.00	3.00
2015-08-21		M15-067	JG	9	642457.00	6051612.00	Tributary to Gibsons Creek	Unnamed road	0.39		Other	Ford								
2015-08-21		M15-068	JG	9	642475.00	6051372.00	Tributary to Gibsons Creek	Unnamed road	1.18		Closed Bottom Structure	Round Culvert	0.50	5.00	No		No	No		1.30
2015-08-21		M15-070	JG	9	642917.00	6053726.00	Tributary to Deep Creek	Unnamed road	1.37		Closed Bottom Structure	Round Culvert	0.50	5.00	No		No	No		1.00
2015-08-21		M15-071	JG	9	634146.00	6044543.00	Tributary to Coffin Lake	Unnamed road	0.18		Other	Ford								
2015-08-21		M15-073	JG	9	634193.00	6044754.00	Tributary to Coffin Lake	Unnamed road	0.90		Other	Ford								
2015-07-15		M15-028	JG	9	651732.00	6048275.00	Tributary to McQuarrie Creek	Unnamed road	2.18		Other	Ford								
2014-10-24		M14-433	MG	9	634258.00	6048556.00	Tributary to Coffin Lake	Unnamed road	0.83		Other	Ford								
2014-10-24		M14-434	MG	9	633611.00	6048814.00	Tributary to Coffin Lake	Unnamed road	1.57		Other	Ford								
2014-10-24		M14-435	MG	9	633384.00	6048956.00	Tributary to Coffin Lake	Unnamed road	1.83		Other	Ford								
2014-10-24		M14-436	MG	9	633171.00	6049110.00	Tributary to Coffin Lake	Unnamed road	2.08		Other	Ford								

Location and Overview Information											Field Observations and Assessment Measurements									
Date of Assessment (YYYY-MM-DD)	PSCIS Cro	My Crossing Reference	Crew Members	UTM Zone	Easting	Northing	Stream Name	Road Name	Road KM Mark	Road Tenure	Crossing Type	Crossing Subtype	Diameter or Span (meters)	Length or Width (meters)	Continuous Embeddedment? Yes/No	Average Depth Embededdment (meters)	Resemble Channel? Yes / No	Backwatered? Yes / No	Percentage Backwatered	Fill Depth (meters)
2014-10-24		M14-437	MG	9	632206.00	6048717.00	Tributary to Coffin Lake	Unnamed road	0.31		Closed Bottom Structure	Round Culvert	0.60	5.25	No		No	No		0.35
2014-10-24		M14-438	MG	9	632614.00	6048492.00	Tributary to Coffin Lake	Unnamed road	0.41		Other	Ford								
2014-10-24		M14-439	MG	9	632462.00	6048296.00	Tributary to Coffin Lake	Unnamed road	0.20		Other	Ford								
2015-08-31		M15-080	MG	9	599460.00	6063163.00	Tributary to Winfield Creek	Unnamed road	13.96		Other	Ford								
2015-08-31		M15-081	MG	9	599204.00	6063405.00	Tributary to Winfield Creek	Unnamed road	14.08		Other	Ford								
2015-08-31		M15-082	MG	9	598738.00	6063555.00	Tributary to Winfield Creek	Unnamed road	14.88		Other	Ford								

				Stream Information						Scoring Data								Recommendations		
Outlet Drop (meters)	Outlet Pool Depth (0.01m)	Inlet Drop? Yes / No	Culvert Slope (%)	Downstream Channel Width (meters)	Stream Slope	Beaver Activity? Yes / No	Fish Observed? Yes / No	Valley Fill	Habitat Value	Stream Width Ratio	Culvert Length Score	Embed Score	Outlet Drop Score	Culvert Slope Score	Stream Width Ratio Score	Final Score	Barrier Result	Crossing Fix	Recommended Diameter or Span (meters)	Assessment Comment
0.6	0.37	No	4.00	1.57	15	No	No	Deep Fill	Medium	3.93	0	10	10	10	6	36	Barrier	Removal		Active ATV rd - remove and install ford
						No	No			0.00	0	0	0	0	0	0	Passable			Blocked in middle, needs to be removed
						No	No			0.00	0	0	0	0	0	0	Unkown	Additional Substrate Material		No barriers to fish passage observed
0.62	0.42	Yes	2.00	0.45	5	No	No	Deep Fill	Low	1.00	3	10	10	5	3	31	Barrier	Streambed Simulation	0.60	Plastic CV preventing access to lake, controlled flow
0.38	0.23	No	9.00	1.60	9	No	No	Deep Fill	High	1.33	3	10	10	10	6	39	Barrier	Streambed Simulation	1.6	Potentially passable at high water
0.06	0.00	Yes	12.00	0.62	14	No	No	Deep Fill	Low	0.89	0	10	0	10	0	20	Barrier	Streambed Simulation	0.6	2 CVs, smaller inlet is blocked
						Yes	No			0.00	0	0	0	0	0	0	Unkown	Additional Substrate Material		Passable if fish present
						No	No			0.00	0	0	0	0	0	0	Passable			Box CV collapsed, overflow CV present, not passable
						No	No			0.00	0	0	0	0	0	0	Unkown	Additional Substrate Material		Passable if fish present
						No	No			0.00	0	0	0	0	0	0	Unkown	Additional Substrate Material		Passable if fish present
						No	No			0.00	0	0	0	0	0	0	Unkown	Additional Substrate Material		Remaining piece of CV should be removed
						No	No			0.00	0	0	0	0	0	0	Unkown	Additional Substrate Material		Passable if fish present
0.06	0.34	No	9.00	2.63	9	No	No	Deep Fill	High	2.63	0	10	0	10	6	26	Barrier	Open Bottom Structure	2.60	Culvert is partially crushed
						No	No			0.00	0	0	0	0	0	0	Passable			Bridge in good condition
0	0.18	Yes	5.50	1.23	4	No	Yes	Deep Fill	High	0.75	0	10	0	10	0	20	Barrier	Streambed Simulation	1.20	Currently 2 CVs, no access at low water
0.22	0.07	No	3.00	1.27	5	No	Yes	Deep Fill	High	1.06	3	10	5	10	3	31	Barrier	Backwater		No access at low water
0.05	0.00	No	6.00	0.57	8	No	No	Deep Fill	Medium	0.95	0	10	0	10	0	20	Barrier	Streambed Simulation	0.60	Culvert likely passable if fish present
						No	No			0.00	0	0	0	0	0	0	Unkown	Additional Substrate Material		Passable if fish present
0.02	0.04	No	5.00	0.97	6	No	No	Deep Fill	Medium	0.97	0	10	0	10	0	20	Barrier	Streambed Simulation	1.00	Culvert likely passable if fish present
						No	No			0.00	0	0	0	0	0	0	Unkown	Additional Substrate Material		Passable if fish present
						No	No			0.00	0	0	0	0	0	0	Passable			Replace with .6m CV - WBC collapsing
						No	No			0.00	0	0	0	0	0	0	Unkown	Additional Substrate Material		Passable if fish present
						No	Yes			0.00	0	0	0	0	0	0	Unkown	Additional Substrate Material		Bridge has been removed, no fish passage concerns
1.1	0.00	No	1.00	4.60	3	No	No	Deep Fill	Medium	2.00	0	10	10	5	6	31	Barrier	Open Bottom Structure	4.60	No access, install OBS and restore channel
1.61	0.60	No	2.00	3.77	5	No	No	Deep Fill	Medium	2.09	6	10	10	5	6	37	Barrier	Open Bottom Structure	3.80	CV length: 170m, Fill Depth: 35m estimate
						No	No			0.00	0	0	0	0	0	0	Unkown	Additional Substrate Material		Passable if fish present
0.28	0.07	Yes	3.00	0.53	21	No	No	Deep Fill	Low	1.06	0	10	5	10	3	28	Barrier	Streambed Simulation	0.50	Culvert placed too high, good channel present
0.4	0.08	No	6.00	1.83	6	No	No	Deep Fill	Medium	3.66	0	10	10	10	6	36	Barrier	Streambed Simulation	1.80	Culvert incorrectly located, line up with channe
0	0.15	Yes	2.00	1.83	8	No	No	Deep Fill	High	2.03	0	0	0	5	6	11	Passable			CV blocked, water flowing under CV - Barrier
0.05	0.55	No	3.00	1.13	3	No	No	Deep Fill	Medium	2.26	0	10	0	10	6	26	Barrier	Streambed Simulation	1.10	Replace, culvert rotting out
						No	No			0.00	0	0	0	0	0	0	Unkown	Additional Substrate Material		Passable if fish present
0.14	0.00	Yes	5.00	0.58	40	No	No	Deep Fill	Low	1.29	0	10	0	10	3	23	Barrier	Streambed Simulation	0.60	Fish access from d/s unlikely, replace if fish present
0.19	0.05	No	2.00	0.83	3	No	No	Deep Fill	Medium	1.38	0	10	5	5	6	26	Barrier	Streambed Simulation	0.80	Culvert sloped backwards
0.27	0.09	No	5.00	0.63	3	No	No	Deep Fill	Medium	1.05	0	10	5	10	3	28	Barrier	Streambed Simulation	0.60	Culvert sloped backwards
0.43	0.24	No	5.00	3.03	3	No	Yes	Deep Fill	High	2.16	0	10	10	10	6	36	Barrier	Open Bottom Structure	3.00	Currently 2 CVs, 1 blocked - fish OBS u/s and d/s of CV
0.38	0.47	No	3.00	3.10	2	No	Yes	Deep Fill	High	2.82	0	10	10	10	6	36	Barrier	Open Bottom Structure	3.10	Fish observed both u/s and d/s of CV
0.23	0.00	No	7.00	2.43	3	No	No	Deep Fill	Medium	1.52	0	10	5	10	6	31	Barrier	Open Bottom Structure	2.10	Currently 2 CVs, replace with OBS
0.04	0.00	No	3.00	2.13	4	No	No	Deep Fill	Low	4.26	0	10	0	10	6	26	Barrier	Backwater		Culvert likely passable if fish present
						No	No			0.00	0	0	0	0	0	0	Unkown	Additional Substrate Material		Passable if fish present
						No	No			0.00	0	0	0	0	0	0	Unkown	Additional Substrate Material		Passable if fish present, stream impacted by cattle
0.22	0.00	No	2.00	0.85	2	No	No	Deep Fill	Low	1.89	0	10	5	5	6	26	Barrier	Streambed Simulation	0.85	Low habitat value, replace if fish present
						No	No			0.00	0	0	0	0	0	0	Unkown	Additional Substrate Material		Passable if fish present
0.02	0.00	No	3.00	0.47	2	No	No	Deep Fill	Low	2.35	0	10	0	10	6	26	Barrier	Streambed Simulation	0.50	Replace with larger CV if fish present
0.65	0.00	Yes	3.00	1.10	2	No	No	Deep Fill	Medium	1.10	0	10	10	10	3	33	Barrier	Streambed Simulation	1.10	CV controlled by valve at lake - old dam
						No	No			0.00	0	0	0	0	0	0	Unkown	Additional Substrate Material		CV recently removed, no fish passage concerns
0	0.08	Yes	5.00	1.13	5	No	No	Deep Fill	Medium	1.26	0	10	0	10	3	23	Barrier	Streambed Simulation	1.20	Limited flow from lake upstream
						No	No			0.00	0	0	0	0	0	0	Unkown	Additional Substrate Material		Passable if fish present - low flow channel
0	0.00	No	3.00	1.07	5	No	No	Deep Fill	Medium	2.14	0	10	0	10	6	26	Barrier	Streambed Simulation	1.10	Replace with larger CV if barrier
2.85	0.25	Yes	5.00	1.43	16	No	No	Deep Fill	Medium	2.86	0	10	10	10	6	36	Barrier	Streambed Simulation	1.40	Replace with properly embedded CV
						No	No			0.00	0	0	0	0	0	0	Unkown	Additional Substrate Material		Inactive ford, no fish passage concerns
						No	No			0.00	0	0	0	0	0	0	Unkown	Additional Substrate Material		Inactive ford, no fish passage concerns
						No	No			0.00	0	0	0	0	0	0	Unkown	Additional Substrate Material		Passable if fish present
						No	No			0.00	0	0	0	0	0	0	Unkown	Additional Substrate Material		Road should be seeded to prevent erosion
						No	No			0.00	0	0	0	0	0	0	Unkown	Additional Substrate Material		Passable if fish present
						No	No			0.00	0	0	0	0	0	0	Unkown	Additional Substrate Material		Passable if fish present
						No	No			0.00	0	0	0	0	0	0	Unkown	Additional Substrate Material		Passable if fish present

				Stream Information						Scoring Data								Recommendations		
Outlet Drop (meters)	Outlet Pool Depth (0.01m)	Inlet Drop? Yes / No	Culvert Slope (%)	Downstream Channel Width (meters)	Stream Slope	Beaver Activity? Yes / No	Fish Observed? Yes / No	Valley Fill	Habitat Value	Stream Width Ratio	Culvert Length Score	Embed Score	Outlet Drop Score	Culvert Slope Score	Stream Width Ratio Score	Final Score	Barrier Result	Crossing Fix	Recommended Diameter or Span (meters)	Assessment Comment
0	0.00	Yes	4.50	0.95	5	No	No	Deep Fill	Low	1.58	0	10	0	10	6	26	Barrier	Removal		Remove and properly deactivate road
						No	No			0.00	0	0	0	0	0	0	Unkown	Additional Substrate Material		Passable if fish present
						No	No			0.00	0	0	0	0	0	0	Unkown	Additional Substrate Material		Passable if fish present
						No	No			0.00	0	0	0	0	0	0	Unkown	Additional Substrate Material		Fish access from d/s unlikely, no concerns
						No	No			0.00	0	0	0	0	0	0	Unkown	Additional Substrate Material		Fish access from d/s unlikely, no concerns
						No	No			0.00	0	0	0	0	0	0	Unkown	Additional Substrate Material		Fish access from d/s unlikely, no concerns

APPENDIX VI

REASONING FOR SITES NOT ASSESSED

Sites not Assessed, of Sites Remaining to be Completed at Beginning of 2015 Field Work ONLY

Watershed	Mapsheet	Site #	Reason Not Assessed
1363	93L.056	287563	No access to site
1364	93L.066	286915	Unable to obtain permission from landowner
		286922	Double mapped site - only 1 present
1367	93L.067	287070	Road not built
	93L.056	287491	Private land, unable to obtain permission from landowner
	93L.066	287378	Locked gate, no access
		287890	Private land, unable to obtain permission from landowner
1375	93L.047	287850	Private land, unable to obtain permission from landowner
		287851	Private land, unable to obtain permission from landowner
		287853	Private land, unable to obtain permission from landowner
		287854	Private land, unable to obtain permission from landowner
		287867	Private land, unable to obtain permission from landowner
		287884	Private land, unable to obtain permission from landowner
		288029	Site does not exist
		288040	Double mapped site - only 1 present

COPIES OF FIELD NOTES ARE AVAILABLE UPON REQUEST