



WATERSHED BOUNDARY ASSESSMENT CHAPMAN CREEK – WILSON CREEK

for:

Sechelt Community Projects Inc.

by:

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WATERSHED BOUNDARY ASSESSMENT CHAPMAN CREEK – WILSON CREEK

1.0 INTRODUCTION

Madrone Environmental Services Ltd. (Madrone) was retained by Sechelt Community Projects Inc. (SCPI), to locate and verify in the field the watershed boundary between Wilson Creek and Chapman Creek within the community Forest tenure area boundary, located east of Sechelt, B.C. I reviewed available information about the site and conducted a detailed ground inspection on March 20, 2009, accompanied by Mr. Paul Tingley, R.F.T. who is a subcontractor to SCPI.

2.0 BACKGROUND

The Chapman Creek Community Watershed is located 3 kilometres east of Sechelt, BC and is one of the primary water supplies for Sechelt. It is a designated community watershed and presently provides drinking water for 23,000 people. It is 6273 hectares in size¹. There is also a fish hatchery located on Chapman Creek located approximately 4.5 kilometres downstream of the drinking water intake.

Wilson Creek is located 5 kilometres southeast of Sechelt, BC and is a neighboring watershed to Chapman Creek. It is comprised of Wilson Creek and East Wilson Creek and is approximately 1950 hectares in size².

¹ http://www.env.gov.bc.ca/wsd/data_searches/comm_watersheds/index.html

² <http://geobc.gov.bc.ca/>

It is not a designated community watershed, however there are five points of diversion located above the confluence of Wilson Creek and Husdon Creek and one located downstream of the confluence. There are three points of diversion on East Wilson Creek. They are all indicated for domestic use. The points of diversion are located approximately three to five kilometers downslope of the area of interest. SCPI has harvesting rights in the Wilson Creek watershed via a Probationary Community Forest License.

3.0 PHYSICAL SETTING

The BC Geological Survey³ has mapped the bedrock in the Wilson Creek and Chapman Creek watersheds as comprising of Early Cretaceous to Late Jurassic unnamed grandioritic intrusive rock. The upper watershed area of Wilson Creek has been mapped as mid-Cretaceous quartz dioritic intrusive rock.

The Wilson Creek and Chapman Creek watersheds are located in areas with significant glaciofluvial and glaciomarine deposits⁴. During the post-glacial period, higher sea levels and melting ice resulted in the formation of large glaciomarine deltas on hillslopes up to approximately 200 m above sea level and glaciofluvial deposits up to approximately 400 m – 500 m above sea level. The glaciofluvial fans and deltas are comprised of sand, gravel and cobbles while the glaciomarine deposits are generally dominated by sands and gravels.

The area inspected was located in terrain dominated by flat benches and sloping terrain with slope gradients ranging from 20% – 50%, separated by sharp ridges. The ridges ranged in slope from 40% – 70% gradient for 8 m – 35 m slope distance. The ridges are comprised of well-drained, cobbly gravelly sandy material and are depositional features, likely of glaciofluvial origin. The ridges are meandering and are oriented both parallel and perpendicular to contour (roughly parallel to the Chapman Creek valley). The ridges are not apparent on the present TRIM contour maps which have 20 m contour intervals. The ridges range in height from 4 m – 10 m. Mean sediment depth for the area likely varies from 3 m deep to upwards of 10 m deep.

³ <http://webmap.em.gov.bc.ca/mapplace/minpot/bcgs.cfm>

⁴ McCammon, J.W. 1977. Surficial Geology and Sand and Gravel Deposits of Sunshine Coast, Powell River, and Campbell River Areas. Bulletin 65. Prepared for the Ministry of Mines and Petroleum Resources, Province of British Columbia.

The inspected area was previously harvested approximately 15 years ago and there is an existing but deactivated forestry road that runs across the watershed boundary line. It appears that during road deactivation, creek crossings were restored; therefore determining the watershed boundary line from the direction of streamflow was appropriate.

4.0 WATERSHED BOUNDARY ASSESSMENT

4.1 Methods

The upper watershed boundary was inspected on foot and local stream flow directions were inspected to determine the direction of flow of local hydrologic networks. Once we were able to determine where the watershed divide was located, we used a GPS to map the line as determined in the field and hung flagging tape to delineate the boundary. I spent one day in the field along with Mr. Tingley determining the location of the watershed boundary line. We hung approximately 50% of the boundary in the field on the first day. Mr. Tingley hung the rest of the boundary line on a subsequent field day according to our previously discussed field observations and mapping techniques. After the field inspection, the flagged line was traversed and mapped (See Figures 1 and 2).

4.2 Results

The original watershed boundary line was established by interpreting slope breaks from contour lines, using the 1:20,000 scale provincial TRIM mapping. However, during the field inspection, it became apparent that the glaciofluvial ridges were acting as barriers to streamflow and were, in fact, determining the watershed divide. For example, there was one creek that was flowing downslope towards Chapman Creek that made two 90 degree turns where it encountered a ridge and then flowed back into the Wilson Creek watershed.

Watershed boundary lines typically run perpendicular to contour but in this case, the watershed boundary line follows the top of a ridge that is largely located parallel to contour. The watershed boundary line starts at the western boundary of SCPI's harvesting area on very low gradient terrain (1% – 5%) where we determined that streams were flowing south into Wilson Creek. It runs northeast into standing timber and then climbs on top of a 5 m high ridge. The boundary line follows this ridge across the existing road through the old clearcut, and runs roughly on contour.

Towards the eastern end of the watershed boundary line, the boundary follows the ridge to its end. The end of the ridge is located at the base of a slope. The watershed boundary line then runs roughly straight up this slope to the boundary of the SCPI harvesting area, which is located near the crest of the hill.

The new boundary line is located north of the existing watershed boundary line, which means that there is terrain that was previously mapped as being in the Chapman Creek watershed that is actually located in the Wilson Creek watershed (see Figures 1 and 2).

5.0 CONCLUSION

The hydrologic divide between Chapman Creek and Wilson Creek within the Community Forest tenure area boundary is largely controlled by glaciofluvial ridges that are not visible on existing TRIM contour maps. Remapping the watershed boundary line by inspecting the terrain and hydrologic networks in the field has resulted in a significant shift of the watershed boundary to the north.

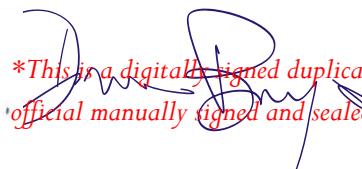
An area previously mapped as being located in the Chapman Creek watershed is actually located in the Wilson Creek watershed. The result is that the Chapman Creek watershed is smaller than mapped while the Wilson Creek watershed is somewhat larger than previously mapped. The total change in watershed area based on this field validation of the hydrologic divide is approximately 54.12 hectares, or 0.8% reduction of the total area of the Chapman Creek watershed and a 2% increase in the size of the Wilson Creek watershed.

Prepared by:



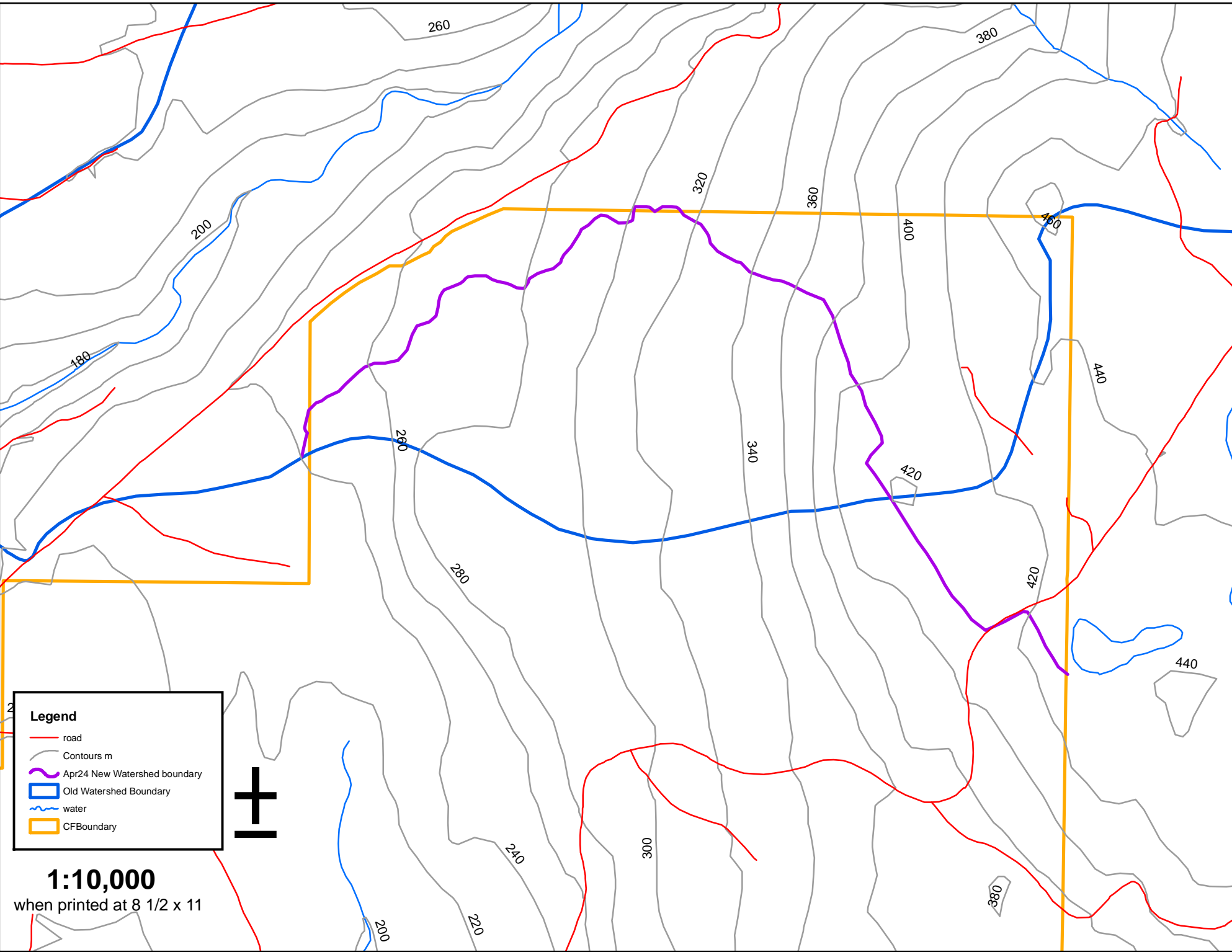
Victoria Stevens, B. Sc., G.I.T.

Reviewed by:


**This is a digitally signed duplicate of the official manually signed and sealed document.*

Drew Brayshaw, M. Sc., P. Geo.



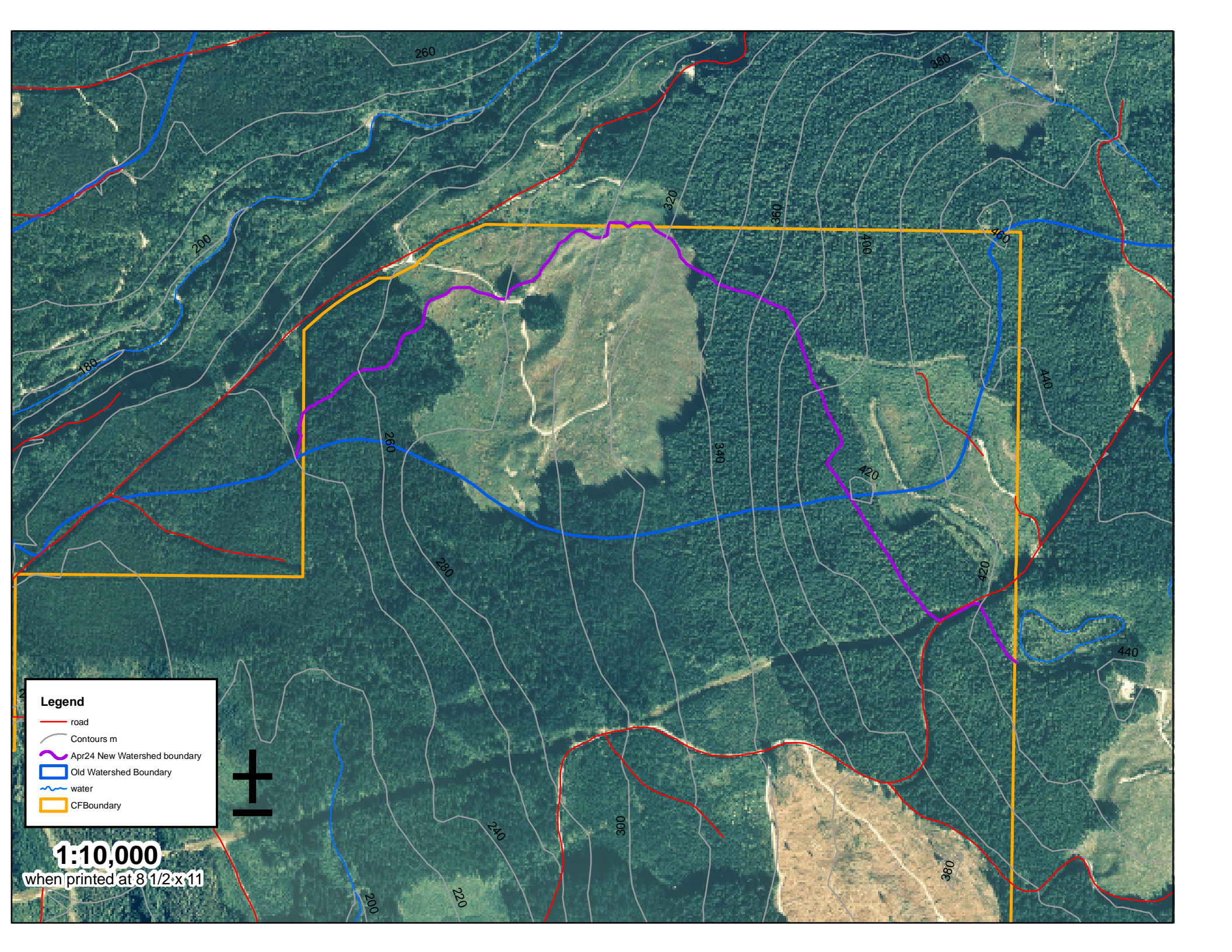


Legend

- road
- Contours m
- Apr24 New Watershed boundary
- Old Watershed Boundary
- water
- CFBoundary



1:10,000
when printed at 8 1/2 x 11



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