



PROJECT PROFILE

Aerial Assessment of Riparian Areas of the Vermilion River and its Major Tributaries

KEY ELEMENTS

- **Client**
North Saskatchewan Watershed Alliance
- **Client Contact**
Information provided upon request
- **Project Value**
\$195,000
- **Duration**
July 2015 - April 2016
- **Key Personnel**
Valerie Coenen
Anne Sommerville
- **Services**
Aerial Assessment of Riparian Areas of the Vermilion River, AB and its Major Tributaries
- **Project Location**
Vermilion River, Alberta



Teichreb, C. and G. Walker. 2008

Golder Associates Ltd. (Golder) completed an Aerial Assessment of Riparian Areas of the Vermilion River, AB and its Major Tributaries. The focus of the assessment was five-fold, including:

- 1) Delineation of lotic riparian areas and floodplains of the Vermilion River and riparian areas of its major tributaries.
- 2) Assessment of the condition of all riparian areas in the watershed using a rapid method or methods.
- 3) Identification of intact areas for conservation and/or protection.
- 4) Identification of degraded areas for restoration.
- 5) Prioritization of degraded areas for restoration.



Teichreb, C. and G. Walker. 2008

Golder contracted Tarin Resource Services Ltd. (Tarin) from Calgary, Alberta to acquire digital stereo imagery and LiDAR data for the Vermilion River and identified tributaries. Digital, colour imagery was acquired on August 23rd and September 12th, 2015 for a 1 kilometer (km) wide corridor, centered on the following watercourses (Figure 1):

Vermilion River	Birch Creek	Campbell Creek	Cotton Creek
Deer Creek	Mundare Creek	Irish Creek	Marwayne Creek
Stretton Creek	Waskwei Creek	Holden Drainage	Holden Creek
Lamont North Creek	Warwick Creek		



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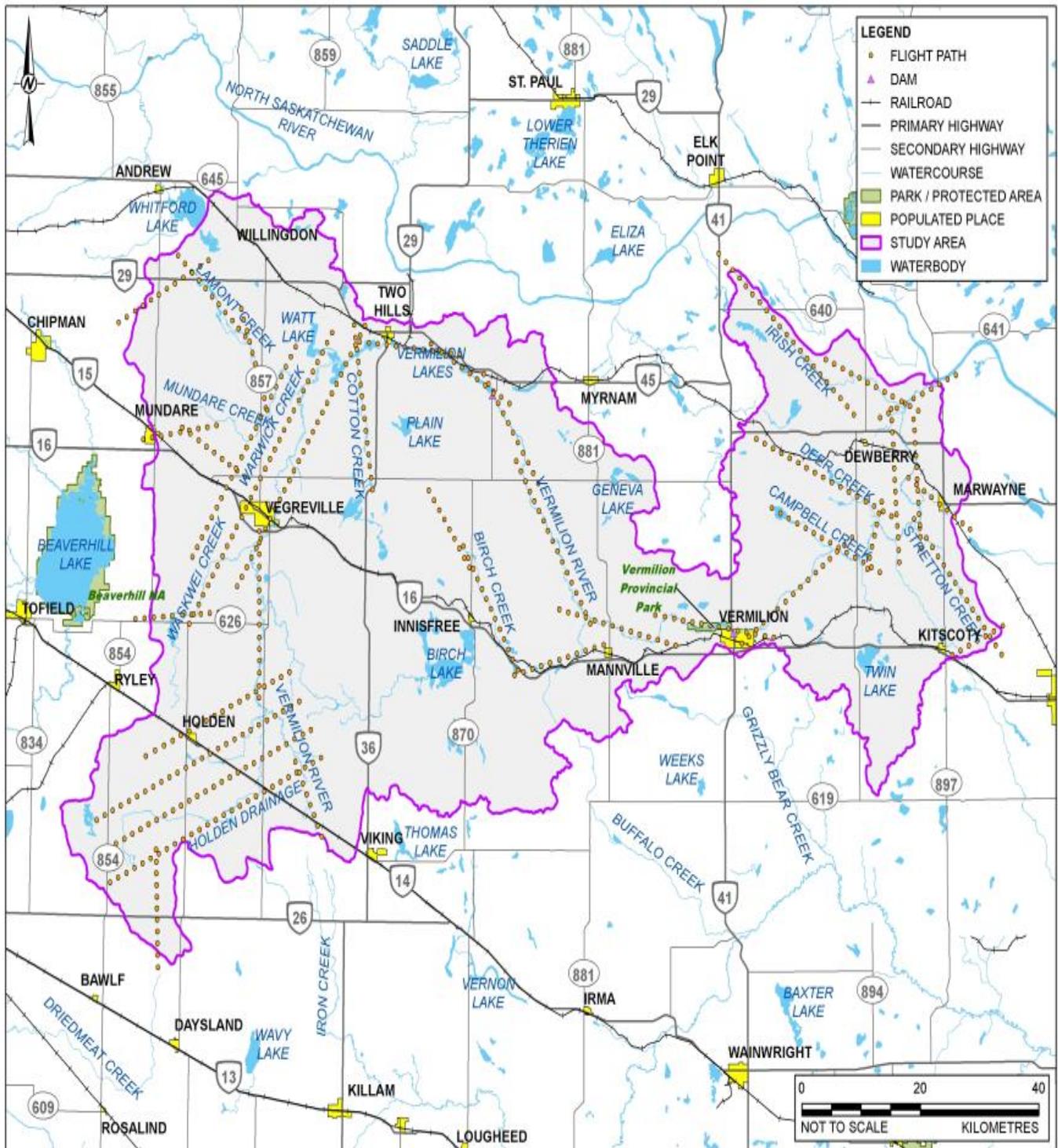


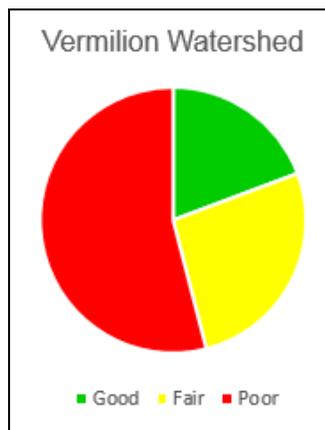
Figure 1: Flight Plan for Collection of Imagery



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Over the last 100 years, the Vermilion River watershed has been extensively altered. There has been extensive drainage of wetlands to allow the expansion of agriculture, transportation and municipal and industrial development within the watershed. Some of the programs have been authorized by licenses, but other drainage projects have proceeded without proper authorization. The cumulative impact of drainage in the upper watershed may have increased the frequency and intensity of flooding in the middle reaches of the Vermilion River. Drainage may have also reduced the natural storage of water, thereby reducing the duration of water flow. Physical alteration of the Vermilion Lakes and the Vermilion River at Vegreville, and various water management structures, were constructed as flood management tools to reduce the impact of major summer rainfall events in the Vermilion Lakes basin. Substantial change in the vegetation types and extent from pre-European settlement were also summarized. The results of a landcover change analysis between 1990 and 2010 indicates that land-use change is still ongoing, and is driven primarily by an increase in the anthropogenic footprint and a corresponding decrease in forested and wetland landcover types.



Results from the aerial assessment and evaluation of riparian health showed that only 19% of the riparian areas within the Vermilion River watershed are in good condition, while 27% are in fair condition and 54% are in poor condition. The Vermilion River watershed results are similar to those found in the Battle River watershed, where the majority of the riparian areas assessed were scored as being in 'poor' health (Teichreb and Walker 2008). These results are likely not surprising, given the level of anthropogenic modification of riparian zones, in a largely agricultural setting. Overall the riparian health trend varies between drainages, with the Birch Creek drainage having the highest overall proportion of riparian areas with a 'good' health score of 57%, compared to the lowest 'good' health score of 8% in both the Holden and Lamont Creek Drainages. Results from the aerial assessment and evaluation of riparian health are presented in Table 1.

Table1: Riparian Health Score and Length by Drainage within the Vermilion River Watershed

Drainage	Good		Fair		Poor		Total Drainage Length (km) ^a
	% of drainage	km ^a	% of drainage	km ^a	% of drainage	km ^a	
Birch Creek	57	59	21	22	21	22	103
Campbell Creek	29	7	29	7	42	10	23
Cotton Creek	22	8	49	19	29	11	38
Deer Creek	35	21	14	8	51	30	59
Holden Creek	8	20	10	24	81	193	237
Irish Creek	43	42	25	24	33	32	97



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Table1: Riparian Health Score and Length by Drainage within the Vermilion River Watershed

Drainage	Good		Fair		Poor		Total Drainage Length (km) ^a
	% of drainage	km ^a	% of drainage	km ^a	% of drainage	km ^a	
Lamont Creek	8	7	16	13	76	65	85
Marwayne Creek	24	7	24	7	53	15	29
Mundare Creek	34	20	25	14	41	24	58
Stretton Creek	19	14	28	20	53	37	71
Vermilion River	14	121	33	287	53	468	876
Warwick Creek	17	10	29	18	54	32	60
Waskwei Creek	20	13	28	18	53	34	64
Grand Total	19	347	27	481	54	973	1801

^a – km value represents both right and left stream bank distances.

Notably, alteration of natural vegetation cover, represented by questions 1 through 3 of the assessment score-card, largely contributed to most scores in the Vermilion River watershed. For most drainages and reaches, physical alteration of the riparian areas was not evident and resulted in a high score. Exceptions to this trend were observed within the Holden Creek and the Vermilion River drainages. This result is not a surprise, given the long history of wetland and agricultural drainage activities within the Holden Drainage District, and water control structures and altered channels along the Vermilion River itself. Limited areas of physically altered riparian zones were observed within most drainages, but most notably within Deer Creek.

The results of this aerial riparian health assessment cannot replace ground-based field assessments. The aerial assessment methodology does, however, provide a record of the current status of the riparian areas within an area, and can serve as a coarse-filter to evaluate large areas such as the Vermilion River watershed, to identify priority areas for further survey. The recommended methods for ground-based assessments would follow the Alberta Riparian Habitat Management Society, Riparian Health Assessment which has been extensively used in Alberta for over 20 years. Using the final health scores, preliminary drainages and reaches were identified and prioritized for either restoration or conservation management practices. Scores of 'fair' and 'poor' riparian health condition can identify areas for restoration opportunities, while areas of 'good' riparian health condition can be prioritized for conservation. Identifying landowners who are open and amenable to riparian conservation opportunities will be a key step in the process of implementing restoration and conservation practices. When appropriate, individual reach segments to be prioritized for conservation or restoration can be identified through review of the ArcGIS riparian health geodatabase.

References: Teichreb, C. and G. Walker. 2008. Aerial videographic health and integrity assessment of the riparian management area for selected reaches of the Battle River. Alberta Environment Technical Report. 23pp.