# A new Alberta locality for the Western Red Damsel (Odonata: Coenagrionidae), with notes on habitat characteristics

By Robert Bercha

**Abstract** (DOI: 10.5281/zenodo.20978961)

In Alberta, Canada, *Amphiagrion abbreviatum*, the Western Red Damsel, is known from only a few localities. During the summer of 2015 I identified a new locality south of Hill Spring, Alberta. A return trip to the site in 2016 and more thorough surveys of the site and nearby water bodies confirmed that the population is thriving at this location and is localized to one marsh. This site diverges from the species' preferred shallow, spring-fed pond habitat as fresh water is supplemented at this site from a nearby irrigation canal. The habitat and water conditions at the Hill Spring locality are compared to two other known sites where *Amphiagrion abbreviatum* has been found.

**Figure 1.** A male *Amphiagrion abbreviatum* (Western Red Damsel) at the Hill Spring Marsh – 29 June 2015. Photograph by R. Bercha.

**Figure 2.** A female Western Red Damsel perched on a bulrush at the Jenner Bridge Badlands Seep – 28 June 2016. Photograph by R. Bercha.

## Introduction

*Amphiagrion abbreviatum* (Selys), the Western Red Damsel, is a locally common species found in the southern parts of British Columbia, Alberta, and Saskatchewan in Canada (Walker 1953; Cannings 2002). In Alberta, the species was previously known from only eight locations before 2015 (Walker 1953; Acorn 2004; iNaturalist.org). The preferred habitat of this species in Alberta appears to be shallow, spring-fed ponds and seeps with emergent and terrestrial grassy vegetation (Acorn 2004). The damselflies are easily identified by their coloration, hairiness, and stocky appearance (Walker 1953). The males have a black head and thorax and predominantly red abdomen (Fig. 1). The females are typically more orange and have lighter coloration (Fig. 2) than the males (Acorn 2004).

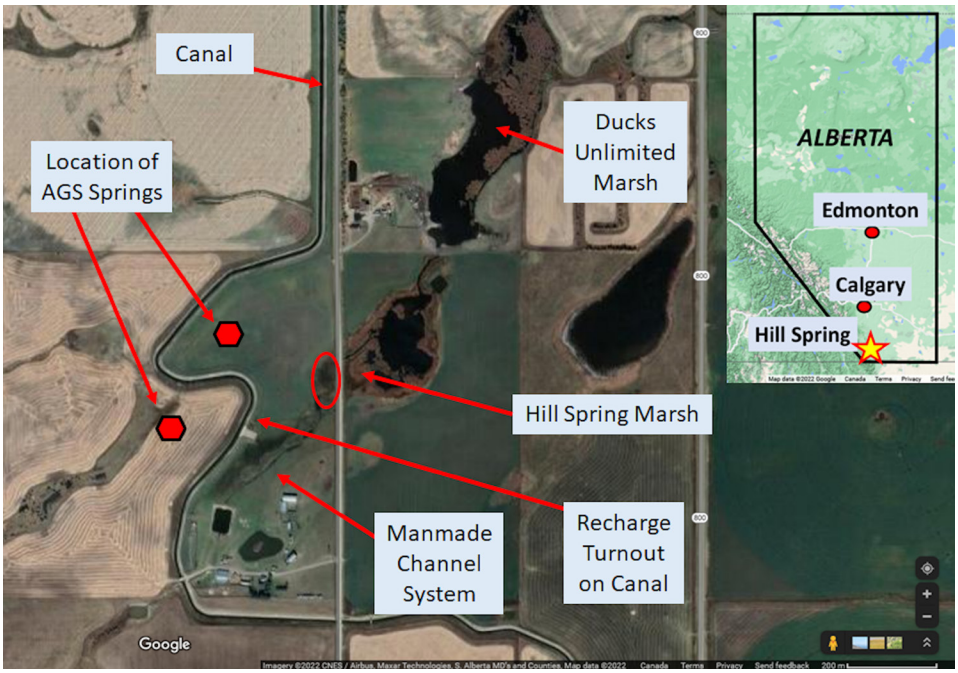


**Figure 3.** Hill Spring is located in the south western corner of Alberta (Yellow Star on inset map). The larger map shows the location of the Hill Spring Marsh and its proximity to the canal to the west (the black line running from north to south through the map), the location of the turnout used to recharge the Ducks Unlimited project and the location of the AGS springs (red hexagons). The red oval on the map circles the area where *Amphiagrion abbreviatum* was found. (Maps courtesy of Google).

### Known Localities

Before the Hill Spring discovery in 2015, *Amphiagrion abbreviatum* was known from only eight localities in Alberta: Bow River Falls Slough (Walker 1953) and Vermilion Lakes area in Banff National Park, Many Springs complex in and to the west of Bow Valley Provincial Park, Lowden Lake Spring, Jenner Bridge Badlands Seep, Jenner Springs (Acorn 2004), Lussier Springs in Medicine Hat (J. Acorn, personal communication, 26 March 2022), and Glenbow Ranch Provincial Park from a photograph of one individual on iNaturalist.org.

### New Hill Spring Locality

The Hill Spring locality is located 2 km south of the village of Hill Spring along range road 280 in southwestern Alberta, Canada (49.27381, -113.63421). It consists of a wetland that runs ~350 m in a NE/SW direction on either side of the road allowance—the Hill Spring Marsh (HSM). Satellite images (Fig. 3) reveal that on the west side of the road the wetland area appears to have a manmade channel running down its center and to the east of the road the wetland is less disturbed. This wetland lies in the middle of a 4 km long system of marshes, man-made connectors, dugouts, and natural drainage courses that ends to the northeast at Dipping Vat Lake. Directly to the west of the site is an irrigation canal lateral that transports water from the Belly River in the United Irrigation District. This is important as there is a turnout on the east side of the canal adjacent to the locality that allows for fresh water recharge of the wetland system. The water level in the marsh appears to fluctuate depending on ambient temperature, precipitation, and the amount of recharge provided by the canal. The wetland east of the road is part of a Ducks Unlimited project on private land. During certain times of the year, Ducks Unlimited directs the irrigation district to recharge the

**Figure 4.** The Hill Spring locality looking south – 7 August 2017. Emergent vegetation in the marsh is primarily cattails, with terrestrial grasses along the road allowance. Photograph by R. Bercha.

wetland system from the canal (F. Rice, personal communication, 11 November 2021).

Another possible source of water in this wetland system is a natural spring. To confirm this, I plotted data from the Alberta Geological Survey's (AGS) "Spring" database in the Hill Spring area in Google maps. Two data points plot at ~200 and ~300 m west of the wetland system in dry farm fields. Based on notes from the AGS, these are older estimated location data; it is unknown if these springs were originally tied to drainage patterns further west or to the wetland system.

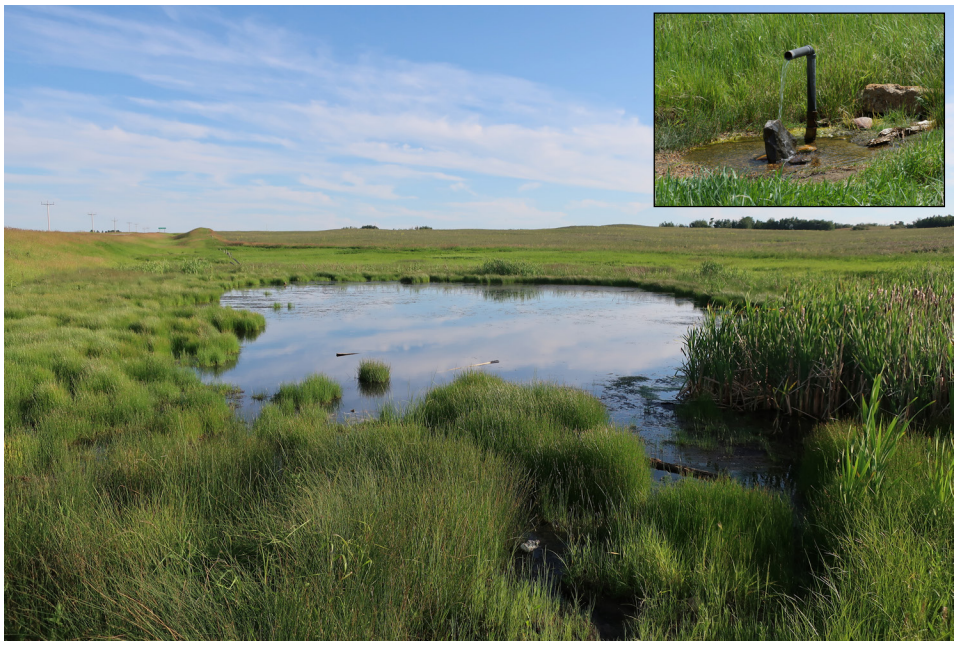

**Figure 5.** Lowden Lake Spring – 4 July 2017. This photo is taken from the spring stand pipe looking towards the south (see inset). Run off from the spring enters the marsh in the bottom right corner of the photo. There is a shallow channel at the south end of this marsh were water exits through a culvert to Lowden Lake on the other side of the road. Vegetation at the locality consists of bulrushes, cattails, and duckweed. The water from the spring is collected as drinking water by area residents. Photographs by R. Bercha.

**Damselfly Survey**

I conducted the initial one-hour survey at this site on 29 June 2015 starting at 10:22 AM, as part of a longer three-day damselfly survey and collecting trip in Southern Alberta. During the stop, I collected and identified four different species of damselflies: *Coenagrion resolutum* (Taiga Bluet), *Enallagma annexum* (Northern Bluet), *E. boreale* (Boreal Bluet), and *Amphiagrion abbreviatum* (Western Red Damsel). The Western Red Damsel was an exciting and unexpected discovery. As of 2015, it was known from only eight sites in Alberta. A thorough search of the area turned up five individuals. Interestingly, the damselflies were only present on the west side of the road in the long grass where the road foreslope meets the marsh. The emergent vegetation in the HSM where the Western Red Damsels were found is primarily cattails (*Typha latifolia*) and the vegetation surrounding the marsh in farm fields and road allowance is mainly grass. The entire marsh is overgrown with cattails; there are no large areas of open water, suggesting relatively shallow water depths.

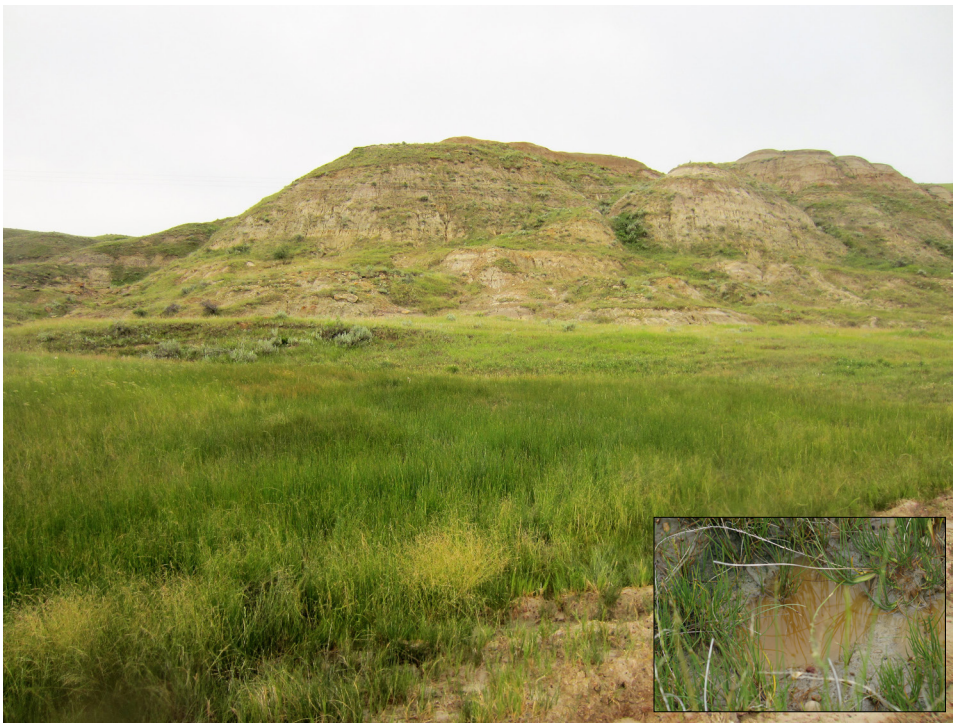

**Figure 6.** The Jenner Bridge Badlands Seep locality – 28 June 2016. The source of the spring is just off the road to the center left of the photograph where it bubbles up through the ground. The area consists of water saturated clay with water filled pock marks and lush bulrush growth (see inset). Photographs by R. Bercha.

On 23 June 2016 starting at 11:42 AM, I conducted a second five-hour visit to the Hill Spring area. The purpose of this visit was to: 1) confirm if *Amphiagrion abbreviatum* was still

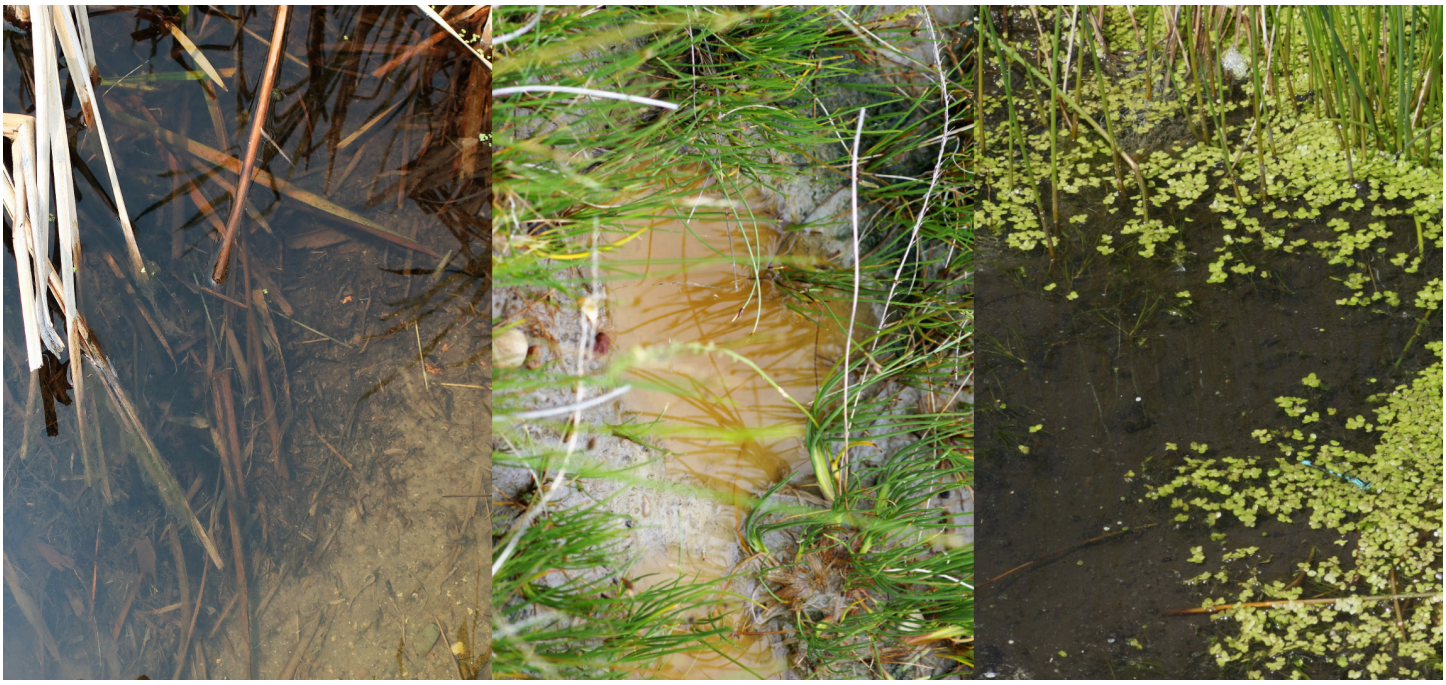

**Figure 7.** A series of photographs showing the substrate at the different localities. *From left to right:* Hill Spring Marsh, Jenner Bridge Badlands Seep and Lowden Lake Spring Marsh. Hill Spring has organic material consisting of cattail debris and some harder substrate near the road allowance, Jenner Bridge Badlands seep consists of clay rich soil with pock marks and Lowden Lake Spring marsh is predominantly bare soil with sparce aquatic vegetation. Photographs by R. Bercha.

present at this location, 2) collect and analyze water samples from the HSM, and 3) conduct a more thorough survey of surrounding roadside accessible marshes/water bodies within 1.5 km to determine the size of the population. I identified nine *A. abbreviatum* at the HSM—again on the west side of the road in the long grass sloping down to the marsh (Fig. 4). Interestingly, one of the damselflies was still teneral, indicating that it had emerged recently. Two other damselfly species were also present: *Coenagrion resolutum* (Taiga Bluet) and *Enallagma annexum* (Northern Bluet). A search of the nearby marshes provided no additional specimens of *A. abbreviatum*, suggesting that this population is localized in the HSM marsh.

Finally, I made a third stop at the HSM on 7 August 2017. No *Amphiagrion abbreviatum* were observed, indicating that the flight season was past. A water sample was collected for analysis and a number of site photos were taken.

**Hill Spring Marsh Water Samples**

I collected and analyzed two water samples from different parts of the marsh on 23 June 2016 and one on 7 August 2017. Total dissolved solids (TDS) and temperature were measured and recorded three times from each sample and an average value was computed. Measurements were taken with an HM Digital TDS-3 Handheld TDS Water Meter. This TDS meter automatically compensates for temperature variations. The TDS and temperature measurements on 23 June 2016 for sample 1 were: 298 ppm and 17.9 °C and sample 2: 403 ppm and 20.2 °C. The water sample from 7 August 2017 was analyzed after sitting for a week in my basement; it had a TDS of 122 ppm and temperature of 20.7°C.

To determine how these TDS values compare to the canal water used to recharge this marsh, I referenced the Assessment of Water Quality in Alberta's Irrigation Districts (Little et al. 2010). The source of water in the canal is the Belly River (F. Rice, personal communication, 14 June 2022). Based on this report the mean TDS of the Belly River water as it is diverted into the canal is less then 116 ppm. This lower TDS value combined with Ducks Unlimited use of the canal as a source of recharge water provide a reasonable explanation for the lower TDS values at Hill Spring Marsh.

**Visits to Previously Known Localities**

I visited two other known localities (Lowden Lake Spring and Jenner Bridge Badlands Seep) to confirm the presence of *Amphiagrion abbreviatum* and provide a comparison of habitat and water conditions to the HSM site. I made visits to the Lowden Lake Spring on 7 June 2015 and 4 July 2017. The Lowden Lake Spring site is approximately 18 km south of the town of Stettler along Highway 56 (52.1493; -112.7195) and consists of a small standing pipe with spring water flowing out of it down a short waterway

to a small wetland area on the west side of highway. Emergent vegetation around this marsh consists primarily of bulrushes (*Juncus*), with a few patches of cattails (Fig. 5). The wetland is drained by a small waterway and culvert that passes under the highway to the east into Lowden Lake. In the 2015 visit, 13 Western Red Damsels were counted and six were observed in the 2017 visit. Other species of damselflies present were: 2015 and 2017, *Coenagrion resolutum* (Taiga Bluet); 2015, *C. angulatum* (Prairie Bluet); 2017, *Enallagma boreale* (Boreal Bluet), and *Lestes disjunctus* (Common Spreadwing). I measured water parameters directly from the spring pipe and at four spots around the marsh. The results of these measurements were: the spring had an average TDS of 910 ppm and a temperature of 10°C; the four spots in the marsh showed TDS ranging from 904 ppm and a temperature of 14°C on the northern side by the spring waterway and up to 10600 ppm and 25.9°C on the south edge away from the spring.

On 28 June 2016, I visited the Jenner Bridge Badlands Seep. This site is 0.9 km east of Highway 884 on Township Road 220A on the south side of the Red Deer River valley (50.8353; -111.1631). The side of the valley has classic badlands geomorphology, with a small fresh water seep exiting the valley side. Downslope and surrounding the seep, a small area has lush, semi-aquatic plant growth, primarily bulrushes (Fig. 6). The site is also frequented by cattle in search of fresh water, leaving it with a pocked hoof print morphology. Within the hoof prints, water accumulates, providing habitat for *Amphiagrion abbreviatum*. I surveyed the site and turned up a total of five Western Red Damsels. Two other species of damselflies were also identified: *Enallagma annexum* (Northern Bluet) and *Coenagrion resolutum* (Taiga Bluet). Water samples were taken, providing an average TDS of 1450 ppm; temperatures were 14.3 °C from the spring and 20.4 °C from the cow hoof prints.

### Comparison of Substrate

I completed a comparison of the substrate in the two marshes and the seep based on a visual survey during the site visits and using photographs (Fig. 7) taken at each site. The Hill Spring Marsh substrate consists of decaying organic material provided by the numerous cattails that grow in the marsh. The bottom of the marsh is soft and spongy. Near the margin of the road foreslope and marsh (the ditch) there are occasional small patches of bare gravelly clay/dirt from the aggregate base of the road. At the Jenner Bridge Badlands Seep site, the substrate is bare clay-rich soil that is typical of badlands, with isolated areas of bulrush growth around the hoof pocks. The areas between the hoof pocks are emergent, but extremely water-saturated and cannot hold any significant amount of weight. Finally, the Lowden Lake Spring Marsh substrate consists of grey-black mud with very sparse aquatic vegetation growing on it in the northern half of the marsh where the cooler water is present. All three of these localities are different, demonstrating that *Amphiagrion abbreviatum* can thrive in habitats with significantly different substrates.

## Discussion

The data from these surveys provide useful insights into the seasonality of *Amphiagrion abbreviatum* and the water conditions and habitat that it prefers. Mature adult *A. abbreviatum* were on the wing on 23 June and 29 June at the HSM. These records lie within the dates from the other two localities (7 June–24 July) and those provided by various authors for Alberta: 29 May–25 July (Acorn 2004) and 1 June–7 July for Alberta and Saskatchewan (Walker 1953). The emergence dates at a given locality vary due to weather and local water and other related habitat conditions.

The TDS range at the Hill Spring Marsh (122–450 ppm) was the lowest of the three localities visited with Lowden Lake Spring and Jenner Bridge Badlands Seep having higher TDS ranging from 910–1450 ppm (and up to 10450 ppm at the south outflow of the Lowden Lake Spring marsh). The source of water at the Hill Spring Marsh comes partially from the nearby canal, which explains the low TDS measured. Ranges of water temperatures were measured from the two marshes and seep. Each locality had areas with cooler water temperatures, with the coldest temperatures ranging from 14.0 to 17.9°C. These cooler water temperatures may be a requirement for *Amphiagrion abbreviatum*. Finally, the Hill Spring Marsh is the first known place in Alberta where *A. abbreviatum* is associated with canal water instead of spring water.

The emergent vegetation was different between the two marshes and seep. The Hill Spring Marsh was inundated with cattails, the Lowden Lake Spring Marsh had bulrushes with occasional patches of cattails, and the Jenner Bridge Badlands Spring was primarily bulrushes and grass. None of the marshes had willow or other trees growing at their margins. In all cases, the Western Red Damsels perched on either grass or bulrushes.

Based on the data presented, the required habitat conditions for *Amphiagrion abbreviatum* include: a reliable source of cool water with low TDS such as a spring or canal, an open marsh or seep with inflow and outflow with minimal accumulation of dissolved solids, areas within the marsh or seep with cool water temperatures (less than 18°C and, based on Acorn (2004), perhaps as cold as 6°C), mixed substrates with some bare areas, emergent marsh vegetation of bulrushes and/or cattails, and surrounding terrestrial grass for perching.

### Acknowledgments

I thank Dr. Rob Cannings and John Acorn for their review of this article and suggestions for its improvement; Fred Rice, District Manager for the

United Irrigation District, for sharing his knowledge on the irrigation system in this area; and Dr. Amanda Whispell is thanked for her guidance in seeing this paper through to publication. The specimens used in this study have been preserved and reside in my personal collection.

**Citations**

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