

Mountain Legacy Project 2010 Field Season Summary Report

Presented to Dr. Eric Higgs
and
Ms. Alina Fisher

By Stuart Higgs

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Introduction:

Dear reader,

The following report was compiled during and shortly after the field 2010 season. It was presented to Dr. Eric Higgs, the project's principal investigator and Ms. Alina Fisher, the project administrator in early November, 2010.

This report describes the activities and character of the 2010 field season. I hope that this record will be informative and to some extent capture the nature of the fieldwork we encountered. If there is any need to substantiate or clarify the contents of this document, don't hesitate to contact me at stuart.higgs@gmail.com.

In summary, I see the 2010 field season as three things. First, it was a summer that broke new ground and took new approaches to old challenges. Secondly, it was a season that continued to develop practices to improve the integrity and consistency of the data. Finally and most importantly, it was, in my eyes, a resounding success.

With these three themes in mind, I invite you to read on and enjoy the exploits of the 2010 field season.

Sincerely,

Stuart Higgs

MLP Field Crew Leader, 2010

The 2010 Field and Lab Crew:

Crew Members:

Not surprisingly, one of the hardest tasks of any field season is trimming down the hundreds of exceptional field crew applicants to build a tight-fitting, crack team. This year was no exception. With over one hundred applications, the list was whittled down to 27 candidates by early March. A second selection was made, again based on CV's, and out of this short list five applicants were interviewed at the end of March. Job offers were made shortly after, on March 30th. Evolving ideas on how to best break up the data work and field work meant a second call for applications to the newly formed "lab crew" was made at the end of March; this position was filled by late May.

At the end of the day, six candidates were hired for the 2010 season. I stepped into the role of field crew leader and Will McInnes was hired as an assistant crew leader. Allie Dickhout and Ryan Hilperts completed the four person field crew. In the lab, Ellie Stephenson was hired on to continue the mapping work she began in the previous semester through UVic's Undergraduate Research Scholarship (URS) Program and Matt Richards joined the project to curate the digital library.

I can truly say, after spending time working in the full gamut of circumstances (from the most frustrating to most elating), that they are all exceptionally talented, hardworking, and inspiring individuals.

Crew Configuration:

This year, a brand new crew configuration was employed. The pressing need for extensive digital organization resulted in forming two crews. On the home front a lab crew, comprising of Ellie Stephenson and Matt Richards, made outstanding headway on several digital projects in Victoria. Simultaneously, a four-person field crew consisting of Will McInnes, Ryan Hilperts, Allie Dickhout and I made tracks repeating imagery throughout Alberta and BC.

To add to the complication of having a lab crew and a field crew, the field crew was deployed in two stages. A two-person crew, made up of Will and I, spent the first two months preparing for the season and getting the fieldwork up to speed. At the end of June, as the weather and helicopter support began to improve Allie and Ryan arrived.

Allie and Ryan joined Will and I for a whirlwind, two-month streak of fieldwork during July and August. Initially it was hoped that Ellie and Matt would join the four of us at some point in early August but alas, data work kept them tied down in Victoria until the final week of the season.

The 2010 Field Season Campaign:

Pre Season:

Pre season preparations were extensive this year. Limited funding the previous year and staffing shortages at LAC meant that we entered the field season with relatively few new scans. Fortunately this gave us the opportunity to focus on cleaning up left over images from previous field seasons. In addition to having no new images, no new critical priority regions/images were identified by any of the project stakeholders. These two factors lead us to adopt a clean up approach to the summer's work and thus focus on completing surveys and regions, rather than direct our efforts towards specific image sets as done in previous seasons.

The flexibility of "cleaning up" surveys was offset by the fact that a lot of data preparation was required before we could dig into the summer work. This motivated Will and I to stay in Victoria for all of May. In retrospect, spending a month preparing was a very good idea and something I would recommend for future field seasons. This month gave us time to clean and prepare equipment, as well as complete most of the data preparation (ie: renaming, inverting, cropping, gridding, printing and station locating). Having the full suite of resources and a great office space to work out of while preparing for the season made things much easier. Having all the images printed and data sorted before hand also significantly improved the data's organization and our ability to manage it in the field during the remainder of the season.

I believe that having the data ready before heading to the field made the field work much more efficient. Spending the time in Victoria to set ourselves up properly was an important step in preventing mistakes, dropped images, and other data management errors. Additionally, as it turned out, May was exceptionally rainy and cool this year so only a few field days could have been gleaned if we had rushed off to Alberta anyway. It seems we played our cards right! I'm confident that the month spent in Victoria more than offset the lost field time.

This year, we did not have formal pre-season field training, a significant change from previous year's. The annual, pre-season meeting was still held in Victoria to introduce Allie, Ryan, Will, Ellie and Matt to the inner workings of the project. However, given the two-staged field approach and the month of office-based work Will and I conducted, there was no pressing need to conduct training until later in the summer. I would recommend this approach again, as long as two or three days are earmarked as orientation and training days once the new crewmembers arrive.

Field Season Calendar:

May:

May 1st – 6th:

I worked in Victoria initiating field prep. The inaugural field season meeting was held on May 6th.

May 7th – 15th:

Will and I spent the week working in the lab sorting out data and field equipment.

May 16th – 21st:

Will and I refreshed our Wilderness First Aid certification in Squamish. Matt started work in the lab.

May 22nd – 31st:

Will and I wrapped up our work in Victoria, picked up the field truck from Budget on the 25th, and headed east on the morning of the 31st. The first stop was a night in Vancouver. While in the city, we picked up some final supplies and had the cameras looked over by Mike Mander at Beau Photo.

June:

June 1st – 3rd:

Will and I drove to Rogers Pass, then Calgary, and finally arrived in Blairmore on the 3rd. We were based out of the Blairmore Ranger Station, located right in town.

June 4th – 13rd:

First real push of field work for the summer. Will and I rattled off 12 truck-accessed stations along the divide.

June 14th – 18th:

Will took a few days off for his Convocation in Victoria, during which I worked at the SRD office in Calgary. Will joined me for two days in Calgary at the end of the week as well. During the week in Calgary we started scanning and processing Bob Stevenson's Bridgland 1918, 1919, 1920 prints. See the Accomplishments section for details.

June 19th – 23rd:

Will and I returned to Blairmore and repeated one more station before the weather closed in. On the 23rd we picked Allie up in Fernie and drove 9 hours north to the Ya Ha Tinda Ranch. On the way we stopped by the SRD offices in Calgary.

June 24th – 26th:

The three of us spent a few days getting oriented in the Rocky District, and did some last minute sorting out of the Bridgland imagery. Ryan arrived on the night of the 25th and we spent the whole day on the 26th going through training and orientation.

June 27th – 28th:

Ryan and Allie's timing couldn't have been better! The day after training, we got our hands on a Parks RW and dove right into the thick of it. We took the opportunity to get up into the alpine and the four of us spent the day getting oriented to the hazards and challenges of field work in the mountains. It was a bit of a nerve wracking first heli day, for our pilot, a Saskatchewan-native, had limited experience flying in the mountains (none it turned out) and managed to literally bounce off the ground twice while taking off. Yikes!

June 29th – 30th:

Eric came to the field! Again, with expert timing Eric and Rob joined the four of us at the Ya Ha Tinda for some perfect weather and SRD helicopter time.

July:

July 1st – 3rd:

Eric, Rob and the crew headed south to Banff, to our new Parks accommodation at the 10-plex.

July 4th – 19th:

A two week stint in Banff. Unfortunately the weather really didn't cooperate with us and only 5 field days were possible. A significant amount of data processing work was completed and a two days of tent based work in the Healy Pass area gave us the chance to practice before heading into Assiniboine.

July 20th – 21st:

Drove from Banff to Radium and met with Rick Kubian. After a quick orientation, we knocked off four stations on the 21st.

July 22nd – 25th:

Flew into Mt Assiniboine and repeated 13 stations on foot in three days!

July 26th – 31st:

Despite almost two weeks straight of long days in the field, another five days were squeezed out in the Kootenays. Some very well deserved chocolate and beers were doled out at the end of the month!

August:

August 1st – 3rd:

After a much-needed break, the crew reassembled and uprooted ourselves from the 10-plex in Banff to head north again. Three more stations were squeezed in on our last day in Banff.

August 4th – 23rd:

These two and a half weeks were spent at the Red Deer River Base in the SRD's Rocky District. No crews were based out of the Red Deer base and the SRD were generous enough to let us adopt it as our own for the month. In contrast to the previous few weeks of limited heli support and marginal weather in Banff, we had great RW support from the SRD and after a wet start to the month, beautiful weather. There were some issues with smoke later in the month and limited access to non-treed in stations slowed us down when the helicopter wasn't available. The legendary Trudi Smith also joined us for a few days at "Camp MLP".

August 24th – 29th:

After a month of solitary confinement (no internet, phones, or city lights) at the base, it was a bit of a shock when strangers started trickling in! First Lesley Winterhault (from the 2009 field crew), followed by the lab crew - Ellie and Matt, Mandy Annand (field crew leader from 2008 and 2009), Mike (Ryan's squeeze), and eventually Eric, Stephanie and Logan arrived as well. Shortly after which they were followed by 20 or so more for the annual season finale, the Rendezvous!

August 30th – Sept 1st:

After a tenuous few hours where it looked like we had more gear than space in the truck, Matt's packing skills saved the day and we headed back east. The five of us spent the night (Lesley, Ellie, Matt, Will and I) at Will's aunt's house in Vancouver, and caught an early ferry back to the island. Gear was efficiently unpacked on the afternoon of the 31st, and the truck returned to Budget on the 1st. Another incredible summer of field work comes to a close.

** A day-by-day record of the season's work is available as a Google Calendar printout in the 2010 resources folder. This is located at .../MLPDrobo/Field Resources/2010.*

Summary of Major Accomplishments:

Field Work:

In this year's three month field season:

- 446.19 Gb of new data were generated, consisting of 17 059 digital objects.
- 10 Surveys were worked on:
 - Bridgland 1913, 17, 18, 19, 20, 22, 23, 27
 - McArthur 1887-92
 - Wheeler 1903-07, 1913-24
- 1 114 raw 3FR Hassleblad images were added to the MLP collection, repeating approximately 900 historic images.
- 1 708 Bridgland 1918-20 prints on loan from Bob Stevenson were scanned by the field crew (with help from SRD staff). 544 images from 1918, 552 from 1919, and 612 from 1920. All of these images were scanned, named, enhanced, cropped, sorted, gridded and in many cases repeated during this field season. See the section titled Scanning and Processing the Bridgland 1918, 1919, 1920 Prints for details on this work.
- All of the station locations for Bridgland 1918, 1919 and some of the 1920 survey were identified by Rob Watt and myself. There is no map sheet for this survey and identifying these station locations was a challenging project whose completion is of interest to a number of stakeholders.
- The Bridgland 1922-23 imagery from Kootenay National Park was very nearly completed and Rick Kubian noted that almost all of the high priority stations located within the park have now been repeated. Repeating the remaining images may require collaboration with additional partners in addition to those at Kootenay National Park.
- All of the Wheeler 1913 imagery, taken in Mount Assiniboine Provincial Park, was repeated. This collection required significant logistical work and included five days of tent based, remote fieldwork. As noted by Eric, a campaign of this scale hasn't been undertaken since the Jasper work in 1999. It's not much of a stretch to say that, in every aspect, this was the highlight of the summer work.
- The repeat images from Stn. 68 1x4 East 18-13-2-5, located in a nondescript, grassy field are worth singling out. Will and I repeated this station in late June and in doing so checked off the final remaining station in the Bridgland 1913 collection. This survey is one of the largest image collections held by the project and its completion is a milestone that has been a focus of the last four year's fieldwork.

Truck Accidents:

An achievement worth noting for its absence! Breaking the streak of bumps and scrapes collected by the work vehicles over the last two years, this year was accident free. A few curbs were hopped, one flat tire was unfortunately picked up, and plenty of mud had to be carefully scrubbed off of the top of the canopy before returning it to Budget – I have no idea how it got there – but no major damage was done.

This year I added an informal “off road and four wheel driving” section to the orientation and training program. I don’t think this was directly responsible for the lack of accidents, but it is something I felt was missing in the last few years and was appreciated by the crew. Perhaps the SRD could offer a more formal version in the future?

For the record, this season we had a Chevrolet Silverado 2500HD Crew Cab.

Crew Accidents:

Again, noteworthy for its absence, no crewmembers suffered any serious injuries this year! Granted a sizeable collection of blisters, scrapes, some sore knees and backs were accrued, along with the anticipated number of intermittently bruised egos, but nothing life or season threatening.

The Blog:

Will did a phenomenal job keeping the blog up to date. The lure of his new Blackberry seemed to help. For a more detailed, anecdotal account of the seasons work, see the wordpress blog currently accessible at:

<http://mountainlegacy.wordpress.com>

In an effort to one up our field antics, the lab crew also started a somewhat satirical blog of their own. It’s accessible at:

<http://mountainlegacylab.wordpress.com>

Hardware Additions and Upgrades:

A number of hardware upgrades were made this year:

- 1) New **Rubbermaid boxes** for the field notes and printed images. It sounds trivial, but it was a big step up from the heap of binders we had last year!

- 2) A through **equipment inventory** was conducted by Will at the start of the season. The equipment inventory from last year was updated and significantly expanded. The new inventory can be found on Drobo, in the 2010 resources folder. Located at:
.../MLPDrobo/Field Resources/2010/"MLP Inventory-2010.xls"
- 3) A monster **Pelican Case** from MEC (keep in mind the unlimited warranty). After killing two hard drives, I twisted Alina's arm and picked up a case for all of the drives. It seems a worthy investment given the value of the data inside.
- 4) Both of the **Seagate 1Tb drives failed and were replaced under warranty**. See the purchase noted above. The warranties were a bit lucky. I don't really think those drives are designed to have three computers plugged into them simultaneously. Lesson learnt and only one day's overlaying lost in the process. Thank you Seagate for being forgiving.
- 5) Two new drives were purchased. A 1Tb iomega RAID drive, "**Rhino**" and a 1Tb black Seagate USB drive, "**Tarantula**". Both named in accordance with the "Deadly Animals" theme adopted in 2009. Tarantula is formatted as FAT32, so can be used to shuttle data between Windows and Macintosh operating systems.
- 6) Will industriously repaired the **Kestrel case** and ordered two replacement **battery covers** so we now have a spare.
- 7) The new, **Write in the Rain field note sheets** were used with great success! They are much more durable and easier to use than the old field note books.
- 8) Several repairs to the old Hassleblad, HB1:
 - A **new IR cover** (called "Projection Window" by Hasselblad), carefully glued on by Will.
 - A **new eye cup**, after watching the old one spiral down the forest floor while doing hover repeats above the Red Deer River.
 - A new **CF card door** with the vastly superior hinge mechanism.
 - A few **new screws** for back cover, which, surprisingly, may have been free. I assumed they would Hasselblad branded and \$5 each!

Note: we had the "splash" marks on the HB1 mirror looked at by Mike at Beau Photo. Mike cautioned us strongly against trying to remove them for fear of damaging the mirror and pointed out that even the slightest misalignment caused by putting pressure on the mirror could affect the accuracy of the AF system. These cautions are emphasized by the fact that the marks have no effect on the captured image and are only cosmetic.

It is also worth pointing out that we had minimal software errors with either camera this summer. We were careful to avoid introducing moisture into the body of the Hasselblad and were mindful of condensation while in the field, especially when rapidly changing the air temperature during helicopter flights. It seems that moisture condensation inside the camera may have been the cause of the issues in 2009.

Scanning and Processing the Bridgland 1918, 1919, 1920 Prints:

With the help of the SRD's Calgary Logistics staff, Jaci and Sarah, Will and I scanned Bob Stevenson's Bridgland 1918, 1919, 1920 images prints. This was no small feat! Processing and locating aside, it amounted to about 20 workdays of scanning time between the crew, spread over a number of office days when weather forced us inside for the day.

These books contain prints of Bridgland's images and were on loan from Bob Stevenson to Rick Arthur for the summer. Rick identified them as a valuable resource as they offered a cheaper (in terms of short term scanning costs, if not person hours) avenue to digitize and access these images. The original plates are catalogued in LAC and will eventually need to be scanned.

It is important to remember that these are low-resolution scans and will generate poor quality overlays. I would strongly encourage scanning the original's before investing time in overlaying with these scans. At the very least, time should be taken to evaluate the intended application of the overlays and understand the limitations of using these low quality scans. Furthermore, some of the prints were no longer in the book (whether they were removed or simply fell out its hard to tell). Until these few missing images are scanned at LAC and available in the field it seem inefficient to visit the stations.

Fortunately, these low-resolution images are more than enough to permit locating the station locations, evaluating the survey's spatial extent and determining the priority image sets. They are also scanned at a high enough resolution to be repeated. Although, we did not generate a grid for this survey because the scans have poor geometric consistency. The distortion introduced by our scanning is assumed to be much higher than that introduced by LAC's techniques.

There is variation in these images because several people using various scanners at different times scanned them. Every effort was made to ensure consistency in file characteristics, naming, formatting and processing. Raw scans were saved for all of the prints scanned by Will and I. These scans often contain hand written notes about the image and potential location in the margins of the page.

Bob's books also contained view indexes. Documents (PDF's) were created from the scanned view indexes and the raw JPEG's are saved under metadata for each survey. Excel spreadsheets were also created, as pseudo work orders (imitating the work

order spread sheets provided by LAC), which track each image. Both of these will be valuable resources for future work on these surveys as they can often explain missing or unconventional images and file names.

These images also gave Rob and I the resources to identify the station locations. Rob worked his way through the 1919 images, while I identified the 1918 locations. Both of these survey's station locations, as well as a few 1920 stations I managed to pin down, were determined in the usual "intuitive" manner. They are our best guess after consulting NTS maps, Google Earth and any memories we have generated during time spent in the area. As such, a big disclaimer is attached and each station should be double checked against the images before heading out into the field. That said, none of our guesses have been off yet! A KML is saved under the metadata file for each survey that shows the station locations.

McArthur 1890 images and Station Locations:

In addition to Bridgland stations located, a number of additional McArthur stations were plotted. We received the McArthur 1890 LAC scans early in the summer, and processed (inverted, renamed and started sorting) them.

A cautionary note: The McArthur images are very disorganized. Image names and years given by LAC do not appear to be correct for many of the images. See Grotto Mountain for example, where three images form a panorama with the same clouds visible in all the images but each is allegedly from a different year! Furthermore, a number of the new 1890 images turned out to be from stations we have previously visited. *It seems it would be wise to order all the remaining McArthur images, about 100, and sort them into locations before continuing to repeat this survey.*

Several new station locations were "discovered" in the Unknown McArthur images. A Google Earth file (.kml) has been saved into the metadata folder. A significant number of these stations in this survey are still unknown. Several of the Public Safety officers at the BNP warden offices in Banff expressed interest in helping locate the remaining images and their knowledge of the area would be a significant asset to tap into. Unfortunately were unable to sit down with them during our short stay in Banff this summer.

Field Laptops:

Both field laptops had their hard drives cleared and software updated. A new battery was bought for the white MacBook.

The passwords, account names and user icons were also changed. Both are now:

User Name: Mountain Legacy Project
Password: mlp

They also have cute, matching cairns as icons that we stole from the website.

Novel Techniques and Recommendations for Future Seasons:

New bases:

With the geographically dispersed nature of this year's stations, we were forced to experiment with some new accommodation options. The three new bases are the Coleman Bunkhouse, Red Deer River Fire Base, and Banff Park Staff Accommodation / Research 10-Plex Apartments.

The Coleman Bunkhouse is a fantastic jumping off point for the Bridgland 1913 imagery along the divide in the Crowsnest Pass area. Located in blocks from the center of Coleman (and the Cinnamon Bear Coffee Shop!) it's a three bedroom, renovated, 1940's (?) house that sleeps two plus Aaron, the quintessential ranger and long time tenant. With its easy access to town, internet and the Elk Valley, it was the perfect place to work out of in the early season. Not to mention, it has its own kitchen! To stay there, coordinate through Rick Arthur with the staff at the Blairmore Ranger Station. To avoid stepping on any toes, it would be good courtesy to give Aaron a call as well.

The Red Deer River Fire Base is located about 45 minutes West of Sundre, on the Red Deer River. It's a SRD Fire Base located in the Rocky District, although hasn't had a crew assigned to it in a few summers. Although only maintained as a day base, they were more than happy give us the keys and let us live there for all of August this summer. It's rustic, but ideally located, free, has a heli pad as well as a number of quaint cabins and its own kitchen. For work on the Bridgland 1917-20 images, I would recommend staying here. Coordinate through the Rocky District dispatch and duty officer, again Rick Arthur can help here.

The Banff 10-Plex was a fantastic place to work from. Located in downtown Banff, it is a condo unit rented to parks staff and researchers. It is often booked up quite far in advance, but we were lucky enough to rent two units for the month of July. It is by far the best accommodation we have had in Banff, vastly superior to camping at Two Jack or the staff accommodation facilities located there. The one downside is its price, each unit cost ~ \$900/month. Fortunately this year Ian Pengelly was able to cover the rental costs for the month using the Parks fire budget. If the crew knows far enough in advance when they will be in Banff, and are able to cover the cost, this is a great accommodation option for working on the McArthur imagery. The next closest, usable, long-term accommodating we have stayed in is the Boundary Cabin in Kananaskis country, a one-hour drive away.

Post Season Data (re)Integration:

One of the biggest hurdles to managing MLP's data is the annual need to cleave off a substantial portion of the MLP library, take it to the field and modify it in a non-systematic way, then return at the end of the season and reintegrate the new data

with the old in a seamless, efficient process. This season a very successful, novel data management technique was applied to address this problem.

I'd argue that in the past, this challenge was the single greatest factor that led to the data disorder tackled by Matt this summer. Attempting to reintegrate hundreds of gigabytes of data at the end of the summer without a premeditated plan is next to impossible and can quickly end up in a "drag, drop and deal with later" mentality. This elegantly simple solution, if applied in future field seasons, is a substantial step towards maintaining the organization in the MLP Library.

The approach we took was to split the data into two sets: 'MLP Library Duplicate' and '2010 Field Data'. MLP Library Duplicate was a direct copy of all the data we needed from Drobo at the onset of the season. This was used exclusively as a reference set of data, with the vital understanding that *any changes or additions to this volume would be blindly (without checking the drive first) discarded at the end of the season*. We used the 1TB drive, Tarantula to store this data. It even looks a bit like a mini-Drobo!

The second set was the 2010 Field Data. This volume contained all new and modified data that was destined to be integrated with the MLP Library at the end of the season. Specifically, it held all of the field season's work but *no identical copies of any data in the MLP Library Duplicate set*.

These two sets were stored on separate hard drives, to emphasize their difference and ensure that the two italicized points above were adhered to. By following these two guidelines and separating the data as such, we hoped to generate a set of field data that followed the standard data structure and contained only new, unique data. The intention was that this would enable us to use an automated "merge and overwrite all identically named folders" or "merge all differences (at the file level)" approach to combine the field data with the MLP Library at the end of the summer.

Specifically, this season I used a simple copy command in the Terminal window, adding each survey separately:

```
cp -R -i -v /[directory path to "/Stations/" level on the field hard drive]/* /[directory path to "/Stations/" level on the server]/
```

What really impeded reintegrating the data in the past was that automatically merging the data sets would generate thousands of duplicates when data copied from the Library at the start of the season was added back again at the end. The new technique developed this year requires some mindfulness in the field and a little bit of back-and-forth between drives at times, but was a rigorous method that prevented misplacing data and saved an enormous amount of time after the field season wrapped up. This year reintegration took a matter of hours, rather than the expected weeks.

Crew Configuration:

The new crew arrangement, with a two-stage summer crew and a dedicated lab crew was tremendously effective. I would strongly recommend using this configuration in the future. A four-person field team is a balanced number, and I would caution against having five field crewmembers, as in 2010.

Consensus amongst the field crew was that the only way to improve this model would be to add a tech-savvy, “domestically oriented” Camp Boss. Having someone to deal with tech problems, handle daily logistical challenges such as cooking, cleaning and repairs would be an enormous asset. It would also mean images could be prepared and helicopter support organized a few days in advance.

Employing a camp boss would take a significant amount of logistical pressure off the crew leader by handling day-to-day challenges, leaving the crew leader to focus on broader scale, field logistics. This would set the crew up to take better advantage of unexpected weather windows or heli support. With the number of variables in this work, it takes an enormous amount of time and foresight to plan fieldwork much more than 24 hours in advance. With this challenge compounded by daily logistical challenges, it is very hard to take advantage of unexpected opportunities. For example, switching from a low elevation, truck accessed station with one crew to a heli day, with two crews takes a substantial shift in equipment and logistics. This can only be done at the drop of a hat when very extensive preparations have already been laid in place. One, dedicated crewmember to help prepare the crew would be an enormous asset.

Having a camp boss dedicated to data processing, organization, and digital accounting in the field would also mean far better digital security and allow the field crew to focus solely on repeating images. Data management is a task that’s not easily done after spending ten hours on top of a mountain. Significant data management headaches and potential data losses could be avoided in this way. Furthermore, if the camp boss is able to stay on top of the daily camp tasks, they could work on overlays in the field and return real-time repeat pairs to stakeholders.

Finally, having a camp boss in the field would provide two-fold insurance against injuries in the field. If one of the field crew are tired and could use a rest day, the camp boss could step in. This would reduce the likely hood of an injury happening due to negligence or inattentiveness and would give mild injuries time to heal without reducing productivity. Secondly, if a crewmember suffered a significant injury and had to end their field season early, a camp boss could step in and see out the remainder of the season.

The benefits of employing a camp boss would only pay off if the expectations of their position were very clearly stated before the season began. They would need to appreciate that they would spend upwards of 90% of their time at camp, *occasionally* spending a day in the field.

Field Campaign Timing Recommendations:

Over the course of a number of conversations with several BNP and KNP employees, I gained a bit of insight into how best take advantage of helicopter time with Parks. As I understand it, the helicopter contract time is set out at the onset of the season and runs until about the first or second week of August. This means that there is a bit of a waiting game played for the majority of the summer. The hours roll over from day to day, but not from contract to contract (year to year). Therefore helicopter time is very limited for the first half of the summer but plentiful towards the end. Essentially, the hours are stockpiled for use later in the summer in case large fires blow up in July.

Therefore, unlike the approach we took this summer that was constrained by the availability of accommodation in Banff, it doesn't make much sense to work with Parks early in the season because helicopter support will be minimal. Fortunately the SRD does not roll over helicopter time from day to day when the hazard is high enough to necessitate having a machine on standby. This is often the case in May and June so, generally, it would make sense to work with the SRD during these months.

As the first week of August approaches, things begin to get interesting with Parks. If it looks like the hazard will stay high throughout August and into September, they have the option of extending the contract. They can extend it for as little as a week at a time and extending it effectively puts Parks back into the waiting game played earlier in the summer. Things get very interesting when they decide they won't extend the contract. Suddenly there's a flush of available helicopter hours as Parks tries to spend all of the accumulated time. This flush of hours is also when everyone tries to get in their helicopter projects for the summer, and so uninterrupted days with the machine are very hard to come by.

With this insight, I would recommend planning parks work for the last two week of July and first few weeks of August. The odds of picking up helicopter time seem to be greatest at this point in the summer. Unfortunately, this is often when the haze really begins to set in to the Kootenays.

It is also worth noting that the machine is based out of Red Streak, in Radium. Due to their proximity, Rick Kubian and the Lake Louise Yoho Kootenay (LLYK) duty officer have much more control over its use and assignment. Being based out of Radium, even for work that is closer to Banff, may be quite advantageous in regards to helicopter support in the future. We had much more success with heli time while based out of Radium this summer.

A final recommendation on timing and helicopter work involves hover exit training with the SRD. The standard, heli-attack hover exit training happens quite early in the summer – mid May I believe. Being in the field during the SRD's standard

training days is a much more convenient way to get trained. After the training days, there are often no machines available for training until late June.

Digital Folder Colour Labeling:

A concerted effort was made this summer to formalize and continue the colour labeling initiated by Chris Gat last year. Achieved with Mac OS 10's finder application. This turned out to be tremendously helpful in the field and is a powerful data management tool that should be adopted in future years.

Documentation is contained within the "Read_Me" file located on the server and Drobo. In brief:

Blue signifies that "Lab work is required", namely that overlays have not been created

Green signifies that "Field work is required", namely that repeats have not been taken

Yellow indicates that a serious inconsistency exists within the data. This is a catch all, warning colour that is often associated with a "Note.txt" file describing the inconsistency.

Grey indicates that the data is a "non-essential duplicate" and can be deleted without compromising the collection.

Aperture Library:

This year, for the first time, an Aperture Library database was automatically generated. Using the new standardized folder hierarchy, each set of stations could be migrated (referenced) into a folder within Aperture using Aperture 3.0's "Import Folders as Projects" function.

This took about an hour to set up, and 30 hours to run. The resulting 5 GB library of referenced images are a tremendous asset and can easily be browsed. View the data as an aperture library opens up a number of exciting opportunities. For example, the imbedded GSP data in the Hasselblad images is now used through the software's built in mapping function. It's also now possible to generate slideshows, imbed keywords, and create edited versions of images as well as light table compilations.

General Recommendations:

A few recommendations that aren't substantial enough to warrant a category of their own:

- Split the blog into each field season and ensure it is properly archived in some form
- As recommended last year, make up business cards or a hand out of some form to give to interested parties we come across in the field
- Expand the gear inventory to include more information for safety gear (such as climbing equipment). Specifically, it should include information about their age, condition, etc. Consider starting Rope Log Book for the randonee ropes to document any abuse they are subject too (ie: significant fall, frozen, washed, etc.).
- In regards to the field vehicle, I believe a smaller, lighter, 4x4 vehicle with better clearance and a trailer would be a much better arrangement than what we have used in the last three years. The hauling capacity of the Silverado 2500HD we had this year was very rarely needed, and its length and low clearance were a challenge to work with at times. A small Jeep-like vehicle with a trailer for use when changing bases would be a much better, and potentially cheaper, arrangement if possible.
- Definitely host the Rendezvous again! It's a fantastic way to wrap up the field season and bring closure to the summer's work.
- The practice of recording Key Words in the field notes was continued this year. It has enormous potential, and should be developed further in future field seasons. Specifically, more complete key words reference sheets should be written and a method of incorporating them into the image metadata developed.

And, finally, the standard three recommendations:

- Decide on field crew configuration earlier and be very clear to define the expectations and anticipated role each member will play. This was hard to follow this year but I would be cautious in offering field time to a lab-based crew in the future. It would be very hard logistically to add two more crewmembers at any point in July or August. Ultimately, with the increased logistical demands and training requirements, I don't believe having two additional sets of hands would increase productivity later in the field season. If the lab crew were to spend time in the field, it would be best to do so in May or June when work is a bit slower paced.
- Plan the field campaign earlier. One of the biggest conceptual challenges I faced this year, as it was my first time leading the crew, was wrapping my

head around exactly what work and what quantity of work was anticipated by the stakeholders and project managers. Developing an explicit priorities list with guidance from Eric, Alina, and stakeholders before heading into the field would help. In the end, developing my own set of priorities worked really well but it is hard to make the daily, in field, judgment call's on which work to prioritize without the clear insight into the projects expectations, goals and commitments.

- Order scans earlier. As suggested every year, having the scan orders placed well in advance of the field season so the images can be prepared before heading into the field will save a considerable number of headaches.

Summary of Recommendations:

A brief summary of the recommendations described in this document, excluding those listed above in the General Recommendations section.

- 1) Scan any remaining McArthur BNP images before continuing to work on this survey and speak to BNP staff, specifically the public safety wardens and Percy Woods, about the location of unknown images.
- 2) Order LAC scans of the Bridgland 1918-20 images as soon as possible (approximately 1 700 plates), or at the very least order the 25 or so missing images. Determine whether or not it is worth investing time into overlaying the images on the SRD print scans we currently have.
- 3) Running field crew training and orientation in the field, rather than in Victoria, was a success. It took about three days to have everyone up to speed but was very effective and a great way to realistically introduce the field work! I would recommend it again.
- 4) Find out when the SRD is offering hover exit training to their heli-attack crews and coordinate the participation of the field crew. This orientation to helicopters and powered landings is a very important training activity that I strongly recommend is incorporated into future years.
- 5) Continue using the standardized digital file colour labeling.
- 6) The four-member crew model was a big success. I would strongly encourage the use of this model in future years. I feel that, with the addition of a Camp Boss, this would be the optimal field crew configuration.
- 7) Run a more formal vehicle orientation and four-wheel driving workshop, especially if a trailer is used in future seasons.
- 8) Work with parks in late summer, SRD in early summer and consider being based out of Radium to take advantage of helicopter support.

Acknowledgments:

The incredible field season this year could not have been possible without the help of many individuals. First I would like to thank Eric and Alina for respectively providing the inspiration, glue and lubrication to make this project work. A heartfelt thank you is certainly also due to my colleagues in the field: Ryan, Will and Allie. I couldn't have hoped to work with a more inspiring and wonderful group of colleagues. Furthermore, Rick Arthur, Rob Watt and Mandy Annand – your support, wisdom and encouragement are deeply appreciated, thank you.

During our travels we worked with many individuals, all of who were integral in making this season a success and deserve our thanks. In the Crowsnest pass, Aaron Davy and the staff at the Blairmore Ranger Station; in Banff, Ian Pengelly, all of the BNP Dispatchers, Dan Perrakis, Matt Rance, Percy Woods, as well as Halie Monod for her fantastic map; in the Kootenays, Rick Kubian, the Redstreak Campground staff and all of the duty officers including Darren Quinn for his help when we were key-less; at the Ya Ha Tinda ranch, a big thank you to the camp managers Rick and Jean for their wonderful hospitality as well as the coy-bows Rob and Tom; in Mt Assiniboine Provincial Park, Jeff Volp, Barb and Sepp Renner for their amazing and unexpected welcome; and for all of the wild landings, thanks are due to our favorite pilot Matt Clarke.

In addition to those listed above, there are many more who deserve acknowledgment for their help this summer. In particular, the committed group who made it out to the Red Deer River for the 2010 Rendezvous. Here's to another great year in 2011!