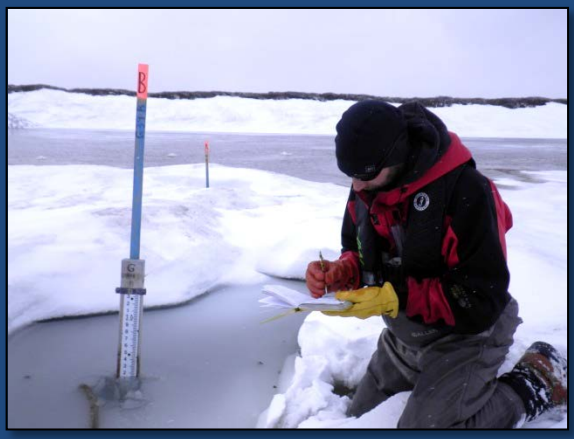

Colville River Delta 2014 Spring Breakup Field Report

ConocoPhillips

Submitted by:

Michael Baker Jr., Inc.
3900 C Street, Suite 900
Anchorage, AK 99503

Baker

7/16/2014

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ACRONYMS AND ABBREVIATIONS

Baker	Michael Baker Jr., Inc.
CPAI	ConocoPhillips Alaska, Inc.
CRD	Colville River Delta
HSE	Health, Safety, and Environment
JSA	Job Safety Analysis
MON	Monument
USGS	United States Geological Survey
WSE	Water surface elevation(s)

1.0 INTRODUCTION

Michael Baker Jr., Inc. (Baker) provided hydrology monitoring services to ConocoPhillips Alaska, Inc. (CPAI) for the 2014 Colville River Delta (CRD) Spring Breakup Hydrologic Assessment. The CRD field study is conducted annually to support U.S. Army Corps of Engineers Permit No. POA-2004-253-2, stipulation 6 by evaluating the effect of breakup flooding events. The field programs and observations acquired through these efforts are integral to understanding the regional hydrology and maintaining the continued safety of the environment, oilfield personnel, and facilities during annual flooding, and are important to obtaining future permits and designing future facilities.

Spring breakup on the North Slope of Alaska is the largest annual flooding event in the region. In 2014, breakup lasted approximately four weeks from mid-May to mid-June. This report provides an initial summary of the 2014 CRD spring breakup field program and general observations. The comprehensive hydrological assessment report, including results of the data analysis, will be submitted in November 2014.

1.1 2014 SPRING BREAKUP FIELD STUDY

The primary objective of the 2014 CRD Spring Breakup Hydrologic Assessment is to document high water events resulting in water passing through cross-drainage structures and estimate the magnitude and extent of breakup flooding within the CRD. Figure 1 shows primary monitoring locations throughout the CRD, and Figure 2 shows the specific Alpine facilities monitoring locations including CD2, CD4, and CD5 access roads.

Measurements of water surface elevation (WSE) were collected around existing Alpine pads and facilities, access roads and pipelines; and at other locations including drinking water lakes and ice bridges. Discharge was measured at the Alpine facility drainage structures and bridges, on the Colville River near the Monument 1 (MON1) monitoring site, on the Nigliq Channel at the crossing location, and at the Nigliagvik Bridge location. Breakup progression observations include floodwater and ice jam effects, ice bridge degradation, and post-breakup floodwater impacts.

Safety was a priority, and all field tasks were performed in compliance with Baker's North Slope Water Resources 2014 Health Safety and Environment (HSE) Plan and project-specific Job Safety Analysis (JSA). Daily tailgate health and safety meetings were conducted by the field crew prior to the initiation of work at the start of work each day. Task hazards and controls, protective equipment, and helicopter safety were discussed daily.

Figure 1: Colville River Delta Monitoring Locations

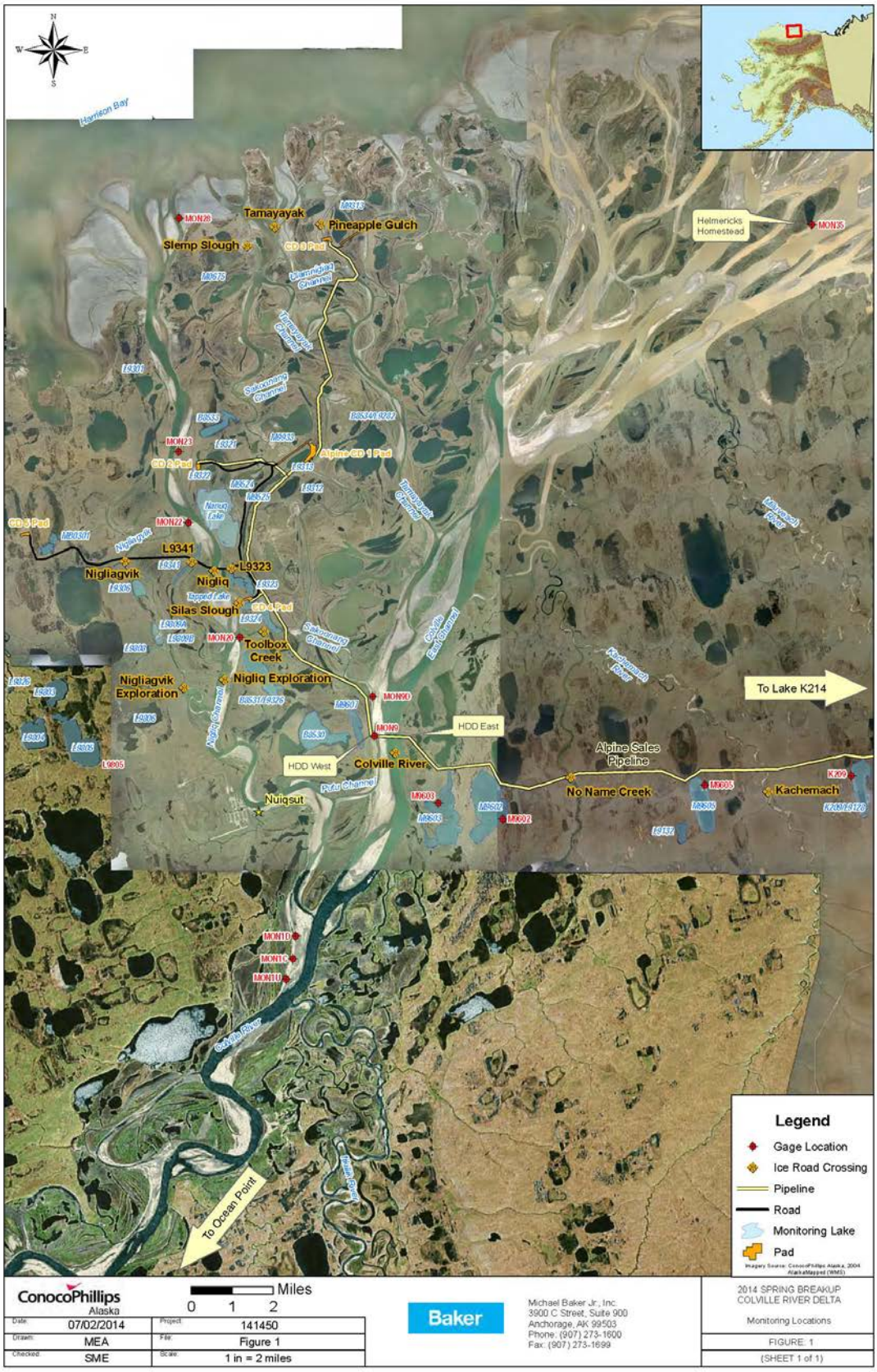
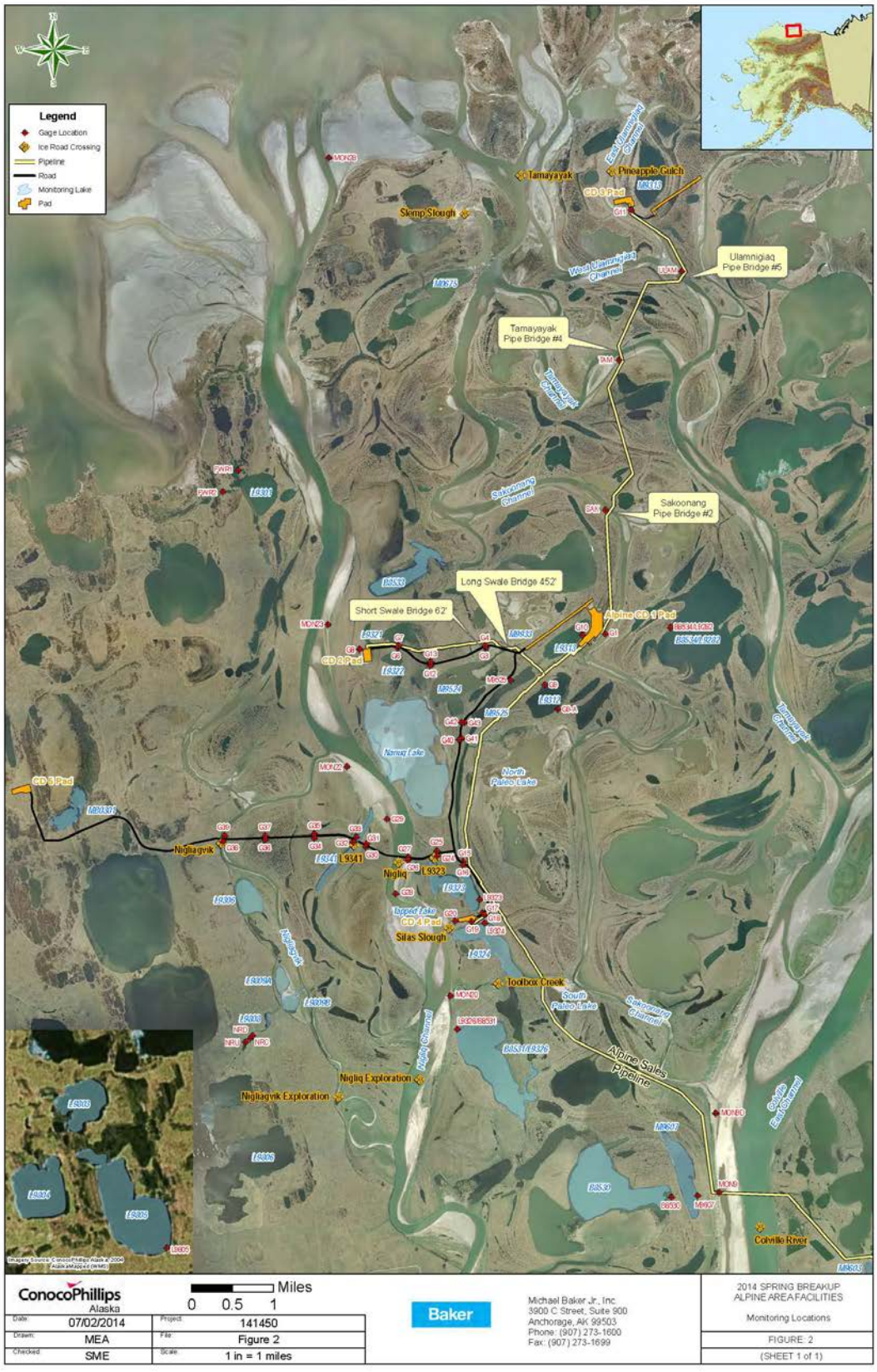


Figure 2: Alpine Area Facilities Monitoring Locations



1.2 METHODS SUMMARY

Sets of staff gages were used to measure WSE. All gages were rehabilitated and surveyed prior to spring breakup and assigned elevations tied to British Petroleum Mean Sea Level (Photo 1).

Photo 1: Conducting elevation surveys during spring breakup setup; May 3, 2014

At select gage locations, pressure transducer data loggers were installed to digitally record changes in pressure induced by the height of the water column above the instrument (Photo 2). The data collected from the pressure transducers supplement gage readings to provide a continuous record of local WSE. Blue chalk was applied to back side of all gages and used to manually record peak water levels.

Discharge data was collected by applying U.S. Geologic Survey (USGS) approved techniques. Daily observations of breakup progression were recorded. The observations included the arrival and progression of the leading edge of initial breakup flood flow, ice jam activities, lake recharge and drainage, condition of channel ice, flooding extents, peak stage, degradation of ice bridge crossings, recession of water, location and quantities of grounded ice floes, and the general effects of flooding and ice at monitoring sites. Alpine facilities access roads and pads were evaluated for potential erosion affects from floodwaters after the recession of the flood stage.

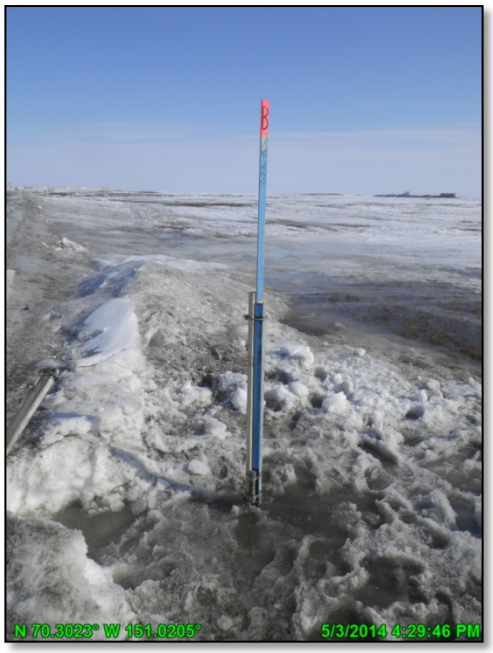


Photo 2: Gage G26-B setup with pressure transducer and chalk; May 3, 2014

Field teams submitted Daily Field Reports summarizing work accomplished and general observations of conditions during both the setup and monitoring phases. These reports document relevant project information and compliance with Baker's HSE Plan and spring breakup monitoring project specific JSAs, identify field staff, and outline work planned for the next field day. Photo documentation of areas and events of interest are also included. Daily Field Reports for setup and monitoring are included in Appendix A and Appendix B, respectively.

1.3 Dates of Work

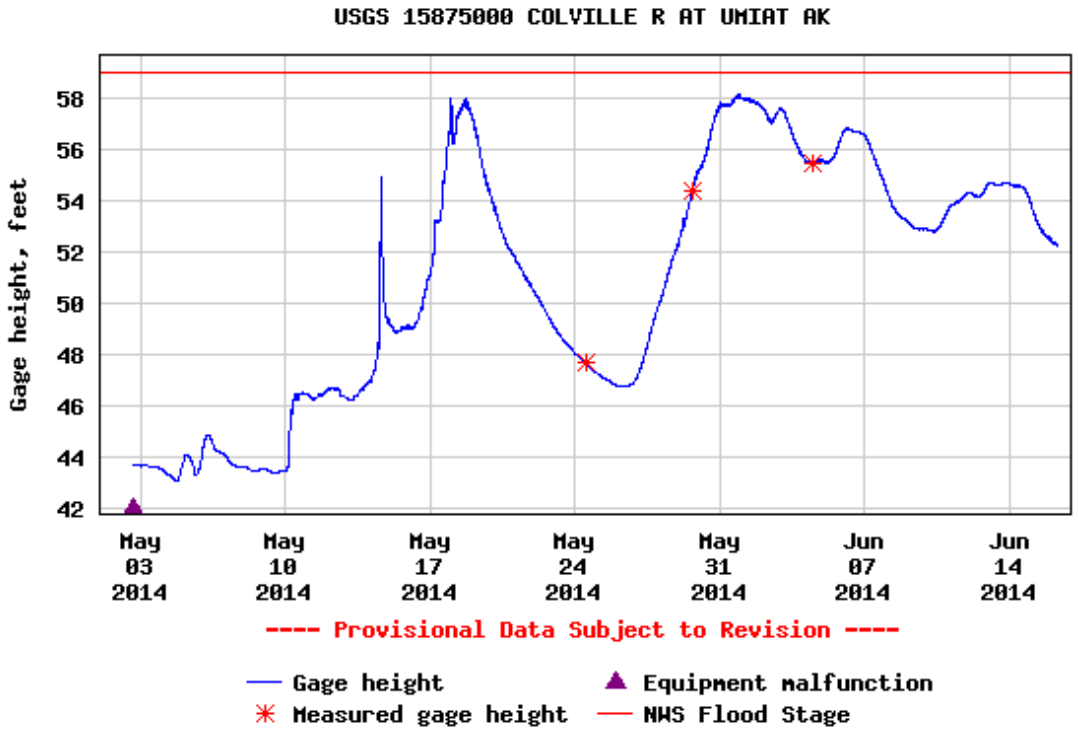
The field effort for the CRD Spring Breakup Hydrologic Assessment occurred between May 1 and June 10, 2014. Field crews began setup and rehabilitation of monitoring gages on May 2; breakup monitoring began on May 15 and ended on June 9, 2014. Field crews temporarily demobilized on May 26 when prolonged below freezing temperatures caused declining water levels and increasing ice thickness. Conditions were monitored remotely, and the crew returned to the field on May 30 as water levels began rising.

2.0 General Observations of 2014 Spring Breakup Conditions

The winter of 2013-2014 was the warmest on record in the past 13 years; the coldest being 2011-2012 (ICE 2014). Snow pack north of the Brooks Range was average, and below average south of the Brooks Range. Spring temperatures in 2014 were above average, and warming weather during the first week of May caused snow and ice to rapidly melt in place.

The 2014 breakup occurred slowly over an extended period of time. The hydrograph recorded at the USGS gage at Umiat showed two distinct peaks, the first high water event reached a gage height of 58 feet on May 18, and the second peak was on June 1 at just over 58 feet; 59 feet is considered minimum flood stage at the Umiat gage (Figure 3). There are approximately 80 river miles between Umiat and the MON1 gage set on the Colville River. The confluences of the Chandler and Anaktuvuk Rivers are downstream of Umiat and contributions are not accounted for in the Umiat gage data.

Figure 3: Colville River gage height at Umiat; May 1 to June 16, 2014



Following gage setup, field personnel initiated reconnaissance flights upstream of MON1 on the Colville River on May 10. On May 13, the leading edge of the melt water in the Colville River was observed approximately 9 miles downstream of Ocean Point. By May 15, the leading edge was in the Colville East Channel between the Sakoonang bifurcation and the Kachemach confluence. On May 17, the Miluveach and Kachemach Rivers had substantial flow and were mostly clear of snow and ice. Water levels were slowly increasing in the Colville East Channel, and the Nigliq Channel was connected to the Nanuq Lake basin. However, no flow was observed through the CD2 road swale bridges. Overflow was observed on the coastal shorefast ice (Photo 3).

On May 20, the swale bridges and a few culverts along the CD2 road began conveying water (Photo 4). An ice jam was located north of Ocean Point with minimal overbank flooding behind the jam.

The first peak stage at MON1 (14.34 feet BPMSL) occurred on May 20 (Preliminary), and is earlier than the historical average. Nigliq Channel flood water continued to enter the Nanuq Lake basin, and the CD2 swale bridges and culverts continued conveying flow (Photo 5). On May 21, water levels continued to increase in the delta and around facilities. On May 22, a direct discharge measurement was collected at the long swale bridge on the CD2 Road. Ponded water was present at the short swale bridge, and no discharge measurement was collected. Discharge was also measured at culverts conveying flow along the CD2 and CD4 roads. Photo 6 and Photo 7 show the CD4 and CD5 roads on May 22 and a few CD4 road culverts on May 23. The ice jam north of MON1 remained intact. Competent channel ice continued to prevent the release of the jam and stranded ice along the banks and shoals upstream of the ice jam indicated backwater was receding. WSE at the Colville East, Sakoonang, and Nigliq Channels were also decreasing.

Photo 3: Overflow on coastal shorefast ice; May 17, 2014

Photo 4: Swale bridges conveying water; May 20 2014

Photo 5: CD2 road culvert conveying water; May 20, 2014

Photo 6: CD4 and CD5 roads, looking southwest, May 22, 2014

Photo 7: CD4 Road culverts; May 23, 2014

Colder temperatures caused WSE to decrease over the following week. The ice jam upstream of MON1 was still in place on May 26. Temperatures were below freezing, no water was present on MON1 gages, and WSE continued to decrease. Field crews temporarily demobilized and monitored the weather and water levels at Umiat and Alpine remotely. As the river stage began to increase at Umiat, the field team was redeployed.

On May 30, the ice jam had moved downstream of MON1, and flow was observed through the CD2 road swale bridges. Over the next few days, intact channel ice diminished in the East and Nigliq Channels. Water levels continued to rise around roads and pads (Photo 8). By June 2, the Nigliq Channel was predominantly free of channel ice upstream of the CD5 crossing. Minimal flow was observed through a few culverts along the CD4 road (Photo 9 through Photo 11). On June 3, channel ice in the Nigliq Channel remained intact downstream of the Nigliagvik confluence.

Photo 8: CD2 Road culverts at Gage G6; June 1, 2014

Photo 9: CD4 Road culvert with no flow present; June 2, 2014

Photo 10: Minimal flow through CD4 Road culvert; June 2, 2014

Photo 11: Flow through CD4 Road culverts; June 2, 2014

The Nigliagvik Channel was mainly ice free by June 5 with the exception of a minor ice jam at the mouth. The West Ulamnigiaq and Tamayayak channels were predominantly free of competent channel ice by June 3 at the pipeline crossings. The competent channel ice on the Sakoonang Channel at the pipeline crossing broke up on June 4.

Direct discharge measurements where completed at the CD2 road culverts and swale bridges on June 2 (Photo 12). Decreasing stage and stranded ice floes along the banks at MON1 indicated water levels had crested. Gage readings at MON1 (14.92 feet BPMSL) indicated the second, higher observed peak occurred on May 31 (Preliminary).

Photo 12: Discharge measurement at CD2 road culvert; June 2, 2014

Direct discharge measurements were completed on June 4 and 5 at MON1 and at the Nigliq Channel crossing location, respectively, when there were no longer ice floes or competent ice in the vicinity.

Between June 2 and June 9, crews continued to monitor all gages as water levels decreased. The condition of the few remaining minor ice jams along the Sakoonang Channel upstream of the pipeline crossing bridge and at the mouth of the Nigliagvik Channel were documented.

On June 8, Baker conducted a visual inspection to document erosion resulting from breakup flooding along the CD2 and CD4 roads. Other than a minor high water scarp (Photo 13) and runoff effects at delineators (Photo 14) no discernable erosion was observed on facility roads.

Photo 13: Stakes placed to illustrate minor high water scarp; June 8, 2014

Photo 14: Minor erosion around road delineator; June 8, 2014

3.0 CD5 Access Road and Pads

Breakup conditions along the CD5 access road were monitored over the same period (May 1 – June 10). Staff gages were surveyed prior to breakup, and gage readings and pressure transducer data were recorded. Representative aerial and ground photography were taken at cross drainage structures including lakes L9341 and L9323 bridges, the Nigliq Channel crossing piers, and the Nigliagvik Bridge from May 17 through June 8.

The two bridged lakes, L9341 and L9323, remained mostly frozen throughout breakup; they were ice covered on May 25 and partially open on June 5 and 6 (Photo 15 and Photo 16). Photo 17 shows the CD5 road between Lake L9341 and the Nigliagvik Channel.

Throughout the monitoring period, no flow was conveyed through the Lake L9323 bridge crossing. Lake L9341 connected to the Nigliq Channel, but flow under the bridge was not observed.

Photo 15: Lake L9341 Bridge; June 5, 2014

Photo 16: Lake L9323 Bridge and CD5 access road culvert; June 6, 2014

Photo 17: CD5 Road between Lake L9341 and Nigliagvik Channel; May 22, 2014

Intact channel ice was present at the Nigliq Channel crossing on May 22 and 31 (Photo 18 and Photo 19), and open water conditions were observed by June 3 (Photo 20 and Photo 21). No flow was observed through the CD5 road culverts; some areas had ponded water. No water was observed around the multi-season ice pad or other CD5 pads throughout the monitoring period (Photo 22). A direct discharge measurement was collected downstream of the Nigliq Channel crossing on June 5.

Photo 18: CD5 Road and Nigliq Channel crossing; May 22, 2014

Photo 19: Nigliq Channel crossing looking upstream; May 31, 2014

Photo 20: Nigliq Channel looking upstream; June 3, 2014

Photo 21: Nigliq Channel crossing looking upstream; June 9, 2014

Photo 22: CD4 Road and multi-season ice pad; June 3, 2014

On June 5 at the Nigliagvik Bridge, there was bottom fast ice along the east bank, drifted snow along the west bank and plowed snow piles upstream of the bridge. By June 5, the channel was open and some drifted snow persisted along the west bank and near the piers (Photo 23). A direct discharge measurement was collected from the Nigliagvik Bridge crossing on May 24. Snow drifts and ice shelves were on both sides of the channel and potentially bottom fast ice. A second discharge measurement was collected from the Nigliagvik Bridge crossing on June 8. At that time, the channel was clear of ice with drifted snow on the west bank and no bottom fast ice (Photo 24).

Photo 23: Nigliagvik Bridge looking downstream; June 5, 2014

Photo 24: Nigliagvik Bridge looking east; June 8, 2014

4.0 REFERENCES

ICE Consult and Design. 2014. NPRA N. Tundra Monitoring Station. Cumulative Freezing Degree Days. Winters 2002-2014 Coldest to Warmest Year. April 18.

Appendix A **Setup – Daily Field Reports**

Daily Field Report

Project Name:	2014 Colville River Delta Spring Breakup	**Date:**	**05/01/2014**
Project Number:	**TBD**		
Submitted by:	Garrett Yager		
Field Personnel:	Sloane Weidmann, Garrett Yager, Michael Townshend, Michael Ulmgren, Jim Meckel		
Subcontractor:	LCMF		
Morning Check-In:	0945	**Contact Person:**	Karen Brown and Alpine Security
Evening Check-In:	1830	**Contact Person:**	Karen Brown and Alpine Security

Wind:	**Temperature:**	**Sky:**
South 12 mph	35°F	Overcast

Health & Safety:

The morning toolbox safety meeting was conducted with LCMF. Potential hazards were discussed including travel along the melting ice roads, overhanging snow and ice from buildings at Alpine, entering and exiting the Hägglund, sun protection, staying hydrated, and walking on melting snow.

Summary of Events:

Equipment was transferred from the conex to the field office where it was organized. Pressure transducers (PTs) were programed and equipment needed for the day was loaded into two Hägglunds. Field personnel traveled to MON1U, MON1C, and MON1D. Gages were rehabbed, chalked, and PTs were installed on each of the A gages. Surveys were performed at each of the gage sites and were tied to MON1. Field personnel then split into two crews. One crew travelled to MON9 to begin digging out gages while the other crew removed snow poles from the Colville River and Nigliq Channel ice bridge monitoring programs.

Challenges:

None

Comments:

Warm temperatures are causing snow and ice to melt quickly.

Planned for Next Field Day:

Field personnel will split into two crews. One crew will head to MON9 and MON9D while the other crew will head to Fish Creek Basin to set up gages on the Ublutouch River and small stream gages between the proposed CD5 pad and the Ublutouch River.

Daily Photo(s)

Photo 1: Shoveling out gage at MON1C; May 1, 2014

Photo 2: Removing rust from steel at MON1C; May 1, 2014

Photo 3: Locating MONUMENT 1; May 1, 2014

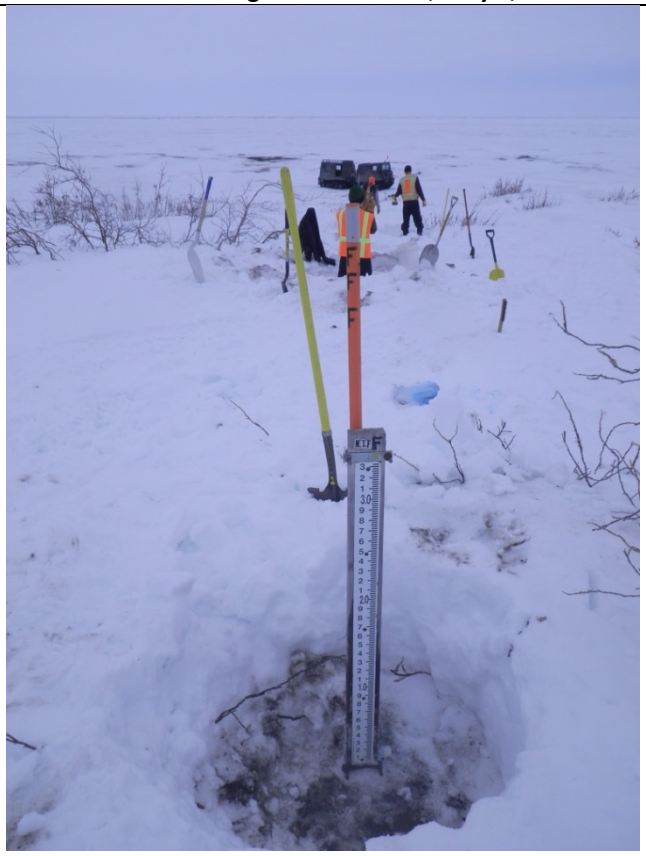


Photo 4: Field personnel rehabbing gages at MON1; May 1, 2014

Daily Field Report

Project Name:	2014 Colville River Delta Spring Breakup	**Date:**	**05/02/2014**
Project Number:	**TBD**		
Submitted by:	Garrett Yager		
Field Personnel:	Sloane Weidmann, Garrett Yager, Michael Townshend, Michael Ulmgren, Jim Meckel, Diana Lower		
Subcontractor:	LCMF		
Morning Check-In:	0900	**Contact Person:**	Karen Brown and Alpine Security
Evening Check-In:	1800	**Contact Person:**	Karen Brown and Alpine Security

Wind:	**Temperature:**	**Sky:**
6 mph (S)	28°F	Scattered Clouds and Sunny

Health & Safety:

The morning toolbox safety meeting was conducted with LCMF. Potential hazards were discussed including travel along melting ice roads, staying hydrated, sun protection, using proper PPE for the task, and entering and exiting the Hägglund. Additionally, the runway ice road bypass routes are closed so safe driving on the runway was discussed.

Summary of Events:

Equipment was organized and loaded into the Hägglund. Pressure transducers were programmed. Field personnel traveled to MON9, MON9D, G24, G25, G28, G29, and MON22. At each site, with exception of MON9D, gages were dugout and rehabilitated. At MON9D new gages were installed.

Challenges:

None

Comments:

Warm air temperatures and solar radiation are causing the snow to become heavy when digging and local melt to accumulate in low lying locations.

Planned for Next Field Day:

Field personnel will return to Monument 9 to survey MON9 and MON9D. Additionally, field personnel will survey the sites that were rehabbed today. Crews will then focus attention on setting up gages along the new CD5 road.

Daily Photo(s)

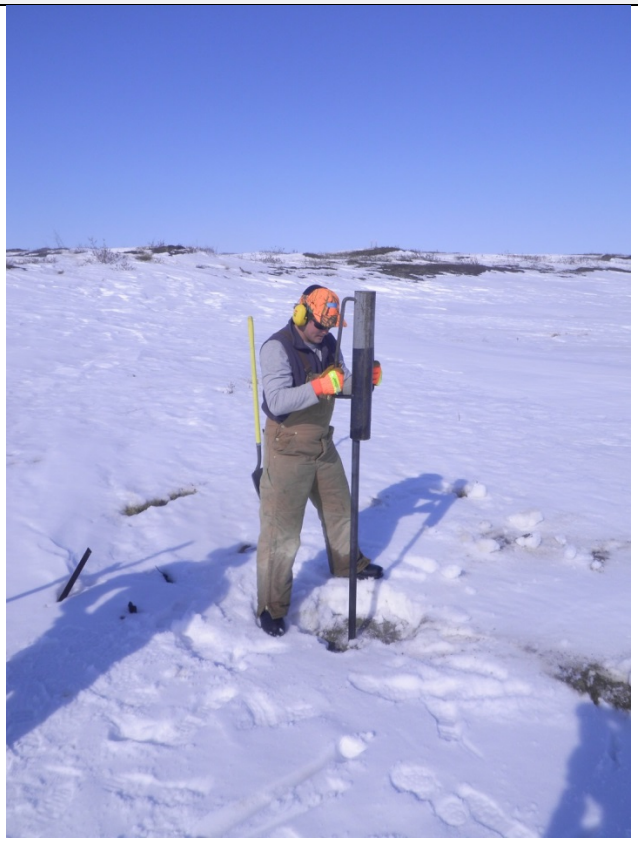


Photo 1: Installing steel for gages at MON9D; May 2, 2014

Photo 2: Hazardous exposed steel at MON9D marked; May 2, 2014

Photo 3: New A-gage installed at G24 on the L9323 bridge crossing; May 2, 2014

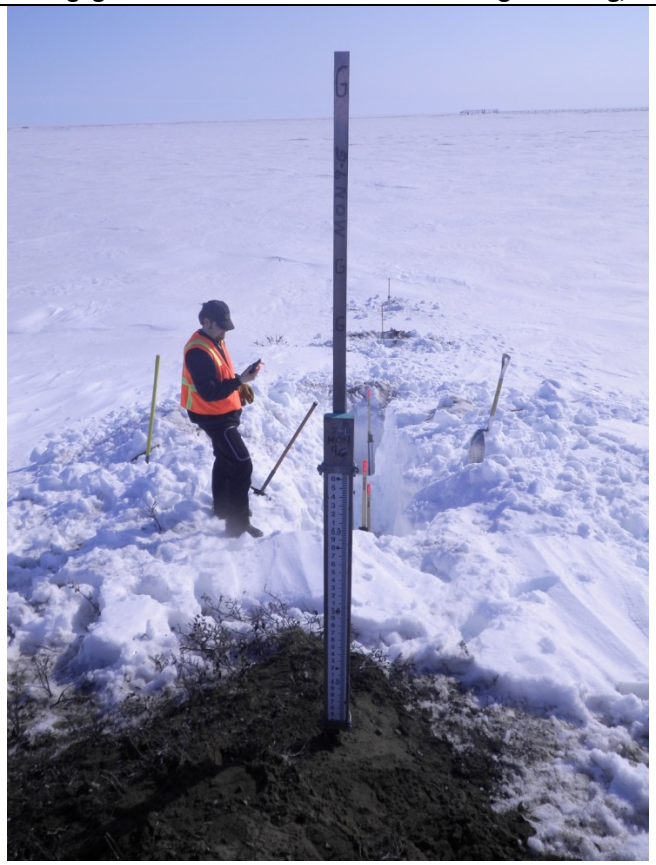


Photo 4: Confirming gage locations with GPS at MON9; May 2, 2014

Daily Field Report

Project Name:	2014 Colville River Delta Spring Breakup	**Date:**	**05/03/2014**
Project Number:	**TBD**		
Submitted by:	Garrett Yager		
Field Personnel:	Sloane Weidmann, Garrett Yager, Michael Townshend, Michael Ulmgren, Jim Meckel, Diana Lower		
Subcontractor:	LCMF		
Morning Check-In:	0900	**Contact Person:**	Karen Brown and Alpine Security
Evening Check-In:	1815	**Contact Person:**	Karen Brown and Alpine Security

Wind:	**Temperature:**	**Sky:**
5 mph	28°F	Clear with scattered clouds

Health & Safety:

The morning toolbox safety meeting was conducted with LCMF. Potential hazards were discussed including travel along melting ice roads, staying hydrated, sun protection, and footing while walking through melt water.

Summary of Events:

Equipment was organized and loaded into the two Hägglunds. Pressure transducers were programmed. Field personnel split into two crews. The first crew went to MON9 and MON9D to survey the gages and tie elevations between the monitoring locations. The crew then rehabilitated the upstream and downstream gages of the Nigliq Channel bridge crossing on the CD5 road. The other sites along the CD5 road to the Nigliagvik crossing were assessed for damage. The downstream gages at the Nigliagvik crossing were dugout and rehabilitated. The other crew surveyed from control on the CD4 pad to the gages at MON20, which were dugout and rehabilitated. The crew then spent the remainder of the day surveying the gages at the Nigliq Channel CD5 bridge crossing.

Challenges:

The majority of the gages at the CD5 Nigliq Channel crossing were destroyed or under the construction ice pad, requiring crews to establish new gages.

Comments:

Local melt is causing water to pool in the gaging areas at the CD5 bridge crossings. Because of this, the crew will plan on carrying appropriate PPE (traction devices) for the changing conditions in the monitoring area.

Planned for Next Field Day:

Field personnel will return to the gage sites on the Nigliq Channel and along CD5 road. The crew plans to rehabilitate and survey remaining gages in the area.

Daily Photo(s)

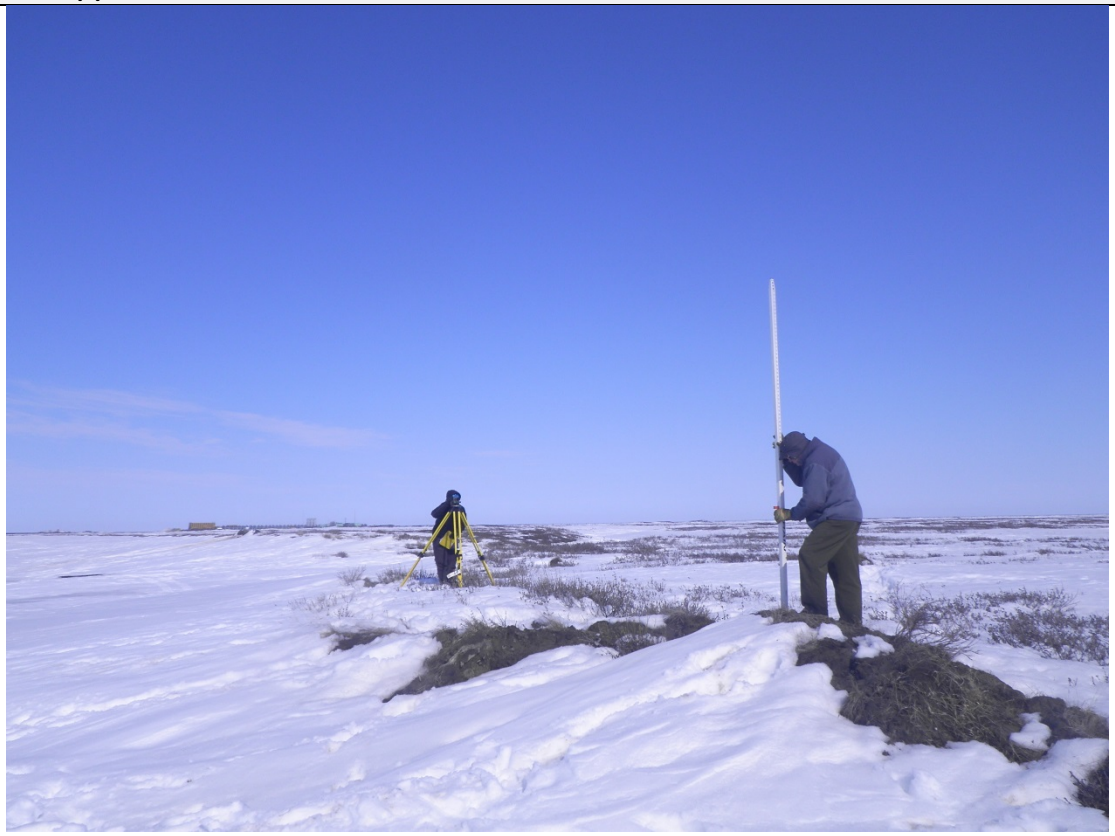


Photo 1: Surveying at MON20; May 3, 2014

Photo 2: Chalking gages at G26 upstream of Nigliq Channel bridge crossing; May 3, 2014

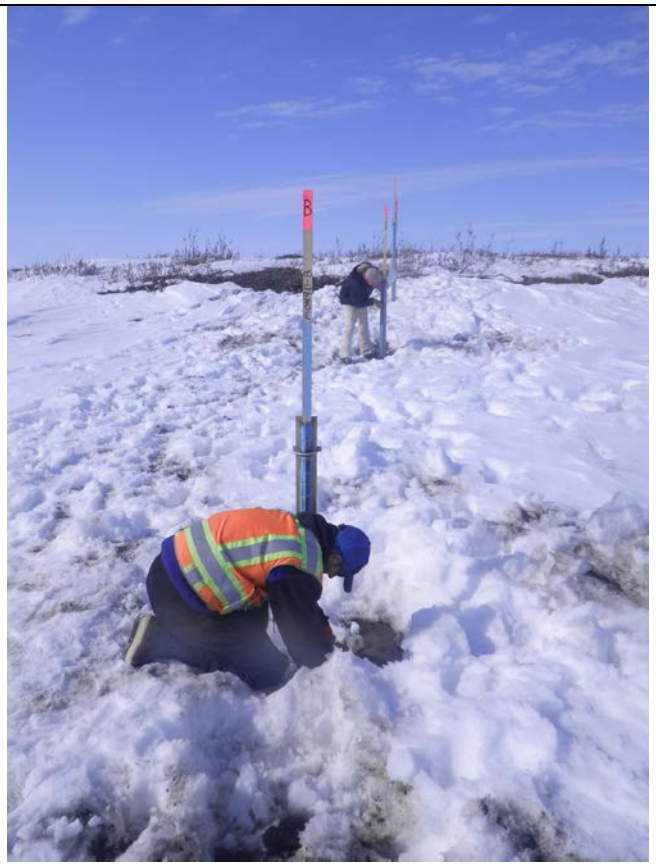


Photo 3: Chalking gages at MON9D; May 3, 2014

Daily Field Report

Project Name:	2014 Colville River Delta Spring Breakup	**Date:**	**05/04/2014**
Project Number:	**TBD**		
Submitted by:	Michael Townshend		
Field Personnel:	Sloane Weidmann, Michael Townshend, Michael Ulmgren, Jim Meckel, Diana Lower		
Subcontractor:	LCMF		
Morning Check-In:	0845	**Contact Person:**	Karen Brown and Alpine Security
Evening Check-In:	1800	**Contact Person:**	Karen Brown and Alpine Security

Wind:	**Temperature:**	**Sky:**
9 mph picking up to 25 mph	26° F	Early fog then clearing skies

Health & Safety:

The morning toolbox safety meeting was conducted with LCMF. Potential hazards were discussed including travel along melting ice roads, staying hydrated, and sun protection. Additionally, slip, trip, and fall protection was discussed when walking over tundra, in pooling water, and on ice.

Summary of Events:

Equipment was organized and loaded into the two Hägglunds. Field personnel split into two crews. The first crew went to the Nigliagvik crossing on the CD5 road to install and rehab the gages. The crew then rehabilitated the remaining gages along the CD5 road back towards the CD4 intersection. All rehabilitated gage sites were surveyed to nearby control. The gage sites at the L9341 bridge crossing are yet to be rehabilitated. The other crew rehabilitated and surveyed the gages at MON23 and moved upstream on the Nigliq Channel to survey the previously rehabilitated gages from the past few field days.

Challenges:

The gages at the Nigliagvik crossing were destroyed during ice road construction and slotting forcing the crew to establish new gages on the upstream side of the ice road. Additionally, high winds today made long surveys difficult for carrying datum from control to the gage sites.

Comments:

High temperatures and rapid melting of snow are limiting the ability to travel across tundra. The crew is remaining flexible with planning as it is uncertain exactly when tundra travel will be shut down and transportation to gage sites will need to be by helicopter.

Planned for Next Field Day:

Field personnel will return to the remaining sites along the CD5 road and then begin rehabilitating gages at the facilities. Another crew will rehabilitate and survey the gages at the CD3 pipeline crossings and on the CD3 pad.

Daily Photo(s)

Photo 1: Installing gages at G38; May 4, 2014

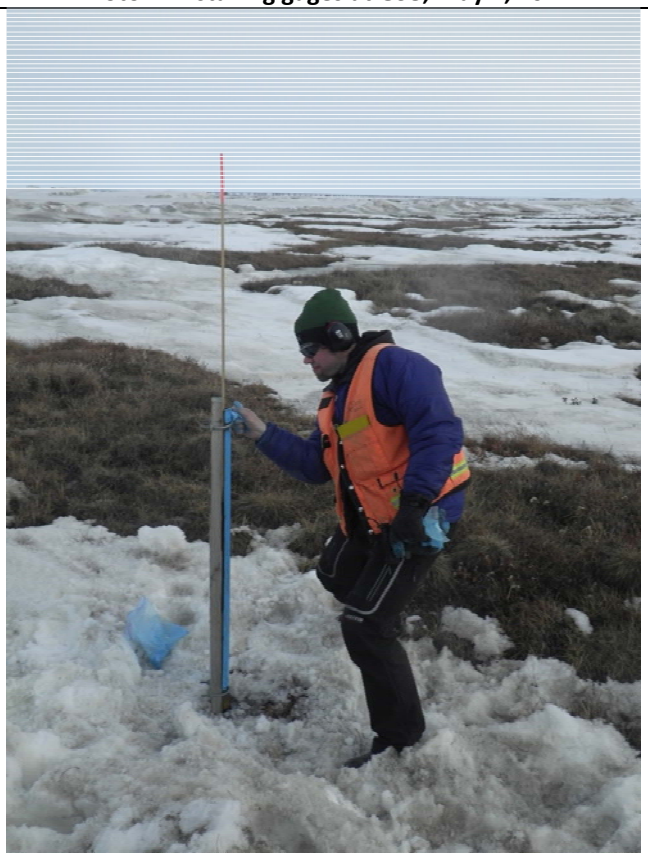


Photo 2: Chalking gages at G24 on Lake L9323; May 4, 2014

Photo 3: Surveying at MON23; May 4, 2014

Photo 4: Chalking gages at G28; May 4, 2014

Daily Field Report

Project Name:	2014 Colville River Delta Spring Breakup	**Date:**	**05/05/2014**
Project Number:	**TBD**		
Submitted by:	Michael Ulmgren		
Field Personnel:	Sloane Weidmann, Michael Townshend, Steven Clark, Jim Meckel, Diana Lower		
Subcontractor:	LCMF		
Morning Check-In:	0915	**Contact Person:**	Karen Brown and Alpine Security
Evening Check-In:	1745	**Contact Person:**	Karen Brown and Alpine Security

Wind:	**Temperature:**	**Sky:**
17 - 20 mph SSW	19 - 27° F	Clear skies

Health & Safety:

The morning toolbox safety meeting was conducted with LCMF. The group watched the 50-minute video *Staying Safe in Bear Country*, which provides important information to help reduce human injuries and property damage from grizzly and black bears throughout North America while also reducing unnecessary bear deaths.

Summary of Events:

Equipment was organized and loaded into the two Hägglunds. Field personnel split into two crews. The first crew installed and rehabbed gages at the pipeline stream crossing monitoring locations (SAK, TAM, ULAM) along the Sakoonang, Tamayayak, and Ulamnigiaq channels. The crew then proceeded to rehabilitate all facility gages at CD2 and CD3. All rehabilitated gage sites were surveyed to nearby control with the exception of G3, G4, G6, and G7. These gages will be surveyed by LCMF. The second crew rehabbed and surveyed gage at the L9341 bridge crossing and at lakes M9602, M9603, and M9607. Furthermore, the elevation of the ice and the water surface elevation were established at the lakes.

Challenges:

Finding a location at Lake M9602, where the ice was not completely frozen to the bottom, proved to be challenging. However, after several attempts, a deeper section of lake was located and the water surface elevation at Lake M9602 was determined.

Comments:

The gradual melting of snow is limiting the ability to travel across tundra. The crew is remaining flexible with planning as it is uncertain exactly when tundra travel will be shut down and transportation to gage sites will be limited to travel by helicopter. Tomorrow the crew will be informed if travel by helicopter to the gage sites in the Fish Creek Basin has been authorized.

Planned for Next Field Day:

Assuming that travel by helicopter to NPRA will be authorized for tomorrow, the first crew will proceed to rehabilitate and survey gages in the Fish Creek Basin and the second crew will rehabilitate and survey gages at the remaining recharge lakes.

Daily Photo(s)

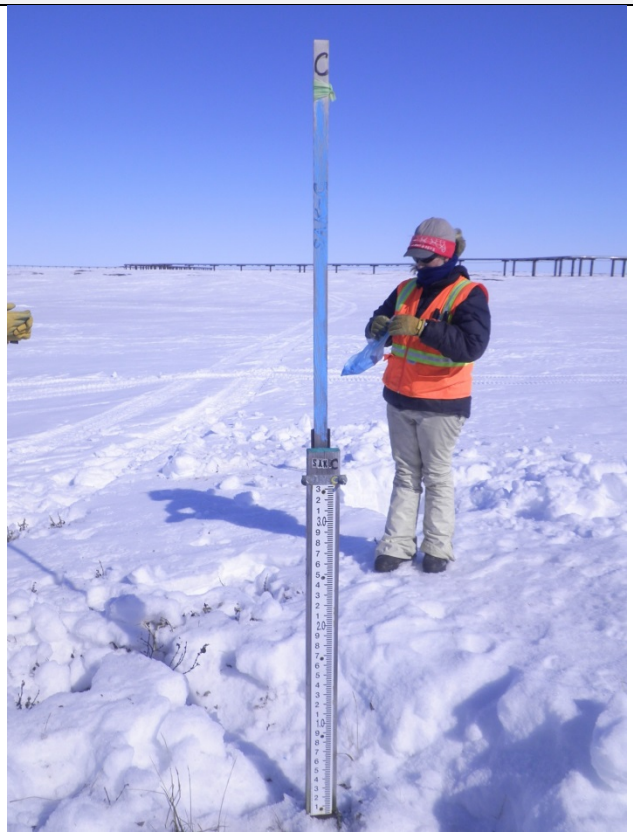


Photo 1: Rehabilitating gages at SAK; May 5, 2014

Photo 2: Drilling ice at Lake M9607; May 5, 2014

Photo 3: Drilling ice at Lake M9607; May 5, 2014

Daily Field Report

Project Name:	2014 Colville River Delta Spring Breakup	**Date:**	**05/06/2014**
Project Number:	**TBD**		
Submitted by:	Diana Lower		
Field Personnel:	Sloane Weidmann, Michael Townshend, Michael Ulmgren, Jim Meckel, Diana Lower		
Subcontractor:	LCMF		
Morning Check-In:	0900	**Contact Person:**	Karen Brown and Alpine Security
Evening Check-In:	1730	**Contact Person:**	Karen Brown and Alpine Security

Wind:	**Temperature:**	**Sky:**
12 mph	28° F	Mostly clear skies

Health & Safety:

The morning toolbox safety meeting was conducted with LCMF. Field personnel received *Helo 101 Safety Training*. Training emphasized how to properly enter and exit the helicopter, approach the helicopter while carrying gear, and strap larger and longer items to the baskets. Field personnel also discussed minimizing talking during takeoff and landing and securing any loose gear, including hats and paperwork.

Summary of Events:

Field personnel split into two crews. Equipment was organized and loaded into one Hägglund and the helicopter. The Hägglund crew surveyed the gages at G28 and rehabbed and surveyed gages on lakes L9323, L9324, and B8530. The helicopter crew surveyed gages at MON35 located at the Helmericks' Homestead. Gages at MON28 on the Nigliq Channel were also rehabbed and surveyed.

Challenges:

Helicopter availability was limited because of other projects in the area. High temperatures and rapid melting of snow are limiting the ability to travel on tundra.

Comments:

Crews will continue to use the Hägglund and helicopter when available. Tundra travel will cease on May 8, 2014.

Planned for Next Field Day:

Field personnel will begin rehabilitating and surveying gages at SAK15.3, S1, S2, S3 and the UB gages in the NPRA, where travel is permitted. If there is time, the field crew will then begin rehabilitating gages near CD4 and G1. Crews will complete setup on the remaining gage sites in the NPRA when additional access is permitted.

Photo 1: Installing a pressure transducer at MON28; May 6, 2014

Photo 2: Surveying gages at MON35; May 6, 2014

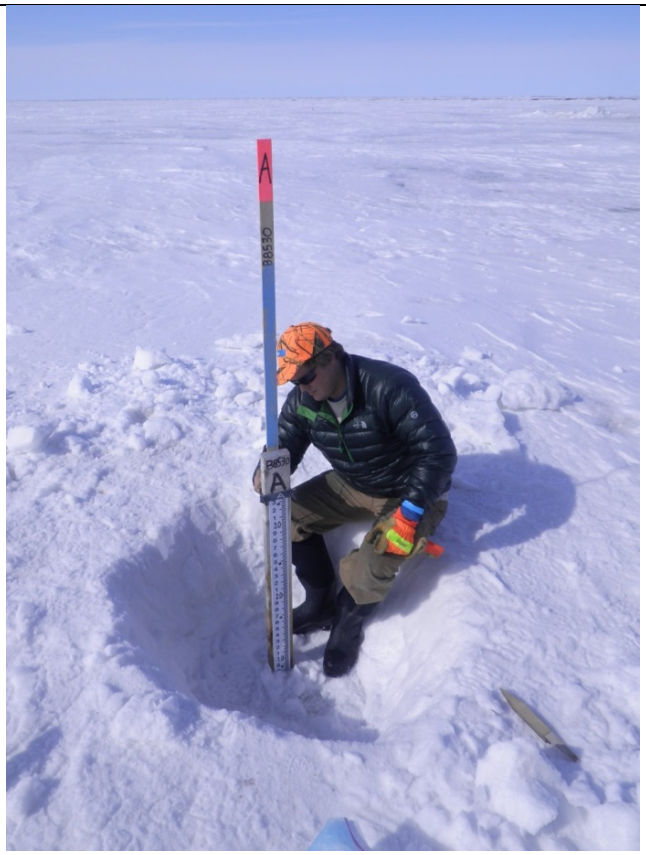


Photo 3: Chalking gages at Lake B8530; May 6, 2014

Photo 4: Chalked gage at G29; May 6, 2014

Daily Field Report

Project Name:	2014 Colville River Delta Spring Breakup	**Date:**	**05/07/2014**
Project Number:	**TBD**		
Submitted by:	Michael Townshend		
Field Personnel:	Sloane Weidmann, Michael Townshend, Steven Clark, Jim Meckel, Diana Lower, Michael Ulmgren		
Subcontractor:	LCMF		
Morning Check-In:	0930	**Contact Person:**	Karen Brown and Alpine Security
Evening Check-In:	1800	**Contact Person:**	Karen Brown and Alpine Security

Wind:	**Temperature:**	**Sky:**
10 mph NNW	24° F	Overcast

Health & Safety:

The morning toolbox safety meeting was conducted with LCMF. Hazards discussed included staying hydrated and protected from the sun and maintaining balance when walking through melting snow. Additionally, the crew completed a toolbox safety meeting for the helicopter. The crew was reminded to be extra vigilant when the blades were turning and always get a positive response from the pilot when entering or exiting from under the rotor arc.

Summary of Events:

The field crew visited the remaining lakes in the monitoring area. The lakes included B8531/L9326, K214, K209, and M9605. At each lake, the gage was rehabbed, surveyed, and a WSE was obtained. The field crew dugout, rehabbed, and surveyed the gages at SAK15.3. The secondary pressure transducers were installed at the Monument 1 gages.

Challenges:

None

Comments:

The crew is to use the helicopter for all remaining off-pad travel.

Planned for Next Field Day:

The crew plans to visit the remaining lakes in the monitoring area as well as the FWR1 and FWR2 gage sites.

Daily Photo(s)

Photo 1: Preparing to survey at Lake K214; May 7, 2014

Photo 2: Hole being drilled in ice at Lake K209; May 7, 2014

Photo 3: Installing second pressure transducer at MON1C; May 7, 2014

Photo 4: Gage array at SAK15.3; May 7, 2014

Daily Field Report

Project Name:	2014 Colville River Delta Spring Breakup	**Date:**	**05/08/2014**
Project Number:	**TBD**		
Submitted by:	Sloane Weidmann		
Field Personnel:	Sloane Weidmann, Michael Townshend, Steven Clark, Jim Meckel, Diana Lower, Michael Ulmgren		
Subcontractor:	LCMF		
Morning Check-In:	0900	**Contact Person:**	Karen Brown and Alpine Security
Evening Check-In:	1630	**Contact Person:**	Karen Brown and Alpine Security

Wind:	**Temperature:**	**Sky:**
4 mph E	19° F	Overcast

Health & Safety:

The morning toolbox safety meeting was conducted with LCMF. Hazards discussed included frequent wildlife scans, staying hydrated and protected from the sun, maintaining balance when walking through melting snow, and slow driving speeds on roads.

Summary of Events:

The field crew visited FWR1 and FWR2 to rehabilitate the gages and survey to local control. In addition, the crew visited Lake B8534/L9282, G9, G17, G18, G19, and G20 to rehabilitate the gages and survey. Additionally, a Barologger was installed at G19 on the CD4 pad and a pressure transducer was installed on each of the FWR gages.

Challenges:

None

Comments:

The crew is to use the helicopter for all remaining off-pad travel.

Planned for Next Field Day:

The crew plans to visit the remaining on pad gage sites and begin to prepare the field equipment for breakup monitoring.

Daily Photo(s)

Photo 1: Surveying at G18; May 8, 2014

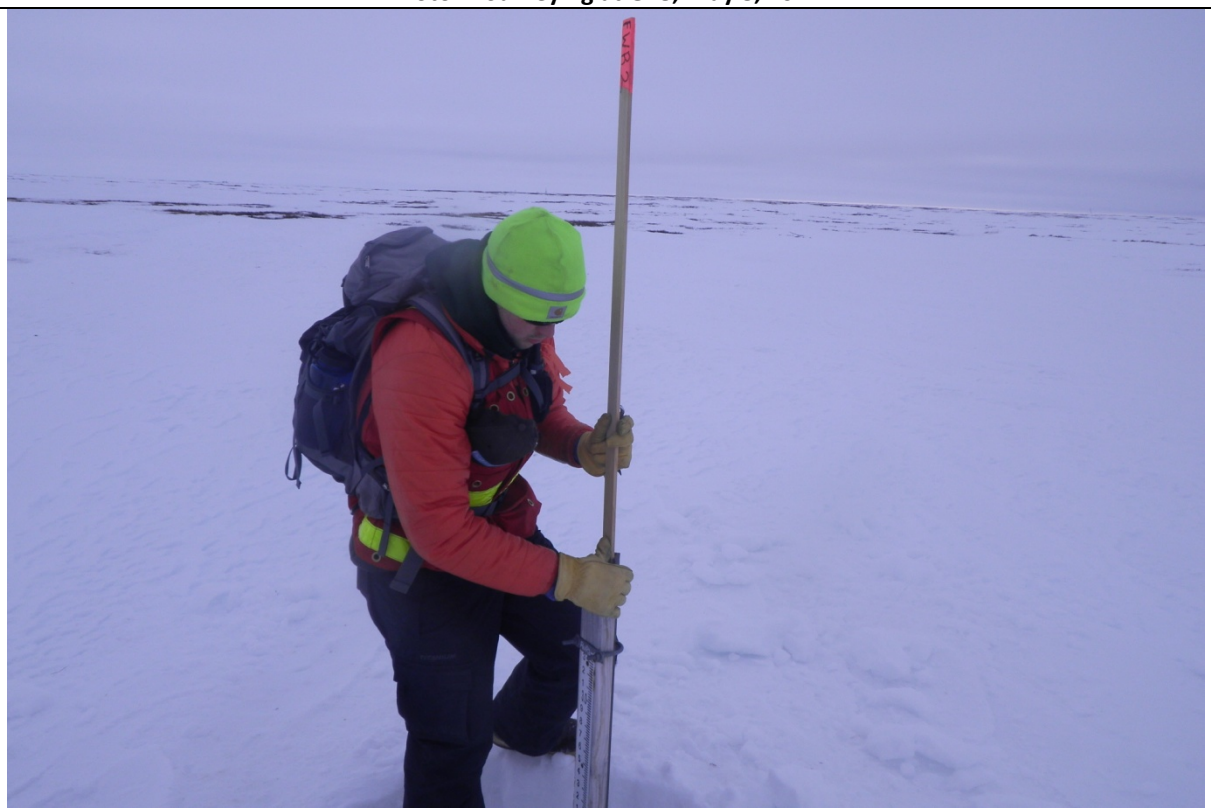


Photo 2: Rehabilitating a gage at FWR2; May 8, 2014

Photo 3: Surveying at Lake B8534/L9282; May 8, 2014

Photo 4: Installing pressure transducer at FWR1; May 8, 2014

Daily Field Report

Project Name:	2014 Colville River Delta Spring Breakup	**Date:**	**05/09/2014**
Project Number:	**TBD**		
Submitted by:	Diana Lower		
Field Personnel:	Sloane Weidmann, Michael Townshend, Jim Meckel, Diana Lower		
Subcontractor:	None		
Morning Check-In:	0815	**Contact Person:**	Karen Brown and Alpine Security
Evening Check-In:	1545	**Contact Person:**	Karen Brown and Alpine Security

Wind:	**Temperature:**	**Sky:**
9 mph NE	20° F	Overcast

Health & Safety:

The morning toolbox safety meeting was conducted by Baker personnel. Proper driving techniques were discussed including appropriate driving speeds, staying clear of soft road shoulders, and always conduct a 360° walk-around of the vehicle before driving. Other hazards discussed included frequent wildlife scans, maintaining balance when walking through soft snow, and using "safety stripes" when installing gages.

Summary of Events:

The field crew rehabilitated and surveyed gages at G15 and G16. Two new gage sites, G40 and G41, were established at a culvert battery along the CD4 road. G10, the gage at Lake L9313, was rehabilitated and surveyed. Field crew returned to the office to work on level summaries and organize photographs.

Challenges:

None

Comments:

The crew dropped off the two outboards at ACS for annual maintenance.

Planned for Next Field Day:

The crew plans to visit the remaining on-pad gage sites. Additionally, the crew may visit Lake L9805 to rehab and survey the gages.

Daily Photo(s)

Photo 1: Walking to chalk gage at G16; May 9, 2014

Photo 2: Shoveling out culvert at G40; May 9, 2014

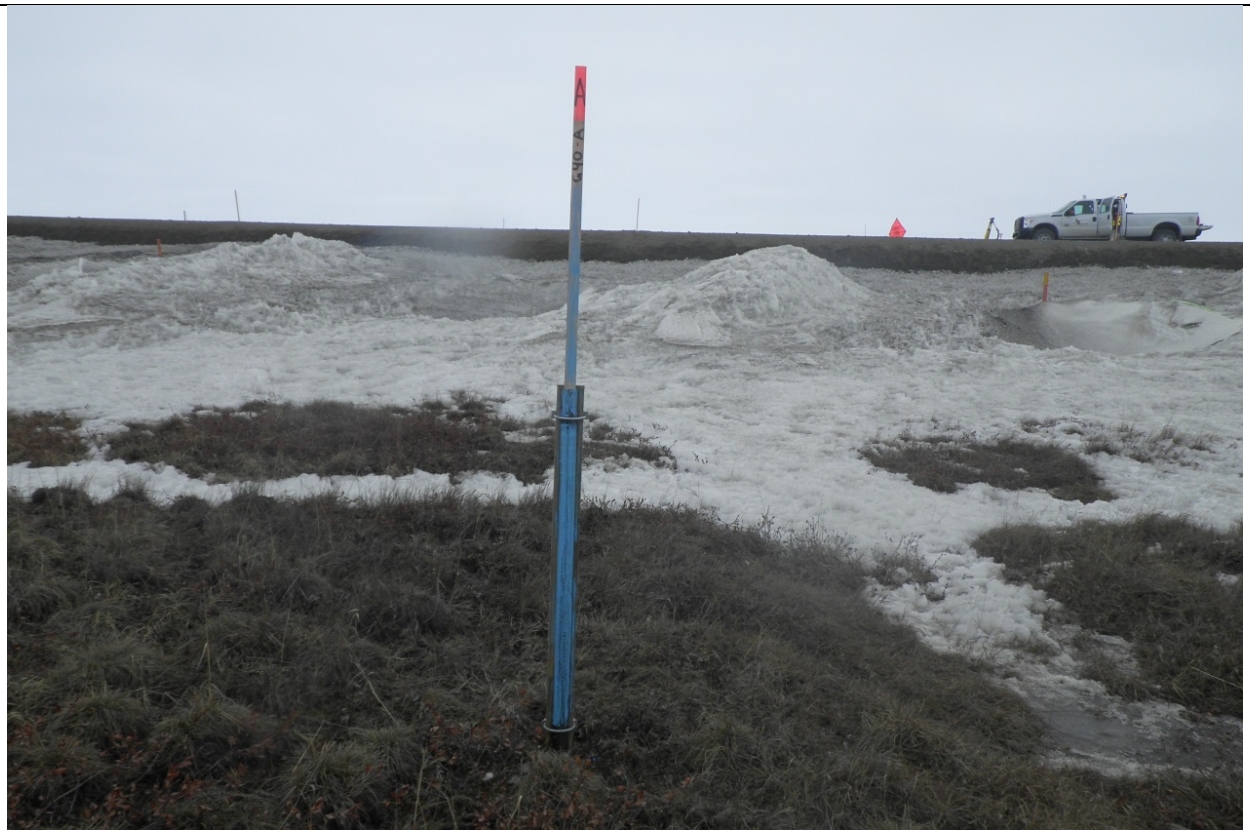


Photo 3: Newly installed G40 looking from water; May 9, 2014

Photo 4: Surveying G40 and G41; May 9, 2014

Daily Field Report

Project Name:	2014 Colville River Delta Spring Breakup	**Date:**	**05/10/2014**
Project Number:	**TBD**		
Submitted by:	Sloane Weidmann		
Field Personnel:	Sloane Weidmann, Michael Townshend, Jim Meckel, Diana Lower		
Subcontractor:	None		
Morning Check-In:	0815	**Contact Person:**	Karen Brown and Alpine Security
Evening Check-In:	1545	**Contact Person:**	Karen Brown and Alpine Security

Wind:	**Temperature:**	**Sky:**
12 mph SE	25° F	Overcast

Health & Safety:

The morning toolbox safety meeting was conducted by Baker personnel. Safe driving techniques were discussed including appropriate driving speeds and using a spotter to backup if needed. Additionally, the crew discussed the hazards associated with repetitive motion tasks. Controls used for these tasks include taking many breaks and stretching often.

Summary of Events:

The field crew worked on level summaries and checked for any missing data required before monitoring begins. In addition, the field crew completed the installation and survey of G42 and G43 as well as rehabilitated and surveyed gages at Lake M9525. Pressure transducer elevations were gathered at G3 and G4. A reconnaissance flight was taken upstream to monitor the progress of flow in the upper reach of the Colville and confluence with the Anaktuvuk River.

Challenges:

None

Comments:

Flowing water was seen at the confluence of the Anaktuvuk River and Colville River. It is estimated that that the leading edge could reach MON1 in two to three days.

Planned for Next Field Day:

The crew plans to visit sites within the monitoring area prior to water arriving in the delta to verify data. G1, located near CD1 pad, will be rehabilitated and surveyed. In addition, another reconnaissance flight will be made in the afternoon to see the progress of the leading edge upstream.

Daily Photo(s)

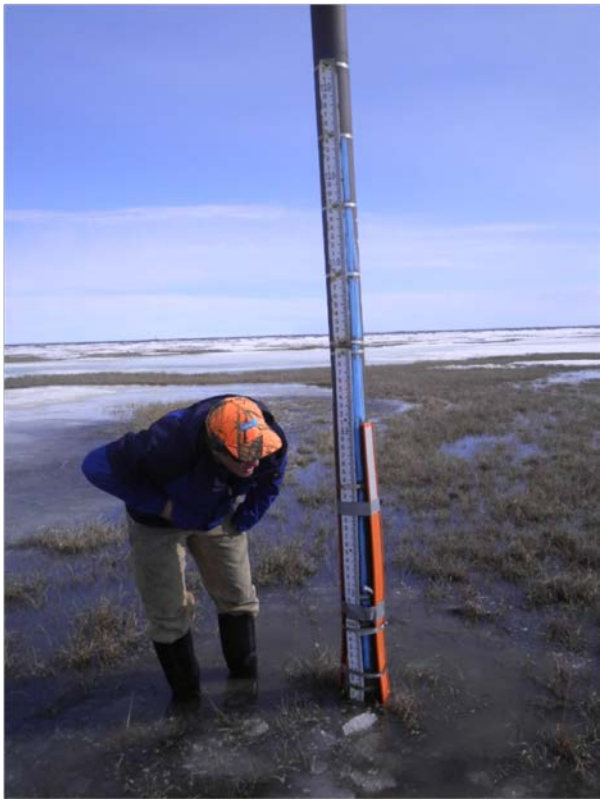


Photo 1: Examining gage G3; May 10, 2014

Photo 2: Surveying at G42 and G43; May 10, 2014

Photo 3: Colville River just upstream of the confluence with the Anaktuvuk River; May 10, 2014

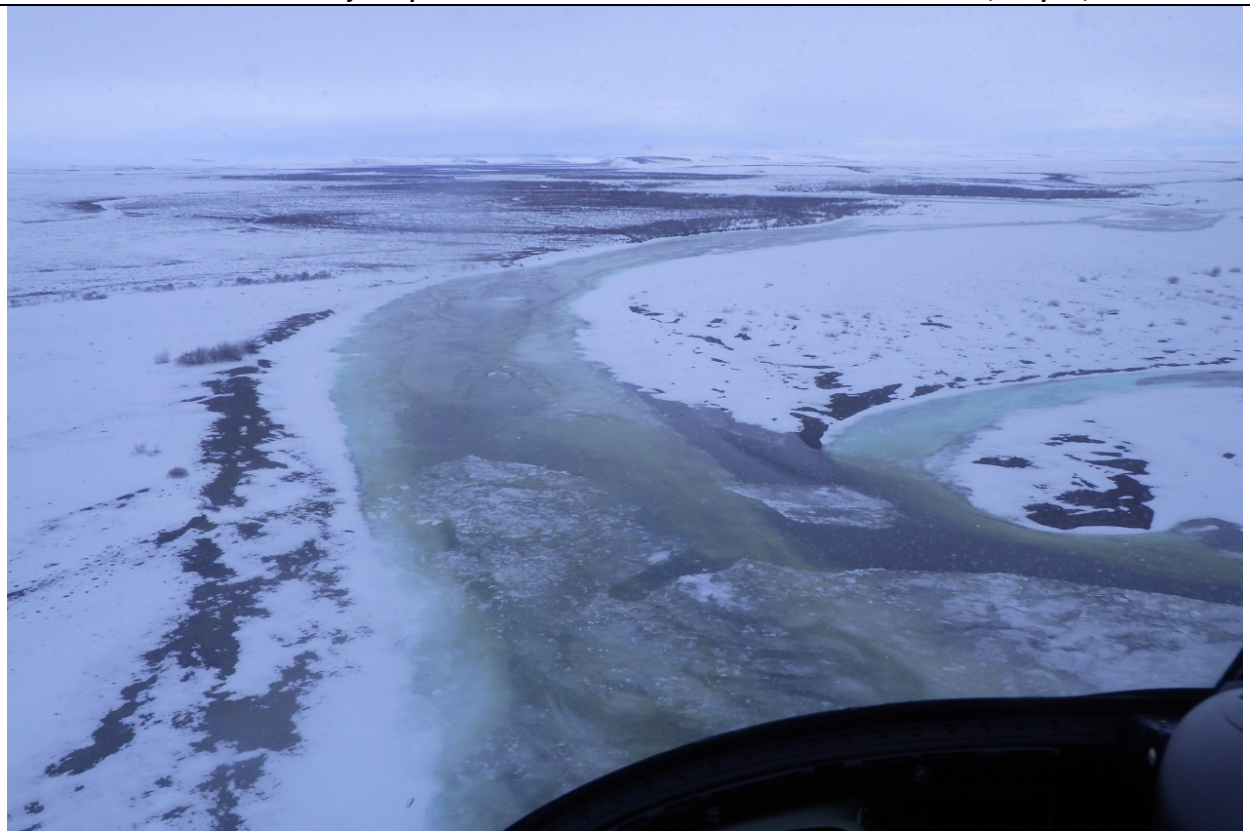


Photo 4: Anaktuvuk River just upstream of the confluence with the Colville River; May 10, 2014

Daily Field Report

Project Name:	2014 Colville River Delta Spring Breakup	**Date:**	**05/11/2014**
Project Number:	**TBD**		
Submitted by:	Diana Lower		
Field Personnel:	Sloane Weidmann, Michael Townshend, Jim Meckel, Diana Lower		
Subcontractor:	Pathfinder Aviation		
Morning Check-In:	0800	**Contact Person:**	Karen Brown
Evening Check-In:	1530	**Contact Person:**	Karen Brown

Wind:	**Temperature:**	**Sky:**
9 mph S	25° F	Clear

Health & Safety:

The morning toolbox safety meeting was conducted by Baker personnel. Safe driving techniques were discussed including using appropriate flagging along the roadways when doing work near the facilities and pads. The crew also discussed proper helicopter safety and the importance of using proper skin protection.

Summary of Events:

The crew did a second reconnaissance flight upstream on the Colville River. The leading edge had progressed approximately 34 river miles downstream over the last 24 hours. Additionally, the crew finalized setup for the gages in the monitoring area.

Challenges:

None

Comments:

The leading edge is approximately 36 river miles south of the MON1 gages. Channel ice was intact with no obvious signs of cracking along the reach near the leading edge. More local melt is accumulating in pockets throughout the delta because of the increased temperatures.

Planned for Next Field Day:

The crew plans to monitor the progression of the leading edge towards the head of the delta. The crew will also continue preparations for the monitoring efforts that will begin as soon as water enters the delta.

Daily Photo(s)

Photo 1: Progression of water south of the monitoring area; May 11, 2014

Photo 2: Leading edge south of the delta; May 11, 2014

Photo 3: Snow melt around CD1 pad; May 11, 2014

Photo 4: Digging out G1 gage; May 11, 2014

Daily Field Report

Project Name:	2014 Colville River Delta Spring Breakup	**Date:**	**05/12/2014**
Project Number:	**TBD**		
Submitted by:	Michael Townshend		
Field Personnel:	Sloane Weidmann, Michael Townshend, Jim Meckel, Diana Lower		
Subcontractor:	Pathfinder Aviation		
Morning Check-In:	0830	**Contact Person:**	Karen Brown
Evening Check-In:	1800	**Contact Person:**	Karen Brown

Wind:	**Temperature:**	**Sky:**
9 mph SE	33° F	Clear

Health & Safety:

The morning toolbox safety meeting was conducted by Baker personnel. With another clear and sunny day forecast, the crew discussed the importance of protecting skin from the sun. The crew also discussed hazards of driving around the pad and being safe near the helicopter. As spring approaches, more birds are in the air and on the tundra so the crew discussed the importance of alerting the helicopter pilot of any birds or hazards that they might not be able to see.

Summary of Events:

The crew did another reconnaissance flight south along the Colville. The leading edge was found near Ocean Point approximately 20 river miles from the gages at MON1. The crew installed a trail camera up on the bank at MON1C that will produce a time lapse of the breakup as it happens. A pressure transducer was installed at G11, near CD3. Additionally, the crew participated in a "Breakup Preparedness" meeting with the CPAI Environmental staff and Alpine management personnel.

Challenges:

None

Comments:

The leading edge traveled approximately 16 river miles in the last 24 hours. The progression of the leading edge downstream had slowed overnight but is still expected to arrive at the MON1 gages sometime tomorrow. Also, the NPR-A BLM landing permit is in now in place so the crew can visit the remaining gage locations in the Fish Creek Basin monitoring area.

Planned for Next Field Day:

The crew plans to fly to the leading edge in the morning to monitor the progression downstream. Afterwards, the crew plans to rehabilitate the gages at the upper Ublutuoch and the proposed Clover Mine. If time allows, the crew will travel to the small stream gages west of the Ublutuoch River.

Daily Photo(s)

Photo 1: Looking upstream at Ocean Point; May 12, 2014

Photo 2: Looking downstream at Ocean Point; May 12, 2014

Photo 3: Installing pressure transducer at G11 near CD3 pad; May 12, 2014

Photo 4: Setting up trail camera at MON1C; May 12, 2014

Daily Field Report

Project Name:	2014 Colville River Delta Spring Breakup	**Date:**	**05/13/2014**
Project Number:	**TBD**		
Submitted by:	Diana Lower		
Field Personnel:	Sloane Weidmann, Michael Townshend, Jim Meckel, Diana Lower		
Subcontractor:	Pathfinder Aviation		
Morning Check-In:	0930	**Contact Person:**	Karen Brown
Evening Check-In:	1715	**Contact Person:**	Karen Brown

Wind:	**Temperature:**	**Sky:**
20 mph W	33° F	Light rain and snow

Health & Safety:

The morning toolbox safety meeting was conducted by Baker personnel. The importance of dressing in layers was discussed especially when being physically active in the field. Watching your footing on the tundra was also discussed as the snow becomes softer.

Summary of Events:

The crew did another reconnaissance flight along the Colville River. The leading edge was located approximately nine miles downstream of Ocean Point.

Challenges:

None

Comments:

Field personnel will continue to be on alert as the leading edge approaches MON1 and eventually to facilities.

Planned for Next Field Day:

The crew plans to fly to the leading edge in the morning to monitor its progression downstream. A second time lapse camera will be installed on the Nigliq near the CD5 bridge. The remaining pressure transducers will be installed and the crew will continue to prepare for monitoring.

Daily Photo(s)

Photo 1: Looking at the leading edge downstream from Ocean Point; May 13, 2014

Photo 2: CD1; May 13, 2014

Daily Field Report

Project Name:	2014 Colville River Delta Spring Breakup	**Date:**	**05/14/2014**
Project Number:	**TBD**		
Submitted by:	Michael Ulmgren		
Field Personnel:	Garrett Yager, Sloane Weidmann, Michael Townshend, Jim Meckel, Diana Lower		
Subcontractor:	Pathfinder Aviation		
Morning Check-In:	0830	**Contact Person:**	Karen Brown
Evening Check-In:	1730	**Contact Person:**	Karen Brown

Wind:	**Temperature:**	**Sky:**
12-21 mph WSW	28-37^{o} F	Overcast

Health & Safety:

The morning toolbox safety meeting was conducted by Baker personnel. A few safety topics discussed included the importance of dressing in layers, special care while walking on the tundra, and being observant of wildlife.

Summary of Events:

The crew did a reconnaissance flight along the Colville River to observe the leading edge. The leading edge appeared to have reached MON1. There was no clear evidence of its exact location because of the influence of local melt. A strong southerly wind also made the direction of flow difficult to determine. Additionally, a second time lapse camera was installed at MON9 to observe breakup at the HDD crossing.

Challenges:

None

Comments:

Field personnel will continue to observe the leading edge as it travels through the delta. As stage increases the crew will begin recording the water surface elevations.

Planned for Next Field Day:

The crew plans to fly to the leading edge in the morning to monitor its progression downstream. A couple of remaining pressure transducers will be installed before monitoring will commence.

Daily Photo(s)

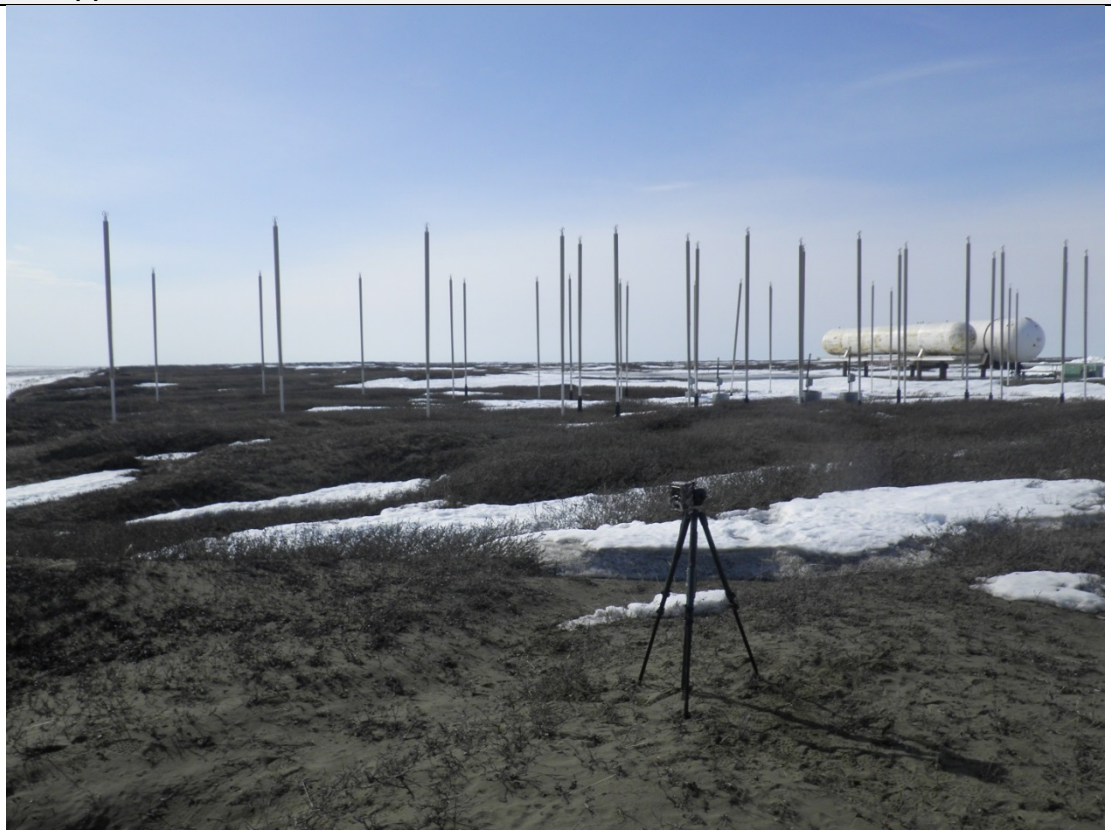


Photo 1: Time lapse camera located at MON9 downstream from the HDD crossing; May 14, 2014

Photo 2: Leading edge moving downstream from MON1; May 14, 2014

Appendix B **Monitoring – Daily Field Reports**

Daily Field Report

Project Name:	2014 Colville River Delta Spring Breakup	**Date:**	**05/15/2014**
Project Number:	**TBD**		
Submitted by:	Diana Lower		
Field Personnel:	Garrett Yager, Sloane Weidmann, Michael Ulmgren and Diana Lower		
Subcontractor:	Pathfinder Aviation		
Morning Check-In:	0950	**Contact Person:**	Karen Brown
Evening Check-In:	1730	**Contact Person:**	Karen Brown

Wind:	**Temperature:**	**Sky:**
7 mph S	32°F	Overcast, slight rain

Health & Safety:

The morning toolbox safety meeting was conducted by Baker personnel. Helicopter safety was reviewed, including wearing safety glasses, watching the doors when the rotors are in motion, and never approach the helicopter from the rear. With wetter weather in the last few days, the importance of caring extra dry layers in the field was discussed.

Summary of Events:

A morning reconnaissance flight revealed that the leading edge was approximately at the MON9 (HDD crossing). An afternoon reconnaissance flight showed more inundation of sandbars and shoals along banks. The leading edge was in the Colville East Channel was between the Sakoonang bifurcation and the Kachemach confluence. Flood water was observed in the Nigliq Channel. Water has not reached any of the gages at this time.

Challenges:

None

Comments:

Field personnel will continue to observe the leading edge as it travels up the Nigliq Channel and Colville East Channel.

Planned for Next Field Day:

The crew plans to fly to the leading edge in the morning to monitor its progression downstream. Monitoring will commence when the water reaches the gages.

Daily Photo(s)

Photo 1: Slotted Colville Ice Bridge near the HDD crossing; May 15, 2014

Photo 2: Colville Ice Bridge near the HDD crossing; May 15, 2014

Photo 3: Flood water at MON1; May 15, 2014

Photo 4: Leading edge near MON9 gages and HDD crossing; May 15, 2014

Photo 2: Flood water at Nigliq Channel bifurcation; May 15, 2014

Daily Field Report

Project Name:	2014 Colville River Delta Spring Breakup	**Date:**	**05/16/2014**
Project Number:	**141450**		
Submitted by:	Diana Lower		
Field Personnel:	Garrett Yager, Sloane Weidmann, Michael Ulmgren, Diana Lower		
Subcontractor:	Pathfinder Aviation		
Morning Check-In:	0830	**Contact Person:**	Karen Brown
Evening Check-In:	1740	**Contact Person:**	Karen Brown

Wind:	**Temperature:**	**Sky:**
20 mph WSW	36° F	Generally cloudy

Health & Safety:

The morning toolbox safety meeting was conducted by Baker personnel. Helicopter safety topics were discussed including securing loose clothing and hats when hot-loading or unloading the helicopter, wearing double hearing protection, and never approach the helicopter from a slope. Additionally, wearing proper PPE, including personal floatation devices when in the vicinity of water was discussed.

Summary of Events:

Morning and afternoon reconnaissance flights were conducted and water surface elevations (WSE) were recorded at gages where flood water was present.

Challenges:

None

Comments:

Channel ice was intact from Ocean Point to the coast. Open water conditions were observed upstream of Ocean Point. MON1 gages are dry however some downstream gage sites have measurable water at this time. For reference, WSE increased approximately 0.5 feet at MON9 during the day. Flood water was observed in the Nigliq Channel extending out to the coast. Additionally, flood water was observed in the Sakoonang and Tamayayak channels. No flood water has been observed in the immediate vicinity of facilities.

Planned for Next Field Day:

The crew plans to fly upstream to look for any ice jams and continue monitoring gages.

Daily Photo(s)

Photo 1: Looking upstream at the slotted Colville Ice Bridge; May 16, 2014

Photo 2: Gages at MON9 near the HDD crossing; May 16, 2014

Photo 3: MON9D Gage A; May 16, 2014

Photo 4: Checking the time lapse camera; May 16, 2014

Daily Field Report

Project Name:	2014 Colville River Delta Spring Breakup	**Date:**	**05/17/2014**
Project Number:	141450		
Submitted by:	Diana Lower		
Field Personnel:	Garrett Yager, Sloane Weidmann, Michael Ulmgren, Diana Lower		
Subcontractor:	Pathfinder Aviation		
Morning Check-In:	0955	**Contact Person:**	Karen Brown
Evening Check-In:	1820	**Contact Person:**	Karen Brown

Wind:	**Temperature:**	**Sky:**
10 mph SSW	37° F	Overcast in the morning, clear in the late afternoon

Health & Safety:

The morning toolbox safety meeting was conducted by Baker personnel. The safety topic of ear protection was discussed. The crew practiced inserting foam ear plugs properly as ear protection is essential during helicopter hot loading and unloading. The crew also chose which personal floatation device, float coat, or float collar was best suited for their individual comfort and safety.

Summary of Events:

The crew flew east along the Alpine Sales Pipeline to observe conditions in the Miluveach and Kachemach rivers. Morning and afternoon gage reading flights were conducted and water surface elevations were recorded at gages where flood water was present. Gages around facilities were monitored throughout the day.

Challenges:

Off-pad field activities were delayed in the morning hours because of weather.

Comments:

The Miluveach and Kachemach rivers had substantial flow and were mostly clear of snow and ice. Water levels were slowly increasing in the Colville East Channel. The Nigliq Channel is now connected to the Nanuq Lake basin however no flow was observed through the swale bridges. All channels are receiving flood water and are actively being monitored. Intact channel ice persisted throughout the Colville River Delta. Overflow was observed over the coastal shorefast ice.

Planned for Next Field Day:

The crew plans to continue monitoring gages throughout the Colville River Delta.

Daily Photo(s)

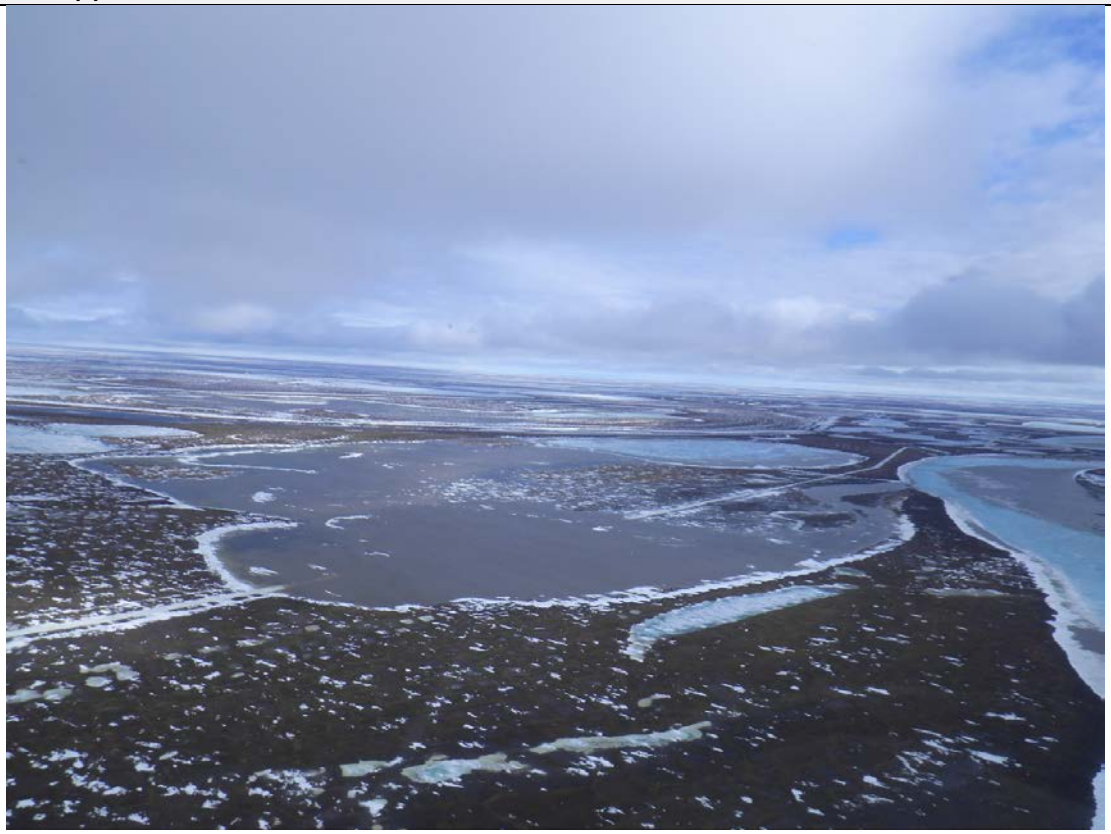


Photo 1: Nigliq Channel connected to Nanuq Lake; May 17, 2014

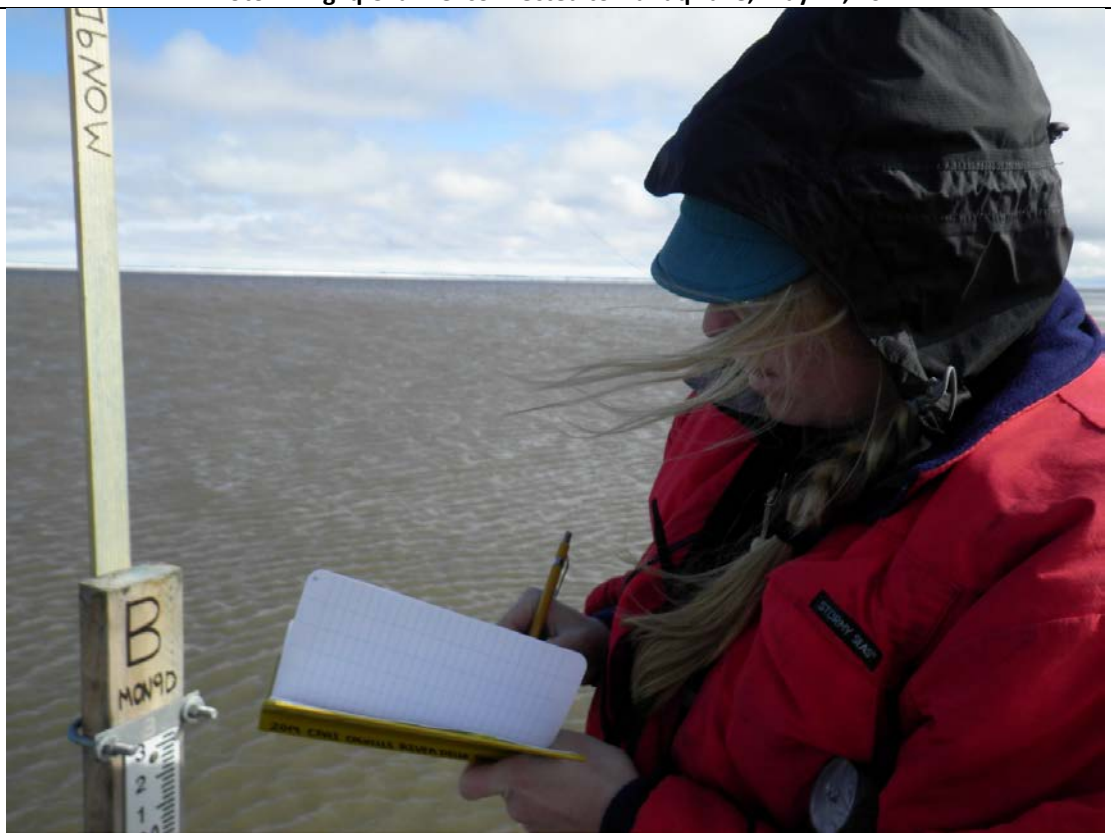


Photo 2: Gage reading at MON9D; May 17, 2014

Photo 3: Reading gages at MON9D; May 17, 2014

Photo 4: Intact channel ice in the Nigliq extending to the coast; May 17, 2014

Photo 5: Flood water meeting the coast; May 17, 2014

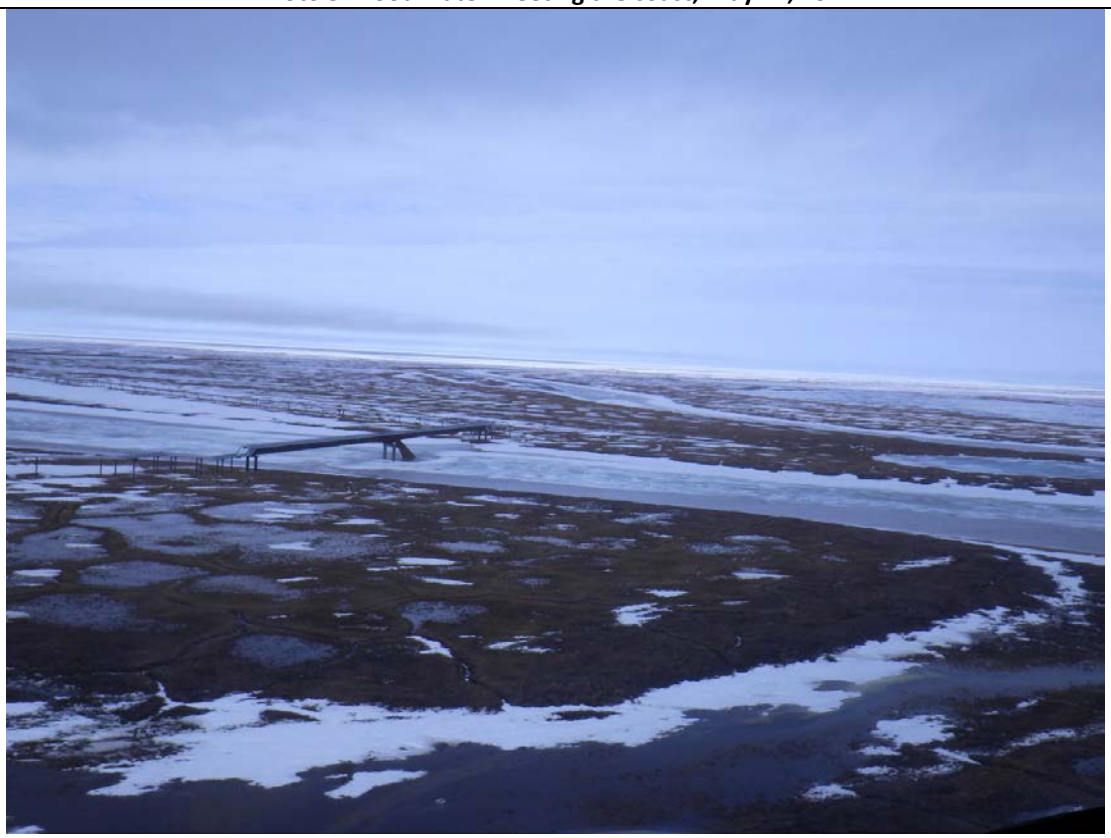


Photo 6: Pipeline crossing at the Ulamnigiaq Channel; May 17, 2014

Daily Field Report

Project Name:	2014 Colville River Delta Spring Breakup	**Date:**	**05/18/2014**
Project Number:	141450		
Submitted by:	Garrett Yager		
Field Personnel:	Garrett Yager, Sloane Weidmann, Michael Ulmgren, Diana Lower, Karen Brown		
Subcontractor:	Pathfinder Aviation		
Morning Check-In:	0855	**Contact Person:**	Karen Brown
Evening Check-In:	1710	**Contact Person:**	Karen Brown

Wind:	**Temperature:**	**Sky:**
16 mph NNW	27° F	Light snow and mist in the morning

Health & Safety:

The morning toolbox safety meeting was conducted by Baker personnel. The crew discussed ways to combat complacency when working around the helicopter, using the buddy system, maintaining pilot/crew communication, and keeping your mind on task (Be Here Now) were a few safety topics discussed. The crew also discussed the importance of being an extra set of eyes for the pilot when landing and taking off to identify potential hazards.

Summary of Events:

Gages around facilities were monitored throughout the day. Discharge equipment was inspected and functionality was evaluated. Karen Brown arrived at Alpine at approximately 1700. A spin test was performed on the Price AA current meters.

Challenges:

Off-pad field activities were delayed in the morning hours because of weather conditions.

Comments:

Water levels continue to rise at the head of the delta, East Colville Channel, Nigliq Channel, Sakoonang Channel, and all other gaged channels in the delta. Overbank flow from the Sakoonang is entering Lake L9324 from the South Paleo Lake. Nigliq channel flow water continues to enter the Nanuq Lake basin, however no flow was observed through the Swale Bridges. Competent channel ice remains in all channels at this time.

Planned for Next Field Day:

The crew plans to continue monitoring gages.

Daily Photo(s)

Photo 1: Nigliq Channel connected to Nanuq Lake; May 18, 2014

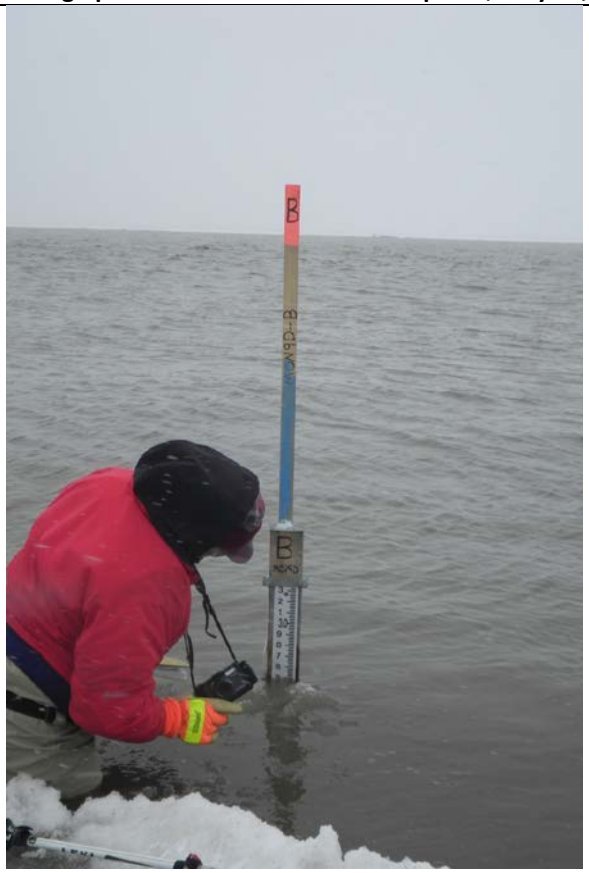


Photo 2: Gage reading at MON9D; May 18, 2014

Photo 3: Chalking gages at ULAM; May 18, 2014

Photo 4: Wading to gage at MON28; May 18, 2014

Photo 5: Monitoring gages at G20 near CD4 pad; May 18, 2014

Photo 6: Reading the gage at Lake M9525; May 18, 2014

Daily Field Report

Project Name:	2014 Colville River Delta Spring Breakup	**Date:**	**05/19/2014**
Project Number:	141450		
Submitted by:	Karen Brown		
Field Personnel:	Garrett Yager, Sloane Weidmann, Michael Ulmgren, Diana Lower, Karen Brown, Garrett Thatcher		
Subcontractor:	Pathfinder Aviation		
Morning Check-In:	0800	**Contact Person:**	Sara Eklund
Evening Check-In:	1740	**Contact Person:**	Sara Eklund

Wind:	**Temperature:**	**Sky:**
7 mph SW	22° F	Overcast, light snow

Health & Safety:

The morning toolbox safety meeting was conducted by Baker personnel. The crew discussed the importance of using redundant hearing protection to reduce helicopter noise and the importance of communication between pilot and field crew. Boating safety was reviewed and the use of proper PPE (mustang suits), awareness of slippery banks and ice under water, and proper lifting techniques when moving and assembling the boat was discussed. The new crew member was provided Helicopter 101 training and the pilot helicopter safety briefing.

Summary of Events:

The long swale bridge and a few culverts along the CD2 road are transmitting water with local melt at the short swale bridge. An ice jam was located north of Ocean Point with overbank flooding behind the jam. Intact channel ice was preventing the release of the jam. The Nigliq and East channels were flowing. Readings were collected at the MON1, MON9, MON9D, and MON20 gages. The water surface elevation at MON1 was 14.25 feet BPMSL. Crew member, Garrett Thatcher, arrived at Alpine.

Challenges:

None

Comments:

The Nigliq Channel flow continues to enter the Nanuq Lake basin. Competent channel ice remains in all channels at this time.

Planned for Next Field Day:

The crew plans to continue monitoring gages throughout the delta and around facilities.

Daily Photo(s)

Photo 1: Ice jam downstream of Ocean Point looking upstream; May 19, 2014

Photo 2: Ice jam downstream of Ocean Point looking downstream; May 19, 2014

Photo 3: Long swale bridge on CD2 Road conveying water; May 19, 2014

Photo 4: Gages at MON1U; May 19, 2014

Daily Field Report

Project Name:	2014 Colville River Delta Spring Breakup	**Date:**	**05/20/2014**
Project Number:	141450		
Submitted by:	Diana Lower		
Field Personnel:	Garrett Yager, Sloane Weidmann, Michael Ulmgren, Diana Lower, Karen Brown, Garrett Thatcher		
Subcontractor:	Pathfinder Aviation		
Morning Check-In:	0800	**Contact Person:**	Sara Eklund
Evening Check-In:	1740	**Contact Person:**	Sara Eklund

Wind:	**Temperature:**	**Sky:**
9 mph WNW	34° F	Clear skies in the morning, light snow mist in the afternoon

Health & Safety:

The morning toolbox safety meeting was conducted by Baker personnel. Helicopter and boating safety was discussed. While loading and unloading, especially while the helicopter is hot, crews should be cautious while handling long objects and make sure they are always carried parallel to the ground. Paddles will be carried in the boat as a safety precaution in the event of engine failure. Crews are to make sure everyone is wearing properly sized personal floatation devices.

Summary of Events:

The long swale bridge, short swale bridge, and a few culverts along the CD2 road are conveying water. Stage slowly increased throughout the day around facilities. An ice jam remained intact north of Ocean Point with overbank flooding behind the jam. Intact channel ice continues to prevent the release of the ice jam. The water surface elevation at MON1 was 14.34 feet BPMSL.

Challenges:

None

Comments:

The Nigliq Channel flow continues to enter the Nanuq Lake basin. Competent channel ice remains in all channels at this time.

Planned for Next Field Day:

The crew plans to continue monitoring gages throughout the delta and around facilities.

Daily Photo(s)

Photo 1: Long swale bridge on CD2 Road; May 20, 2014

Photo 2: Ice jam upstream of MON1; May 20, 2014

Photo 3: Overbank flooding upstream of ice jam; May 20, 2014

Photo 4: Gages at the Ulamnigiaq Channel near the pipeline crossing; May 20, 2014

Daily Field Report

Project Name:	2014 Colville River Delta Spring Breakup	**Date:**	**05/21/2014**
Project Number:	141450		
Submitted by:	Karen Brown		
Field Personnel:	Garrett Yager, Michael Ulmgren, Karen Brown, Diana Lower		
Subcontractor:	Pathfinder Aviation		
Morning Check-In:	0800	**Contact Person:**	Sara Eklund
Evening Check-In:	1700	**Contact Person:**	Sara Eklund

Wind:	**Temperature:**	**Sky:**
9 mph WNW	29° F	Snow

Health & Safety:

The morning toolbox safety meeting was conducted by Baker personnel. Helicopter safety, driving on pad, and proper fueling procedures were discussed. Crews discussed the importance of preplanning and communication with the pilot and helicopter coordinator. Crews remaining in the field without the helicopter should ensure all of their safety gear remains with them including survival bags, satellite phone, and air to ground radio. While fueling, the vehicle should be shut off and duck ponds are to be placed under a potential spill source. Crews are to observe signs and check in and out with the CD2 and CD4 operators when accessing pads to check gages. Crews are to wear safety vests when walking on roads and set up "Survey Crew" signs when collecting discharge measurements on bridges.

Summary of Events:

Crews recorded water surface elevation (WSE) readings at all CRD and CD5 monitoring gages. The ice jam, north of MON1, remains intact. Intact channel ice continues to prevent the release of the jam. The WSEs at the Colville East, Sakoonang, and Nigliq channels are decreasing. Overbank flooding upstream of the ice jam appears consistent with yesterday. The WSE at MON1 was 12.8 feet BPMSL, decreasing 1.54 feet since yesterday. There is a small ice jam behind intact channel ice at the confluence of Tool Box Creek and the Nigliq Channel. Lake M9525 and the North Paleo Lake are hydraulically connected. Lake L9524 and Nanuq Lake are hydraulically connected. Flow is present at both the long and short swale bridges on the CD2 road with some culverts conveying flow along the CD2 and CD4 roads.

Challenges:

Temperatures dropping, cold wind, and snow were challenges encountered today.

Comments:

The boat and gear were prepared for sling loading and arrangements were made with the helicopter coordinator to transport to MON1. Equipment was readied in preparation of discharge measurements on the swale bridges. The weather at Alpine is forecasted to have highs below freezing for the next 5 days. Water levels at Umiat continue to decline.

Planned for Next Field Day:
The crew plans to continue monitoring gages throughout the delta and around facilities. Weather permitting, the helicopter will be used to sling load boats and gear to MON1 in preparation for direct discharge measurements.
Daily Photo(s)

Photo 1: Lake M9525 hydraulically connected to North Paleo Lake; May 21, 2014

Photo 2: Ice jam upstream of MON1; May 21, 2014

Photo 3: Gage reading at MON1 Gage A; May 21, 2014

Photo 4: Re-chalking gage at Tamayayak Channel near the pipe bridge crossing; May 21, 2014

Photo 5: Long swale bridge on CD2 Road; May 21, 2014

Daily Field Report

Project Name:	2014 Colville River Delta Spring Breakup	**Date:**	**05/22/2014**
Project Number:	141450		
Submitted by:	Diana Lower		
Field Personnel:	Garrett Yager, Michael Ulmgren, Karen Brown, Diana Lower, Sloane Weidmann, Garrett Thatcher		
Subcontractor:	Pathfinder Aviation		
Morning Check-In:	0800	**Contact Person:**	Sara Eklund
Evening Check-In:	1700	**Contact Person:**	Sara Eklund

Wind:	**Temperature:**	**Sky:**
6 mph WNW	29° F	Overcast with occasional light snow

Health & Safety:

The morning toolbox safety meeting was conducted by Baker personnel. Helicopter safety and working around flowing water was discussed. Helicopter noise and hot loading and unloading can make crews feel rushed. Slowing down, wearing redundant hearing protection, and working purposefully and safely is always a priority. In the event a crew member falls in the water, remain calm, aim feet downstream, and allow the current to assist you to shore. Once out of the water, change to dry clothes immediately and return to camp as soon as possible.

Summary of Events:

A direct discharge measurement was taken at the long swale bridge on the CD2 Road. Ponded water was present at the short swale bridge; therefore, no discharge measurement was taken. Discharge measurements were taken at culverts conveying flow along facility roads. CRD and CD5 monitoring gages were read. The ice jam north of MON1 remains intact. Intact channel ice continues to prevent the release of the jam. The water surface elevations at the Colville East Channel, Sakoonang, and Nigliq channels continue to decrease. Stranded ice along the banks and shoals within the ice jam and upstream of the ice jam indicate backwater is receding. The water surface elevation at MON1 was 11.4 feet BPMSL, decreasing 1.4 feet BPMSL since May 21.

Challenges:

None

Comments:

Decreasing stage in the CRD and receding backwater upstream of ice jam indicates peak likely occurred on May 20, 2014. Crews will continue to monitor until temperatures rise above freezing.

Planned for Next Field Day:

The crew plans to continue monitoring gages throughout the delta and around facilities. Two field personnel will demobilize on May 23, 2014.

Photo(s)

Photo 1: Stranded and rafted ice on shoals within ice jam upstream of MON1; May 22, 2014

Photo 2: Stranded ice on shoals within ice jam upstream of MON1; May 22, 2014

Photo 3: Long swale bridge on CD2 Road; May 22, 2014

Photo 4: Preparing for the direct discharge measurement on long swale bridge; May 22, 2014

Photo 5: Measuring direct discharge at a CD4 culvert; May 22, 2014

Daily Field Report

Project Name:	2014 Colville River Delta Spring Breakup	**Date:**	**05/23/2014**
Project Number:	141450		
Submitted by:	Karen Brown		
Field Personnel:	Garrett Yager, Michael Ulmgren, Karen Brown, Diana Lower, Sloane Weidmann, Garrett Thatcher		
Subcontractor:	Pathfinder Aviation		
Morning Check-In:	0730	**Contact Person:**	Sara Eklund
Evening Check-In:	1800	**Contact Person:**	Sara Eklund

Wind:	**Temperature:**	**Sky:**
8 mph NE	22° F	Light snow mist

Health & Safety:

The morning toolbox safety meeting was conducted by Baker personnel. Helicopter safety and proper procedures for handling bear spray was discussed. Crews should be aware of pinch points when loading, entering and exiting the helicopter including doors, and the cargo storage area. When transporting bear spray in the helicopter, it should always be packed in a secondary containment and stowed in the cargo area. When carrying bear spray in the field, always make sure the safety latch is secure until ready for use. Bear spray should be easily accessible, attached to a belt or carried in a pocket, so it will be ready to use if needed. If the spray is inadvertently discharged, flush any affected area with water and do not rub. The effects will wear off over time. Do not handle any objects that may have been contacted by the spray. Wash and allow to dry before using again.

Summary of Events:

One crew collected readings and chalked gages at all facility roads and pads. The other crew performed an overflight reconnaissance of Alpine, Exploration, and CD5 recharge lakes and monitored gages around the Colville River Delta. Stage in the Sakoonang Channel continues to decrease. Crews noted intact channel ice in the Sakoonang and Tamayayak channels at the CD3 pipeline crossing. Channel ice in the Nigliq Channel remains competent. Colder temperatures have increased ice thickness. Water surface elevations throughout the CRD continue to decrease. The floes in the ice jam upstream of the MON1 gages are stranded; backwater continues to recede. No water is present on any of the MON1 gages.

Challenges:

None

Comments:

Crews will continue to monitor until temperatures rise above freezing. The forecast shows colder weather continuing through the early part of next week. Two crew members demobbed to Anchorage.

Planned for Next Field Day:

One crew plans to continue monitoring gages throughout the delta and around facilities. One crew will collect a discharge measurement at the Nigliagvik Channel.

Daily Photo(s)

Photo 1: Stranded and rafted ice on shoals within ice jam upstream of MON1; May 23, 2014

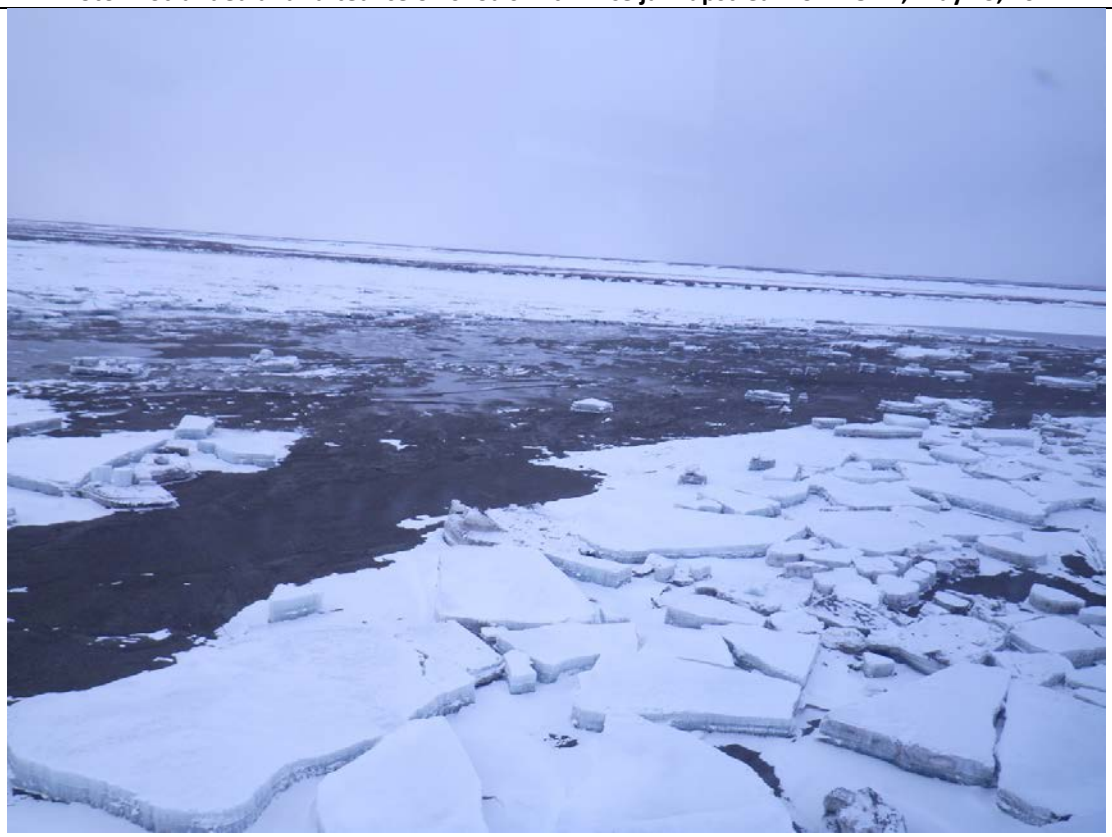


Photo 2: Stranded ice on shoals within ice jam upstream of MON1; May 23, 2014

Photo 3: Monitoring Gage G19 near the CD4 pad; May 23, 2014

Photo 4: Gage reading and chalking at Lake M9525; May 23, 2014

Photo 5: Upstream side of long swale bridge; May 23, 2014

Photo 6: Reading gage at Ulamnigiaq Channel; May 23, 2014

Daily Field Report

Project Name:	2014 Colville River Delta Spring Breakup	**Date:**	**05/24/2014**
Project Number:	141450		
Submitted by:	Karen Brown		
Field Personnel:	Karen Brown, Diana Lower, Sloane Weidmann, Garrett Thatcher		
Subcontractor:	Pathfinder Aviation		
Morning Check-In:	0730	**Contact Person:**	Sara Eklund
Evening Check-In:	1800	**Contact Person:**	Sara Eklund

Wind:	**Temperature:**	**Sky:**
16 mph E	25° F	Scattered clouds

Health & Safety:

The morning toolbox safety meeting was conducted by Baker personnel. Helicopter safety and tundra drop offs were discussed. Crews dropped off by helicopter should carry satellite phones, air to ground radios, and survival bags. Crews will stay in contact with the helicopter coordinator and be prepared for an overnight stay in the event of bad weather or mechanical issues with the aircraft. While on the ground, crews should conduct frequent wildlife scans and have bear spray readily available. All food should be kept in sealed containers and kept in one location.

Summary of Events:

One crew collected readings and chalked gages at MON9 and CD5. The crew retrieved the field camera from MON9 and placed on the Nigliq Channel. The other crew collected direct discharge data at the Nigliagvik Channel. Ice thickness continues to increase with colder temperatures. Water surface elevations throughout the CRD continue to decrease. No water is present on any of the MON1 gages.

Challenges:

None

Comments:

Even with the rise in temperatures, stage will likely not achieve the preceding observed peak because the headwaters of the Colville River have lost 70 to 80 percent of the snow pack. Tributaries have shown signs of recession as well.

Planned for Next Field Day:

Crews will conduct erosion surveys on the CD2 and CD4 roads. Gear will be cleaned, inventoried, and packed. One crew member will depart Alpine on May 25.

Daily Photo(s)

Photo 1: Remnants of the Colville River Ice Bridge ramp adjacent to MON9; May 24, 2014

Photo 2: Sakoonang Channel gages; May 24, 2014

Photo 3: Monitoring gages at MON9D; May 24, 2014

Daily Field Report

Project Name:	2014 Colville River Delta Spring Breakup	**Date:**	**05/25/2014**
Project Number:	141450		
Submitted by:	Karen Brown		
Field Personnel:	Karen Brown, Diana Lower, Sloane Weidmann, Garrett Thatcher		
Subcontractor:	Pathfinder Aviation		
Morning Check-In:	0730	**Contact Person:**	Sara Eklund
Evening Check-In:	1800	**Contact Person:**	Sara Eklund

Wind:	**Temperature:**	**Sky:**
8 NE	26° F	Light snow

Health & Safety:

The morning toolbox safety meeting was conducted by Baker personnel. Helicopter safety, freezing conditions, and the importance of the buddy system were discussed. Thick layers of surface ice have formed because of melt followed by freezing temperatures. Ice overlaying water can create hazards. Crews can mitigate by moving slowly and using trekking poles for stability. A two field personnel will always be used for the helicopter drop-offs.

Summary of Events:

One crew performed an erosion survey on the CD2 and CD4 roads. Crew members cleaned, inventoried, and packed field gear and equipment in preparation for demobilization on May 26, 2015.

Challenges:

None

Comments:

Even with the rise in temperatures, stage will likely not achieve the preceding observed peak because the headwaters of the Colville River have lost 70 to 80 percent of the snow pack. Tributaries have shown signs of recession as well.

Planned for Next Field Day:

Final reconnaissance flight on the Colville River and Nigliq Channel. Data will be downloaded from field cameras. Three remaining crew members will demobilize on Monday afternoon.

Daily Photo(s)

Photo 1: Erosion Survey on the CD2 Road; May 25, 2014

Photo 2: Culvert battery on the CD4 Road; May 25, 2014

Daily Field Report

Project Name:	2014 Colville River Delta Spring Breakup	**Date:**	**05/26/2014**
Project Number:	141450		
Submitted by:	Karen Brown		
Field Personnel:	Karen Brown, Diana Lower		
Subcontractor:	Pathfinder Aviation		
Morning Check-In:	0730	**Contact Person:**	Sara Eklund
Evening Check-In:	1600	**Contact Person:**	Sara Eklund

Wind:	**Temperature:**	**Sky:**
9 mph W	36° F	Overcast and snowing

Health & Safety:

The morning toolbox safety meeting was conducted by Baker personnel. Helicopter safety was discussed. During hot loading, crews will exit and move forward and away from the helicopter avoiding any rises in elevation. After work is complete, crews will watch the pilot for the thumbs up sign indicating it is safe to load. Crews will never approach from the rear of the helicopter.

Summary of Events:

One crew flew to MON1 and the Nigliq Channel to retrieve data and check batteries on the time lapse cameras. The cameras will be left in place to record photos and will be retrieved during the next field visit. The crew flew to the ice jam upstream of MON1. The jam remains in place trapped behind channel ice. Thick surface ice has formed around the pans of stranded and jammed ice. Channel ice in the monitoring area remains intact and competent with no signs of breaking up. It is unlikely additional discharge measurements will be collected this season as temperatures continue to drop below freezing.

Challenges:

None

Comments:

Stage is not likely to achieve the preceding observed peak; therefore, monitoring crews will demobilize today and continue to monitor conditions in the Colville River Delta remotely.

Planned for Next Field Day:

None

Daily Photo(s)

Photo 1: Conditions at MON1-C gages; May 26, 2014

Daily Field Report

Project Name:	2014 Colville River Delta Spring Breakup	**Date:**	**05/30/2014**
Project Number:	141450		
Submitted by:	Karen Brown		
Field Personnel:	Jim Meckel, Sloane Weidmann		
Subcontractor:	Pathfinder Aviation		
Morning Check-In:	0730	**Contact Person:**	Sara Eklund
Evening Check-In:	1800	**Contact Person:**	Sara Eklund

Wind:	**Temperature:**	**Sky:**
25 mph NE	29° F	Overcast and raining

Health & Safety:

The morning toolbox safety meeting was conducted by Baker personnel. Helicopter safety was reviewed, including wearing safety glasses, watching the doors when the rotors are in motion, and never to approach the helicopter from the rear. Careful travel across variable terrain including rotting snow and mud and staying alert on pad for heavy equipment moving about was also discussed.

Summary of Events:

Field crew traveled upstream of MON1 to evaluate the increase in floodwaters and determine if the ice jam upstream of MON1 was still intact. The MON1-C gage was monitored. Field crew then travelled downstream along the East Channel to evaluate the location of channel ice.

Challenges:

Limited helicopter time because of its use by other projects and weather delays.

Comments:

Ice jam is no longer upstream of MON1. Water levels continue to increase. Flow through the CD2 swale bridges is also increasing.

Planned for Next Field Day:

The crew plans to continue monitoring gages throughout the delta and around facilities.

Daily Photo(s)

Photo 1: Flow through CD2 swale bridges; May 30, 2014

Photo 2: Looking downstream along the East Channel of the Colvile near MON9D; May 30, 2014

Photo 3: Previous location of ice jam upstream of MON1; May 30, 2014

Photo 4: Frozen rain on time lapse camera at MON1; May 30, 2014

Daily Field Report

Project Name:	2014 Colville River Delta Spring Breakup	**Date:**	**05/31/2014**
Project Number:	141450		
Submitted by:	Karen Brown		
Field Personnel:	Jim Meckel, Sloane Weidmann		
Subcontractor:	Pathfinder Aviation		
Morning Check-In:	0730	**Contact Person:**	Sara Eklund
Evening Check-In:	1800	**Contact Person:**	Sara Eklund

Wind:	**Temperature:**	**Sky:**
22 mph ENE	29° F	Overcast

Health & Safety:

The morning toolbox safety meeting was conducted by Baker personnel. Helicopter safety and freezing conditions were discussed. The crew discussed keeping a lookout for falling ice from buildings and safe driving techniques such as using appropriate flagging along the roadways.

Summary of Events:

The field crew monitored water levels at gages along the Colville and Nigliq channels. The crew observed ice collecting along the banks of the Colville near MON1 and MON9D. Channel ice continues to stay intact along the Nigliq Channel. All gages are showing the highest water levels seen so far this year.

Challenges:

Travel on pad was difficult because of a drill rig moving out to CD4

Comments:

Water levels continue to increase.

Planned for Next Field Day:

The crew plans to continue monitoring gages throughout the delta and around facilities.

Daily Photo(s)

Photo 1: Chipping ice off gage; May 31, 2014

Photo 2: Ice build up along bank at MON9D; May 31, 2014

Photo 3: Ice jam on the Sakoonang Channel; May 31, 2014

Daily Field Report

Project Name:	2014 Colville River Delta Spring Breakup	**Date:**	**06/01/2014**
Project Number:	141450		
Submitted by:	Karen Brown		
Field Personnel:	Jim Meckel, Sloane Weidmann, Garrett Yager, Michael Ulmgren, Michael Townshend, Diana Lower, Karen Brown		
Subcontractor:	None		
Morning Check-In:	0730	**Contact Person:**	Sara Eklund
Evening Check-In:	1800	**Contact Person:**	Sara Eklund

Wind:	**Temperature:**	**Sky:**
20 mph ENE	30° F	Overcast/Freezing Rain

Health & Safety:

The morning toolbox safety meeting was conducted by Baker personnel. The crew reviewed helicopter safety and freezing conditions. The crew reiterated safety around buildings and on the roads including falling ice and proper driving techniques. A second toolbox meeting was conducted as the crew members arrived at Alpine later in the day.

Summary of Events:

Field crew visited gages on the roads and pads. The weather did not permit helicopter travel so the remaining crew members worked on organizing gear and inputting gage reading data into the water surface elevation spreadsheets.

Challenges:

Freezing rain and low visibility prevented helicopter travel.

Comments:

Water levels are rising around the roads and pads. Current water surface elevations are higher than the highest recorded levels from the previous peak on May 20th. Water is expected to continue rising throughout the evening and tomorrow. Channel ice appears to remain competent in the Nigliq Channel.

Planned for Next Field Day:

The crew plans to visit all of the gages in the monitoring area. Additionally, the crew will perform discharge measurements on the swale bridges and culverts if it is deemed that peak water surface elevations have occurred.

Daily Photo(s)

Photo 1: Wading to gage at Lake M9525; June 1, 2014

Photo 2: Chalking gage at Lake L9323; June 1, 2014

Photo 3: Water flowing through the long swale bridge; June 1, 2014

Photo 4: Culvert battery at G6 near the CD2 pad; June 1, 2014

Daily Field Report

Project Name:	2014 Colville River Delta Spring Breakup	**Date:**	**06/02/2014**
Project Number:	141450		
Submitted by:	Karen Brown		
Field Personnel:	Sloane Weidmann, Garrett Yager, Michael Ulmgren, Michael Townshend, Diana Lower, Karen Brown		
Subcontractor:	Pathfinder Aviation		
Morning Check-In:	0800	**Contact Person:**	Sara Eklund
Evening Check-In:	2200	**Contact Person:**	Sara Eklund

Wind:	**Temperature:**	**Sky:**
5 mph W	33° F	Morning fog / light snow and rain

Health & Safety:

The morning toolbox safety meeting was conducted by Baker personnel. Helicopter safety and visibility were discussed. Several crew members are back after a short break and working with a new pilot. Individual pilots may have different rules making communication key. Visibility on roads is hampered by the buildup of mud on windows. Paper towels are kept on hand to clean the windows when needed. Another team member will help with backing up the truck when visibility is poor.

Summary of Events:

One field crew collected gage readings on roads and pads. The second field crew collected readings via helicopter in the Colville River Delta. The third crew collected discharge measurements at culverts and the swale bridges along the CD2 road. Crews also prepared the boats and equipment for collecting discharge at MON1 and the Nigliq Channel tomorrow.

Challenges:

Fog in the morning delayed helicopter gage run.

Comments:

The gage at Umiat is fluctuating around 58 feet. Decreasing stage and stranded ice floes along the banks at MON1 indicate water levels have crested at the head of the delta. Ice has cleared out of the Nigliq Channel near Nuiqsut. The Nigliq Channel is predominantly free of competent channel ice up to the Nigliagvik confluence. Intact channel ice persists downstream of the Nigliagvik confluence. A small jam on the Nigliq Channel downstream of the bridge started to break up in the evening. Lake L9341 and Nanuq Lake remain connected to the Nigliq Channel. Extensive coastal flooding is occurring near the FWR and MON28 gages.

The Sakoonang Channel remains connected to the North and South Paleo Lakes and appears to be connected to Lake L9282/B8534. A small ice jam was observed in the Sakoonang Channel near the North Paleo Lake. Lake L9313 is recharging from Lake M9525. Intact channel ice was observed at the pipeline crossing on the Tamayayak and Sakoonang channels.

Water levels crested at the facility gages today. The long and short swale bridges continue to convey flow.

Jim Meckel departed Alpine today.

Planned for Next Field Day:

The crew plans to visit all of the gages in the monitoring area. Additionally, the crew will perform discharge measurements on the Colville River adjacent to MON1 and on the Nigliq Channel.

Daily Photo(s)

Photo 1: Lakes M9525 and L9313 connected to the North Paleo Lake; June 2, 2014

Photo 2: Ulamnigiaq pipeline crossing; June 2, 2014

Photo 3: Small ice jam on the Sakoonang Channel; June 2, 2014

Photo 4: Collecting discharge measurents at a culvert along the CD2 road; June 2, 2014

Photo 5: Collecting discharge measurents at a culvert along the CD2 road; June 2, 2014

Photo 6: Collecting discharge measurements at the long swale bridge; June 2, 2014

Daily Field Report

Project Name:	2014 Colville River Delta Spring Breakup	**Date:**	**06/03/2014**
Project Number:	141450		
Submitted by:	Karen Brown		
Field Personnel:	Sloane Weidmann, Garrett Yager, Michael Ulmgren, Michael Townshend, Diana Lower, Karen Brown		
Subcontractor:	None		
Morning Check-In:	0600	**Contact Person:**	Sara Eklund
Evening Check-In:	2130	**Contact Person:**	Sara Eklund

Wind:	**Temperature:**	**Sky:**
13 mph E	43° F	Partly sunny

Health & Safety:

The morning toolbox safety meeting was conducted by Baker personnel. Helicopter and boat safety was discussed. Crews will use inflatable boats to collect flow measurements. All equipment should be tested prior to deployment to ensure it is in good working order. All USCG required equipment will be carried including throwable devices, horns, fire extinguishers, and flares. All crew members will wear floatation suits. In addition, crews will carry satellite phones and ELPBs in case of emergency. Because crews will remain on the ground without a helicopter present, survival bags will be staged onshore and a GPS point of the location will be taken. One crew will be dropped off by the helicopter to receive the sling loaded boats. This crew will be in contact with the pilot via air to ground radio and follow the pilot's directions.

Summary of Events:

One field crew collected gage readings on roads, pads, and at CRD gages. One field crew collected direct discharge measurements at MON1.

Challenges:

None

Comments:

The gage at Umiat has leveled off and is beginning to decrease. Warmer temperatures are melting channel ice and stranded floes on banks. Water levels are beginning to show signs of decreasing.

Planned for Next Field Day:

The crew plans to visit all of the gages in the monitoring area. Additionally, the crew will continue to collect direct discharge measurements on the Colville River adjacent to MON1. If time allows, crews will collect direct discharge on the Nigliq Channel.

Daily Photo(s)

Photo 1: Remains of the Colville River ice bridge ramp near MON9; June3, 2014

Photo 2: Collecting discharge measurement on the Colville River near MON1; June 3, 2014

Photo 3: Coastal flooding near Slemp Slough, looking south; June 3, 2014

Photo 4: Mouth of the Nigliagvik near the confluence with the Nigliq Channel, looking west; June 3, 2014

Daily Field Report

Project Name:	2014 Colville River Delta Spring Breakup	**Date:**	**06/04/2014**
Project Number:	141450		
Submitted by:	Karen Brown		
Field Personnel:	Sloane Weidmann, Garrett Yager, Michael Ulmgren, Michael Townshend, Diana Lower, Karen Brown		
Subcontractor:	None		
Morning Check-In:	0700	**Contact Person:**	Sara Eklund
Evening Check-In:	2130	**Contact Person:**	Sara Eklund

Wind:	**Temperature:**	**Sky:**
14 mph N	43° F	Morning Fog then Partly Sunny

Health & Safety:

The morning toolbox safety meeting was conducted by Baker personnel. Helicopter safety and dehydration was discussed. Crews working on collecting data and photos of streams and lakes need to communicate their requirements clearly to the pilot. On the ground, crews will survey the situation and let the pilot know when their work will take more than a few minutes on the ground, and the helicopter can be shut down. Also, wind direction may dictate landing with the tail pointed toward the gage sites. Landing farther from the gages may be necessary so crews are not walking and working in close proximity to the tail rotor. Crews are encouraged to drink plenty of water to stay hydrated. Using sunscreen and reapplying frequently is important to avoid sunburn.

Summary of Events:

One field crew collected gage readings along the Nigliq Channel, at pipeline bridge crossings, and along the CD2 road. Another field crew completed the direct discharge measurements at MON1. The Nigliq Channel is mostly clear of channel ice with a few floes and some stranded ice along banks. The ice jam at the mouth of the Nigliagvik remains in place and is growing. A small ice jam on the Sakoonang Channel upstream of the pipeline crossing bridge began moving downstream. Some small ice floes were present along the west bank of the Colville River near MON1 gages.

Challenges:

Fog delayed deployment of field crews.

Comments:

Warmer temperatures continue to melt channel ice and snow on the tundra. All gages continue to show decreasing water levels.

Planned for Next Field Day:

One crew plans to monitor gages along the CD5 route and in other monitoring areas as time allows. One crew will collect direct discharge measurements on the Nigliq Channel downstream of the bridge crossing. As time allows this week, one crew will deploy to MON35 to setup new gages to replace those wiped out by sea ice.

Daily Photo(s)

Photo 1: Ice jam moving downstream on the Sakoonang Channel, looking northeast; June 4, 2014

Photo 2: G28 gages on the Nigliq Channel upstream of the crossing, looking west; June 4, 2014

Photo 3: Mostly ice free Nigliq Channel, looking upstream; June 4, 2014

Photo 4: Completing discharge measurement on the Colville River adjacent to MON1; June 4, 2014

Photo 5: Ulamnigiaq Channel is mostly clear of ice, looking south; June 4, 2014

Daily Field Report

Project Name:	2014 Colville River Delta Spring Breakup	**Date:**	**06/05/2014**
Project Number:	141450		
Submitted by:	Karen Brown		
Field Personnel:	Sloane Weidmann, Garrett Yager, Michael Ulmgren, Michael Townshend, Diana Lower, Karen Brown		
Subcontractor:	Pathfinder Aviation		
Morning Check-In:	0800	**Contact Person:**	Sara Eklund
Evening Check-In:	1730	**Contact Person:**	Sara Eklund

Wind:	**Temperature:**	**Sky:**
14 mph W	39°F	Overcast

Health & Safety:

The morning toolbox safety meeting was conducted by Baker personnel. The crew discussed using extra caution when exiting and removing cargo from the helicopter and using caution while walking across variable terrain and muddy surfaces. The crew also discussed how to avoid hypothermia by changing to dry clothes if anything gets wet.

Summary of Events:

One field crew collected gage readings along the Nigliq and Nigliagvik channels and at MON1 and MON9. One field crew completed direct discharge measurements at the Nigliq Channel. The Nigliq Channel was clear of ice and snow in the area where the discharge measurement was collected. In addition, real time scour monitoring occurred at the piers along the crossing. The ice jam at the mouth of the Nigliagvik is still in place; water is conveying under the ice with no backwater behind the ice jam. Water levels have decreased along the CD2 road with water ponded around the short swale bridge and some flow through the long swale bridge.

Challenges:

None

Comments:

Water levels continue to decrease around the Colville River Delta.

Planned for Next Field Day:

One crew will clean boats and pack up discharge gear. One crew will continue monitoring Colville River Delta gages.

Daily Photo(s)

Photo 1: Discharge safety boat preparing to survey on the Nigliq Channel, looking west; June 5, 2014

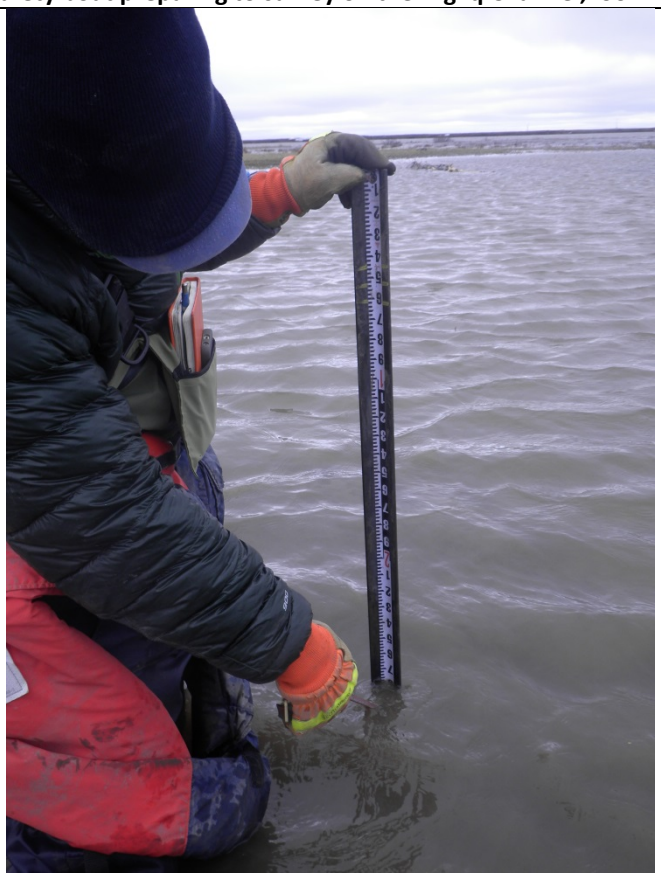


Photo 2: Water surface elevation reading from temporary steel; June 5, 2014

Photo 3: Ice free Colville Channel near MON1, looking upstream; June 5, 2014

Photo 4: Completing direct discharge measurements on the Nigliq Channel adjacent to the crossing; June 5, 2014

Photo 5: Small ice jam at the mouth of the Nigliagvik Channel at the confluence with the Nigliq Channel; June 5, 2014

Daily Field Report

Project Name:	2014 Colville River Delta Spring Breakup	**Date:**	**06/06/2014**
Project Number:	141450		
Submitted by:	Karen Brown		
Field Personnel:	Sloane Weidmann, Garrett Yager, Michael Ulmgren, Michael Townshend, Diana Lower, Karen Brown		
Subcontractor:	Pathfinder Aviation		
Morning Check-In:	0700	**Contact Person:**	Sara Eklund
Evening Check-In:	1800	**Contact Person:**	Sara Eklund

Wind:	**Temperature:**	**Sky:**
5 mph N	38° F	Overcast

Health & Safety:

The morning toolbox safety meeting was conducted by Baker personnel. Helicopter safety and heavy lifting was discussed. To avoid complacency when working around the helicopter, it is important to stop and evaluate the danger involved with loading, unloading, and accessing the cargo bay. Clear communication with the pilot is necessary to locate gages, landing sites, and to get necessary aerial photos of the project area. Heavy lifting will be involved to get the boats and motors back to the office from Silas Slough. Warm up stretches, using your knees, and lifting with a buddy are all important injury preventing techniques.

Summary of Events:

All field crew members retrieved the boats from Silas Slough and carried them to a truck and trailer staged on the CD4 pad. Boats and gear were cleaned while one crew collected gage readings at the Alpine Area Lakes Recharge sites and at MON1. Field equipment was organized and preparations were made for storage and shipment.

Challenges:

None

Comments:

Monitoring activities will continue for the next few days.

Planned for Next Field Day:

One crew will be deployed to MON35 to replace and resurvey gages. One crew will monitor gages around the Colville River Delta.

Daily Photo(s)

Photo 1: Transporting boats from staging area; June 6, 2014

Photo 2: CD1 from Lake B8534/L9282; June 6, 2014

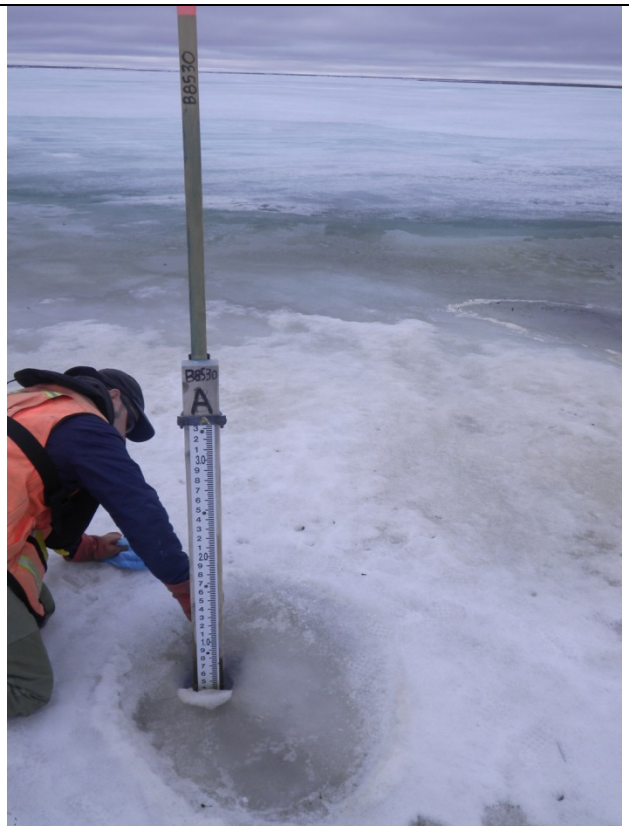


Photo 3: Chalking gage at Lake B8530; June 6, 2014

Photo 4: Gage at Lake K214; June 6, 2014

Photo 5: Pipeline crossing on the Kachemach River; June 6, 2014

Photo 6: Pipeline crossing on the Ulamnigiaq Channel; June 6, 2014

Daily Field Report

Project Name:	2014 Colville River Delta Spring Breakup	**Date:**	**06/07/2014**
Project Number:	141450		
Submitted by:	Karen Brown		
Field Personnel:	Sloane Weidmann, Garrett Yager, Michael Ulmgren, Michael Townshend, Diana Lower, Karen Brown		
Subcontractor:	Pathfinder Aviation		
Morning Check-In:	0700	**Contact Person:**	Sara Eklund
Evening Check-In:	1800	**Contact Person:**	Sara Eklund

Wind:	**Temperature:**	**Sky:**
7 mph N	39° F	Morning snow then overcast in the afternoon

Health & Safety:

The morning toolbox safety meeting was conducted by Baker personnel. Helicopter safety discussion included not walking near the tail, take time entering and exiting as well as loading and unloading gear while the blades are spinning, good communication with pilot, and proper PPE. Additionally, it is imperative that all crew members insure that new personnel are acquainted with the helicopter prior to work beginning. Proper technique for gage installation was discussed including adding safety stripes to angle iron and using a spotter for installing new gages, proper heavy lifting, and taking breaks.

Summary of Events:

One crew travelled to MON35 to install new gages and survey for future monitoring. Another crew monitored gages in the Colville River Delta and around facilities.

Challenges:

None

Comments:

Coastal flooding has receded and water levels in the Colville River Delta have decreased. The water level on the Colville River gage at Umiat continues to decrease.

Planned for Next Field Day:

Field crew will continue to record water surface elevations throughout the monitoring area and inventory and pack gear.

Daily Photo(s)

Photo 1: Surveying gages at MON35; June 7, 2014

Photo 2: Reading Gage G10 on Lake L9313; June 7, 2014

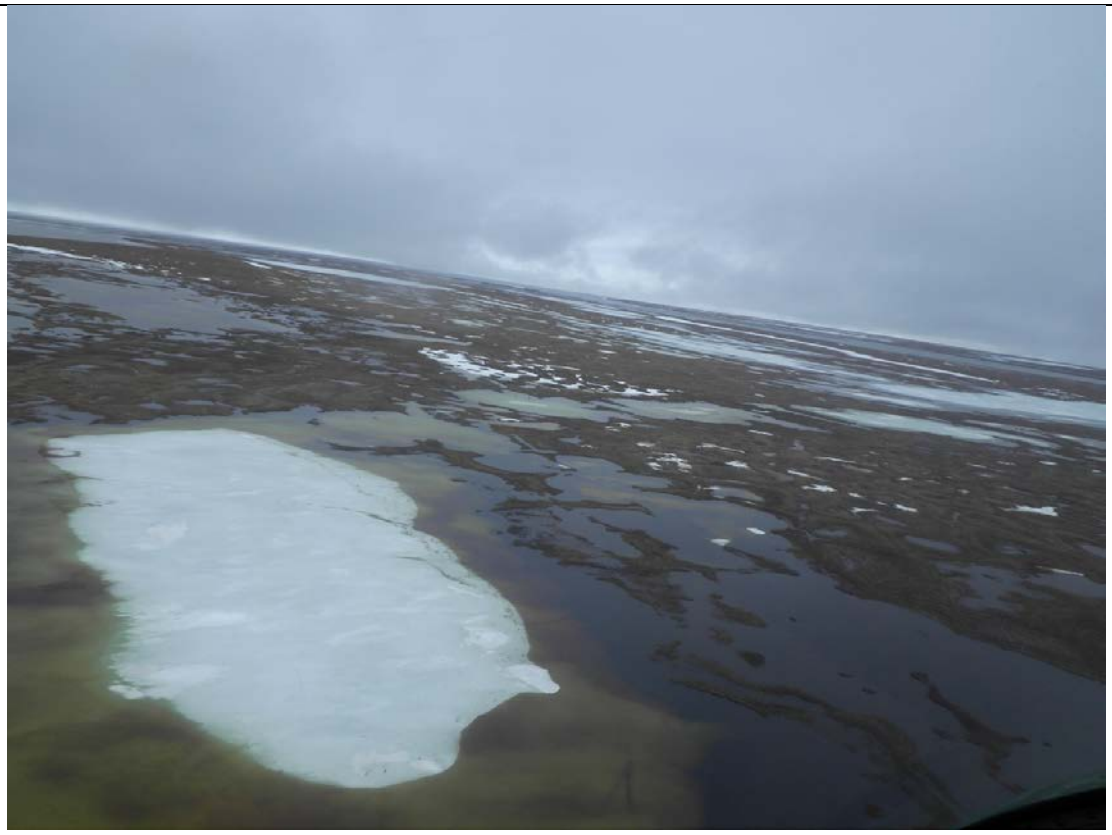


Photo 3: Aerial view of FWR sites; June 7, 2014

Daily Field Report

Project Name:	2014 Colville River Delta Spring Breakup	**Date:**	**06/08/2014**
Project Number:	141450		
Submitted by:	Karen Brown		
Field Personnel:	Sloane Weidmann, Garrett Yager, Michael Ulmgren, Michael Townshend, Diana Lower, Karen Brown		
Subcontractor:	Pathfinder Aviation		
Morning Check-In:	0700	**Contact Person:**	Sara Eklund
Evening Check-In:	1800	**Contact Person:**	Sara Eklund

Wind:	**Temperature:**	**Sky:**
8 mph NE	38° F	Overcast

Health & Safety:

The morning toolbox safety meeting was conducted by Baker personnel. The discussion about helicopter safety highlighted passenger to pilot communication. During hot loading, only approach the helicopter after the pilot has given eye contact and a thumbs-up signal. State your intentions to the pilot prior to performing a task such as unloading gear from skids and ask questions whenever safety is a concern. When working on the road system and on pads, make sure high visibility PPE is being worn, be attentive to radio announcements, and communicate with operators when accessing facility pads to ensure it is safe to enter.

Summary of Events:

Baker personnel split into three crews. One crew completed a direct discharge measurement at the Nigliagvik. A delta wide gage run was performed by one crew and the remaining crew completed an erosion survey on the CD2 and CD4 roads.

Challenges:

None

Comments:

Water levels in the Colville River Delta and at the Umiat gage on the Colville River continue to decrease. Other than a minor high water scarp and runoff effects at delineators, no discernable erosion was observed on facility roads.

Planned for Next Field Day:

Field crew will continue to record water surface elevations throughout the monitoring area and inventory and pack gear.

Daily Photo(s)

Photo 1: Nigliagvik near discharge measurement site; June 8, 2014

Photo 2: Minor runoff erosion effects on CD2 Road; June 8, 2014

Photo 3: Erosion survey on CD2 Road; June 8, 2014

Daily Field Report

Project Name:	2014 Colville River Delta Spring Breakup	**Date:**	**06/09/2014**
Project Number:	141450		
Submitted by:	Karen Brown		
Field Personnel:	Sloane Weidmann, Garrett Yager, Michael Ulmgren, Michael Townshend, Diana Lower, Karen Brown		
Subcontractor:	Pathfinder Aviation		
Morning Check-In:	0700	**Contact Person:**	Sara Eklund
Evening Check-In:	1800	**Contact Person:**	Sara Eklund

Wind:	**Temperature:**	**Sky:**
10 mph NE	33° F	Overcast

Health & Safety:

The morning toolbox safety meeting was conducted by Baker personnel. Helicopter safety topics included wearing eye protection and redundant hearing protection, watching out for pinch points, pilot communication, and moving outside of the rotor arc to stage gear during hot loading and unloading. Slips and falls in mud and water were discussed. Crews should always use the buddy system and watch their footing. When walking and working in soft mud, make sure your foot is free before trying to take a step. Crews are continually making safety observations, verifying procedures, and stepping up proactive efforts to perform tasks safely.

Summary of Events:

Baker personnel cleaned and inventoried gear and prepared for storage or shipment. Water levels on gages were read and surveys were performed as necessary. Time lapse cameras were retrieved from the Niglig Channel and Colville River.

Challenges:

None

Comments:

Water levels in the Colville River Delta and at the Umiat gage on the Colville River continue to decrease. All river channels are ice free with some snow and a few stranded ice floes on the banks. Extensive mud flats and sand bars are appearing in the channels.

Planned for Next Field Day:

No further work in Colville River Delta is planned. All crew members will demobilize to Anchorage on Tuesday 6/10/2014.

Daily Photo(s)

Photo 1: Conducting surveys at G38; June 9, 2014

Photo 2: Gage G38-A on the Nigliagvik; June 9, 2014.

Photo 3: Colville River adjacent to the Sakoonang Channel, looking upstream; June 9, 2014

Photo 4: Nigliq Channel, looking upstream; June 9, 2014.