

Susitna-Watana Hydroelectric Project Document

ARLIS Uniform Cover Page

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Susitna-Watana Hydroelectric Project (FERC No. 14241)

2012 Susitna River Water Temperature and Meteorological Field Study

Appendix A

Prepared for

Alaska Energy Authority



Prepared by

URS Corporation

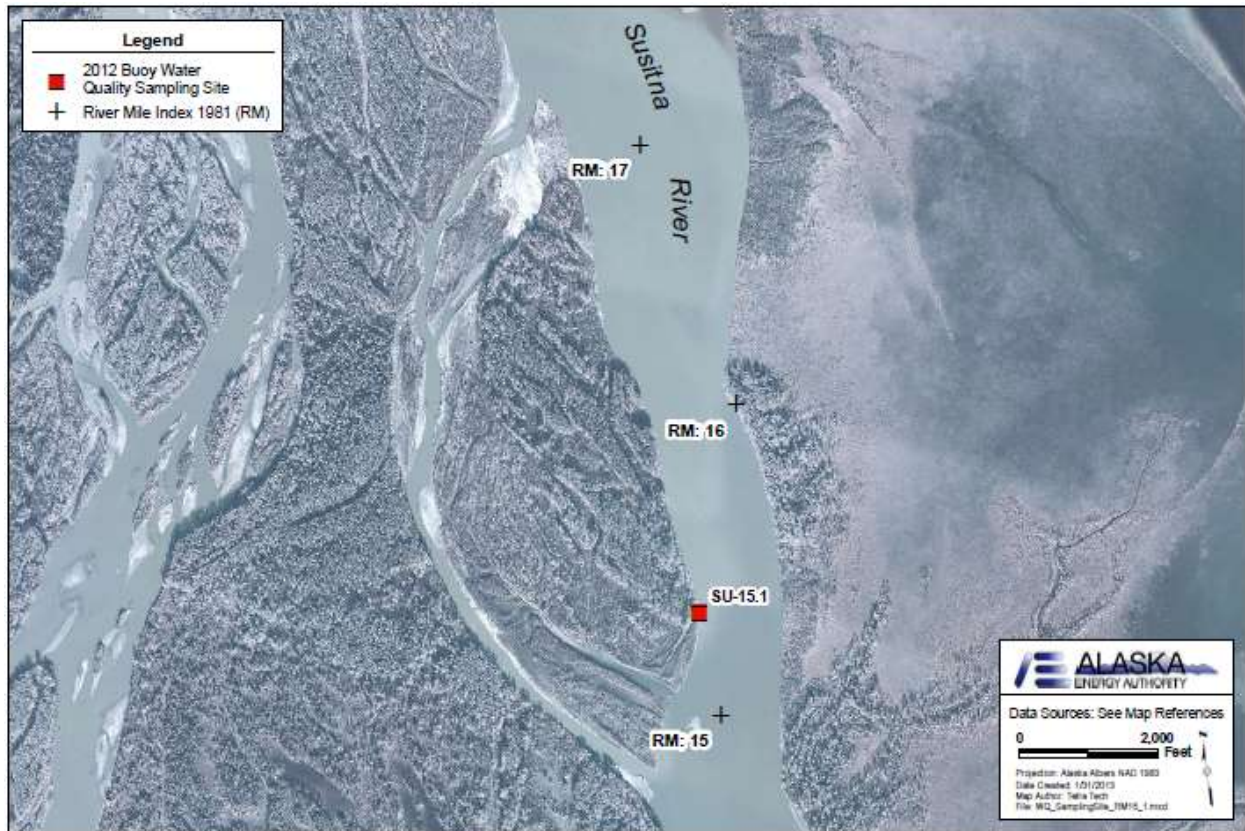
Tetra Tech Inc.

February 2013

APPENDIX A: PHOTOGRAPHS AND SITE INFORMATION

RM 15.1 – Susitna above Alexander Creek (SU-15.1)

NAD 83 Coordinates: 61.43909° N, 150.48512° W



2012 temperature sampling site (Map of Site 15.1- Susitna above Alexander Creek)

Buoy Mounted Thermistor String

Deployed: July 27, 2012 @ 12:51 ADT

Deployment Location: Approximately 75 feet from the RB (right bank of the river looking downstream), along eddy fence in approximately 10 feet of water. The anchor to buoy cable line length is 20 feet.

S/N	Depth (distance from buoy)
10174174	2 feet
10174175	5 feet
10174172	10 feet
10174173	17 feet

Station Notes: The buoy is deployed approximately 800 feet upriver of the proposed location due to an absence of anchoring trees or rocks. The system is anchored to shore with a cable, looped around a cottonwood tree and secured with cable clamps. The river gradient is quite low through this reach and eddy currents are not as obvious as locations upriver. A faint salty odor was observed emanating from the wake of the boat suggesting potential salt intrusion from Cook Inlet.



Buoy at RM 15.1 - Susitna above Alexander Creek

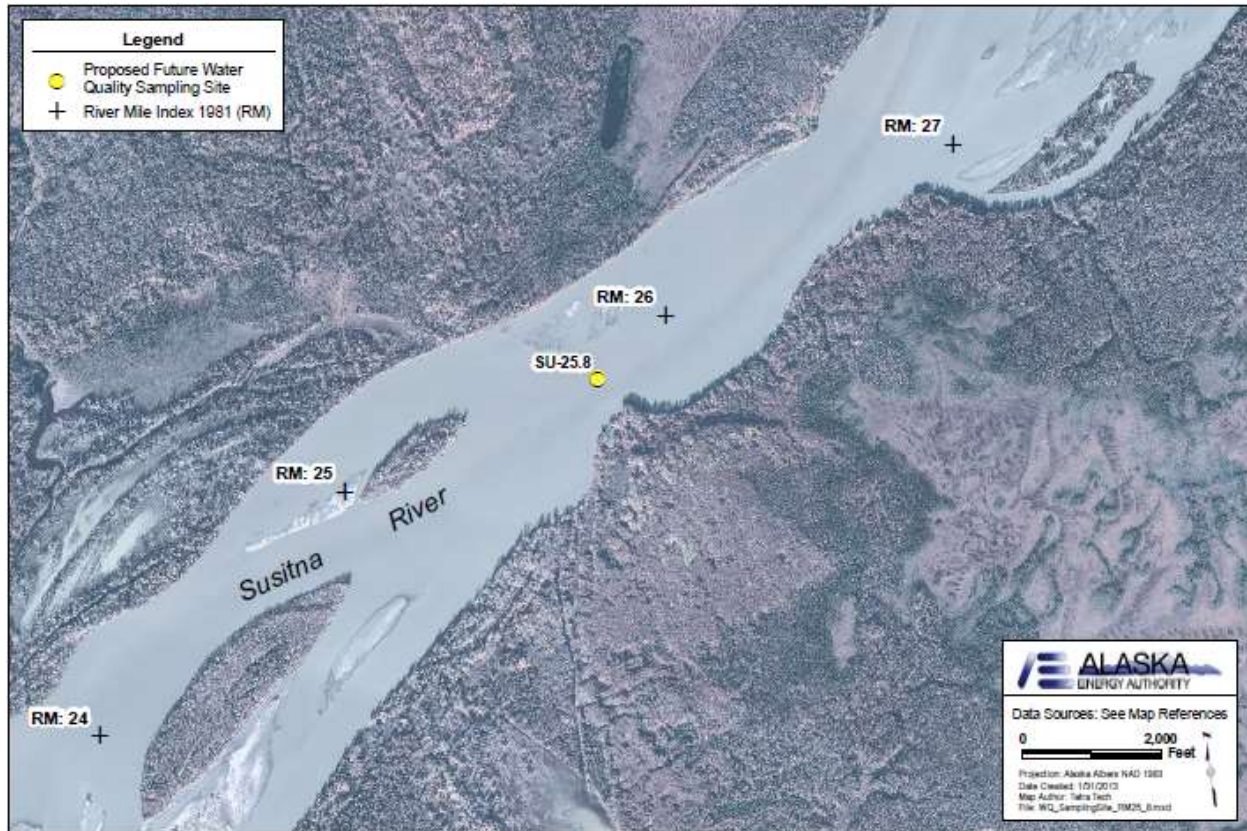
Permanent Thermistor Installation

NOT INSTALLED

Pipe mounting infrastructure is absent along the lower reaches of the river. Highly eroded and unstable banks eliminate trees as a potential mounting location. Near shore water is also very shallow requiring a substantial length of cable housing to be required. This type of installation would be susceptible to equipment loss during ice break up.

RM 25.8 – Susitna River at Susitna Station (SU-25.8)

NAD 83 Coordinates: 61.5454° N, 150.516° W



2012 temperature sampling site (Map of RM 25.8 Site - Susitna River at Susitna Station)

Buoy Mounted Thermistor String

NOT INSTALLED

The anchor-and-buoy installation method is not feasible at this location. Swift current from around the point presented a boating hazard and safe entry into the proposed area was compromised, as well, retrieval of the monitoring equipment was prohibitive. Establishing apparatus for bank installations and for the buoy system was not possible given conditions observed once reaching the site. Alternate equipment for deployment of the temperature probes might include a larger buoy that maintains a position above the water surface. Preliminary depth readings at the site showed the area was deep (~36 feet). The bank at the point was high (~20 feet) and unstable and access to an anchoring point (tree) from the river bank was unsafe. Access appeared to also be an issue from any point other than directly from the river.

If the monitoring location is deemed crucial to the 2013-2014 baseline water quality study, an alternative buoy system would be required here. Alternatively, the site could be moved up or downstream at a safer and more accessible location for continuous monitoring equipment installation.



Proposed location for RM 25.8 – Susitna River at Susitna Station

Permanent Thermistor Installation

NOT INSTALLED

If the location is deemed crucial to the 2013-2014 baseline water quality study, an alternate and more expensive pipe system would be required here. Alternatively, the site could be moved up or downstream at a safer and more accessible location for continuous monitoring equipment installation.

RM 28.0 – Yentna River (YE-28.0)

NAD 83 Coordinates: 61.58761° N, 150.48311° W



2012 temperature sampling site (Map of Site 28.0- Yentna River)

Buoy Mounted Thermistor String

Deployed: July 27, 2012 @ 11:33ADT

Deployment Location: Approximately 40 feet from the LB (left bank of the river looking downstream) of the main branch, along eddy fence in approximately 9 feet of water. The anchor to buoy cable line is 25 feet.

S/N	Depth (distance from buoy)
10174200	2 feet
10174201	7 feet
10174202	15 feet
10174199	23 feet

Station Notes: The main branch of the Yentna River in this reach appears to have migrated since the 1980s study on which the proposed location was based on. Water velocities flowing through the proposed location were quite low and the depth at the time of the site visit was likely less than 4 feet and will likely be dry during low flow. The proposed location was not navigable by boat (too shallow), so deployment at the proposed location would have to have occurred by hand from the shore. Additionally, the river bed was very soft, saturated fine sand and the anchor would have likely sunk and become lodged in the sand.

The actual installation location was chosen to be in the current main channel of the Yentna River upstream of the confluence with the Susitna River (See Figure 5.3). The system is anchored to shore with a cable, looped around a cottonwood tree and secured with cable clamps.



Buoy off the LB of Main Channel at RM 28.0 – Yentna River

Permanent Thermistor Installation

NOT INSTALLED

Pipe mounting infrastructure was absent along the lower reaches of the river. Highly eroded and unstable banks eliminate trees as a potential mounting location. Near shore water was also very shallow which would have required a substantial length of housing. This type of installation would have been susceptible to equipment loss during ice break up.

RM 29.5 – Susitna above Yentna River (SU-29.5)

NAD 83 Coordinates: 61.57597° N, 150.42702° W



2012 temperature sampling site (Map of Site 29.5-Susitna above Yentna River)

Buoy Mounted Thermistor String

Deployed: July 27, 2012 @ 10:05 ADT

Deployment Location: Approximately 50 feet from the RB, along eddy fence in approximately 9 feet of water. The anchor to buoy cable line length is 20 feet.

S/N	Depth (distance from buoy)
10174185	2 feet
10174187	8 feet
10174186	16 feet
10174188	18 feet

Station Notes: The buoy was deployed in the same vicinity as the proposed location. The system was anchored to shore with a cable, looped around a cottonwood tree and secured with cable clamps. The river gradient is quite low through this reach and eddy currents were not as obvious as locations upriver.



Buoy off LB at RM 29.5 – Susitna above Yentna River

Permanent Thermistor Installation

NOT INSTALLED

Pipe mounting infrastructure was absent along the lower reaches of the river. Highly eroded and unstable banks eliminate trees as a potential mounting location. Near shore water was also very shallow which would require a substantial length of housing. This type of installation would be susceptible to equipment loss during ice break up.

RM 40.6 – Deshka River (DE-40.6)

NAD 83 Coordinates: 61.70949° N, 150.32486° W



2012 temperature sampling site (Map of Site RM 40.6- Deshka River)

Buoy Mounted Thermistor String

Deployed: July 27, 2012 @ 14:40 ADT

Deployment Location: Mid-channel, 10 feet off the left bank side of the float plane runway in approximately 10 feet of water. The anchor to buoy cable line length is 12 feet.

S/N	Depth (distance from buoy)
10174274	2 feet
10174277	5.5 feet
10174275	8.5 feet
10174276	10 feet

Station Notes: The buoy was deployed at the proposed location. The site is a popular recreational fishing spot with frequent boat and plane traffic. Water velocities were quite low. The buoy was deployed without an anchor line as it would provide an obstacle for boats and a target for vandalism. River current at this location was likely not strong enough to move the anchor downstream.



Buoy off LB at RM 40.6 in the Deshka River

Permanent Thermistor Installation

NOT INSTALLED

A bank-mounted permanent station was difficult to install at this location due to private property and high traffic volume in the summer as well as a lack of mounting infrastructure.

A secondary method would be to use existing dock infrastructures to vertically mount a PVC or steel pipe housing. Permission would likely be required and much of the infrastructure would need to be pulled before winter.

RM 55.0 – Susitna (SU-55.0)

NAD 83 Coordinates: 61.86224° N, 150.18449° W



2012 temperature sampling site (Map of Site 55.0- Susitna)

Buoy Mounted Thermistor String

Deployed: July 27, 2012 @ 16:15ADT

Deployment Location: Approximately 20 feet off RB, at the eddy fence in approximately 7 feet of water. The anchor to buoy cable line length is 16 feet.

S/N	Depth (distance from buoy)
10174306	2 feet
10174303	6 feet
10174305	10 feet
10174304	14 feet

Station Notes: The proposed location was no longer accessible by boat. The channel in this reach appears to have changed since the 1980s study on which the proposed location was based on. An alternative location was chosen on the RB of the river. Water was extremely swift at the deployment location. The system was anchored to shore with a cable, looped around a clump of thick alder trees and secured with cable clamps.



Buoy Installed at RM 55.0- Susitna

Permanent Thermistor Installation

Deployed: July 27, 2012 @ 17:10 ADT

Pipe Length: 21 feet

S/N	Depth
10174210	15.5 feet
10174211	20.5 feet

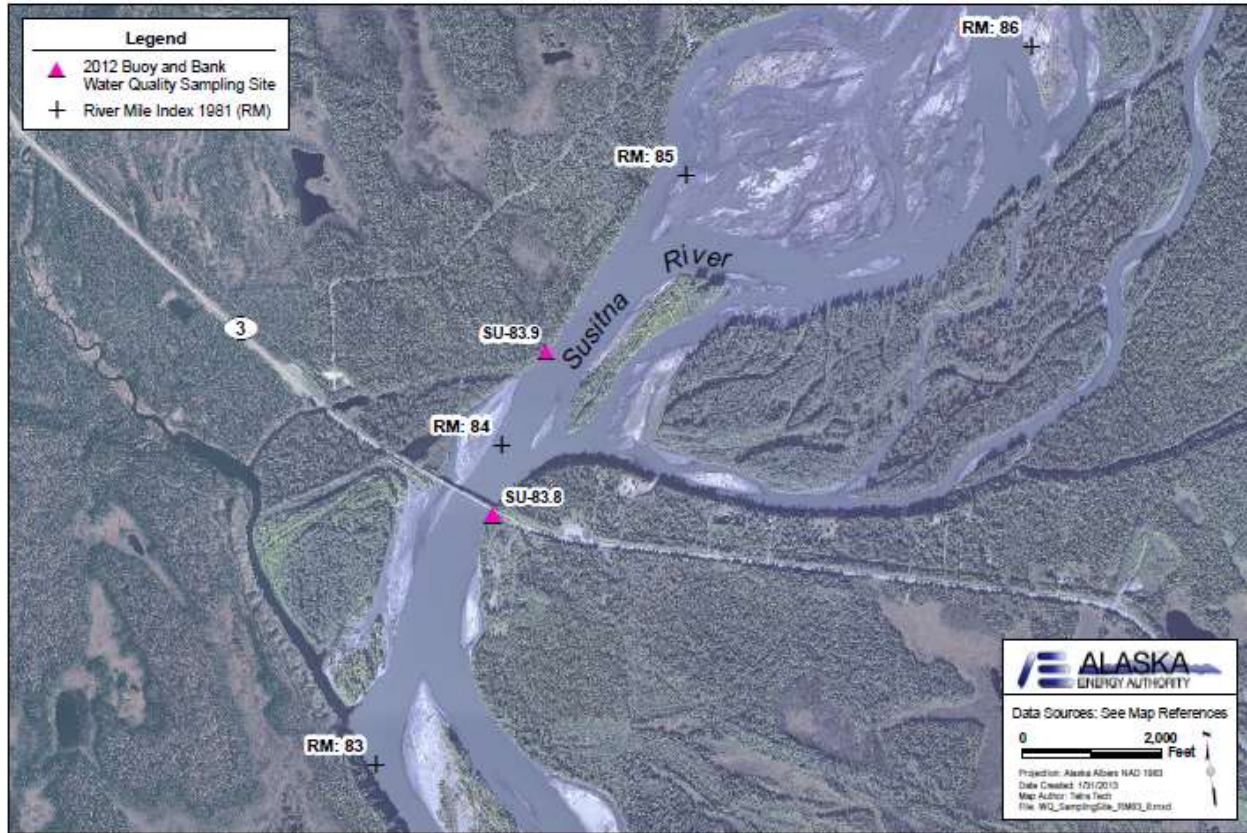
The housing pipe was fastened to a series of alder trees using two pipe brackets and lag bolts. The thermistors were attached to a cable using wire and cable clamps at separate intervals. The cable was then placed inside the pipe. One thermistor was attached to a loop at the end of the cable and the other thermistor was placed 1 foot above the end of the cable.



Pipe System Mounted at RM. 55.0 – Susitna

RM 83.8 – Susitna at Parks Highway East (SU-83.8)

NAD 83 Coordinates: 62.17484° N, 150.17323° W



2012 temperature sampling site (Map of Site 83.8- Susitna at Parks Highway East)

Buoy Mounted Thermistor String

Deployed: July 20, 2012 @ 14:45 ADT

Deployment Location: Approximately 50 feet from the LB, along eddy fence in approximately 4 feet of water. The anchor to buoy cable length is 8 feet.

S/N	Depth (distance from buoy)
10174236	2 feet
10174235	4 feet
10174234	6 feet

Station Notes: The buoy was deployed at the proposed location just south of the Parks Highway Bridge. The system was anchored to shore with a pipe clamp and lag bolts drilled into a boulder. The cable was looped around the pipe clamp and fastened with cable clamps.

August 28, 2012 – River was high, no buoy located, anchor stuck could not pull up. Bank mounted thermistor downloaded at 17:35 ADT.

September 28, 2012- Buoy system was pushed to bank, tangled in wood and debris. Pipe silted in bottom 7 feet. System was fixed and redeployed. All data downloads completed at 11:45 ADT.

October 16, 2012 – Downloaded at 11:00 ADT and removed summer buoy string with multiple data loggers. Replaced with winter, single data logger system (data logger # 10174234). Downloaded and extended pipe housing to 17 feet due to dropping water level. Pipe was found encased in frozen silt, and water level had dropped to six inches above the bottom of the pipe. Extended pipe 17 feet and increased thermistor cable length to 16.5 feet.



Buoy at RM 83.8 – Susitna at Parks Highway East

Permanent Thermistor Installation

Deployed: July 20, 2012 @ 13:30 ADT

Pipe Length: 14 feet, increased to 17 feet October 16, 2012.

SSN: 10174233

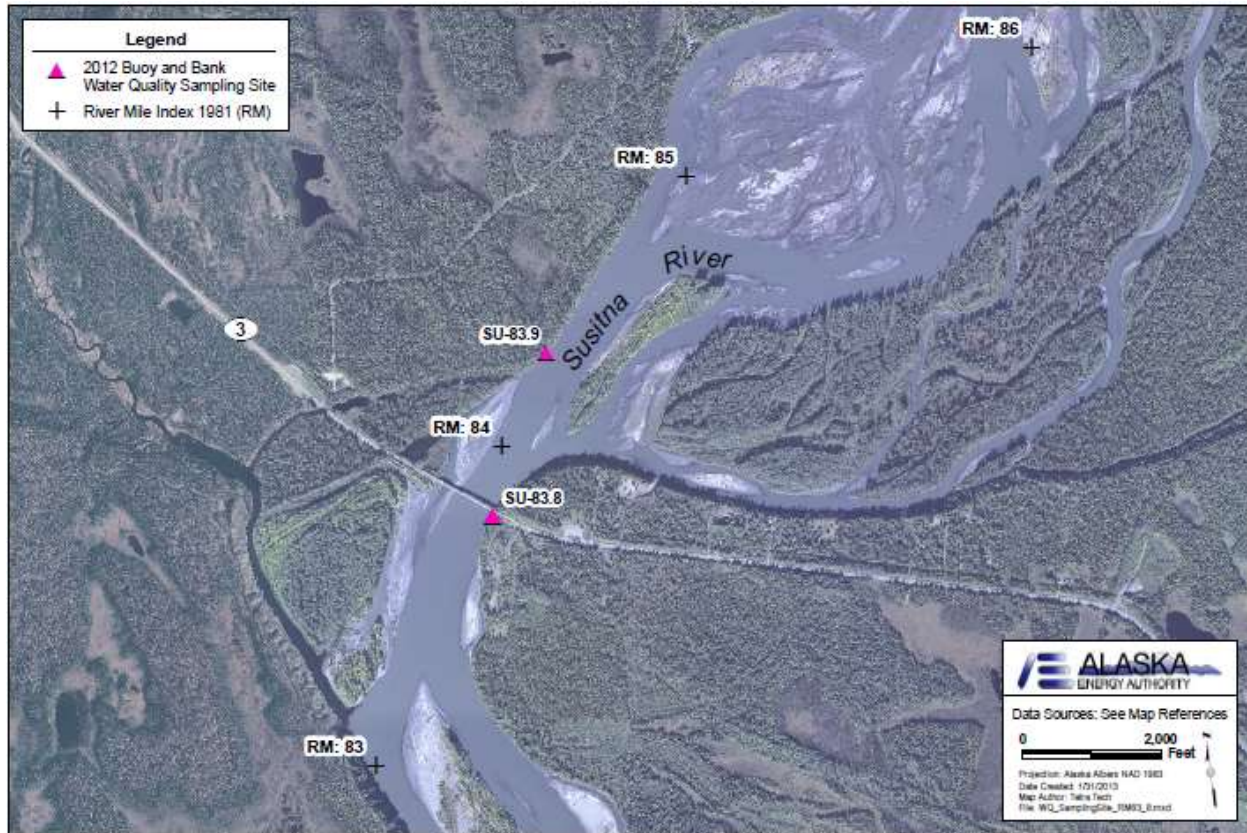
The housing pipe was fastened to a boulder using three pipe clamps and lag bolts. The pipe was mounted at an angle of approximately 30° on the left bank due south from the Parks Highway Bridge. The pipe houses 13 feet of cable (increased to 16.5 feet) with a thermistor attached to a loop at the end.



Pipe mounted at RM 83.8- Susitna at Parks Highway East

RM 83.9 – Susitna at Parks Highway West (SU-83.9)

NAD 83 Coordinates: 62.18112° N, 150.16794° W



2012 temperature sampling site (Map of Site 83.9- Susitna at Parks Highway West)

Buoy Mounted Thermistor String

Deployed: July 20, 2012 @ 15:15 ADT.

Deployment Location: Approximately 30 feet from the RB, along eddy fence in approximately 7 feet of water. Anchor to buoy cable length is 13 feet.

S/N	Depth (distance from buoy)
10174230	2 feet
10174229	4 feet
10174231	6 feet

Station Notes: The buoy was deployed at the approximate proposed location just north of the Parks Highway Bridge, and was anchored to shore with a cable, looped around a pipe clamp and secured with cable clamps.

August 28, 2012 – Downloaded both pipe and buoy systems at 17:50 ADT

September 28, 2012 – Buoy was pushed to bank, tidbits still in 1 foot of water. Data downloads complete at 12:30 ADT.

October 16, 2012 – Downloaded at 15:15 ADT and removed summer buoy string with multiple data loggers. Replaced with winter, single data logger system (data logger # 10174230). Downloaded pipe system at 15:15 ADT.



Buoy System at RM 83.9- Susitna at Parks Highway West

Permanent Thermistor Installation

Deployed: July 20, 2012 @ 14:45:00 ADT.

Pipe Length: 10 feet.

SSN: 10174232

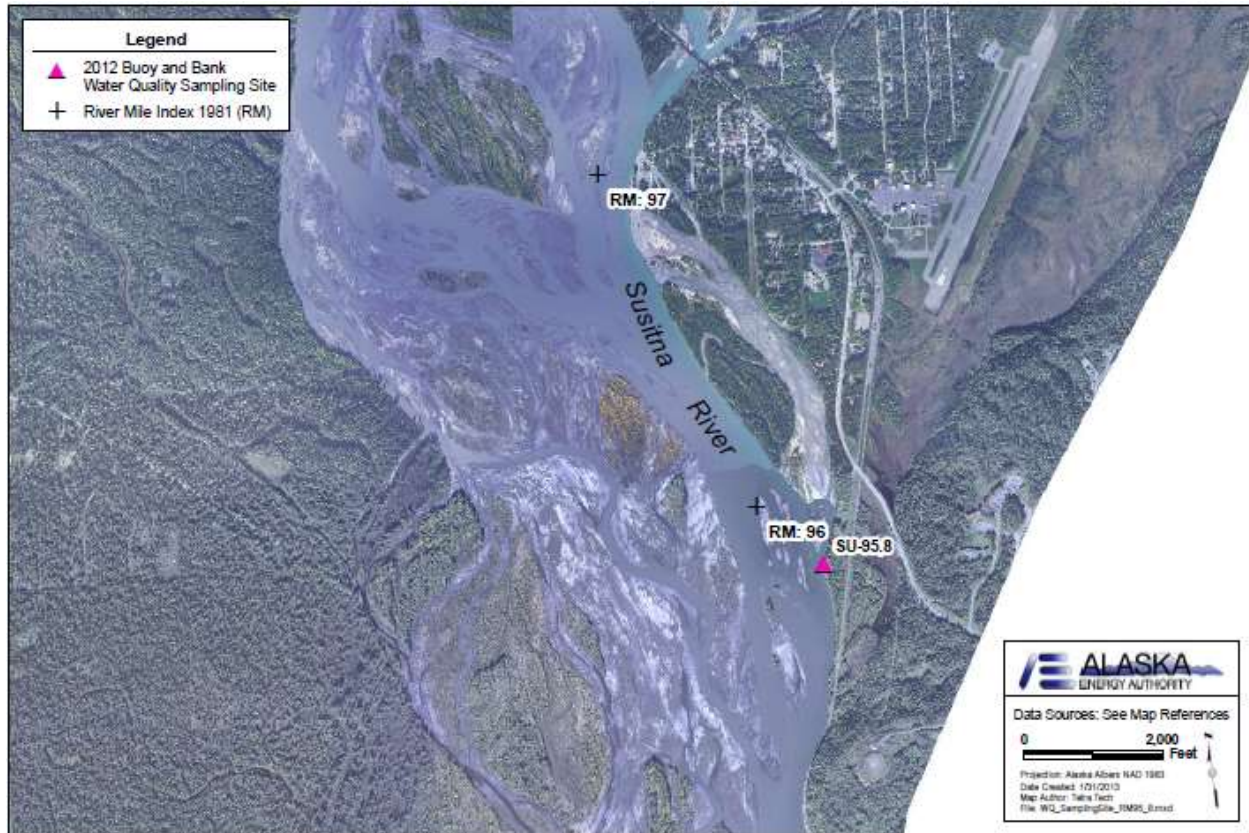
The housing pipe was fastened to a boulder using three pipe brackets and lag bolts. The pipe was mounted at an angle of approximately 30° on the right bank due north from the Parks Highway Bridge. The pipe houses 9 feet of cable with a thermistor attached to a loop at the end.



Pipe System at RM 83.9- Susitna at Parks Highway West

RM 95.8 – Alternative to LRX 1, RM 97 (SU-97.0)

NAD 83 Coordinates: 62.30637° N, 150.10876° W



2012 temperature sampling site (Map of Site 95.8- Alternative to LRX 1)

Buoy Mounted Thermistor String

Deployed: July 20, 2012 @ 17:50

Deployment Location: Approximately 40 feet from the LB, along eddy fence in approximately 8 feet of water. Anchor to buoy cable length is 14 feet.

S/N	Depth (distance from buoy)
10174245	8 feet
10174246	10 feet
10174244	12 feet

Station Notes: The buoy was deployed approximately 1.2 miles downriver of the proposed location due to property access issues. The system was anchored to the shore of the left bank with a cable, looped around a pipe bracket and secured with cable clamps. The pipe bracket was drilled into a rock with lag bolts.

August 28, 2012 – Buoy and anchor stuck and buoy missing. No download of buoy system. Pipe system was in good condition and thermistor was downloaded.

September 28, 2012 – Missing buoy and cable to shore was covered with debris. Used wench to free system from debris. Data loggers were found to be in good condition and in place and were downloaded. Pipe system was found to be in good condition and was also downloaded.

October 23, 2012 – Helicopter fly by only. Cable for buoy system was visible but no buoy visible (maybe under ice). Pipe was present but bent.



Buoy System at RM 95.8- Alternative to LRX 1

Permanent Thermistor Installation

Deployed: July 20, 2012 @ 17:35 ADT

Pipe Length: 13 feet 5 inches

SSN: 10174243

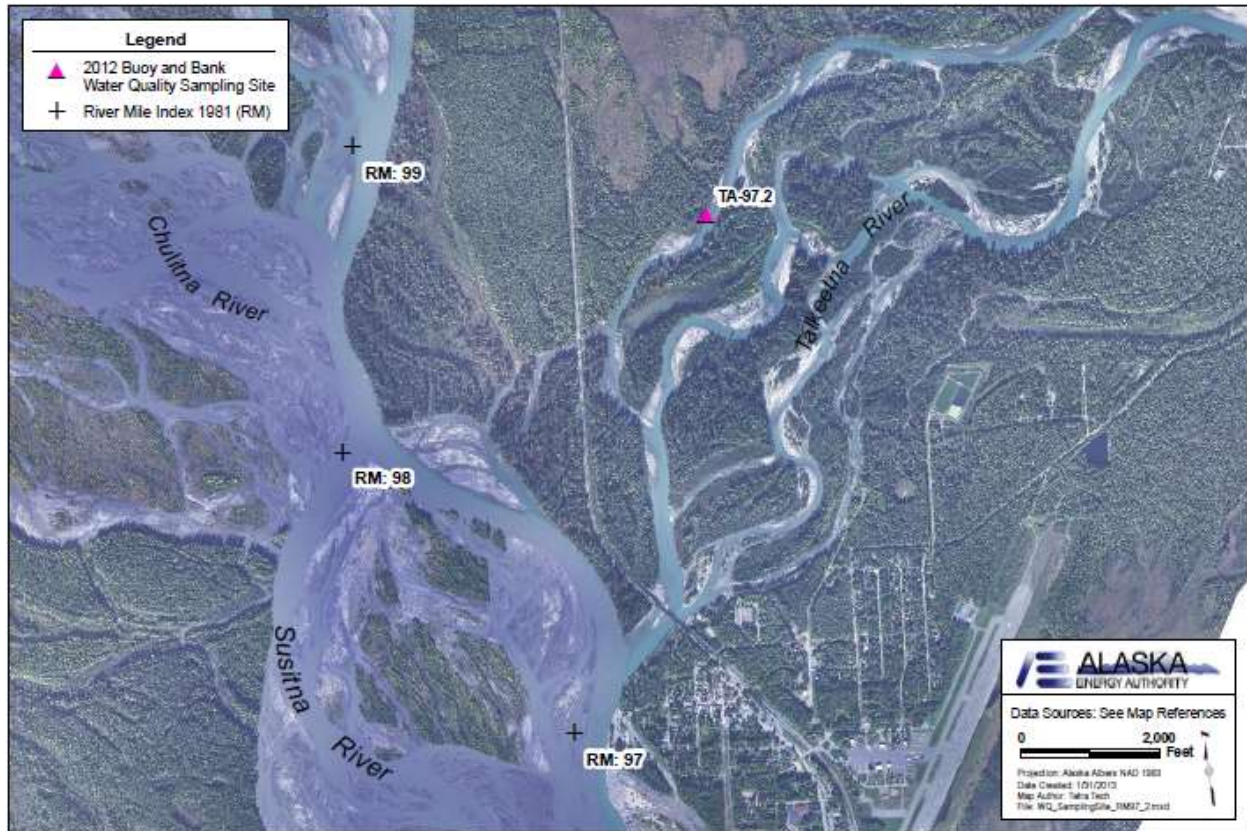
The housing pipe was fastened to a boulder using three pipe brackets and lag bolts. The pipe was mounted at an angle of approximately 30° on the left bank. The pipe houses 12 feet of cable with a thermistor attached to a loop at the end.



Pipe Mounted at RM 95.8 an Alternate Location for RM 97.0

RM 97.2 – Talkeetna River (TA – 97.2)

NAD 83 Coordinates: 62.34241068° N, 150.11216742° W



2012 temperature sampling site (Map of Site 97.2- Talkeetna River)

Buoy Mounted Thermistor String

Deployed: July 21, 2012 @ 10:40 ADT

Deployment Location: Approximately 20 feet from the RB, along eddy fence in approximately 5-6 feet of water.

S/N	Depth (distance from buoy)
10174239	1.5 feet
10174238	3 feet
10174240	4.5 feet

Station Notes: The buoy was deployed a few hundred feet upriver of the proposed location due to an absence of anchoring trees or rocks. The system was anchored to shore with a cable, looped around a tree and secured with cable clamps.

August 28, 2012 – Talkeetna River very high (>5 feet rise), and buoy and pipe system under water. Unable to locate with high flow and no download.

September 28, 2012 – System was gone, bank washed out buoy and pipe installation gone. Bank cut 10 plus feet.

October 15, 2012 – Installed winter buoy system at location of original deployment.



Buoy and Pipe System at RM 97.2 – Talkeetna River

Permanent Thermistor Installation

Deployed: July 21, 2012 @ 10:15

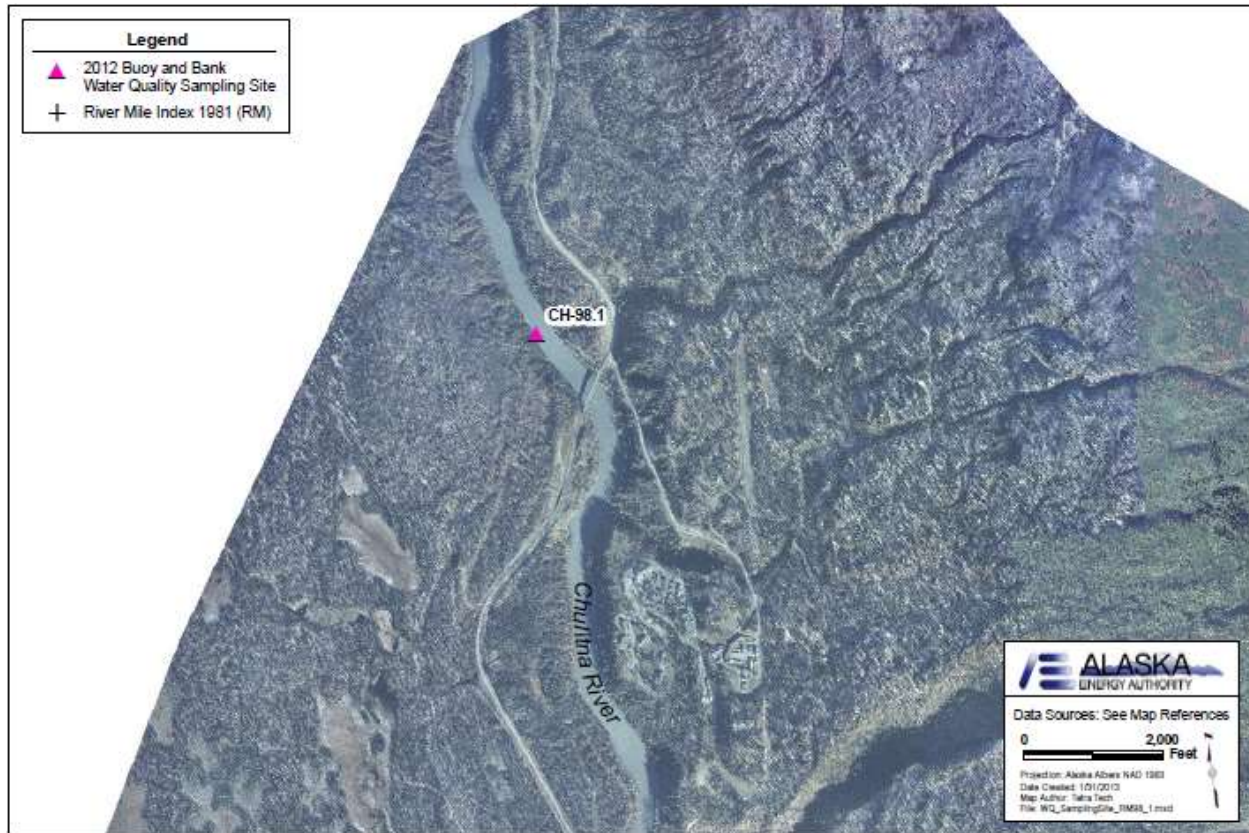
Pipe Length: 9 feet 5 inches

SSN: not available – Pipe system was lost during flooding and not redeployed

The housing pipe was fastened to a downed tree with three pipe brackets and lag bolts. The pipe was mounted at an angle of approximately 60° on the left bank. The pipe houses 9.5 feet of cable with a thermistor attached to a loop at the end.

RM 98.1 – Chulitna River (CH-98.1)

NAD 83 Coordinates: 62.56765113° N, 150.2379961° W



2012 temperature sampling site (Map of Site 98.1 – Chulitna River)

Buoy Mounted Thermistor String

Deployed: July 25, 2012 @ 10:54 ADT

Deployment Location: Approximately 50 feet from the RB, along eddy fence in approximately 14 feet of water. Depth of water at deployment not recorded. The buoy to anchor cable length is 31 feet.

S/N	Depth (distance from buoy)
10174254	2 feet
10174228	9 feet
10174257	16 feet
10174182	23 feet
10174209	29 feet

Station Notes: The buoy was deployed approximately .4 miles downriver of the proposed location, just north of the Parks Highway Bridge due to an absence of anchoring trees or rocks, as well as property access issues. The system was anchored to shore with a cable, looped around a boulder and secured with cable clamps. The water level at this site in the Chulitna River is deep compared to sites on the Susitna.

October 17, 2012 – Both systems downloaded at 13:15 ADT. Sensor 10174257 is missing and likely lost. Buoy system had moved up against shore due to flooding. Upper thermistor in pipe was out of water and incased in frozen silt. Lower thermistor was in approx. 1 foot of water. Additional 7 foot section of pipe added to pipe setup (20 inches) and cable lengthened to 18 feet). Summer buoy system was removed and replaced with single data logger winter system.



Buoy at RM 98.1 – Chulitna River

Permanent Thermistor Installation

Deployed: July 25, 2012 @ 10:45 ADT

Pipe Length: 14 feet

S/N	Depth
10174258	5 feet
10174181	9 feet
10174180	14 feet

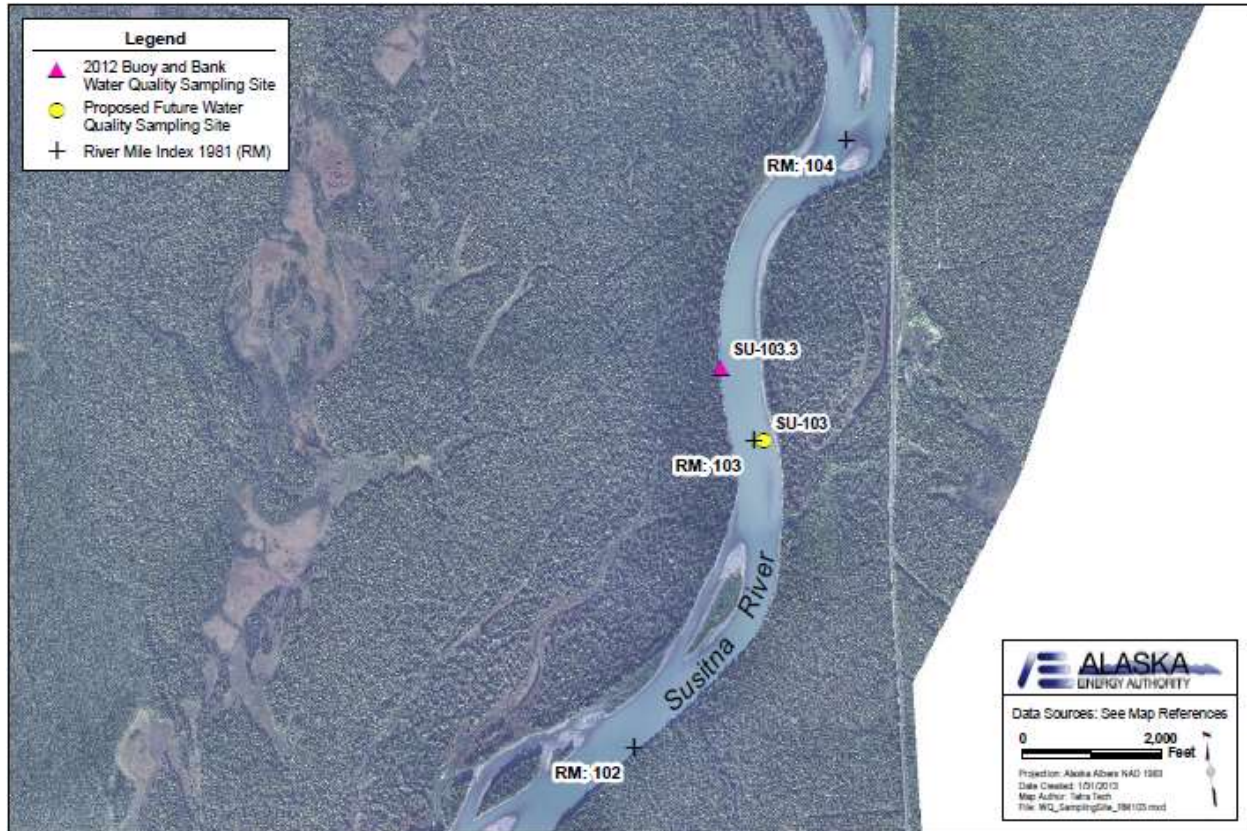
The housing pipe was fastened to a rock with three pipe brackets and lag bolts slightly upstream of the buoy. The pipe houses 13 feet of cable with thermistors attached to the cable along intervals. One thermistor was mounted to the cap at the end of the pipe in the river. The top two thermistors have been exposed to air over the course of this study- use 4180 for the permanent record.



Pipe Mounted at RM 98.1 – Chulitna River

RM 103.0 – Talkeetna (SU-103.0)

NAD 83 Coordinates: 62.394299° N, 150.134° W



2012 temperature sampling site (Map of Site 103.0- Talkeetna)

Buoy Mounted Thermistor String

NOT INSTALLED

Station Notes: A buoy mounted installation, positioned off the left bank at the Talkeetna site, was unable to be installed due to shallow water that may run dry during periods of low water levels.

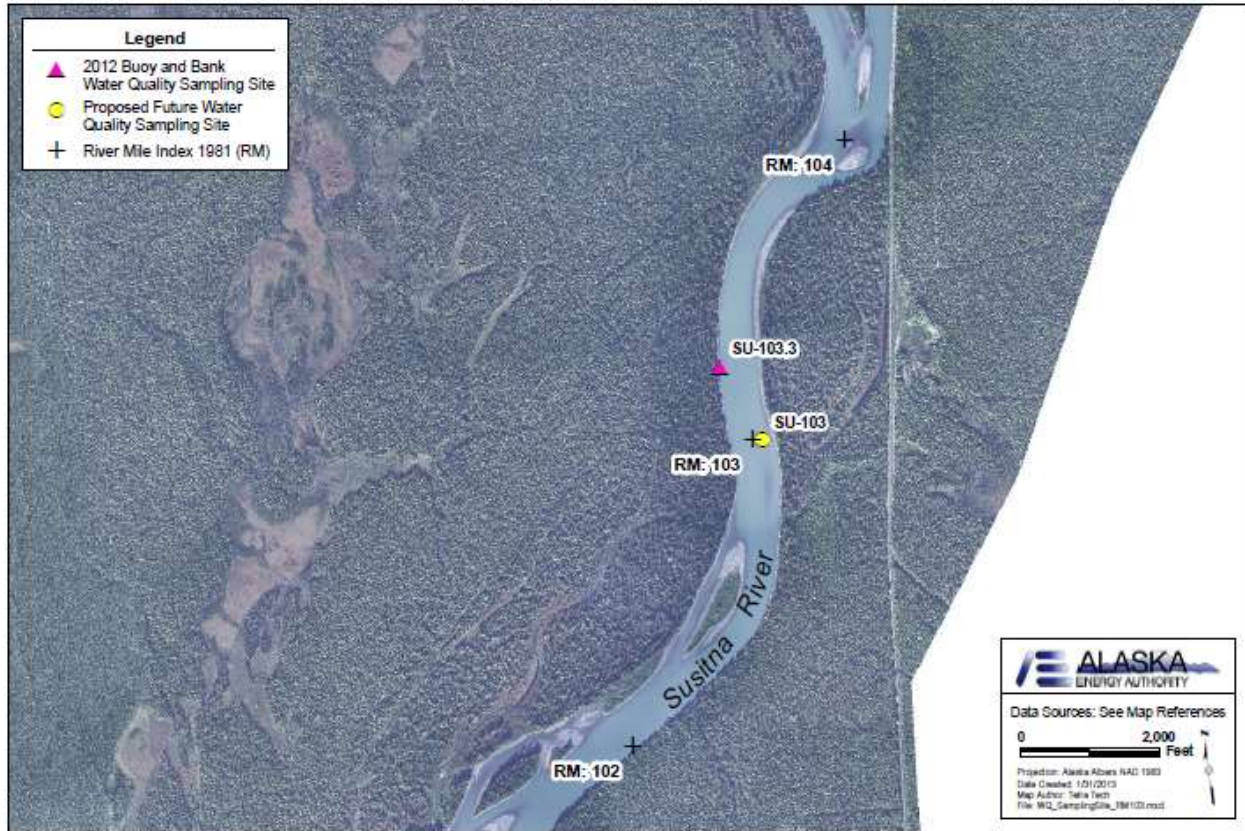
Permanent Thermistor Installation

NOT INSTALLED

Pipe mounting infrastructure was absent. The bank was very shallow, and there was not enough water for the thermistor to be covered year round; the small amount of water would freeze quickly.

RM 103.3 – Susitna River at Talkeetna (SU-103.3)

NAD 83 Coordinates: 62.39724° N, 150.13728° W



2012 temperature sampling site (Map of Site 103.3- Talkeetna)

Buoy Mounted Thermistor String

Deployed: July 21, 2012 @ 12:58 ADT

Deployment Location: Approximately 100 feet from the RB, along eddy fence in approximately 6 feet of water. Anchor to buoy cable length is 6.5 feet.

S/N	Depth (distance from buoy)
10174247	0.5 feet
10174250	2 feet
10174249	4 feet

Station Notes: The buoy was deployed at the proposed location. The system was anchored to shore with a cable, looped around a cottonwood tree and secured with cable clamps.

August 28, 2012 – All sensors downloaded at 16:20 ADT.

September 27, 2012 – Buoy was missing. Replaced buoy, system was still intact and thermistor data was downloaded at 17:45 ADT.

October 23, 2012 – Buoy system intact. Downloaded at 12:30 ADT and removed summer buoy string with multiple data loggers. Replaced with winter single data logger system (data logger # 10174249). Pipe system dry and data logger cable was frozen in pipe – could not remove for download. Left pipe in place.



Buoy at RM 103.3 – Talkeetna

Permanent Thermistor Installation

Deployed: July 21, 2012 @ 13:15 ADT

Pipe Length: 7 feet

SSN: 10174248

The housing pipe was fastened to a rock with three pipe brackets and lag bolts. The pipe houses 6.5 feet of cable with a thermistor attached to a loop at the end.

RM 113 – LRX 18 (SU-113)**NAD 83 Coordinates:** 62.52523486° N, 150.11444946° W

2012 temperature sampling site (Map of Site 113- LRX 18)

Buoy Mounted Thermistor String**Deployed:** July 21, 2012 @ 14:14ADT**Deployment Location:** Off the RB, along eddy fence in approximately 10 feet of water. Anchor to buoy cable length is 16 feet.

S/N	Depth (distance from buoy)
10174252	2 feet
10174253	7 feet
10174251	14 feet

Station Notes: The buoy was deployed near the proposed location. The system was anchored to shore with a cable, looped around a cottonwood tree and secured with cable clamps. A met station was observed on this site.**August 27, 2012** – Buoy system was in good condition and was downloaded at 16:45 ADT

September 27, 2012 – Buoy system came loose from anchor during flood but was found dry on bank down river and retrieved. Data logger 252 was missing remaining loggers were downloaded. System was not replaced due to lack of good anchor point.



Buoy System Installed at RM. 113- LRX 18

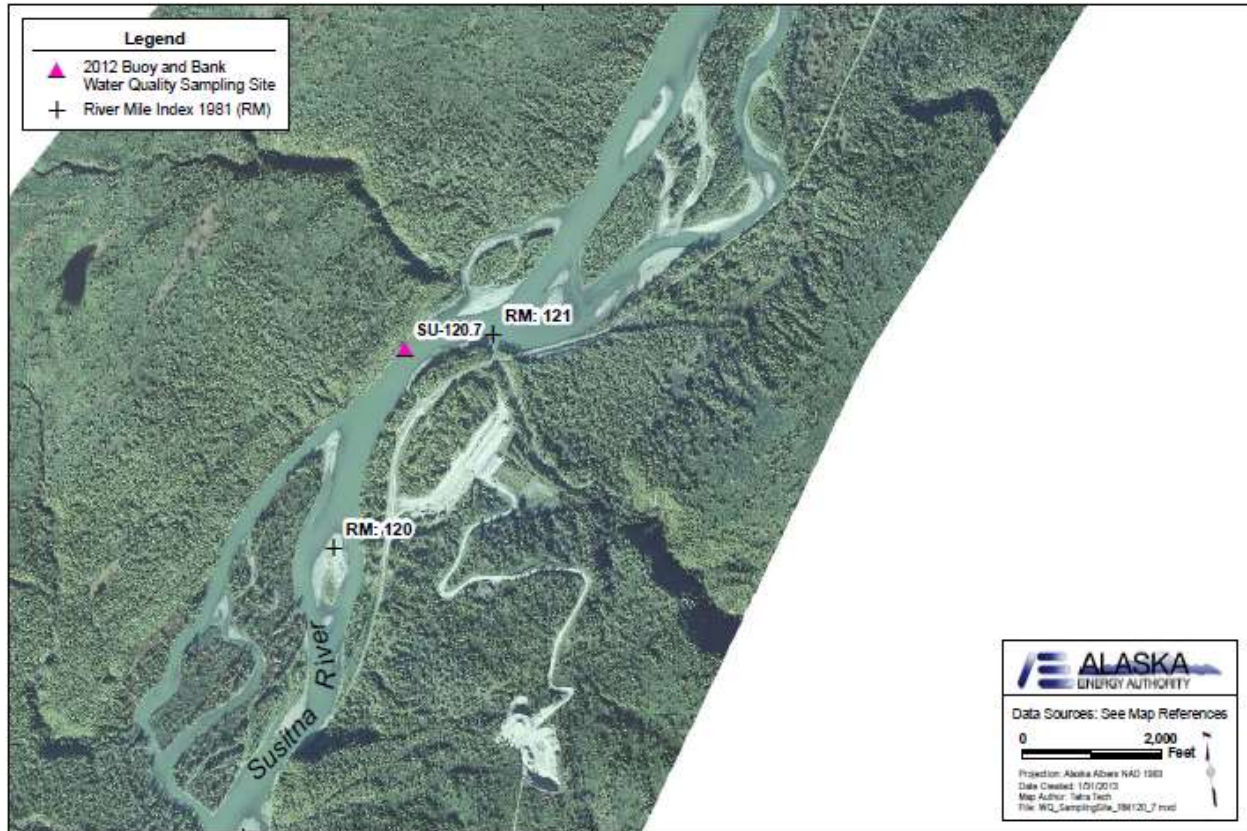
Permanent Thermistor Installation

NOT INSTALLED

Pipe mounting infrastructure was absent. Shore was very shallow and gravelly with very few downed trees that would be safe for pipe attachment. This type of installation would be susceptible to equipment loss during ice break up.

RM 120.7 – Curry Fishwheel Camp (SU-120.7)

NAD 83 Coordinates: 62.61782355° N, 150.01364945° W



2012 temperature sampling site (Map of Site 120.7- Curry Fishwheel Camp)

Buoy Mounted Thermistor String

Deployed: July 22, 2012 @ 15:10 ADT

Deployment Location: Approximately 40 feet from the RB, along eddy fence in approximately 8 feet of water. Anchor to buoy cable line is 21.5 feet.

S/N	Depth (distance from buoy)
10174266	2 feet
10174267	11 feet
10174269	19 feet

Station Notes: The buoy was deployed near the proposed location upriver of the Curry Fishwheel Camp on the right bank. The system was anchored to shore with a cable, looped around a pipe bracket and attached with cable clamps. The pipe brackets are drilled into shale and held by lag bolts. The current at this site was fairly quick.

August 27, 2012 – Downloaded thermistors at 16:30 ADT.

September 27, 2012 – Buoy was missing and was replaced. System still intact, tidbits downloaded at 16:45 ADT, but missing data for 10174269. Pipe downloaded.



Buoy System Installed at RM 120.7- Up-River of Curry Fishwheel Camp

Permanent Thermistor Installation

Deployed: July 22, 2012 @ 13:50 ADT

Pipe Length: 14 feet

SSN: 10174268

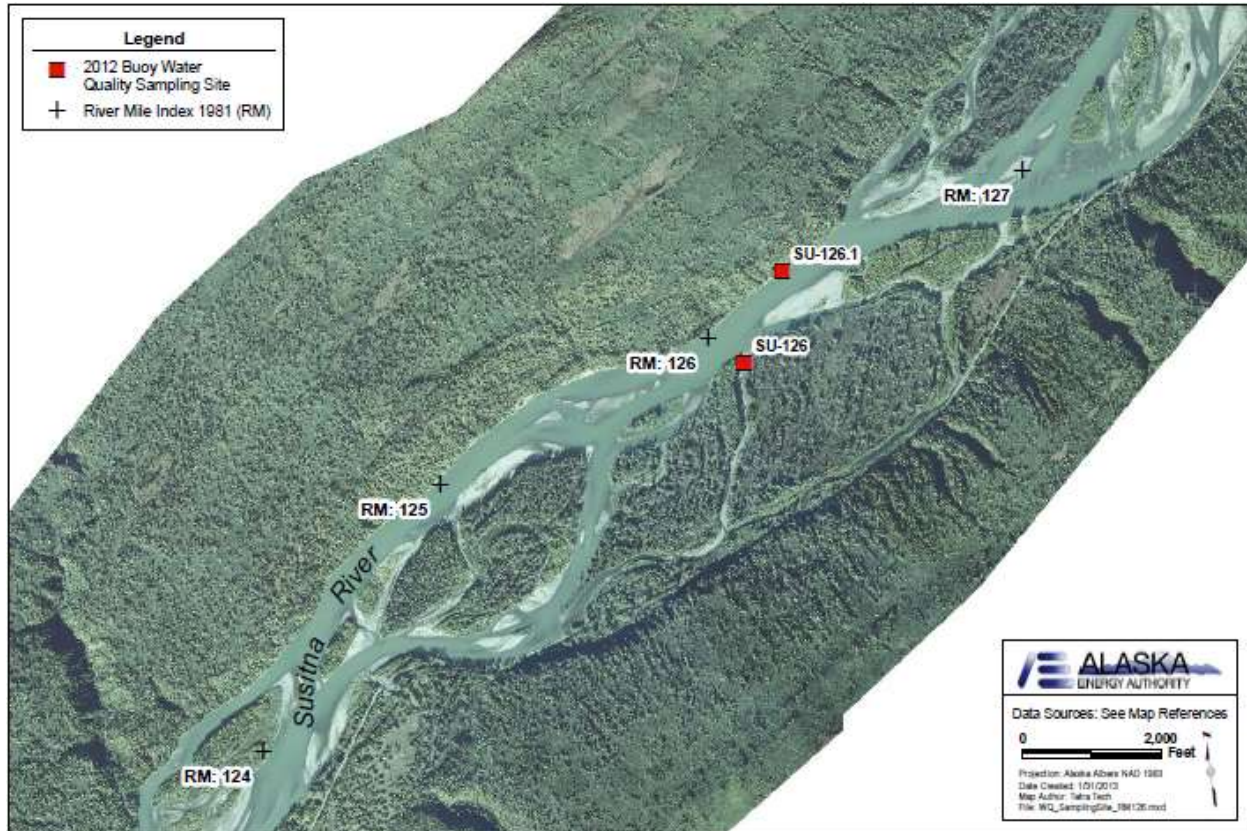
The housing pipe was fastened to shale with two pipe clamps and lag bolts slightly upstream of the buoy. The pipe houses 13 feet of cable with a thermistor attached by zip ties to a loop at the end. The thermistor was mounted to the cap at the end of the pipe in the river. The pipe was submerged 8 feet in the water at a 35° angle. The integrity of the shale is questionable; it may give way eventually.



RM 120.7 – Pipe Mounted at Curry Fishwheel Camp

RM 126.0 – Slough 8A (SU-126)

NAD 83 Coordinates: 62.67043° N, 149.90294° W



2012 temperature sampling site (Map of Site 126- Slough 8A)

Buoy Mounted Thermistor String

Deployed: July 23, 2012 @ 11:24 ADT

Deployment Location: Approximately 20 feet from the RB of the slough. Anchor to buoy cable length is 10 feet.

S/N	Depth (distance from buoy)
10174265	2 feet
10174264	5 feet
10174263	8 feet

Station Notes: The buoy was deployed near the proposed location off the right bank of slough 8A. The system was anchored to shore with a duck-billed anchor hammered into the sand, since there were no downed trees or rocks. The water level was shallow.

September 27, 2012 – Side slough, system was gone and bank cut out.

October 15, 2012 – Buoy with complete data logger string was found in downstream slough. System was retrieved and downloaded at 13:45 ADT.

October 23, 2012 – Helicopter flyby. The side channel where system was deployed was observed to be almost dry. No winter system deployed.

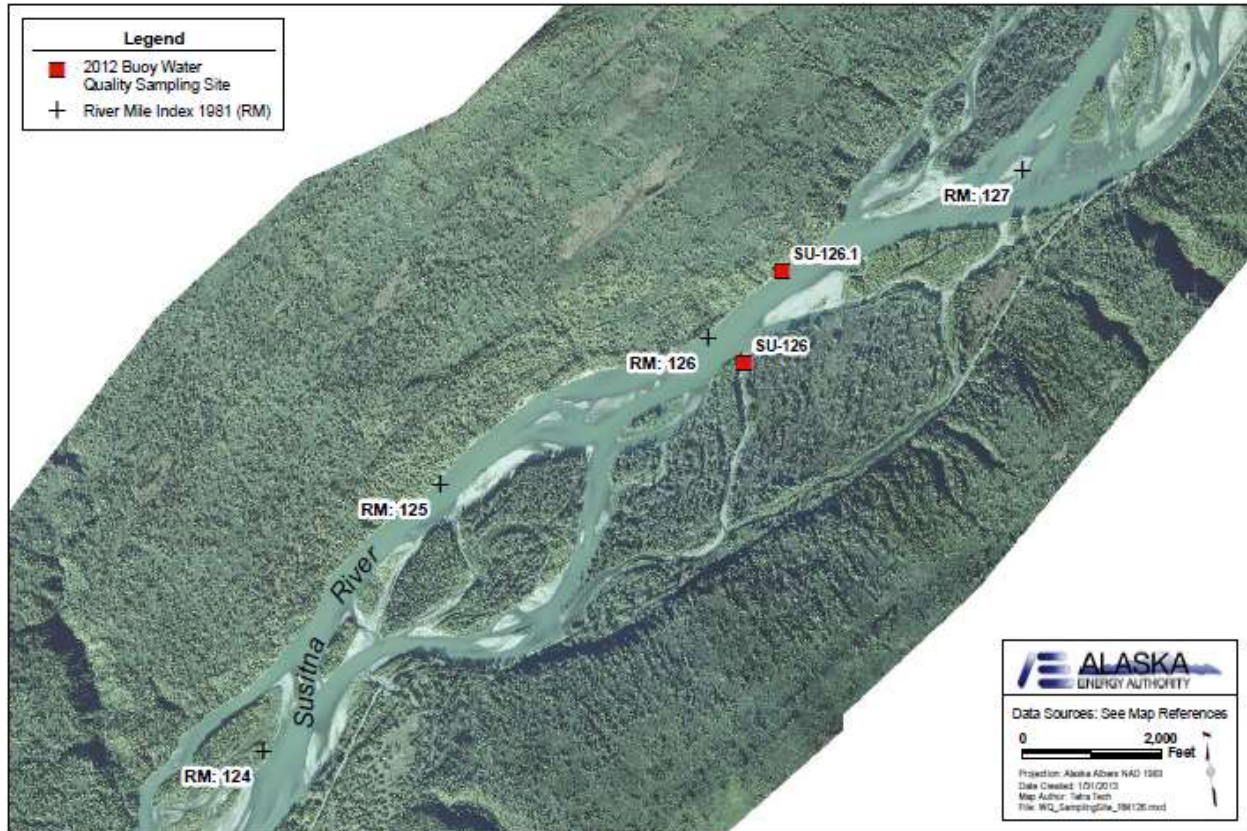


Buoy at RM 126.0 – Slough 8A

Permanent Thermistor Installation

NOT INSTALLED

No permanent system was installed at this location due to the lack of rocks and trees to anchor the pipe to, as well as the shallow water level in the slough which would easily ice over or run dry during periods of low flow.

RM 126.1 – LRX 29 (SU-126.1)**NAD 83 Coordinates:** 62. 6739170 ° N, 149.89915365° W

2012 temperature sampling site (Map of Site 126.1- LRX 29)

Buoy Mounted Thermistor String**Deployed:** July 22, 2012 @ 11:47ADT.**Deployment Location:** Off the LB, along eddy fence in approximately 7 feet of water.

S/N	Depth (distance from buoy)
10174217	2 feet
10174216	8 feet
10174218	14 feet

Station Notes: The buoy was deployed at the proposed river mile on the left bank (originally proposed to be right bank) due to an absence of anchoring trees or rocks. The system was anchored to shore with a cable, secured to a boulder with three pipe brackets and cable clamps.

August 27, 2012 – Downloaded system at 16:00 ADT. Buoy was missing.**September 27, 2012** – Replaced buoy and downloaded data loggers at 16:20 ADT.

October 22, 2012 – Buoy system intact. Downloaded at 11:15 ADT and removed summer buoy string with multiple data loggers. Replaced with winter, single data logger system (data logger # 10174218).



Buoy Install at RM 126- LRX 129

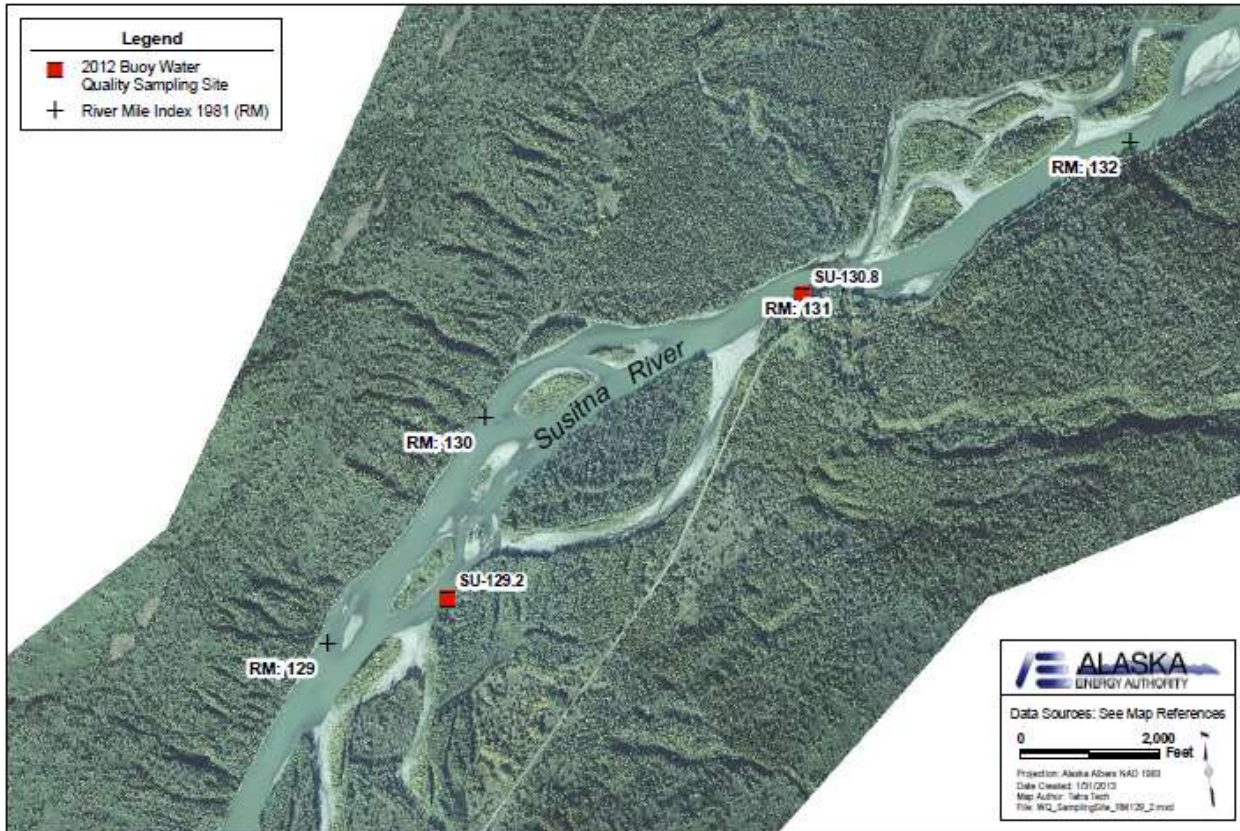
Permanent Thermistor Installation

NOT INSTALLED

Pipe mounting infrastructure was absent at this site. The shore was very shallow with only about 1-2 feet depths. The shallowness of the river in this area would have quick icing and periods of low flows.

RM 129.2 – Slough 9 (SU-129.2)

NAD 83 Coordinates: 62.70254554° N, 149.84122022° W



2012 temperature sampling site (Map of Site 129.2- Slough 9)

Buoy Mounted Thermistor String

Deployed: July 22, 2012 @ 12:42 ADT

Deployment Location: Approximately 1/3 of the channel width from the LB of the slough, in approximately 4 feet of water. The anchor to buoy cable length is 10 feet.

S/N	Depth (distance from buoy)
10174220	2 feet
10174219	8 feet

Station Notes: The buoy was deployed in the proposed location, about 1/3 of the channel width into the slough. The system was anchored to shore with a cable buried into the ground. The slough is extremely shallow.

August 27, 2012 – System downloaded at 15:45 ADT.

September 27, 2012 – System pushed towards shore, all tidbits still in water, system intact. System downloaded at 15:50 and redeployed.

October 23, 2012 – Buoy system intact, buoy froze in ice but data loggers in 1 foot of flowing water. System downloaded at 10:15 ADT and removed. No winter system deployed – too shallow.

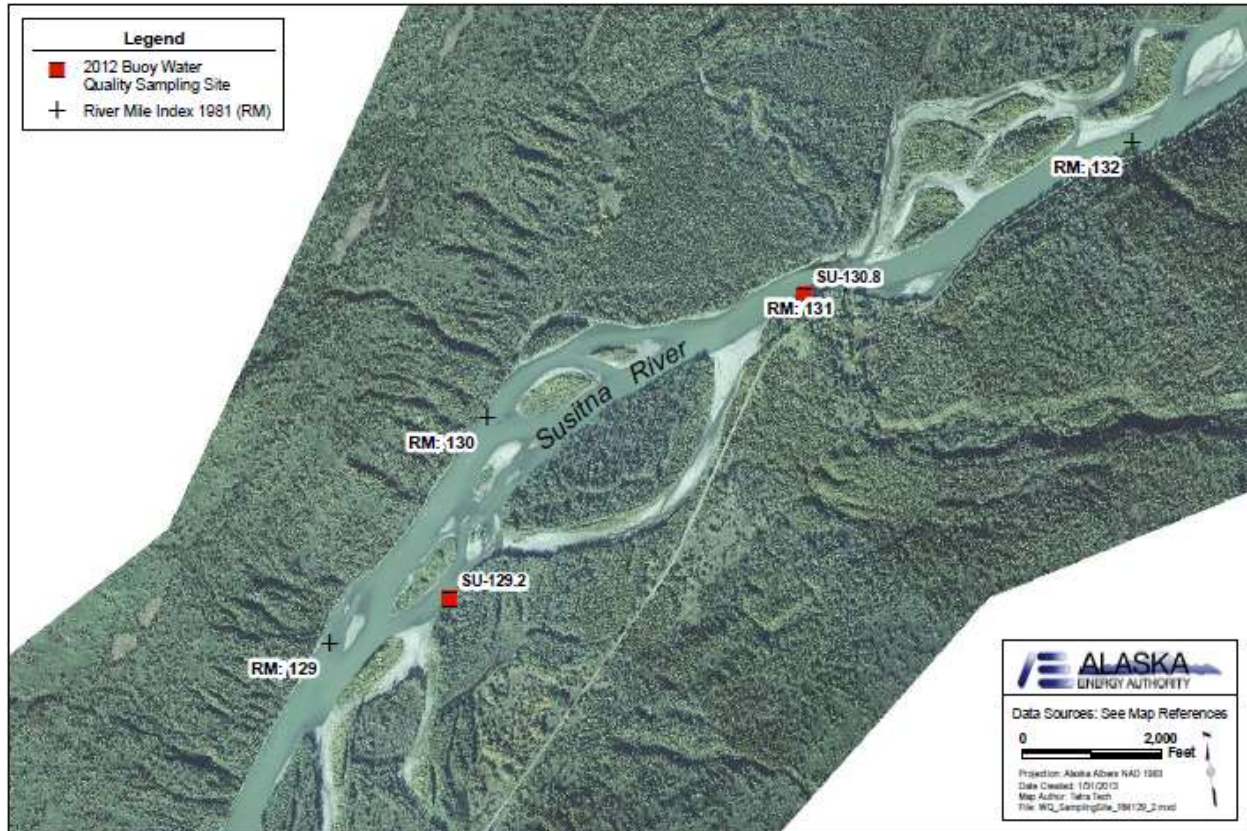


Buoy at RM 129.2 – Slough 9

Permanent Thermistor Installation

NOT INSTALLED

The slough is very shallow; and there was not enough water for a thermistor mounted in a pipe to be covered, especially during icing and periods of low flow.

RM 130.8 – LRX 35**NAD 83 Coordinates:** 62.71362010° N, 149.80894780° W

2012 temperature sampling site (Map of Site 130.8- LRX 35)

Buoy Mounted Thermistor String**Deployed:** July 22, 2012 @ 13:25ADT**Deployment Location:** Approximately 30 feet from the LB, along eddy fence in approximately 10 feet of water. The anchor to buoy cable length is 22 feet.

S/N	Depth (distance from buoy)
10174222	2 feet
10174262	8 feet
10174221	14 feet
10174223	20 feet

Station Notes: The buoy was deployed near the proposed location site, 200 feet above the confluence of Sherman Creek on the left bank, and 500 feet below the 4th of July creek on the right bank. The system was anchored to shore with a cable, looped around a pipe bracket attached to a rock with lag bolts, and secured with cable clamps.

August 28, 2012 – System downloaded at 15:10 ADT.

September 27, 2012 – System intact but swung closer to shore, but still in deep water. Downloaded at 15:30 ADT.

October 22, 2012 – Buoy and shore cable iced in but data loggers were ice free in approx. 2.5 feet of flowing water. Able to free system of debris and downloaded top two tidbits at 15:45 ADT. Removed buoy and redeployed.



Buoy at RM 130.8- LRX 35

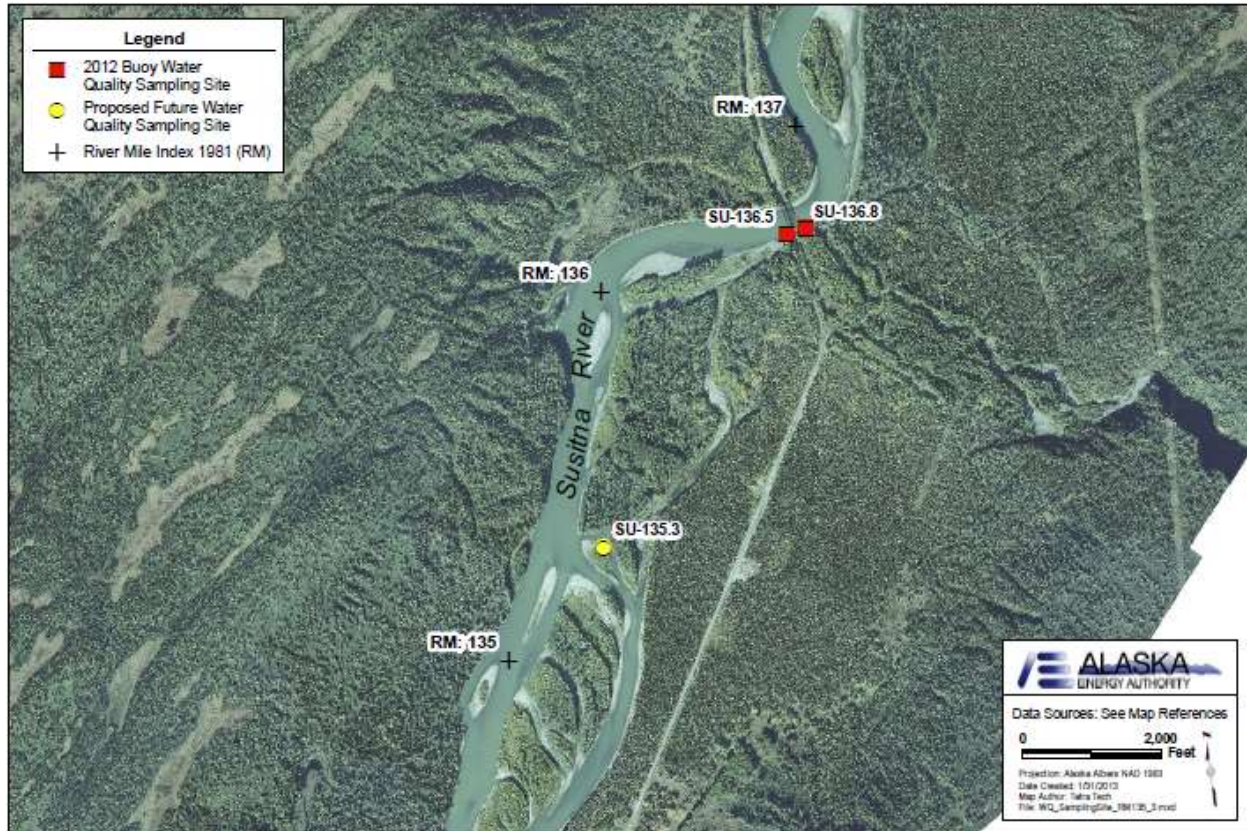
Permanent Thermistor Installation

NOT INSTALLED

The river at this site has a very gently sloping bank; the water remains shallow around 1 foot until a drop off at 10 feet. A pipe installation is not feasible at this site since there is nothing to anchor the pipe to on the sand bar.

RM 136.5 – Susitna near Gold Creek (SU-136.5)

NAD 83 Coordinates: 62.76737° N, 149.69351° W



2012 temperature sampling site (Map of Site 136.5- Susitna near Gold Creek)

Buoy Mounted Thermistor String

Deployed: August 28, 2012 @ 15:00 ADT

Deployment Location: Approximately 30 feet from the LB, along eddy fence in approximately 5 feet of water.

S/N	Depth (distance from buoy)
10174292	2 feet
10174293	4 feet
10174294	6 feet
10174295	8 feet

Station Notes: The buoy was deployed at the proposed location. The buoy was attached to 10 feet of cable with three thermistors spaced at even intervals and attached with wire.

August 28, 2012 – System installed.

September 27, 2012 – System intact but swung closer to shore. Downloaded at 15:05 ADT.

October 22, 2012 – Buoy was missing but data logger string intact. 4293 and 4294 have malfunctioned and data may be lost. Downloaded 4295 at 15:00 ADT and removed initial buoy string with multiple data loggers. Replaced with winter, single data logger system (data logger # 10174292). Buoy found downstream and retrieved.

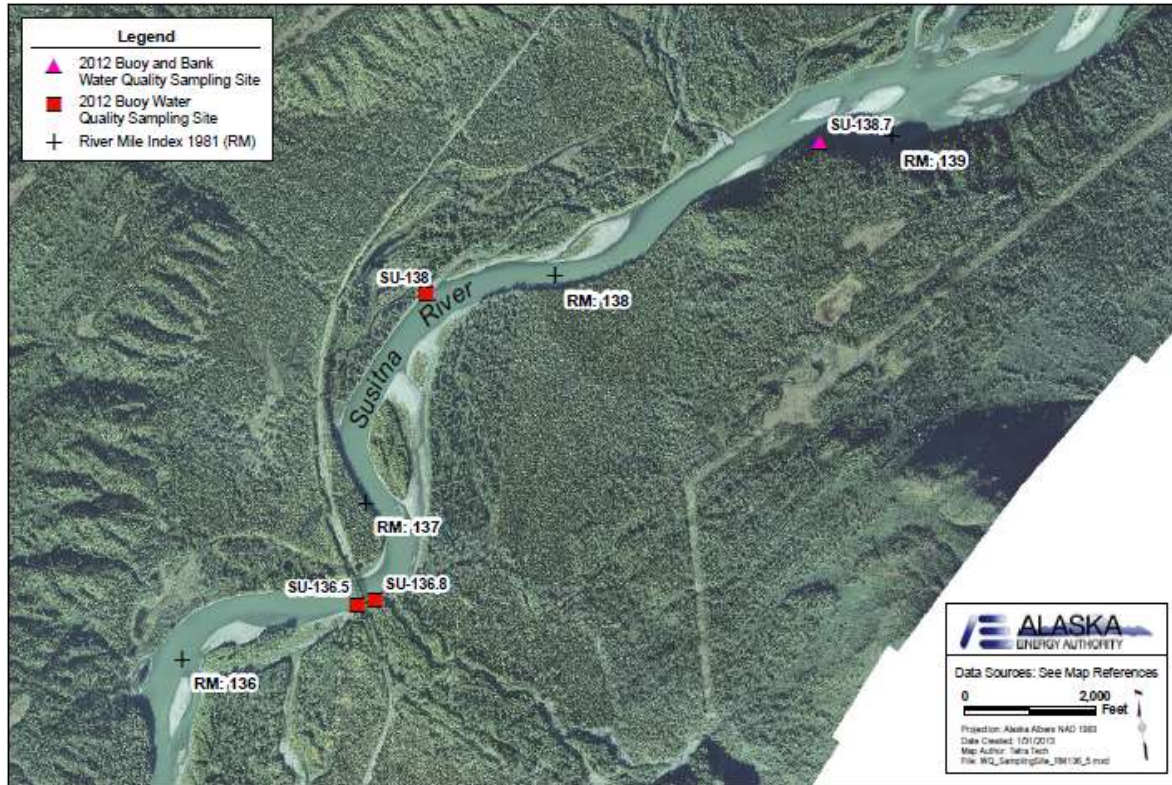
Permanent Thermistor Installation

NOT INSTALLED

Pipe mounting infrastructure was absent at this site due to the lack of good bracket mounting location.

RM 136.8 – Gold Creek (SU-136.8)

NAD 83 Coordinates: 62.76756° N, 149.69185° W



2012 temperature sampling site (Map of Site 136.8- Gold Creek)

Buoy Mounted Thermistor String

Deployed: August 28, 2012 @ 14:45 ADT

Deployment Location: Approximately 30 feet from the LB, along eddy fence in approximately 8 feet of water.

S/N	Depth (distance from buoy)
10174310	2 feet
10174311	10 feet
10174312	18 feet

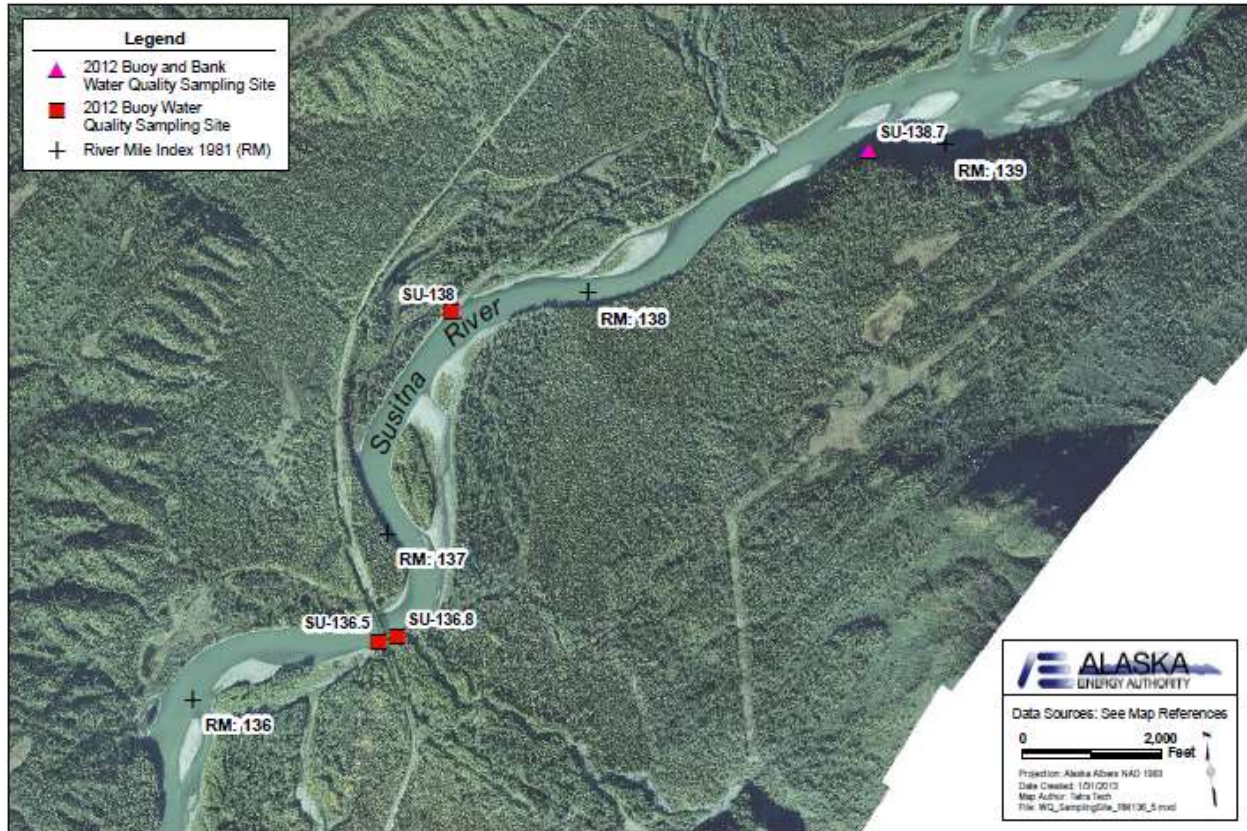
Station Notes: The buoy was deployed at the proposed location in slough 16B. The buoy was attached to 20 feet of cable holding three thermistors attached by wire.

September 27, 2012 – Equipment was missing; entire bank seems to have cut out. Site above bridge/ below Gold Creek.

Permanent Thermistor Installation

NOT INSTALLED

Pipe mounting infrastructure is absent at this site due to the lack of good bracket mounting location.

RM 138.0 – Slough 16B (SU-138.0)**NAD 83 Coordinates:** 62.78020° N, 149.68536° W

2012 temperature sampling site (Map of Site 138.0- Slough 16B)

Buoy Mounted Thermistor String**Deployed:** August 28, 2012 @ 14:40 ADT**Deployment Location:** Approximately 30 feet from the LB, along eddy fence in approximately 7 feet of water.

S/N	Depth (distance from buoy)
10174307	2 feet
10174308	9 feet
10174309	16 feet

Station Notes: After the first buoy was lost, a new buoy system was deployed near the proposed location. The system was anchored to shore with 18 feet of cable, looped around pipe brackets and secured with cable clamps. The pipe brackets were anchored to rocks with lag bolts.

September 27, 2012 – System intact but washed to shore and is exposed to air. Tidbits downloaded at 14:53 ADT and redeployed.

October 22, 2012 – Buoy system intact but completely out of water. System retrieved and downloaded at 14:23 ADT. No winter system installed at this site due to shallow water conditions and ice cover.

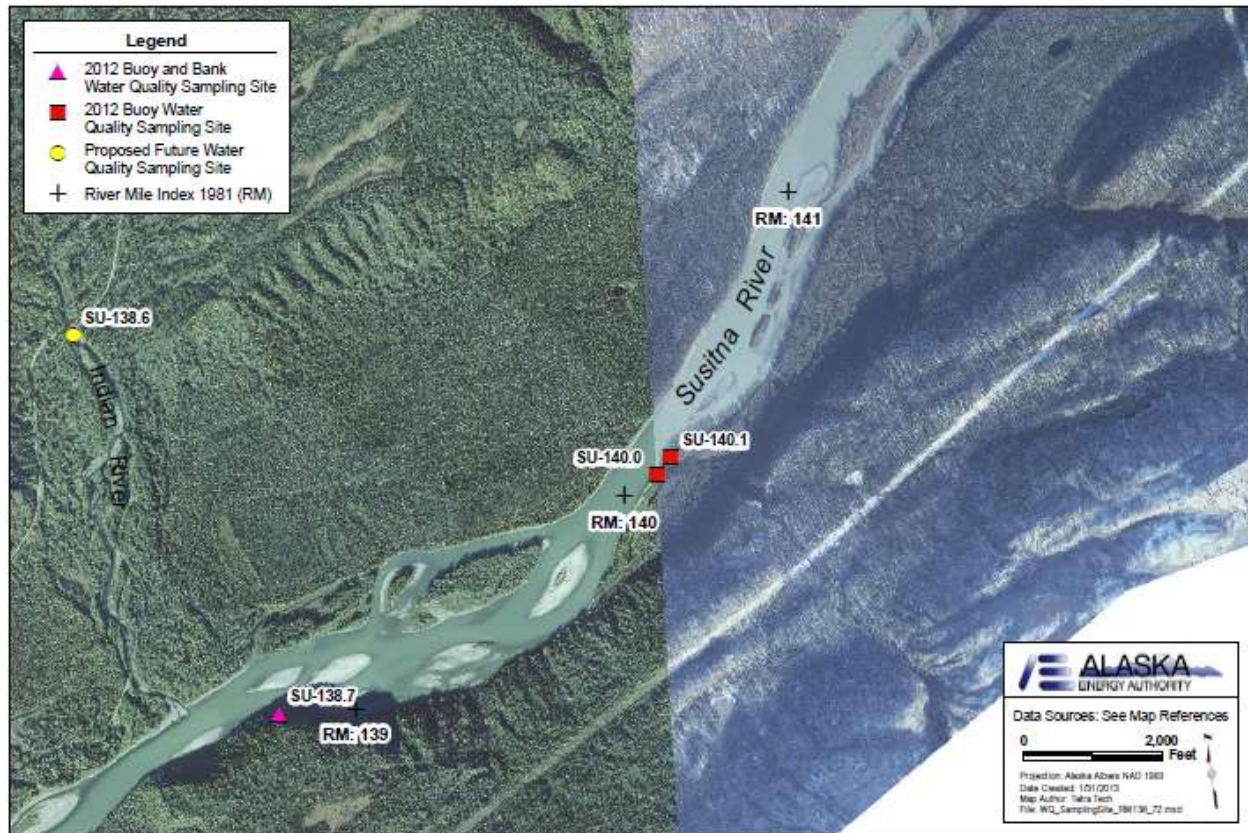
Permanent Thermistor Installation

NOT INSTALLED

Pipe mounting infrastructure was absent at this site due to the lack of good bracket mounting location.

RM 138.6 – Indian River (SU-138.6)

NAD 83 Coordinates: 62.8009° N, 149.664° W



2012 temperature sampling site (Map of Site 138.6- Indian River)

Buoy Mounted Thermistor String

NOT INSTALLED

Station Notes: A buoy was not deployed at this site due to shallow water levels and boat inaccessibility.

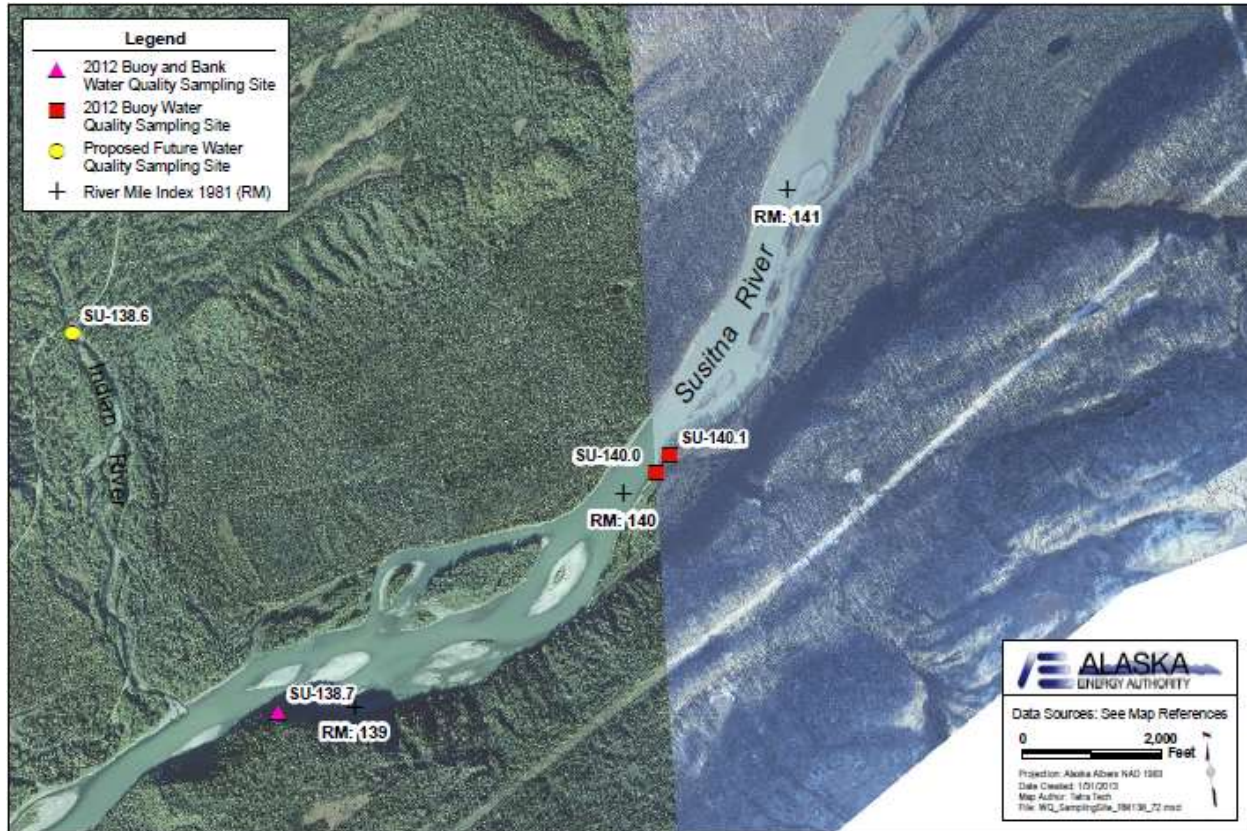
Permanent Thermistor Installation

NOT INSTALLED

A pipe system was not deployed at this location due to boat inaccessibility and shallow water levels.

RM 138.7 – Susitna River above Indian River (SU-138.7)

NAD 83 Coordinates: 62.78540655° N, 149.64841704° W



2012 temperature sampling site (Map of Site 138.7- Susitna above Indian River)

Buoy Mounted Thermistor String

Deployed: July 23, 2012 @ 13:32ADT.

Deployment Location: Approximately 30 feet from the LB, along eddy fence in approximately 6 feet of water. The anchor to buoy line length is 14 feet.

S/N	Depth (distance from buoy)
10174225	2 feet
10174224	7 feet
10174227	12 feet

Station Notes: The buoy was deployed at the proposed location. The system was anchored to shore with a cable, looped around pipe brackets and secured with cable clamps. The pipe brackets are anchored to rocks with lag bolts.

August 28, 2012 – Downloaded both buoy and pipe systems at 14:24 ADT.

September 27, 2012 – Buoy was missing but replaced. One data logger was missing (10174227) and not replaced. Both systems downloaded at 14:28 ADT.

October 23, 2012 – Pipe was high and dry and tidbit cable was frozen in pipe and could not be removed, no download. Buoy system intact. Downloaded at 13:45 ADT and removed initial buoy string with multiple data loggers. Replaced with winter, single data logger system (data logger #10174227).



Buoy and Pipe Systems at RM 138.7 - Susitna above Indian Creek

Permanent Thermistor Installation

Deployed: July 23, 2012 @ 13:32 ADT.

Pipe Length: 10 feet

SSN: 10174226

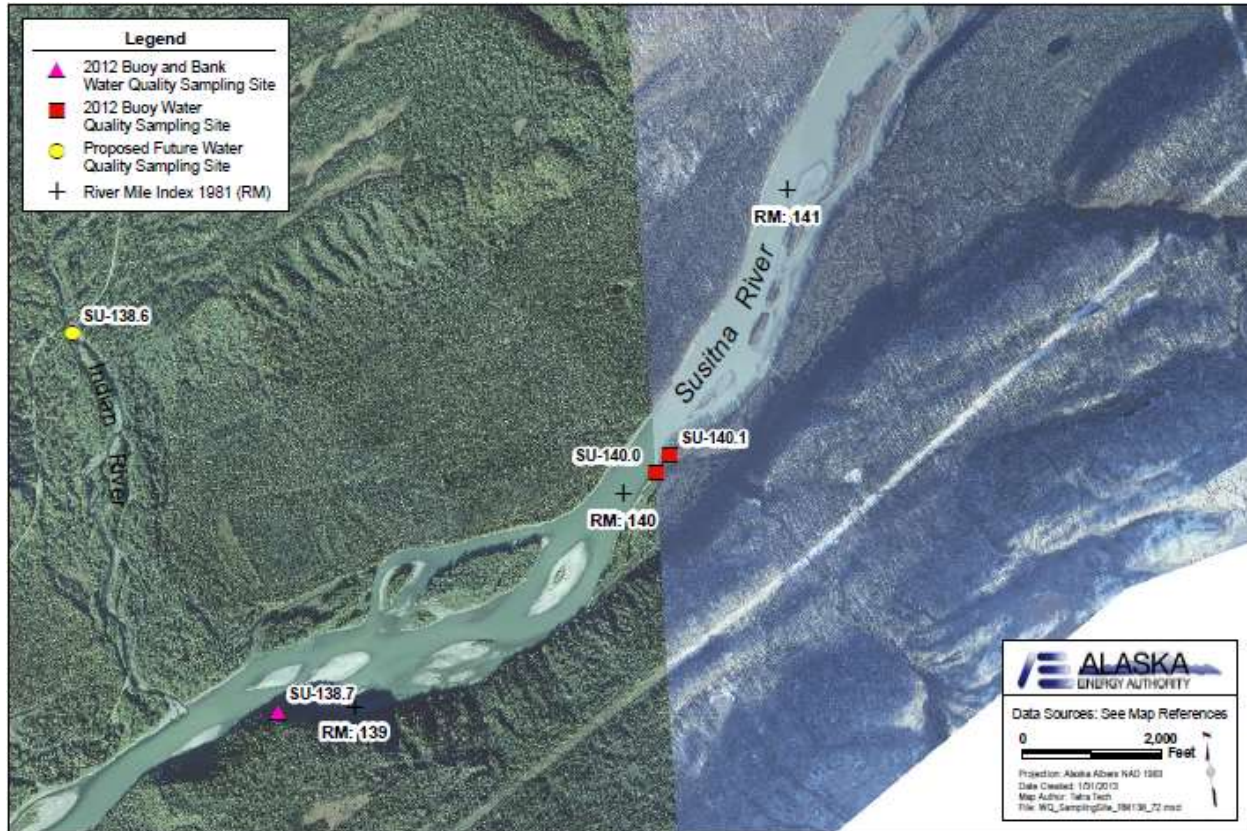
The housing pipe was fastened to a rock with three pipe clamps and lag bolts slightly upstream of the buoy. The pipe houses 10 feet of cable with a thermistor attached to a loop at the end.



RM 138.7 – Pipe Mounted at Susitna above Indian Creek

RM 140.0 – Slough 19 (SU-140)

NAD 83 Coordinates: 62.79387687° N, 149.61425043° W



2012 temperature sampling site (Map of Site 140- Slough 19)

Buoy Mounted Thermistor String

Deployed: July 23, 2012 @ 14:20 ADT.

Deployment Location: Approximately 20 feet from the LB, in shallow water. Anchor to buoy cable length is 8 feet.

S/N	Depth (distance from buoy)
10174190	2 feet
10174188	4 feet
10174189	6 feet

Station Notes: The buoy was deployed at the proposed location off the left bank of the slough. The slough was quite shallow, so only a buoy and anchor system was deployed. The buoy was anchored with cable to a rock using pipe brackets attached by lag bolts and cable clamps.

August 27, 2012 – Buoy was missing but found downstream and reattached. System downloaded 14:10 ADT and re-deployed.

September 27, 2012 – System intact but had moved into shallow water. System downloaded at 14:20 ADT and redeployed.

October 22, 2012 – System intact but dry and incased in ice. System was downloaded at 12:00 ADT and removed from the river. No winter system deployed due to shallow water conditions.

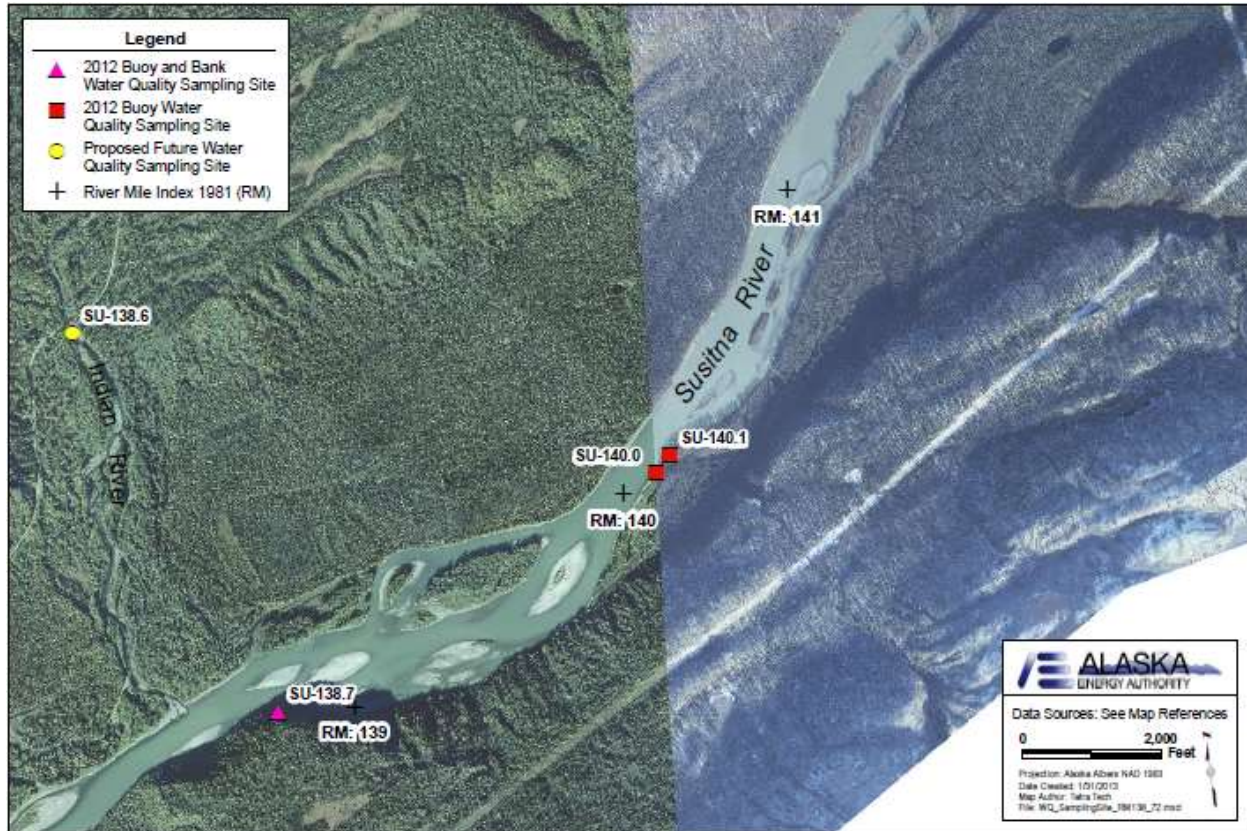


Buoy system at RM 40.0 - Slough 19

Permanent Thermistor Installation

NOT INSTALLED.

Pipe mounting infrastructure was absent. Water level is very shallow requiring a substantial length of housing to be required. This type of installation would be susceptible to equipment loss during ice break up.

RM 140.1 – LRX 53 (SU-140.1)**NAD 83 Coordinates:** 62.79453638° N, 149.61295563° W

2012 temperature sampling sites (Map of Site 140.1- LRX 53)

Buoy Mounted Thermistor String**Deployed:** July 23, 2012 @ 15:00 ADT**Deployment Location:** Approximately 75 feet from the LB, along eddy fence in approximately 9 feet of water. The anchor to buoy cable length is 16 feet.

S/N	Depth (distance from buoy)
10174282	2 feet
10174283	8 feet
10174191	14 feet

Station Notes: The buoy was deployed at the proposed location. The system was anchored to shore with a cable, looped around a live tree up the bank. The immediate bank is a highly unstable cut bank, so the cable was fastened further away to decrease chances of loss of equipment due to the bank collapsing. Flagging was placed on the cable for safety.

August 27, 2012- Buoy was missing but was found downstream and reattached. System was downloaded and redeployed at 13:29 ADT.

September 27, 2012 – System was found high and dry on river bank. System downloaded at 14:08 ADT and redeployed.

October 22, 2012 - System intact but found to be in shallow water. Downloaded at 13:00 ADT and removed initial buoy string with multiple data loggers. Replaced with winter, single data logger system (data logger # 10174191).

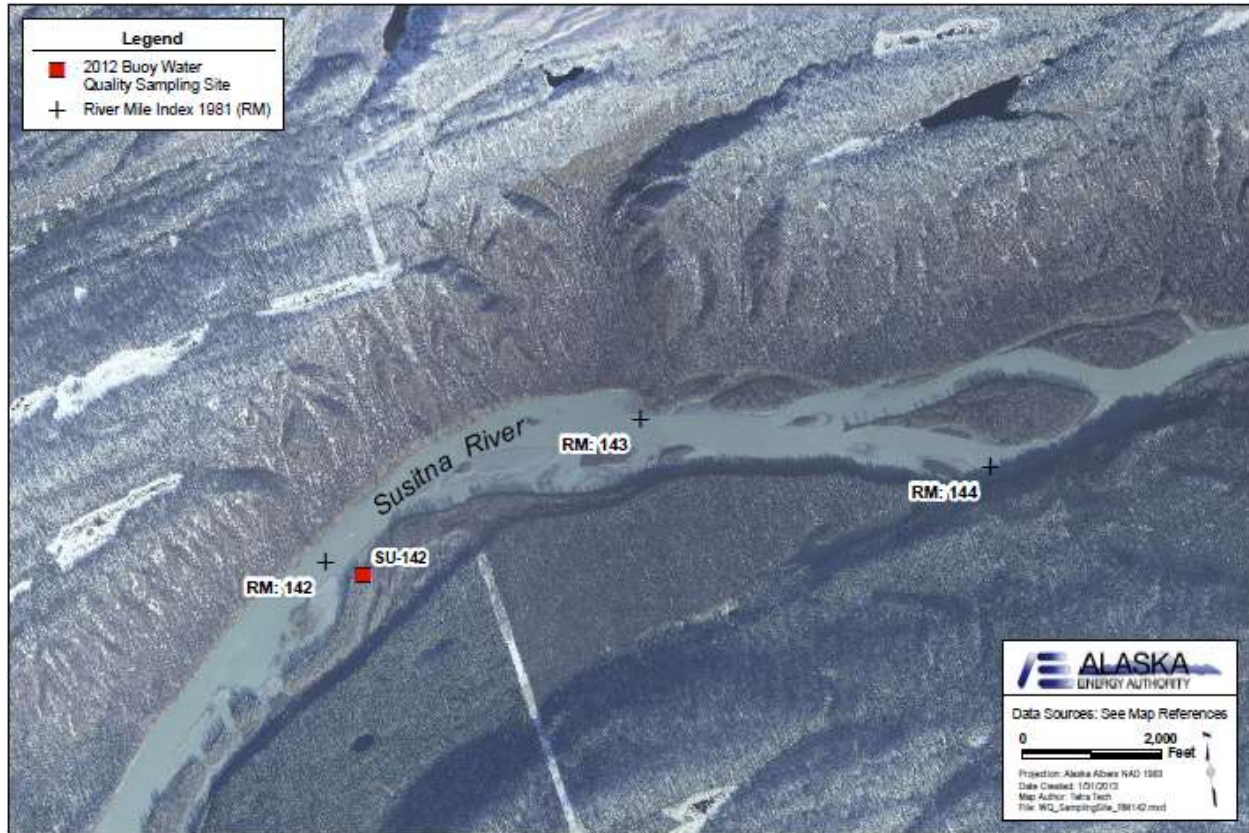
Permanent Thermistor Installation

NOT INSTALLED

Pipe mounting infrastructure was absent at this site due to highly unstable cut banks. A pipe was not mounted here since there were no rocks or downed trees near the river to fasten it to. A pipe was not installed here to prevent equipment loss.

RM 142.0 – Slough 21 (SU-142)

NAD 83 Coordinates: 62.8163° N, 149.576° W



2012 temperature sampling site (Map of Site 142- Slough 21)

Buoy Mounted Thermistor String

S/N	Depth
10174302	1.5 feet

Station Notes: A thermistor with no buoy or anchor line attached was deployed at this site. The site was moved 400 feet past the proposed site which was a dry river channel. This is a still water slough with a depth of 2 feet and a beaver dam at the south end. There is no flowing water, and it will freeze solid this winter.

August 27, 2012 – Installed single thermistor at 14:00 ADT.

September 27, 2012 – Downloaded system at 13:53 ADT.

October 22, 2012 – System present and in approx. 2 feet of water. Downloaded and redeployed at 12:30 ADT.



Buoy Installation Site at RM 142- Slough 21

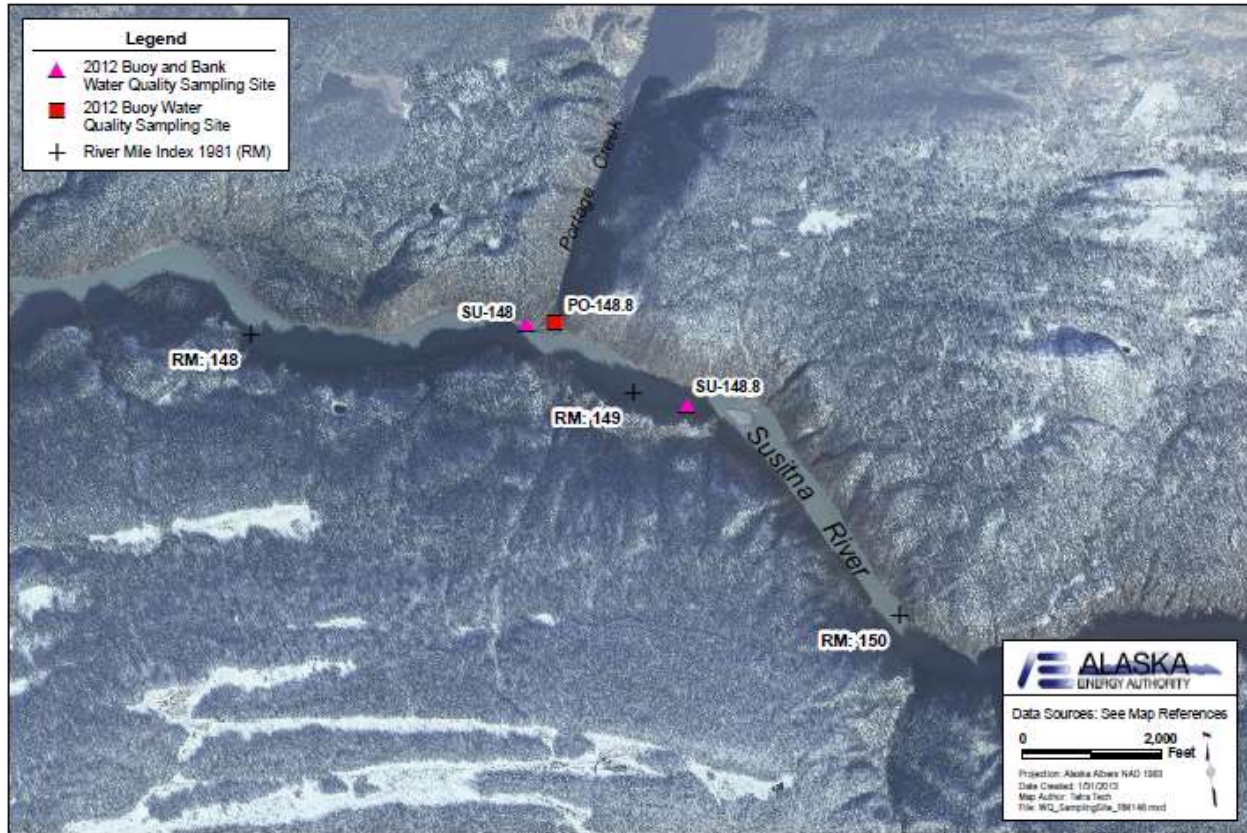
Permanent Thermistor Installation

NOT INSTALLED

A pipe was not deployed at this site because the slough was shallow with still water, which will quickly freeze solid in the winter.

RM 148.0 – Susitna below Portage Creek (SU-148)

NAD 83 Coordinates: 62.83038283° N, 149.38277690° W



2012 temperature sampling site (Map of Site 148- Susitna below Portage Creek)

Buoy Mounted Thermistor String

Deployed: July 24, 2012 @ 11:30 ADT.

Deployment Location: Approximately 60 feet from the RB, along eddy fence in approximately 12 feet of water. The anchor to buoy cable length is 22 feet.

S/N	Depth (distance from buoy)
10174164	2 feet
10174163	11 feet
10174166	20 feet

Station Notes: The buoy was deployed at the proposed location below Portage Creek. The system was anchored to shore with a cable, looped around a pipe bracket and secured to a rock with lag bolts. The cable line was slightly caught on an underwater rock which may eventually erode the cable.

August 28, 2012 –Buoy system and pipe downloaded at 14:41 ADT. Buoy migrated to shore.

September 27, 2012 – Buoy has migrated to shore. Redeploy. Anchor 1 tidbit downloaded. Pipe silted in bottom 4 feet of pipe.

October 22, 2012 – Buoy System present and in approx. 2 feet of water. Downloaded and removed system at 11:48 ADT. No winter system deployed due to shallow river conditions.



Buoy and Pipe Systems at RM 148.0 – Susitna below Portage Creek

Permanent Thermistor Installation

Deployed: July 24, 2012 @ 11:30 ADT.

Pipe Length: 17 feet

SSN: 10174165

The housing pipe was fastened to a rock with three pipe brackets and lag bolts slightly upstream of the buoy. The pipe houses 16.5 feet of cable with a thermistor attached by zip ties to a loop at the end. The thermistor was mounted to the cap at the end of the pipe in the river.

August 28, 2012 – Pipe downloaded at 12:41 ADT. Hard to pull cable, cable clamps removed and tidbits reattached with wire.

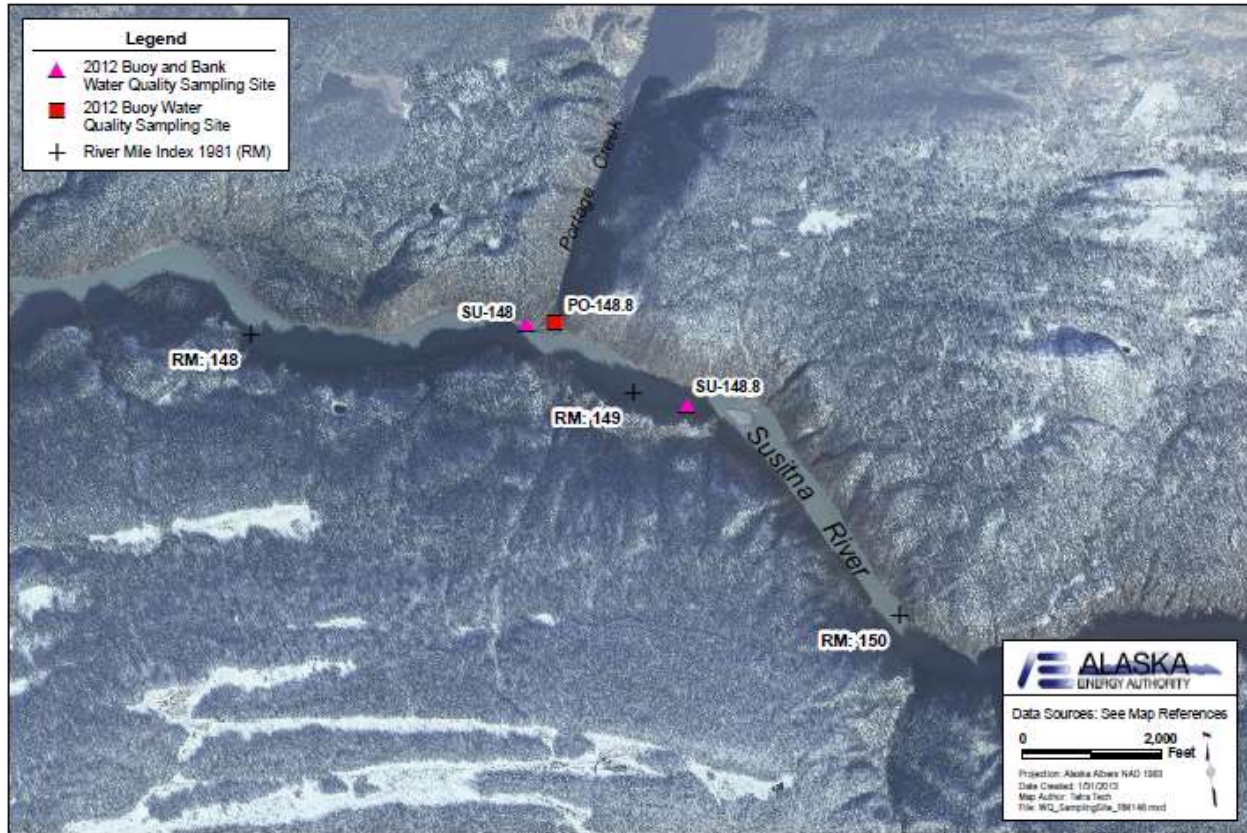
October 22, 2012 – Internal cable is frozen in and cannot be removed for download. Leave system in place until spring.



Pipe System at RM 148.0 – Susitna below Portage Creek

RM 148.8 – Portage Creek (PO-148.8)

NAD 83 Coordinates: 62.83038° N, 149.38029° W



2012 temperature sampling site (Map of Site 148.8- Portage Creek)

Buoy Mounted Thermistor String

Deployed: August 28, 2012 @ 11:00 ADT

Deployment Location: Off the LB of Portage Creek.

S/N	Depth
10174301	2 feet

Station Notes: A single thermistor was attached to 2 feet of cable and deployed at the proposed location in Portage Creek without a buoy. The system is anchored to shore with a cable, looped around a pipe bracket and secured to a rock with lag bolts. The thermistor is positioned in a deep hole which may not freeze during the winter.

August 27, 2012 – Downloaded system

September 27, 2012 – Downloaded system at 12:34 ADT. Thermistor migrated to mid-stream.

October 22, 2012 – Shallow water observed. Downloaded system and re-deployed system at 11:55 ADT.



Buoy Installation at RM 148.8- Portage Creek

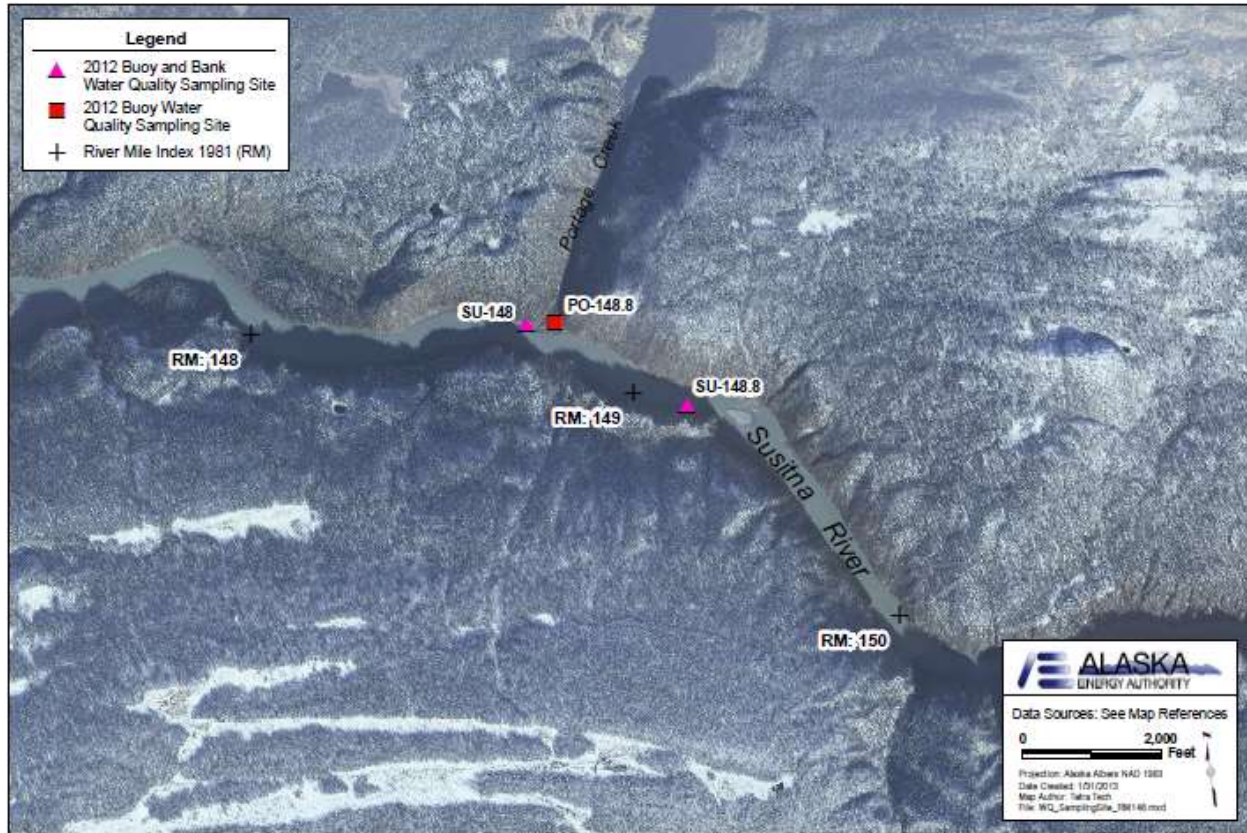
Permanent Thermistor Installation

NOT INSTALLED

A pipe system was not installed at this site due to the shallowness of Portage Creek and the lack of large trees or rocks to anchor the pipe to. There was also concern that the shallow water would freeze quickly during the winter.

RM 148.8 – Susitna River above Portage Creek (SU-148.8)

NAD 83 Coordinates: 62.82672924° N, 149.36932954° W



2012 temperature sampling site (Map of Site 148.8- Above Portage Creek)

Buoy Mounted Thermistor String

Deployed: July 24, 2012 @ 13:45 ADT

Deployment Location: Approximately 50 feet from the LB, along eddy fence in approximately 10 feet of water.

S/N	Depth (distance from buoy)
10174192	2 feet
10174193	10 feet
10174194	18 feet

Station Notes: The buoy was deployed at the proposed location near the mouth of Portage Creek. The system was anchored to shore with a cable, looped around a pipe bracket which was anchored to a rock using lag bolts and cable clamps. The area was checked for other studies which could be interrupted by the buoy before deploying. Although the length of the cable was 20 feet the anchor appeared relatively taut after deployment due to the depth and velocity of the river at this site.

August 28, 2012 – Buoy missing and replaced. System downloaded. At 12:21 ADT and redeployed.

September 27, 2012 – Downloaded system at 12:25 ADT.

October 22, 2012 – Helicopter flyby – no landing area available, boat access only. Pipe system was visible but appeared to be dry. Buoy system was not visible. Buoy is likely gone but data logger string may still present the under ice.



Buoy Installation at RM 148.8- Above Portage Creek

Permanent Thermistor Installation

Deployed: July 24, 2012 @ 11:50 ADT

Pipe Length: 14 feet

S/N	Depth
101741278	5 feet
10174271	9 feet
10174169	14 feet

The housing pipe was fastened to a rock with two pipe brackets and lag bolts slightly upstream of the buoy. The pipe houses 13 feet of cable with the thermistors attached with steel wire at intervals along the cable with one at the end mounted to the top cap.



Pipe Installation at RM 148.8- Above Portage Creek

Station Note: 10174171 may have exposure to air. Use 10174169 for water temperature.

RM 165.0 – Susitna (SU-165)**NAD 83 Coordinates:** 62.79168° N, 148.9938° W

2012 temperature sampling site (Map of Site 165, Proposed Location – Susitna)

Buoy Mounted Thermistor String**Deployed:** September 26, 2012 @ 14:00 ADT.**Deployment Location:** Moved to opposite river bank from mapped location at site of weather station.

S/N	Depth (distance from buoy)
10174291	2 feet

Station Notes: Winter system only installed. System has not been downloaded since install.



Winter buoy system being deployed at RM 165

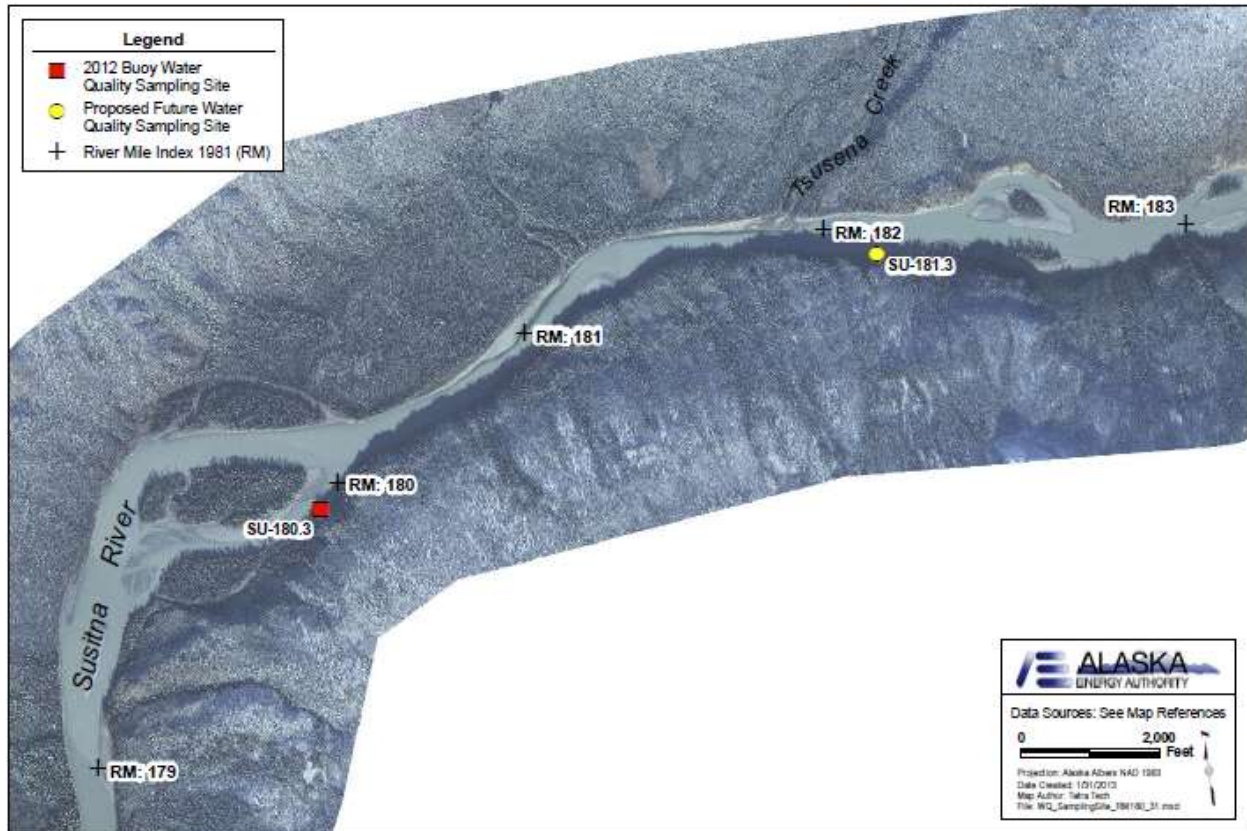
Permanent Thermistor Installation

NOT INSTALLED

A pipe system has not yet been installed at this site.

RM 180.3 – Susitna below Tsusena Creek (SU-180.3)

NAD 83 Coordinates: 62.8134° N, 148.6568° W



2012 temperature sampling site (Map of Site 180.3, Below Tsusena Creek - Susitna)

Buoy Mounted Thermistor String

Deployed: August 29, 2012 at 16:53 ADT.

Deployment Location: In back eddy in 8 feet of water.

S/N	Depth (distance from buoy)
10174286	2 feet
10174285	4 feet
10174284	6 feet

Station Notes: Three thermistors were attached to an 8 feet buoy cable with wire and cable clamps and deployed at this location. The system was deployed in a deep back eddy which should have water all year long.

September 25, 2012 – System intact. Downloaded at 16:45 ADT and removed summer buoy string with multiple data loggers. Replaced with winter, single data logger system (data logger # 10174284).



Buoy at RM 180.3 – Susitna below Tsusena Creek

Permanent Thermistor Installation

NOT INSTALLED

Pipe mounting infrastructure was absent at this site due to deep water and inability to safely mount a pipe. Once the water drops a pipe system could be installed here.

RM 181.3 – Tsusena Creek (TC-181.3)

NAD 83 Coordinates: 62.8217° N, 148.6068° W

Buoy Mounted Thermistor String

Deployed: September 26, 2012 @ 11:25 ADT.

Deployment Location: Moved up stream from proposed location.

S/N	Depth (distance from buoy)
10174290	2 feet

Station Notes: Winter system only installed. System has not been downloaded since install.



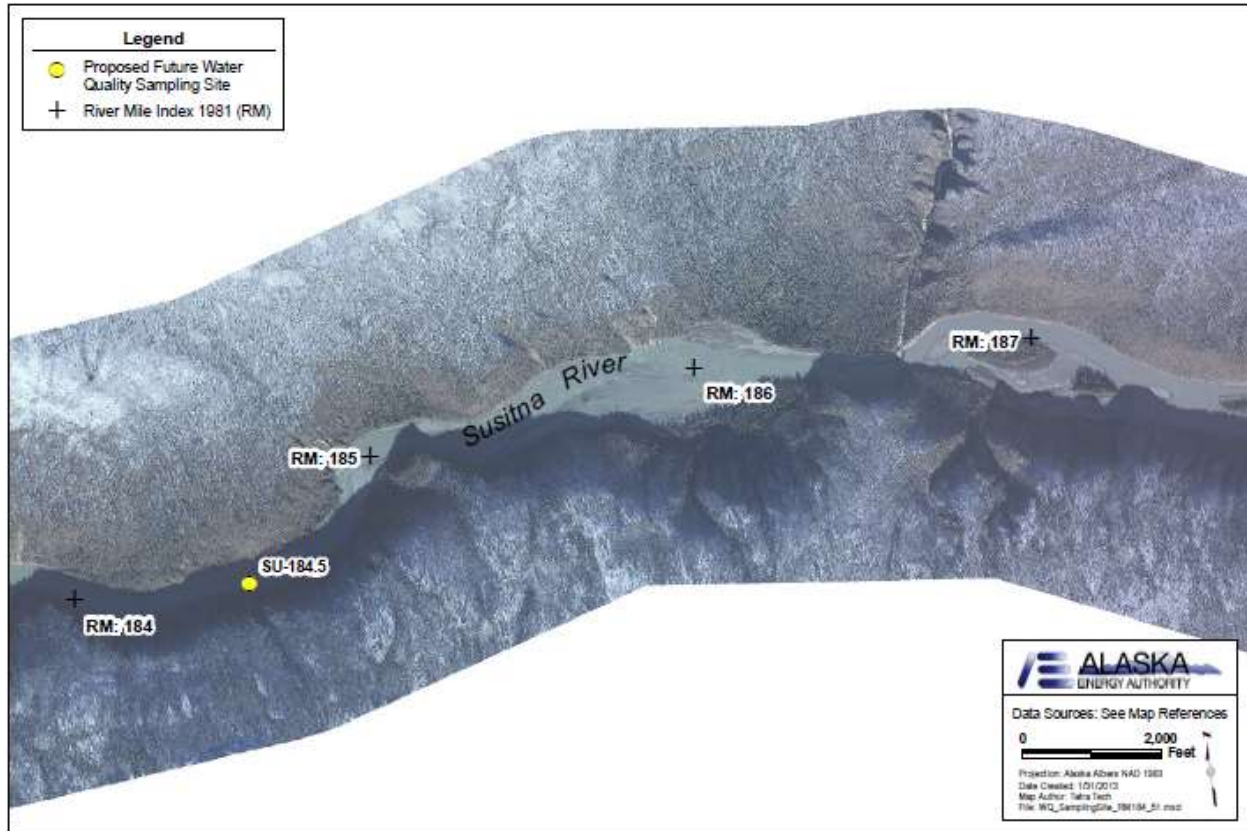
Winter buoy system prior to deployment at RM 181.3 – Tsusena Creek

Permanent Thermistor Installation**NOT INSTALLED**

Pipe mounting infrastructure was absent at this site due to highly unstable cut banks. A pipe was not mounted here since there were no rocks or downed trees near the river to fasten it to, as well as to prevent equipment loss.

RM 184.5 – Susitna at Watana Dam Site (SU-184.5)

NAD 83 Coordinates: 62.8226° N, 148.533° W



2012 temperature sampling site (Map of Site 184.5- Susitna at Watana Dam Site)

Buoy Mounted Thermistor String

Deployed: September 26, 2012 @ 10:39ADT

Deployment Location: Deployed at proposed location.

S/N	Depth (distance from buoy)
10174289	2 feet

Station Notes: Winter system only installed. System has not been downloaded since install.



Preparing to deploy winter buoy system at RM 184.5 – Watana Dam Site

Permanent Thermistor Installation

NOT INSTALLED

A pipe was not installed here due to the lack of helicopter landing zones in the site area during normal summer river conditions.

RM 194.1 – Watana Creek (SU-194.1)

NAD 83 Coordinates: 62.8296° N, 148.259° W



2012 temperature sampling site (Map of Site 194.1- Watana Creek)

Buoy Mounted Thermistor String

NOT INSTALLED

Station Notes: No system was deployed at this site. The site shown on the map at the mouth of the creek has an extremely wide gravel bar. If installed, the safety cable will be lost due to its length. The creek contains high amounts of fine sediment that have deposited at the mouth in the location marked for deployment. The water level at this point was extremely deep as well. If deployed, the system would likely be silted in and irretrievable.

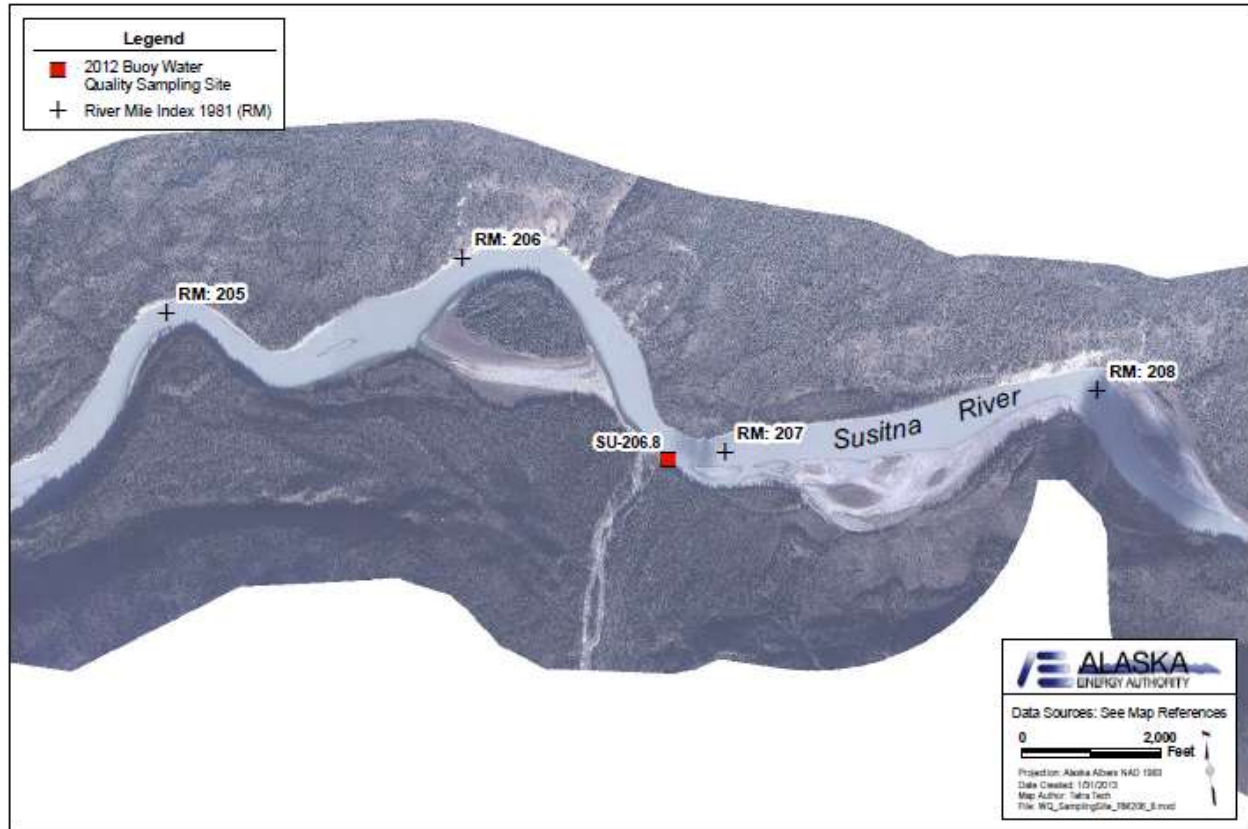
Permanent Thermistor Installation

NOT INSTALLED

Pipe mounting infrastructure was absent at this site due to high amounts of silt and a gravel sand bar with no large objects for the pipe to be anchored. The large amounts of silt would cause the pipe to become silted in.

RM 206.8 – Kosina Creek (SU-206.8)

NAD 83 Coordinates: 62.7822° N, 147.94° W



2012 temperature sampling site (Map of Site 206.8- Kosina Creek)

Buoy Mounted Thermistor String

Deployed: August 30, 2012 at 14:30 ADT.

Deployment Location: Deployed in the main river at upstream channel of creek at mapped location in 4 to 5 feet of water.

S/N	Depth (distance from buoy)
10174281	2 feet
10174280	4 feet

Station Notes: Two thermistors were installed at this site, attached to a 6 feet cable and then to a buoy. The system was deployed at the mouth of the smaller of the two channels shown on the map. The best location for this system would be in the main stem of the creek, due to the shallowness of the current location.

September 26, 2012 – Downloaded at 16:00 ADT and removed summer buoy string with multiple data loggers. Replaced with winter, single data logger system (data logger # 10174281).



Buoy Installed at RM 206.8 – Kosina Creek

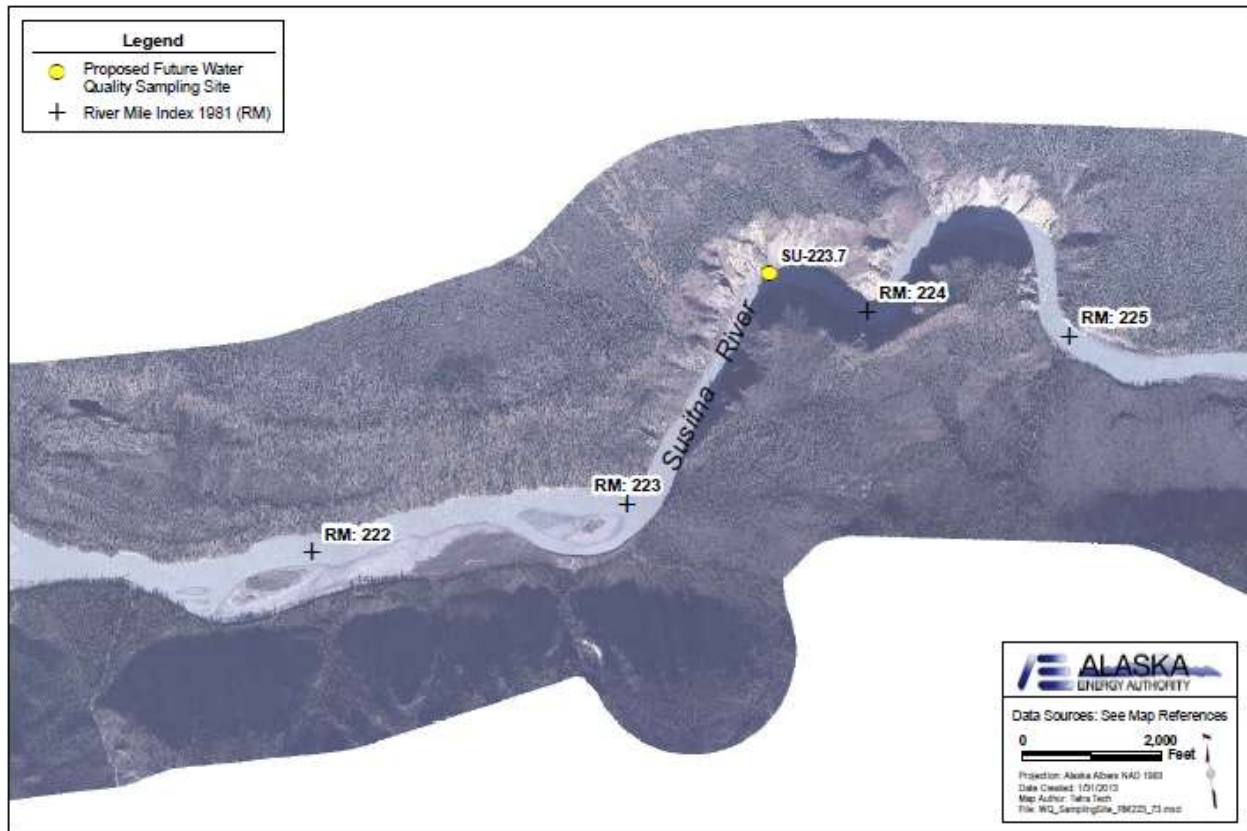
Permanent Thermistor Installation

NOT INSTALLED

Pipe mounting infrastructure was absent at this site due to deep water and inability to safely mount a pipe. Once the water level drops, a pipe system could be installed here.

RM 223.7 – Susitna near Cantwell (SU-223.7)

NAD 83 Coordinates: 62.7052° N, 147.538° W



2012 temperature sampling site (Map of Site 223.7- Susitna near Cantwell)

Buoy Mounted Thermistor String

NOT INSTALLED

Station Notes: A system was not installed at this location due to the lack of helicopter landing zones.

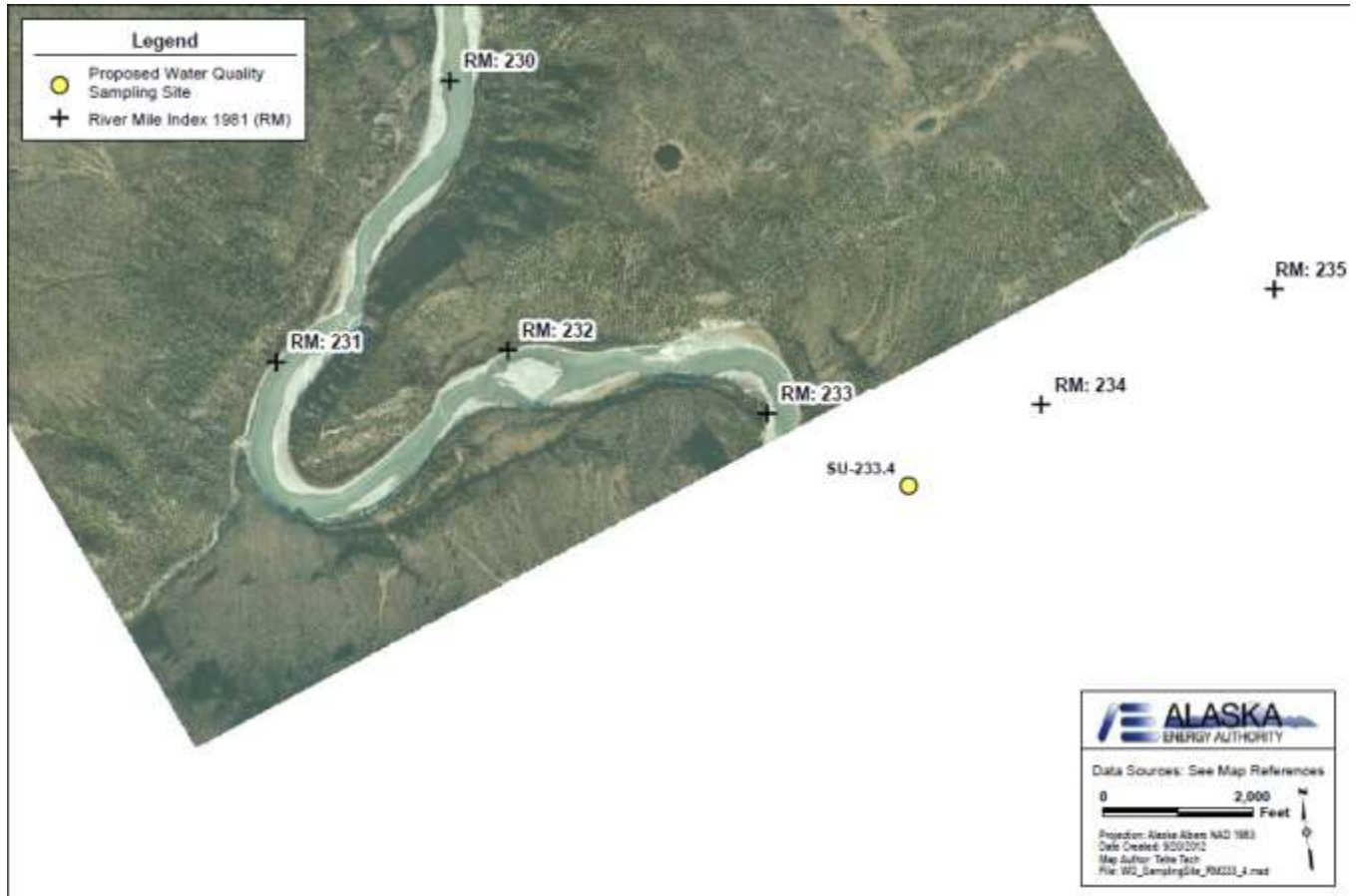
Permanent Thermistor Installation

NOT INSTALLED

Pipe mounting infrastructure was absent at this site due to the lack of helicopter landing zones.

RM 233.4 – Oshetna River (SU-233.4)

NAD 83 Coordinates: 62.6402° N, 147.383° W



2012 temperature sampling sites (Map of Site 233.4- Oshetna River)

Buoy Mounted Thermistor String

Deployed: August 30, 2012 at 11:50 ADT.

Deployment Location: In creek approximately 100 feet up creek from mouth in 4 feet of water

S/N	Depth (distance from buoy)
10174279	1 feet
10174278	5 feet

Station Notes: Two thermistors attached to a buoy by a 6 feet cable, wire, and cable clamps were deployed at this site. The system was deployed at the proposed location in the deepest area that could be found.

September 25, 2012 – System intact but had moved down stream slightly but in at least 2 feet of water. Downloaded sensors at 14:00 ADT and removed summer buoy string. Replaced with winter, single data logger system (data logger # 10174278).



Buoy System Installed at RM 233.4 –Oshetna River

Permanent Thermistor Installation

NOT INSTALLED

Pipe mounting infrastructure was absent at this site due to the lack of good bracket mounting location.