

Sun’aq Tribe of Kodiak
Buskin River Watershed Signal Crayfish Report
Bureau of Indian Affairs Invasive Species Program
Grant Number: A16AV00630 – Project Closing Report
Date: May 31, 2018

Introduction/Goals

In May 2016, the Bureau of Indian Affairs (BIA) Invasive Species Program awarded Sun’aq Tribe of Kodiak a \$55,834 grant for a two-year research project entitled “Preliminary Electrofishing and Kick Seining Survey for Invasive Signal Crayfish (*Pacifastacus leniusculus*) in Buskin River Watershed on Kodiak Island, Alaska”. The main goal of the project was to conduct a rapid species distribution survey and assess the effectiveness of electrofishing and kick seining for Signal Crayfish in Buskin River Watershed. Project Objectives included:

- Objective 1. Capture and remove Signal Crayfish from Buskin River Watershed, as described in the methodology section. Through sampling efforts on the lakes and streams, the invasive crayfish population will be reduced to the lowest level practicable.
- Objective 2. Engage tribal youth in natural resource management by having the youth assist with electrofishing and kick seining activities, public outreach and crayfish specimen sampling.
- Objective 3. Raise awareness of invasive crayfish and encourage the public to report any information regarding Signal Crayfish.
- Objective 4. Develop a final report at the end of the project (May 2018). This report will include the effectiveness of electrofishing and kick seining, how many crayfish were collected and sampled, the spatial distribution of the population, along with an opinion of the risk posed to ecosystem services.
- Objective 5. Professional development and capacity building by collaboration with various agencies, particularly Alaska Department of Fish and Game, Kodiak Soil and Water Conservation District, USFWS Kodiak National Wildlife Refuge, United States Coast Guard and Koniag, Inc.

Methods

This project utilized methods not previously used by others within the Buskin River Watershed, including electrofishing (Figure 1) and kick seining. In addition, crayfish were captured by the following methods: snorkeling, trapping, dip netting, and hand capture.



Figure 1. Electrofishing in the southeast portion of Buskin Lake on August 14, 2016.

In 2016, approximately one mile of stream was surveyed per week by the Invasive Species Crew (three-person crew hired in May 2016). A total of 11.2 miles and 0.5 miles of lakeshore was surveyed within the ten-week survey period (Figure 2). In 2017, all capture methods (except the kick seine) were utilized to capture Signal Crayfish. The data sheet utilized (Figure 3) is shown below.



Figure 2. Survey locations.

Results (Objectives 1 and 4)

In total, 1,086 Signal Crayfish (*Pacifastacus leniusculus*) were sampled and removed from the Buskin River Watershed over the two-year project. During the 2016 field season, 378 Signal Crayfish and three (dead) Red Swamp Crayfish (*Procambarus clarkii*) were sampled and removed from the Buskin River Watershed. Comparatively, during the 2017 field season, 708 Signal Crayfish were sampled and removed from the Buskin River Watershed. Once captured, crayfish were given a specimen ID, and information was collected on the following: name of waterbody, latitude, longitude, datum, collection method, species, life stage, total length, carapace length, length method, sex, and disposition (Figure 4).

Electrofishing occurred on August 13-14, 2016 and August 19 and August 26, 2017 in the southeast corner of Buskin Lake and Buskin Lake outlet. The following organizations participated in the electrofishing activities: Sun'aq Tribe of Kodiak (STK), Kodiak Regional Aquaculture Association (KRAA), Kodiak Soil and Water Conservation District (KSWCD), Alaska Department of Fish & Game (ADF&G), and US Fish & Wildlife Service (USFWS)-Anchorage Fish and Wildlife Conservation Office. Over a two-day period each year, this method proved to be very effective with 169 and 436 Signal Crayfish being captured in 2016 and 2017, respectively. All age classes (juvenile to adult) were captured during the electrofishing activities. To avoid incidental capture of juvenile salmonids, sampling areas were swept by the crew before electrofishing started. In addition, salmon spawning habitat areas were avoided.



Figure 4. A male Signal Crayfish is sampled for length on July 21, 2016.



Figure 5. Kick seining for Signal Crayfish in Buskin River on June 22, 2016.

Two different sized kick seines (1m and 5m) were utilized during the 2016 field season (Figure 5), but neither resulted in any crayfish captured. Dip netting/hand capture proved to be effective only in shallow water within Buskin Lake. Rocks were flipped along the lakeshore and then 14 and 226 crayfish were captured using small dip nets in 2016 and 2017, respectively.

STK collaborated with members of the public who were snorkeling for crayfish within Buskin Lake and Buskin Lake outlet throughout the project (Figure 6). In 2016, several members of the public showed the STK crew where the crayfish are concentrated, and they allowed for us to sample their catch on-site before consumption. Additionally, STK asked other members of the public where they were having success capturing crayfish. Based on this, and observing others in the southeast corner of Buskin Lake, it was determined that the population was thriving in this area of the lake (Figures 10 and 11). The members of the public allowed us to sample 195 and 52 of the Signal Crayfish they captured during the 2016 and 2017 field seasons, respectively.



Figure 6. Snorkeling for Signal Crayfish in the southeast corner of Buskin Lake on July 21, 2016.

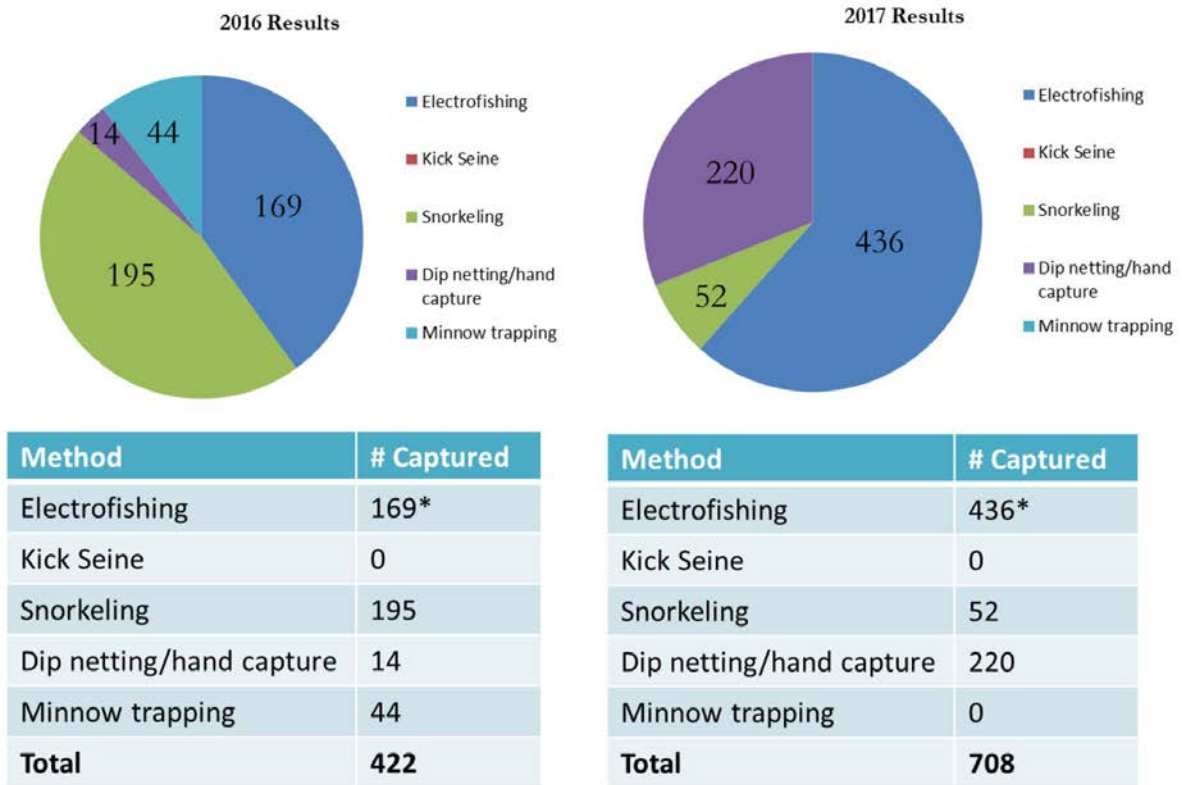


Figure 7. Standard minnow trap with a Signal Crayfish attached to the herring bait.

In addition to the former capture methods, STK collaborated with KSWCD, who received funding from the USFWS Coastal Program to trap for Signal Crayfish within Buskin Watershed in 2014-2016. Standard minnow traps were used for the trapping effort. The trap openings were enlarged from 1” to 2” to allow passage for larger crayfish. Frozen herring was used for bait, with a single herring being placed into a mesh bag and tied to the top of the trap (Figure 7). The STK Invasive Species Crew assisted the KSWCD crew with setting and checking traps. In total, 44 Signal Crayfish were captured over a 20-week period.

The results are shown below (Table 1-2, Figures 8-13).

Table 1. Results for Signal Crayfish by capture method within Buskin Watershed during the survey.



*Same distance of lakeshore fished each year

Table 2. Results for Signal Crayfish size classes and sex ratios during the survey.

	2016	2017
Mean total length	83.7 mm (3.3 inches)	66.3 mm (2.6 inches)
Largest specimen	200 mm (7.9 inches)	185 mm (7.3 inches)
Smallest specimen	10 mm (0.4 inches)	16 mm (0.6 inches)
Sex Ratio	1.2 (female) : 1 (male)	1.2 (male) : 1 (female)
# females	193	309
# males	159	382
# unknown (juveniles)	63	17

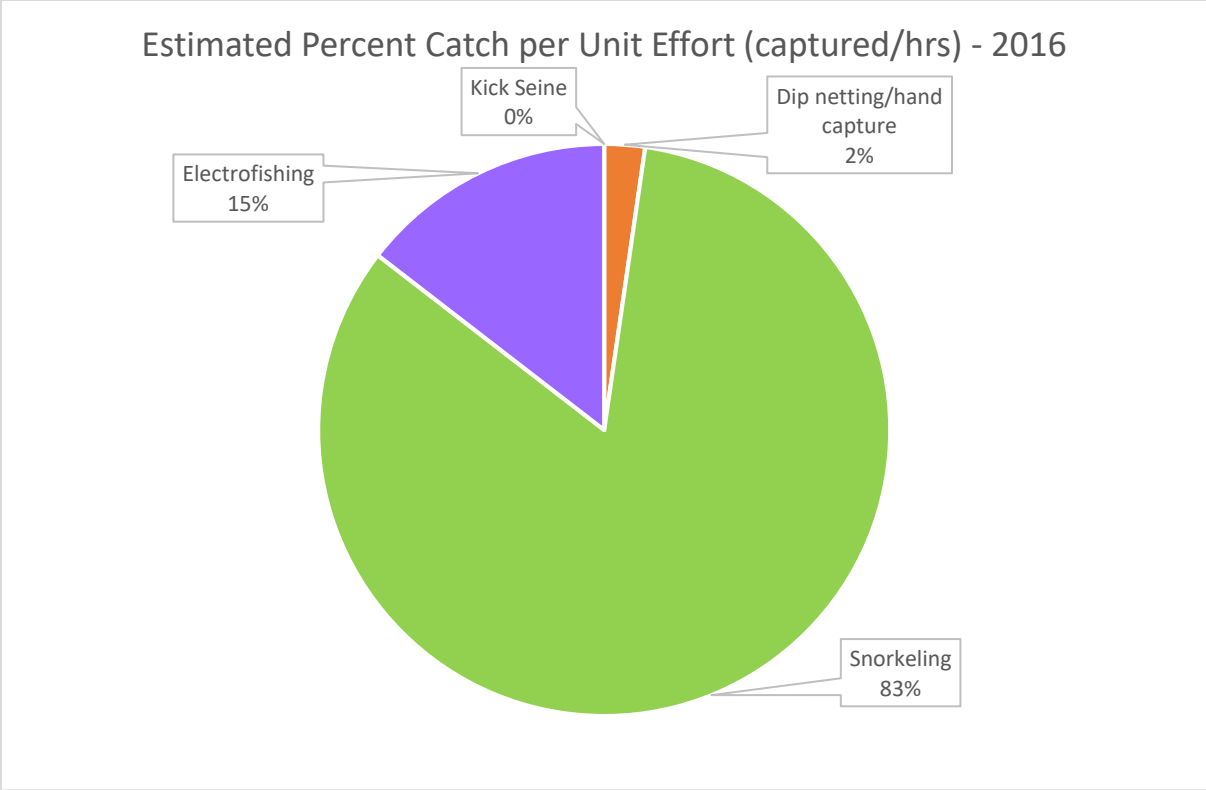


Figure 8. Estimated percentage catch per unit effort in 2016, based on the various methods utilized.

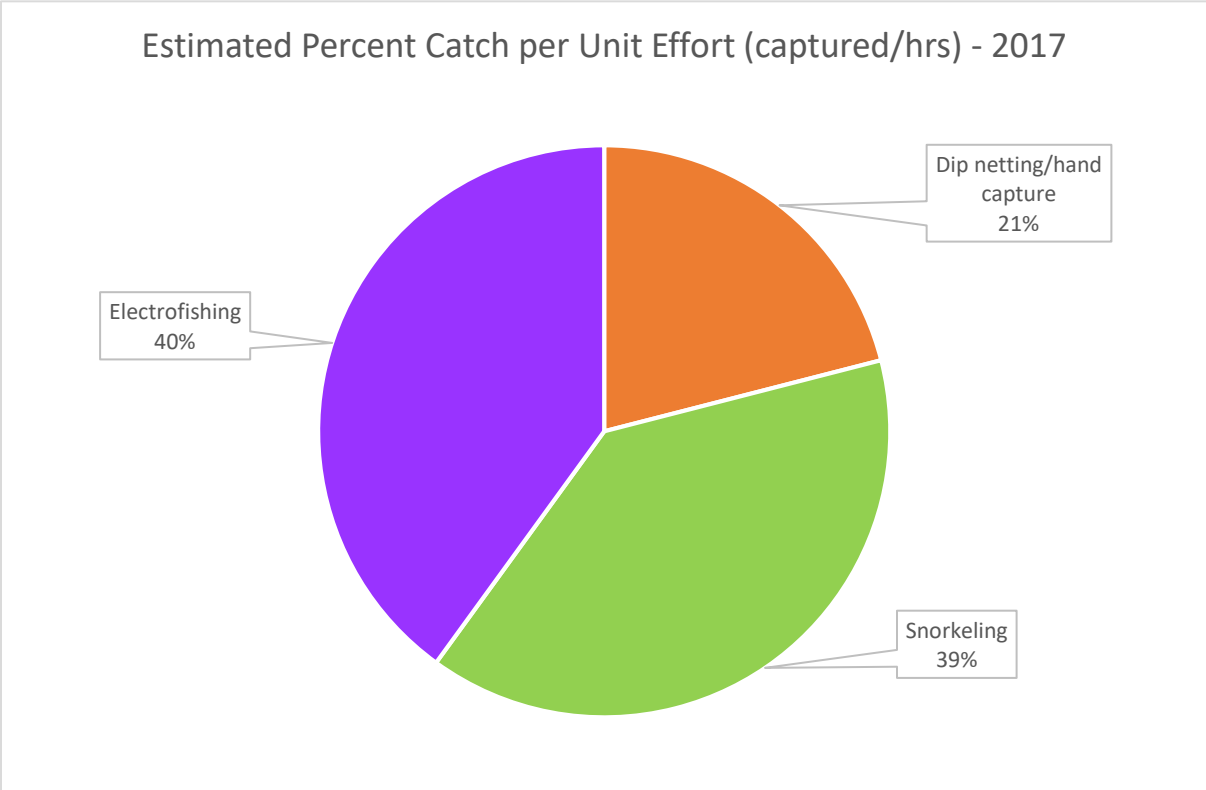


Figure 9. Estimated percentage catch per unit effort in 2017, based on the various methods utilized.

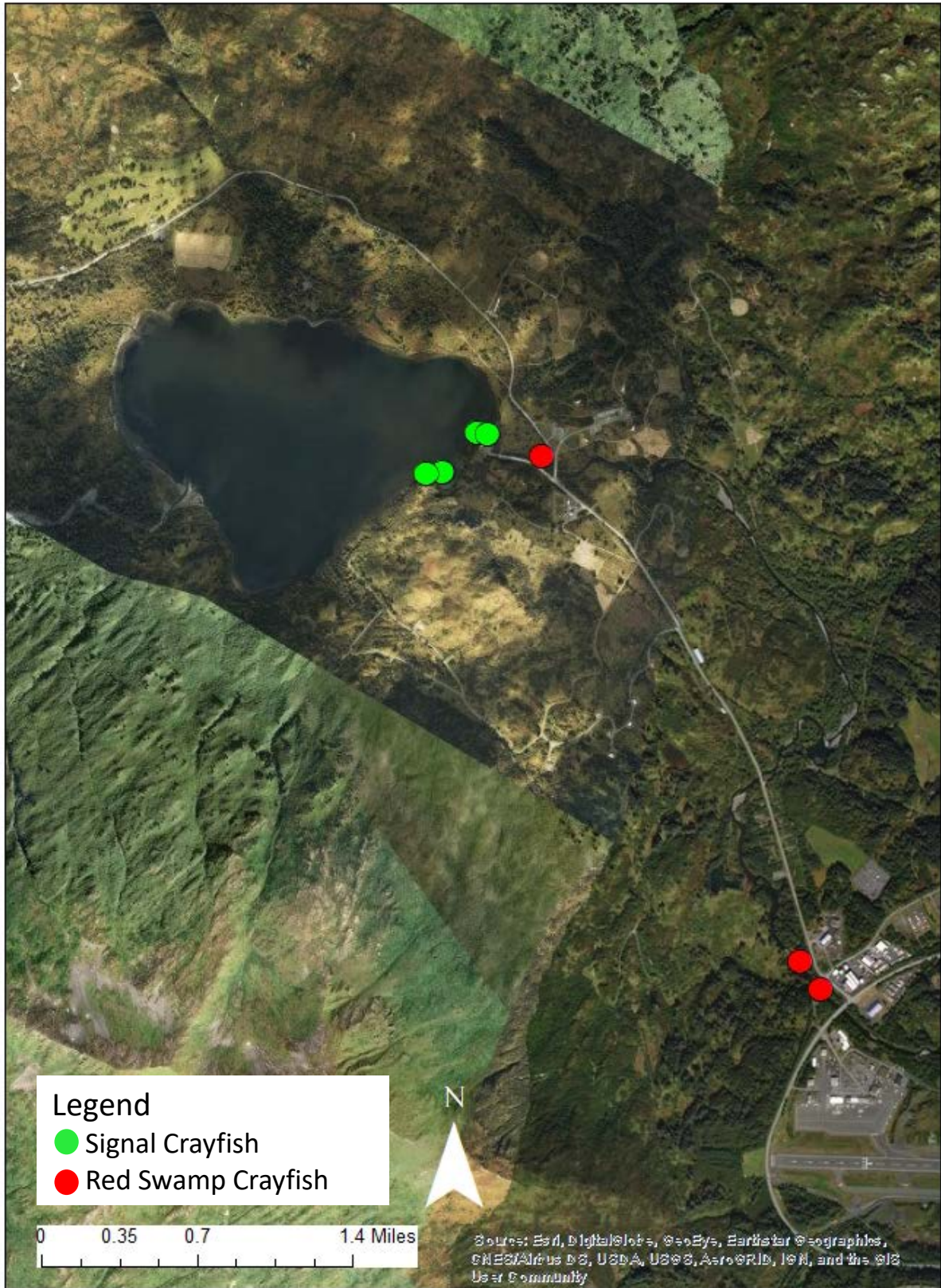


Figure 10. 2016 capture locations of live Signal Crayfish and dead Red Swamp Crayfish.

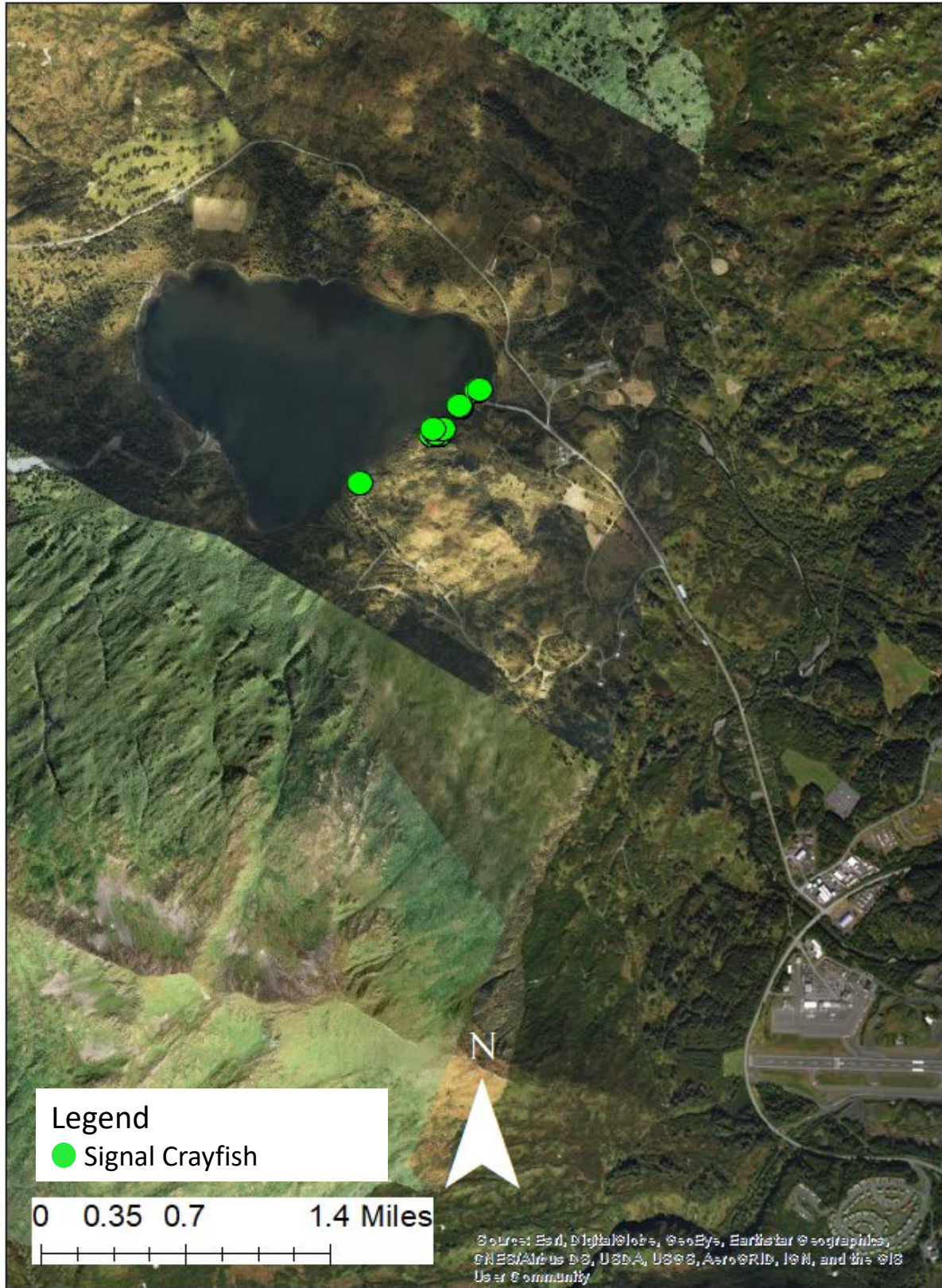


Figure 11. 2017 capture locations of live Signal Crayfish.

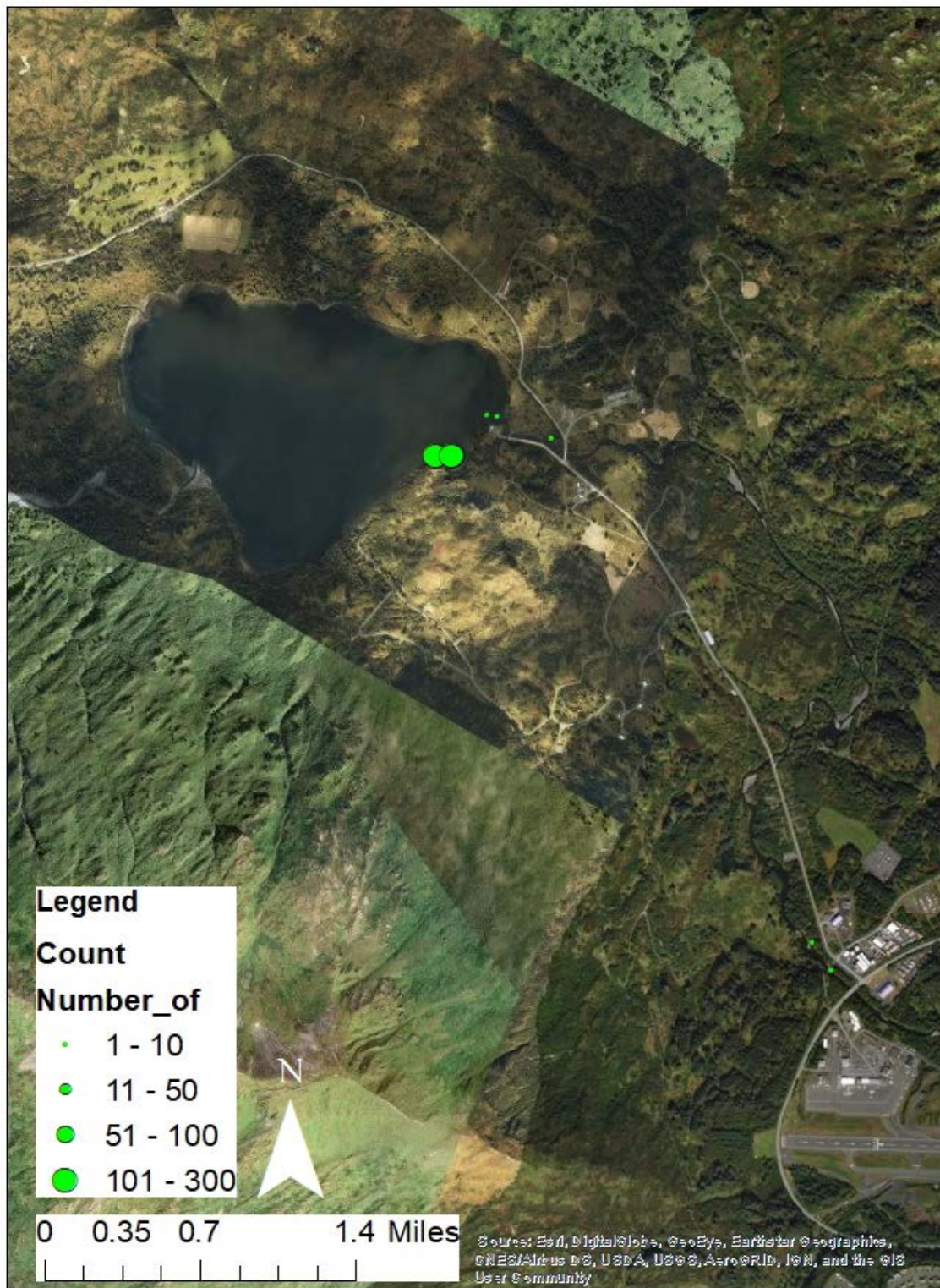


Figure 12. Number of crayfish captured per location in 2016.

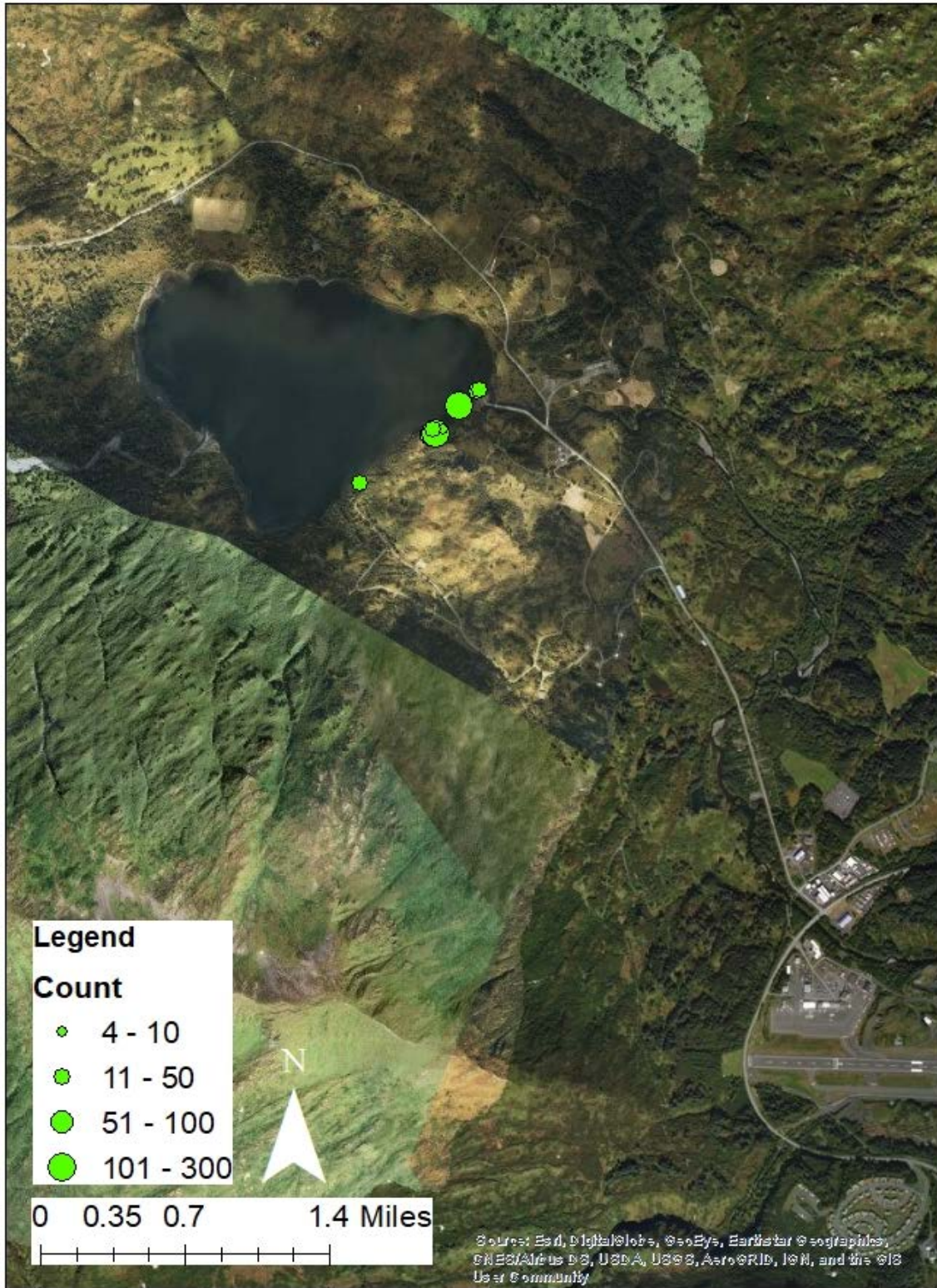


Figure 13. Number of crayfish captured per location in 2017.

Partnerships and Public Outreach (Objectives 3 and 5)

Partners for this project included KSWCD, ADF&G, Koniag, Inc., USFWS – Anchorage Fish and Wildlife Conservation Office as well as USFWS – Kodiak National Wildlife Refuge (KNWR). KNWR staff provided bear defense training for staff at the start of the field season. During the 2016 field season, STK worked extensively with KSWCD staff to conduct trapping of Signal Crayfish and bear guard duty within Buskin Watershed over a period of 10 weeks. STK and KSWCD also worked together to maximize public outreach. This included posting signs at Buskin Lake outlet and all river access points concerning invasive crayfish (Figure 14), and being interviewed by the local public radio station about the crayfish efforts (<http://kmxt.org/2016/08/talk-rock-crayfish-buskin-river/>).



Figure 14. Buskin Watershed public outreach sign.



Figure 15. A 3rd Grade student dissects a Signal Crayfish.

Additionally, STK posted information and videos about Signal Crayfish on the Tribal website (www.sunaq.org/nrd) and on social media. STK also attended the 2016 and 2017 US Coast Guard (USCG) – Base Kodiak “Welcome Aboard” event to teach new Coast Guard transfers about Signal Crayfish in Kodiak waters. STK frequently worked with the USCG for access to lands within the watershed.

Public outreach and information presentations were given at the following events:

- 2016 and 2017 BIA Providers Conference
- 2016 Alaska Annual Invasive Species Workshop
- 2017 Alaska American Fisheries Society Meeting
- 2017 Alaska Forum on the Environment
- 2017 Kodiak Area Marine Science Symposium
- 2017 Kodiak Rotary Club
- 2017 Southeast Alaska Environmental Conference
- 2017 Kodiak Regional Planning Team

Additionally, STK taught at two KNWR Salmon Camp classes, a Youth Conservation Corps orientation, two crayfish dissections at Kodiak's Peterson Elementary School (3rd and 4th Grades) (Figure 15), the St. Mary's Kindergarten class, and Signal Crayfish life history and ecology at Kodiak High School Gifted & Talented class.

Other Partnerships and Outreach

USFWS – Anchorage staff loaned STK electrofishing gear (backpack electrofisher, batteries, battery charger, and nets) for the August 2017 electrofishing sessions. The loaned gear contributed approximately \$2,000 saved in grant project funds.

ADF&G – provided two Fish Resource Permits (SF2016-208 and SF2017-161) to STK for collection and sanitary disposal of Signal Crayfish. Ten voucher specimens were sent to the ADF&G Invasive Species Coordinator (on November 22, 2016) per the permit requirements. Additionally, per the permit requirements, Collections Reports were submitted to ADF&G on October 20, 2016 and October 12, 2017. Research Reports were submitted on March 8, 2017 and March 29, 2018 with those details repeated in this BIA-funded Closing Report.

All project partners were updated through emails and in person meetings. STK emailed all project partners and other interested parties (KNWR, ADF&G, USCG, Kodiak/Aleutians Regional Subsistence Advisory Council, Alaska Sea Grant, and Koniag, Inc.) a project Technical Memo on July 21, 2016.

As previously mentioned, STK worked with members of the public who were capturing Signal Crayfish for culinary use. In particular, three members of the public who frequently snorkeled for crayfish allowed us to sample 195 and 52 of the Signal Crayfish they captured during the 2016 and 2017 field season, respectively. All harvest collections done by the public were recorded informally. Due to the public outreach conducted, STK received numerous emails and phone calls from other people harvesting crayfish within Buskin Lake by snorkeling, trapping, and scuba diving. Because members of the public were harvesting crayfish at all hours of the day, total harvest levels could not be consistently documented.

As part of the public outreach component of the grant, a video was produced to summarize the 2016 field season. The video can be viewed at: <https://www.youtube.com/watch?v=vzqXujVBZtc>. STK Project Investigators wish to acknowledge STK Invasive Crew member Dave Kaplan for producing this video for the project.

Tribal Youth Involvement (Objective 2)

During the 2016 field season, STK hired a three-person “Invasive Species Crew” to survey the watershed for this project. One member of the crew was a Sun’aq Tribal member acting primarily as a bear guard and community outreach liaison (Tonya Lee). Additionally, multiple volunteers assisted with project activities, including one STK Tribal youth.

During the 2017 field season, STK hired three Tribal youth with funding assistance provided through the BIA Tribal Youth Initiative Program. The Natural Resources Intern, Mandi Cox, assisted with crayfish captures through dip netting/hand capture, electrofishing, and data entry (Figure 16). The Fisheries Intern, Brandon Mahle, assisted with crayfish captures through dip netting/hand capture and electrofishing, data entry, and public outreach at the USCG Base Kodiak “Welcome Aboard” event.



Figure 16. Mandi Cox, Natural Resources Intern, measures the total length of a Signal Crayfish.

See Appendix A for the Invasive Species Technicians summaries and field season logbooks.

Opinion on the Risk Posed to Ecosystem Services

Based on the survey results from the 2016 and 2017 field seasons, the population of Signal Crayfish is concentrated within Buskin Lake and is thriving. Sun’aq Tribe of Kodiak is alarmed about the presence of Signal Crayfish within Buskin River Watershed and how the invasive species may impact wild salmon stocks vital to the Tribe’s traditional/subsistence culture, lifestyle, and economic means.

To conserve the natural diversity and subsistence resources of the Buskin River Watershed, federal, state and Native Corporation natural resources managers and other land owners in the area need to better understand the population dynamics of this invasive crayfish. To achieve this, STK will assist collaborators by expanding and sharing their research on Signal Crayfish over the next several years. Based on other Signal Crayfish invasions in Europe, the potential for damage caused by this species to Alaskan salmon streams is a valid concern. See “Next Steps/Future Work” section below.

Next Steps/Future Work

With preliminary information gained through support from BIA’s Invasive Species Program (the subject of this Final Project Report), STK applied for and received funding from the USFWS Tribal Wildlife Grant Program in August 2017. The now funded project, titled “Distribution, Movement and Diet of Invasive Crayfish Populations in Buskin River Watershed on Kodiak Island, Alaska” focuses on learning about the population dynamics of the Signal Crayfish and continued monitoring of the entire watershed for their presence in the main stem river, other lakes and tributaries. STK will partner with multiple natural resource agencies and landowners who share a concern for the abundant subsistence resources of the Buskin River Watershed.

Snorkel/scuba diving transect surveys will be utilized to delineate the spatial distribution of Signal Crayfish in Buskin Lake (Figure 17 depicts one of 30 sites to be surveyed). Seasonal habitat use patterns of Signal Crayfish will be determined through a pilot radio tagging study in Buskin Lake. The diet of the Signal Crayfish population will be analyzed through stable isotopes. Additionally, a mark-recapture technique will be employed to provide a crayfish abundance estimate for Buskin Lake. All data and project findings will be detailed in the Buskin River Watershed Signal Crayfish Report in the last year of the project and shared publicly. The two-year project will start in May 2018.



Figure 17. Snorkeling survey transect design in Buskin Lake.

Sun'aq Tribe of Kodiak- Invasive Species Project Field Log

Date: June 14, 2016

Time: 0900

Location: Boyscout Lake outlet

Parked at Boyscout lake parking lot and walked channel starting from lake outlet. First several hundred yards was cobble and rock. Some old debris from a dock. Started getting muddy – no shelter from crayfish (not prime habitat). Lots of salmon fry and reeds on the stream. Stream converges with Rezanof Drive with a small culvert.

Time: 1000

Parked at Lake Catherine (near location of LCC parking site) and walked channel from lake outlet to convergence into Lake Louise. First part of stream rocky and cobble. New culvert going underneath road. Stream narrows after culvert and starts getting muddy. Last 100 yards was all muddy and lots of lily pads.

Date: June 21, 2016

Time: 0830

Location: Approximately 200m upstream from Buskin Bridge 7

Kodiak Soil and Water Conservation District (KSWCD) set traps while STK crew practiced kick net. Turned over rocks. No crayfish found.

Note: Kick net needs some weight(s) on bottom of net.

Time: 0950

Location: Approximately 200m downstream of ADF&G weir.

No crayfish found.

Time: 1010

Location: ~1 mile stretch of Lower Buskin River, starting at tide water going upstream

Lots of vegetation on this lower reach, deep water intertidal zone in places. Approximately ½ mile upstream habitat shifted to small gravel areas with fast water, then larger deeper pools. Turned over rocks. No crayfish found.

Time: 1340

Location: Picnic Pavilion at Buskin Outlet

Some decent substrate for kick net and seine net. Moderate gravel 1 inch to 3 inches. Nice sample area. Light flow/calm for approximately 200m. No crayfish found.

Time: 1410

Location: Buskin Bridge 2

Faster water, slippery rocks. No crayfish found.

Time: 1430

Location: Buskin Bridge 2

Large pile up of wood debris. May be good for traps. Water was fairly dark even for viewfinder.

Time: 1505

Location: Buskin Bridge 2 backtrack downstream to Picnic Pavilion

Turned over more rocks. No crayfish. Made way back downstream passing fishing plunge pool. Fairly deep and fast.

Date: June 22, 2016

Time: 0900

Location: Met KSWCD on Buskin downstream from weir

Set traps yesterday. No crayfish. KSWCD crew deployed more traps downstream from Buskin Bridge 7.

Time: 0930

Location: Picnic Pavilion

Tested kick seine net on stretch of lower Buskin at Picnic Pavilion. The net is very light and had a hard time staying uniform on bottom of river substrate. Leads are light, river flow plows the leads up leaving gaps.

Note: We need to modify pole attachments.

Time: 1310

Location: Buskin main and east braid of river across from Picnic Pavilion

Used kick screen with chain at the bottom. Worked well. Also turned over more rocks. No crayfish found.

Time: 1430

Location: Buskin Bridge 2

Kick seined and turned over rocks. No crayfish found.

Note: Tonya Lee and daughter Carly (STK Tribal members) assisted STK crew this afternoon.

Time: 1515

Location: Beaver Pond near Bridge 6

Got a report that somebody found a dead "red" crayfish at "beaver pond" near bridge 6. STK crew made a quick survey on east side of beaver pond. No crayfish found.

Date: June 23, 2016

Time: 0830

Location: Upstream approximately 200m and downstream 200m from Bridge 7

Checked 20 traps set by KSWCD. No crayfish found in traps.

Time: 0930

Location: Lower end of Devils Creek

Surveyed from culverts to main Buskin River. Some good potential areas for kick screen and rock flipping.

Time: 1030

Location: Buskin River Bridge 2

Surveyed upstream from Bridge 2 some potential areas for kick screen and rock flipping.

Time: 1330

Location: Middle Devils Creek road to airport runway/road

Few areas to kick screen or flip rocks.

Date: June 24, 2016

Time: 0845

Location: Buskin Bridge 7

Pulled trap line with KSWCD. No crayfish found.

Time: 0930

Location: Devil's Creek upstream from old hatchery site to stop point on map

Very hard beating brush and walking creek after approximately 400m. Upper portion of sector was very dense with brush and creek morphology had faster water, plunge pools and obstacles. Flipped rocks in these areas

and found no crayfish. Best potential catch sampling would be the lower reach of the section from old fish hatchery approximately 400m upstream.

Time: 1130

Location: Upstream from Buskin Bridge 2

Looked for crayfish with view finder and flipping rocks. Started to rain which made visibility difficult. With low light and rain, we called it a day. We will go back to this section again.

Date: June 30, 2016

Time: 0830

Location: Buskin Lake outlet above weir downstream approximately 300m past bridge #7

Received information that some people were catching crayfish above weir off the sides of the lake shore. STK crew surveyed and flipped rocks where crayfish were reported caught. Found a baited minnow box trap on line, out offshore of the lake approximately 30m. No crayfish found, then threw trap back. Also, found several make-shift plastic soda bottle traps that were baited. No crayfish found.

Note: People who caught crayfish were using mask, snorkel, and wetsuits. Hotline (radio) announcement went out from office about local crayfish catch. People who caught crayfish around lakeshore called STK and gave more information about crayfish catch. Was reported that several daily catches yielded approximately 2 to 4 pounds of live crayfish.

Time: 1330

Location: Upper Devil's Creek approximately 400m upstream from old fish hatchery

Water flow in this section was faster than other day due to rains. Flipped rocks, visibility fair to poor. No crayfish found.

Time: 1445

Location: Middle Devil's Creek near road culvert

Flipped rocks near culvert and downstream until cedar substrate. No crayfish found. Water flow moderate to fast deep pool out from culvert.

Date: July 1, 2016

Time: 0830

Location: Lake outlet

STK attached project contact information to two unidentified traps at the lake outlet. Could not find the 3rd trap we found yesterday. Flipped some more rocks and found another Signal Crayfish claw.

Time: 0915

Location: Lower Devil's Creek

Flipped rocks starting at culverts going downstream to Buskin main. Water flow was moderate to very fast. No crayfish found.

Time: 1015

Location: Boyscout Creek

Tried flipping rocks on approximately 500m stretch; visibility poor due to overcast skies. Also, this stretch of creek has fine dark sediment which makes visibility harder after flipping rocks. May have to go back on a sunny day.

Date: July 3, 2016

Time: 1430

Location: Boyscout Creek

Went back to creek when there were bright and clear skies. Creek had better visibility than other day. Brought two volunteers to help. Flipped rocks all the way downstream to muddy slough areas. No crayfish found.

Time: 1600

Location: Lower tributary from Lake Louise to Buskin Main

Hard to access, very brushy with road access. Volunteers were not comfortable whacking through brush. Went to Coast Guard fence near "Nemetzs Gazebo" park. Lots of fence, no easy access with locked fence. Will probably need Coast Guard to open locked gate to finish survey.

Date: July 5, 2016

Time: 0830

Location: Buskin Beaver Pond

Helped KSWCD to bait and set ten traps on perimeter of Buskin Beaver Pond. Will go back first in the morning to check traps.

Date: July 6, 2016

Time: 0900

Location: Buskin Beaver Pond

Checked baited traps (10) with KSWCD. No crayfish caught. Few traps yielded some sticklebacks, sculpin, and a few salmon fry.

Date: July 7, 2016

Time: 0830

Location: Buskin Beaver Pond

Checked traps (10). No crayfish caught.

Time: 0930

Location: Confluence of Catherine and Lake Louise

Surveyed and flipped rocks from outlet creek of Lake Catherine and passed culvert going toward Lake Louise. No crayfish found.

Time: 2030

Location: Buskin Lake Outlet

Kodi Garcia and Brett Kutyna called saying that they just finished catching crayfish at lake outlet. They brought the crayfish to Dave's house. Took pictures and grabbed a small sample that went into the freezer. Kodi and Brett said that they are willing to assist STK in any way and will call when they decide to go back to the lake again.

Date: July 8, 2016

Time: 0830

Location: Buskin Beaver Pond

Pulled traps for weekend. No crayfish caught.

Time: 1300

Location: Dave's house

Redid trap lines, dried traps for next week.

Date: July 11, 2016

Time: 0830

Location: Buskin Lake outlet below weir and downstream approximately 200m

Re-deployed traps (12) in Buskin Lake below weir and downstream. Also found two new traps further in the lake. These were "mesh" traps larger than what STK is using. Note: Mesh traps belong to Kodi and Brett.

Time: 1030

Location: Buskin River behind "Comfort Inn" approximately 600m from Rezanof Bridge to Devil's Creek lower section. Water fast and deep. Not a great sample area.

Time: 1500

Location: Buskin main by pipe approximately 400m upstream from Bridge 3

Found another dead Red Swamp Crayfish lying on bottom. Brought back to office to sample.

Date: July 12, 2016

Time: 0830

Location: Buskin Lake and downstream from weir.

Checked traps (12). No crayfish found.

Time: 0900

Location: Buskin River section approximately 700-800m from Bridge 3

Found one whole dead Red Swamp Crayfish (missing claw). Then found nine separate claws in same area semi-exposed under smaller cobble rocks and gravel. Brought back to the office to sample.

Date: July 14, 2016

Time: 0830

Location: Buskin Lake and downstream from weir.

Checked traps. No crayfish caught. Some incidental catch (dollies, stickleback and salmon fry). Weather is bad, rainy and windy. No surveys performed today.

Date: July 15, 2016

Time: 0830

Location: Buskin Lake and downstream from the weir

Pulled traps for the weekend, no crayfish caught.

Time: 0930

Location: Buskin main upstream from Bridge 3 to Bridge 5

Finished survey on week five. No crayfish found. Section was fast and deep water, some areas shallow.

Time: 1330

Location: Upper tributaries back of Buskin Lake

Tried to find data loggers on lower tributary. Could not find them. Surveyed first tributary near the golf course road. No crayfish found. Tributary was slow water and very narrow. High brush made it hard to survey. No crayfish found.

Date: July 17, 2016

Time: 1430

Location: Lake Louise to Buskin Main

Surveyed upper portion from Rezanof Drive to Lake Louise. No crayfish found. Slow moving water, shallow in places. Very dark along Coast Guard fence.

Date: July 18, 2016

Time: 0930

Location: Week six section, Buskin River upper main

Surveyed and flipped rocks, no crayfish found. Stretch of river was mostly fast and deep. Few areas to sample or survey.

Time: 1315

Location: Upper portion of Lake Louise to Buskin Main section near Rezanof Drive

Helped KSWCD look for reed canary grass. Found some spots and KSWCD took photos and marked sections with GPS. Flipped more rocks going upstream on creek past small bridge along fence line near Lake Louise. No crayfish found. The creek was very dark and most of the substrate was small gravel size stones.

Date: July 19, 2016

Time: 0830

Location: Buskin Lake outlet downstream to Bridge 2

Set ten traps in four locations. Buskin Lake outlet (3 traps). 400m downstream from Bridge 6 (2 traps). Approximately 400m upstream from Bridge 3 (2 traps) and directly under Bridge 2 (3 traps).

Time: 1050

Location: Beaver Pond

Used view finder in and around Beaver Pond. No crayfish found. Very deep and muddy.

Time: 1330

Location: Approximately 500m downstream from Buskin Beaver Pond

Checked out some suitable areas to flip rocks, winds picked up, made visibility hard. Also talked with a fisherman who informed us that he saw photos of more snorkel efforts. Gave him STK info to send photos.

Date: July 20, 2016

Time: 0830

Location: Buskin Lake outlet downstream to Bridge 2

Checked traps (10), no crayfish caught. Note: Also added two more traps 50ft and 100ft below weir.

Date: July 21, 2016

Time: 0830

Location: Buskin Lake outlet downstream to Bridge 2

Checked traps, no crayfish caught.

Time: 0930

Location: 400m Southeast side from ADF&G weir, beach and rocky shorelines.

“Snorkel Boys (Brett Kutyna and Kodi Garcia) suited up and started diving. STK and KSWCD flipped rocks. Ten crayfish caught and sampled. Approximately 200 crayfish caught by “Snorkel Boys”. All catch was sampled. Also took land and underwater video. Lots of crayfish in the southeast portion of Buskin Lake.

Date: July 22, 2016

Time: 0830

Location: Buskin Lake outlet downstream to Bridge 2

Pulled all traps for the weekend, no crayfish captured.

Date: July 25, 2016

Time: 0830

Location: Buskin Lake southeast shore, approximately 400m from lake outlet

Set 10 traps along lakeshore where crayfish were caught during snorkel effort. Also set one trap near lake outlet and one trap just below the weir. Weather cloudy and rainy, no surveys conducted today.

Date: July 26, 2016

Time: 0830

Location: Buskin Lake southeast shore, approximately 400m from lake outlet

14 crayfish caught in 5 out of 12 traps. Larger crayfish in traps further out on the point. Sampled all catch back at office.

Date: July 27, 2016

Time: 0830

Location: Buskin Lake southeast shore, approximately 400m from lake outlet

4 crayfish caught in traps. Note: 1 of 4 was caught at the trap below the weir.

Date: July 28, 2016

Time: 0830

Location: Buskin Lake southeast shore, approximately 400m from lake outlet

No crayfish caught in traps. After trap check, we hung several crayfish information leaflets on Buskin River public info boards.

Date: July 29, 2016

Time: 0830

Location: Buskin Lake southeast shore, approximately 400m from lake outlet

Pulled all crayfish traps for the weekend, 4 crayfish caught in traps. KSWCD sampled the crayfish, passed data to STK.

Time: 1030

Location: Bridge 7 downstream passing Bear Creek

Surveyed approximately 1 mile from Bridge 7, slow water flow first half mile, then fast water until final reach of section. Some small areas okay for sampling, most areas in this reach fast water and riffles coming back upstream. Walked into Bear Creek. Very fast water and substrate not very suitable for crayfish.

Date: August 1, 2016

Time: 0830

Location: East side shore of Buskin Lake above lake outlet

Set 12 traps, 8 on lakeshore, 2 at lake outlet, and 2 below weir. Used herring and bagged tuna fish for bait.

Date: August 2, 2016

Time: 0830

Location: East side of Buskin Lake above lake outlet

Checked 8 traps. Caught one crayfish in traps in lake outlet and another crayfish below weir.

Time: 1000

Location: Bear Creek starting at bridge

United States Coast Guard (USCG) opened gate so we could survey. Went upstream approximately half mile, mostly fast moving shallow water. Some decent spots below the bridge for possible trapping. No sign of crayfish thus far.

Date: August 3, 2016

Time: 0830

Location: East shore of Buskin Lake

Checked traps, only 1 crayfish caught in trap set at lake outlet.

Time: 0915

Location: Bear Creek

Continued survey approximately 400m past the USCG Bridge. Made it past data loggers and continued upstream until we got to a tributary. Really could not go beyond the tributary. Most of the creek is fast water,

shallow to deep plunge pools and some small waterfalls. Creek substrate was larger cobble and boulders. Flipped rocks, no crayfish found.

Date: August 4, 2016

Time: 0830

Location: East shore of Buskin Lake and outlet and below weir

Pulled 12 traps for the weekend. No crayfish caught.

Date: August 8, 2016

Time: 0830

Location: Northeast shore, back of Buskin Lake (behind golf course) and lake outlet and below weir

Set 12 traps. 8 on northeast shore, 2 at lake outlet, and 2 below weir.

Date: August 9, 2016

Time: 0830

Location: Buskin Lake Outlet and below the weir

Three crayfish caught in traps at lake outlet. Another three crayfish caught in traps below the weir.

Date: August 9, 2016

Time: 0900

Location Northeast shore, back of Buskin Lake

Pulled all traps due to bears destroying four out of eight traps. Surveyed back of lake tributaries. Lots of bear activity. Decided not to trap back side of lake due to very shallow water, all sandy substrate, and with bear activity damaging traps.

Note: Found injured juvenile eagle on lake shore. Called this in to USFWS. No action was taken.

Date: August 10, 2016

Time: 0830

Location: Buskin Lake outlet and approximately 200m downstream from weir

Deployed eight traps, above weir and downstream. Caught 2 larger crayfish.

Date: August 11, 2016

Time: 0830

Location: Buskin lake outlet and approximately 200m downstream

Checked traps. 1 crayfish caught approximately 100m downstream from weir.

Note: This is the furthest downstream where a crayfish has been caught live.

Date: August 12, 2016

Time: 0830

Location: Buskin Lake outlet and approximately 200m downstream from weir

Pulled all traps (12) no crayfish found.

Date: August 13, 2016

Time: 0930

Location: Buskin Lake outlet and southeast side of lake approximately 400m into lake from outlet
1st day of conducting electrofishing efforts. Combined crew was STK, KRAA, and KSWCD. Began electrofishing at lake outlet. No crayfish caught. Then went to southeast side of lake approximately 400m from Lake outlet "Crayfish Beach". A total of 79 crayfish were caught. Sizes ranged from adult, subadult, juvenile, and very small first of the year hatch.

Date: August 14, 2016

Time: 0930

Location: Buskin Lake, southeast side of lake "Crayfish Beach"

Continued 2nd day of electrofishing efforts. Same combined crew with the addition of Will Frost (ADF&G) using a second electrofisher unit. A total of 90 crayfish were caught. Sizes ranged from adult, subadult, juvenile, and very small first of the year hatch.

Date: August 20, 2016

Time: 0900

Location: Back side of Buskin Lake – middle small tributaries and upper tributary ending at road culvert
Nice day, sunny, good visibility. Had Camera Q volunteers and Tonya Lee. First short tributary had lots of sockeye spawning. No sign of crayfish or suitable habitat. Mostly small gravel and sand/silt substrate. Second short tributary. No crayfish found, mostly a slough, still some flow with mostly silt/mud substrate. Upper tributary leading to road culvert. Salmon spawning gravel at lower reach with sockeye adult spawning. Upper reach had faster shallow water, some recent cobble for crayfish. Flipped rocks, nothing found.

Date: August 23, 2016

Time: 0830

Location: Southeast side of Buskin Lake, ~600-700m north from snorkeling point

Met US Coast Guard for gate access. Drove to end of gated road with escort. Found very good habitat off beach on lakeshore. Deployed six traps and began flipping very good cobble rocks. Saw quite a few crayfish. Captured 6-8 crayfish for sampling. This stretch of beach is similar to the beach extending south from the snorkeling point. Lots of movable cobble, gravel and medium to large boulders. Crayfish caught were in ankle to knee deep water. Mostly sub-adults captured 1-2 meters off lakeshore. Lots of bear activity, need to be careful. Observed ~10 Sockeye Salmon lakeshore spawners. Will check traps in the morning.

Date: August 24, 2016

Time: 0845

Location: Southeast side of Buskin Lake, ~600-700m north from snorkeling point

Escorted from road gate by USCG. Checked trap-line. 2 crayfish caught in the traps.