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APPENDIX A

DESCRIPTION OF 31 PRIMARY AND SECONDARY TRIBUTARIES
ABOVE DEVILS CANYON FROM WHICH 20 TRIBUTARIES WERE
SELECTED FOR HABITAT MAPPING

PRIMARY TRIBUTARIES DOWNSTREAM OF PROPOSED DAM SITE

PRM 155.9 - Cheechako Creek – Proposed for Habitat Mapping (HRM 152.4)



Cheechako Creek flows into the Susitna River on river left at PRM 155.9 and drains approximately 94.3 km² (36.4 mi²) (Sautner and Stratton 1983). The main channel of Cheechako Creek is approximately 17.2 km (10.7 mi) in length. Multiple falls located roughly 3.4 km (2.1 mi) upstream from its confluence with the Susitna River prevent the upstream movement of adult salmon. Upstream from the falls, the drainage includes a few tributary streams and small lakes.

Fish distribution sampling was conducted in one sample segment, which was located downstream of the fish barrier. Backpack electrofishing was conducted from the mouth to a point approximately 175 m upstream. The entire sample segment was characterized as cascade mesohabitat. No other sampling methods were attempted.

A total of 51 fish were captured during the 16.75 minutes (1,005 seconds) of effort on August 16, 2012. Juvenile Chinook salmon dominated the catch (n=35), followed by Dolly Varden (n=12), Arctic grayling (n=3) and sculpin (n=1). Fork lengths of the juvenile Chinook salmon ranged from 54 mm to 72 mm. A length-frequency histogram for the juvenile Chinook salmon is provided in Appendix 4.

Cheechako Creek was one of only two tributary streams where juvenile Chinook were captured, and was the only location where Chinook salmon dominated the catch. The Chinook salmon were captured primarily from behind boulders and on the margins of the left bank. The stream channel sampled was approximately 12 meters wide and mean depth was 0.45 m. Boulders (70

percent) dominated the substrate; the presence of cobble (20 percent) and gravel (10 percent) was also documented. Visibility in this clearwater stream was considered good to excellent during the survey. Minimal overhanging vegetation was noted in the sample area.

Adult Chinook salmon were observed in this tributary downstream of the barrier during an aerial salmon spawning survey in 2012. The presence of adult Chinook salmon was also documented in the 1980s (ADF&G 1985).

PRM 160.5 - Chinook Creek – Proposed for Habitat Mapping (HRM 157.0)



Chinook Creek flows into the Susitna River on river left at PRM 160.5 and drains approximately 58.0 km² (22.4 mi²) (Sautner and Stratton 1983). The main channel of Chinook Creek is roughly 17.1 km (10.6 mi). This stream was assessed for the presence of adult salmon passage barriers in 2012; no barriers were identified on Chinook Creek. A small secondary channel flows into Chinook Creek roughly 2.1 km (1.3 mi) upstream from its mouth. A waterfall prevents upstream adult salmon movement into the secondary channel.

Fish distribution sampling occurred in Chinook Creek on (July 24, 2012); backpack electrofishing was the primary method used. Electrofishing was conducted in three spatially separate segments over a combined total distance of 180 meters. Mesohabitat sampled was classified as riffle (50.0 percent), pocket-water run (33.3 percent), and cascade (16.7 percent). A total of 29 fish were captured from Chinook Creek during the 16.33 minute (980 seconds) of backpack electrofishing effort. Dolly Varden (n=20) dominated the catch; sculpin (n=9) were also captured. Angling was conducted in the single segment located near the mouth; no fish were captured. Chinook Creek was 1 of 13 streams where Dolly Varden were captured and was 1 of 3 streams where backpack electrofishing catch was dominated by Dolly Varden.

Adult Chinook salmon were observed in the main channel during an aerial salmon spawning survey in 2012. The presence of adult Chinook salmon in this stream was also documented in the 1980s (ADF&G 1985).

PRM 164.8 - Devils Creek – Proposed for Habitat Mapping (HRM 161.5)



Devils Creek flows into the Susitna River on river right at PRM 164.8. Devils Creek drains approximately 190.6 km² (73.6 mi²) (Sautner and Stratton 1983) and includes a number of tributaries and lakes, including High Lake and Little High Lake. The main channel of Devils Creek is roughly 25.4 km (15.8 mi). Two large waterfalls located roughly 2.3 km (1.4 mi) upstream from its confluence with the Susitna River prevent the upstream movement of adult salmon.

Sampling was not conducted in Devils Creek downstream of the adult salmon passage barrier due to the lack of a landing zone. Backpack electrofishing was conducted in one area located upstream of the barrier on August 16, 2012 to catalog fish species presence. Sampling was conducted over a distance of 200 m. Mesohabitat sampled was classified as 100 percent pocket-water riffle. Catch was dominated by Dolly Varden (n=38); sculpin (n=4) were also captured. Devils Creek was 1 of 13 streams where Dolly Varden were captured and was 1 of 3 streams where backpack electrofishing catch was dominated by Dolly Varden.

The presence of adult Chinook salmon has been previously documented downstream of the barrier (ADF&G 1985); adult Chinook were observed downstream of the barrier during all four aerial surveys in 2012.

PRM 169.5 - Unnamed Tributary (HRM 166.3)



This unnamed tributary flows into the Susitna River on river left at PRM 169.5. The tributary drains less than 50 km² (31 mi²). The main channel is roughly 8.7 km (5.4 mi). This stream was assessed for the presence of adult salmon passage barriers in 2012; no barriers were identified.

Backpack electrofishing was the only sampling method used in this tributary. Sampling was conducted in two segments over a total distance of 169 m. Mesohabitat sampled was classified as cascade (n=3, 91.7 percent) and run (n=1, 8.3 percent). A total of 29 fish were captured. Catch was dominated sculpin spp. (n=11), followed closely by Dolly Varden (n=10) and Arctic grayling (n=7). The presence of an unidentified salmonid was also recorded.

Backpack electrofishing was also conducted from the mainstem Susitna River within the vicinity of the tributary plume. Species composition of captured fish was similar; however, no Dolly Varden were captured from the plume. Arctic grayling (n=39) and sculpin (n=10) were captured from the plume.

This stream is similar in species composition, drainage area (less than 31 square miles), and accessible stream length as the four small tributaries that were selected for habitat mapping.

PRM 171.8 - Unnamed Tributary (HRM 168.7)



This unnamed tributary flows into the Susitna River on river left at PRM 171.8. The tributary drains less than 50 km² (31 mi²). The main channel of this tributary is roughly 4.2 km (2.6 mi). Multiple boulder cascades and complex chutes located roughly 0.6 km (0.4 mi) upstream from its confluence with the Susitna River were identified as barriers to adult salmon.

Backpack electrofishing was conducted in two areas, both located downstream of the barrier, over a total distance of 74 m. Mesohabitat sampled was 100 percent riffle. A total of 57 fish were captured. Catch was dominated by sculpin (n=46); followed by Arctic grayling (n=8) and Dolly Varden (n=3). Additional sculpin (n=20) were observed but not captured.

This stream is similar in species composition, drainage area (less than 31 square miles), and accessible stream length as the four small tributaries that were selected for habitat mapping.

PRM 173.8 - Unnamed Tributary (HRM 171.0)



This unnamed tributary flows into the Susitna River on river right at PRM 173.8. The tributary drains less than 50 km² (31 mi²); the main channel is roughly 5.5 km (3.4 mi). Multiple complex chutes identified as barriers to adult salmon were documented in its main channel, starting at a point roughly 2.3 km (1.4 mi) upstream from its confluence with the Susitna River. This small drainage includes a number of secondary tributaries, of which only one is located downstream of the first barrier.

Backpack electrofishing and angling were conducted in one sample segment downstream of the barriers. A distance of 142 m was sampled with the electrofisher; mesohabitat was 100 percent riffle. A total of 13 fish were captured, all Arctic grayling (n=8) were captured by angling and Slimy sculpin (n=5) were captured by electrofishing. Backpack electrofishing was also conducted from the mainstem Susitna River within the vicinity of the tributary plume. Arctic grayling (n=18) and sculpin (n=6) were documented in the plume.

This stream is similar in species composition and drainage area (less than 31 square miles), but accessible stream length is significantly shorter than the four small tributaries that were selected for habitat mapping.

PRM 175.8 - Unnamed Tributary (HRM 173.0)



This unnamed tributary flows into the Susitna River on river right at HRM 175.8. The stream drains less than 50 km² (31 mi²). The main channel of the stream is roughly 8.7 km (5.4 mi). A set of multiple falls located at a point roughly 0.3 km (0.2 mi) upstream from mouth was identified as a barrier to adult salmon.

Backpack electrofishing was conducted in two sample segments, both located downstream of the barrier, over a total distance of 77 m. No other sampling methods were used in this stream in 2012. The mesohabitat sampled was classified as cascade (58.4 percent), run (33.8 percent) and riffle (7.8 percent). Seven fish were captured, including Dolly Varden (n=1), Arctic grayling (n=1), and sculpin (n=5). Additional sculpin (n=3) were observed, but not captured.

Backpack electrofishing was also conducted from the mainstem Susitna River within the vicinity of the tributary plume. Species composition of captured and/or observed fish was similar to the tributary, with the exception of Dolly Varden. Dolly Varden were not captured or observed within the plume. Arctic grayling (n=8) and sculpin (n=5) were captured from the plume.

This stream is similar in species composition and drainage area (less than 31 square miles), but accessible stream length is significantly shorter than the four small tributaries that were selected for habitat mapping.

PRM 176.8 - Unnamed Tributary (HRM 174.0)



This unnamed tributary flows into the Susitna River on river left at PRM 176.8. The stream drains less than 50 km² (31 mi²) and includes a number of tributaries and lakes. The main channel of the stream is approximately 8.9 km (5.5mi). This stream was assessed for the presence of adult salmon passage barriers in 2012; no barriers were identified.

Backpack electrofishing was conducted in one sample segment just upstream from the mouth, over a distance of 46 m. The mesohabitat sampled was classified as run and riffle (73.9 percent and 26.1 percent, respectively). A total of 53 fish were captured. Catch was dominated by sculpin (n=35), followed by Arctic grayling (n=11) and Dolly Varden (n=3). Additionally, longnose sucker (n=1) and young of the year salmonids (n=3) were collected. Backpack electrofishing was also conducted in the mainstem Susitna River within the vicinity of the tributary plume. Species composition was similar; however, no Dolly Varden were captured. Arctic grayling (n=21), sculpin (n=32), and an unidentified salmonid (n=1) were captured.

This stream is similar in species composition, drainage area (less than 31 square miles), and accessible stream length as the four small tributaries that were selected for habitat mapping.

PRM 177.1 - Unnamed Tributary (HRM 174.2)



This unnamed tributary flows into the Susitna River on river left at HRM 177.1. The stream drains less than 50 km² (31 mi²) and includes a number of tributaries and lakes. The main channel of the stream is approximately 13.8 km (8.6 mi). This stream was assessed for the presence of adult salmon passage barriers; no barriers were identified.

Backpack electrofishing was conducted in the main channel over a total distance of 74 m, working upstream from the tributary mouth. The mesohabitat sampled was classified as 100 percent riffle. A total of 46 fish were captured. Catch was dominated by sculpin (n=30), followed by Arctic grayling (n=10) and Dolly Varden (n=2). Additionally, the team captured unidentified salmonids (n=4). Additional sculpin (n=12) were observed but not captured during the survey.

Backpack electrofishing was also conducted from the mainstem Susitna River within the vicinity of the tributary plume, where a total of 37 fish were documented. Species composition of captured and/or observed fish was similar; however, no Dolly Varden were captured from the plume. Arctic grayling (n=8) and sculpin (n=5) were captured from the plume. Additional Arctic grayling (n=15) and sculpin (n=12) were observed but not captured during the survey in the tributary plume. No other sampling methods were used in this stream in 2012.

This stream is similar in species composition, drainage area (less than 31 square miles), and accessible stream length as the four small tributaries that were selected for habitat mapping.

PRM 179.3 - Fog Creek – Proposed for Habitat Mapping (HRM 176.6)



Fog Creek flows into the Susitna River on river left PRM 179.3. The stream drains approximately 381.2 km² (147.2 mi²) (Sautner and Stratton 1983) and includes a number of tributaries and lakes (including the Fog Lakes complex). The main channel of the stream is roughly 44.7 km (27.8 mi) in length. This stream was assessed for the presence of adult salmon passage barriers in 2012; no barriers were identified.

Fish distribution sampling was conducted throughout Fog Creek, within 3 secondary tributary streams, and one lake in the Fog Lakes complex (Figure 3 and Figure 4). Backpack electrofishing was the primary sample method used in stream habitats; angling gear and minnow traps were used at a subset of sample segments. Backpack electrofishing was conducted in stream habitat over a total distance of 1,122.6 m in the Fog Creek drainage. Effort was concentrated in side channel (54.6 percent) and main channel (27.8 percent) habitats; off channel (17.6 percent) habitats were also sampled. Thirty nine habitat units were sampled. Most mesohabitat was defined as riffle (n=13, 41.1 percent), run (n=14, 28.3 percent), or percolation channel (n=4, 19.7 percent). Cascade (n=1), scour pool (n=3), pocket-water riffle (n=2), and slough (n=2) were also sampled and combine for 10.9 percent of total length sampled.

Sampling within stream habitat collected 246 fish from the Fog Creek drainage. The catch was dominated by sculpin spp. (n=169) followed most closely by Dolly Varden (n=72); only 4 Arctic grayling were captured. Dolly Varden fork lengths ranged from 32 mm to 366 mm. The Fog Creek drainage was one of two drainages¹ where the fork lengths of captured Dolly Varden exceeded 200 mm. On July 21, 2012, 5 adult Dolly Varden (fork lengths ranged between 300

¹ Dolly Varden with fork lengths greater than 200 mm were captured from Jay Creek and Fog Creek in 2012.

and 366 millimeters) were collected from a percolation channel near the outlet of the Fog Lake system by angling.

One lake in the Fog Lakes complex was sampled by boat-based electrofishing, minnow traps, and a fyke net. A total of 25 fish was captured from the lake, including sculpin (n=22) and Dolly Varden (n=3). Dolly Varden were also captured from minnow traps placed in the lake's outlet channel. Individual length frequencies generated for Arctic grayling and Dolly Varden captured from Fog, Watana, Jay, and Kosina creeks and the Oshenta River (Appendix 4).

One adult Chinook salmon was observed in Fog Creek on July 30, 2012, during aerial salmon spawning survey. The presence of both adult and juvenile Chinook salmon in Fog Creek has been previously documented (Buckwalter 2012). Juvenile Chinook salmon were captured from two locations in the Fog Creek drainage by ADF&G in 2003 and 2011 (Buckwalter 2011). Sampling in 2012 occurred in close proximity to both locations; however, juvenile Chinook were not captured or observed.

181.8 - Unnamed Tributary (HRM 179.1)



This unnamed clearwater tributary flows into the Susitna River's on river left at PRM 181.8. The stream drains less than 50 km² (31 mi²). The main channel of the stream is roughly 6.1 km (3.8 mi) in length. The stream forks at a point roughly 3.6 km (2.2 mi) upstream from its mouth. On the north (river right) channel, a waterfall located roughly 4.5 km (2.8 mi) upstream from its confluence with the Susitna River is a barrier to adult salmon. No barriers were identified on the south (river left) channel.

Backpack electrofishing was conducted in one sample segment downstream of the barrier on July 29, 2012. The sample segment started at the mouth and extended 137 m upstream, encompassing six mesohabitat sample units. Mesohabitat within the segment was classified as run and cascade (n=4, 86.9 percent and n=2, 13.1 percent, respectively).

A total of 54 fish were captured, including two juvenile Chinook salmon. Catch was dominated by Arctic grayling (n=27). Sculpin (n=20) and Dolly Varden (n=2) were also captured. Backpack electrofishing was also conducted from the mainstem Susitna River within the vicinity of the tributary plume, where a total of 24 fish, including Arctic grayling (n=24) and sculpin (n=19) were captured. No other sampling methods were used in this stream in 2012.

This unnamed stream was 1 of only 2 streams where juvenile Chinook salmon were captured in 2012. Juvenile Chinook salmon were also captured from Cheechako Creek, located farther downstream in the Susitna basin. The presence of Chinook salmon had not previously been documented in this stream drainage. The juvenile Chinook had measured fork lengths of 60 and 64 mm. Both juvenile Chinook salmon were both captured in run habitat just 12 meters upstream from the Susitna River confluence. For this reason it is uncertain if the captured juvenile Chinook had originated from 181.8 or were only temporarily in the lower extent of the creek on their seaward migration. The habitat unit was 11 meters long and averaged 2.6 meters wide and 0.25 meters deep. Substrate consisted of 10 percent boulder, 40 percent cobble, 40 percent gravel, and 10 percent fines. Visibility was considered excellent in this clearwater stream; overhanging vegetation was prevalent. The fish were holding, under cover, along a velocity break between slow and fast water.

This stream is similar in species composition, drainage area (less than 31 square miles), and accessible stream length as the four small tributaries that were selected for habitat mapping.

PRM 182.0 - Unnamed Tributary (HRM 179.4)



This unnamed tributary flows into the Susitna River on river right at PRM 182.0. The stream drains less than 50 km² (31 mi²) and includes a several tributaries. The main channel of the stream is roughly 8.1 km (5 mi). This stream was assessed for the presence of adult salmon passage barriers in 2012; no barriers were identified.

Backpack electrofishing was over a distance of 100 m. Mesohabitat sampled was defined as 100 percent cascade. A total of 14 fish were captured, including Arctic grayling (n=9) and Dolly Varden (n=5). No other sampling occurred in this stream drainage.

This stream is similar in species composition, drainage area (less than 31 square miles), and accessible stream length as the four small tributaries that were selected for habitat mapping.

PRM 184.0 - Unnamed Tributary – Proposed for Habitat Mapping (HRM 181.2)



This unnamed tributary flows into the Susitna River on river right at PRM 184.0. The stream drains over 200 km² (124 mi²). The main channel of the stream is roughly 16.7 km (10.4 mi). A large tributary on the stream's right bank joins the main channel at a point roughly 1.3 km (0.8 mi) upstream from the Susitna River. Upstream from this confluence, both channels flow through relatively steep canyons. A large, single waterfall located on the main channel roughly 2.9 km (1.8 mi) upstream from the Susitna River is a barrier to adult salmon. Barriers were not identified on the secondary channel.

Roughly 300 m upstream from the Susitna River, a distributary channel flows from the primary channel into the Susitna River. All fish distribution sampling was conducted within the lower portion of the primary (west) channel, downstream of the bifurcation. Sampling also occurred within this tributary's relatively extensive clearwater plume.

Backpack electrofishing and snorkeling were conducted within the west channel during two separate events. Backpack electrofishing was conducted in the lower 35 m of cascade habitat by moving upstream from the mouth on July 22, 2012. High velocities precluded the team's ability to sample throughout the entire channel. Sampling was limited to habitats along the stream

margin and behind boulders where slower velocities were encountered. Sculpin (n=6) were the only fish captured.

The team returned on August 10, 2012 with snorkel gear, to sample additional habitats within. A total distance of 249 meters was sampled. Mesohabitat composition was primarily run (39.5 percent), run-pocketwater (22.9 percent), riffle-pocketwater (20.5 percent), cascade (12 percent), and pool (5.2 percent). The snorkeler observed a total of 40 fish, including Dolly Varden (n=2), Arctic grayling (n=32), round whitefish (n=3), and sculpin (n=3). The entire width of the stream could not be sampled by one snorkeler, and velocity and depth precluded movement throughout portions of the stream channel.

A single adult Chinook salmon was observed in the clearwater plume during a boat-based electrofishing survey on July 27, 2012. The Chinook salmon was in spawning colors. Sampling activities ceased as soon as the adult Chinook salmon was observed, total sample effort was 19 seconds. On August 10, 2012, backpack electrofishing was conducted over a total distance of 181 meters in the clearwater plume. A total of 43 fish were captured, including Arctic grayling (n=6), round whitefish (n=3), and sculpin (n=34). The netter observed but was unable to capture other fish identified as salmonids (n=3) and sculpin (n=30).

PRM 184.6 - Tsusena Creek – Proposed for Habitat Mapping (HRM 181.8)



Tsusena Creek flows into the Susitna River on river right at HRM 184.6. The stream drains approximately 374.3 km² (144.5 mi², Sautner and Stratton 1983) and includes many tributaries and lakes, including Clark Creek. The main channel of the stream is roughly 49.4 km (30.7 mi). A large waterfall located roughly 6.1 km (3.8 mi) upstream from the Susitna River confluence is a barrier to adult salmon.

The channel bifurcates in its lower 0.5 km (0.3 mi) and enters the Susitna River as two channels. Backpack electrofishing was conducted in the west channel, downstream of the bifurcation. Total distance sampled 107 m; mesohabitat was defined as riffle (74.8 percent) and run (25.2 percent). A total of 50 fish were captured, including Arctic grayling (n=6) and sculpin (n=43).

A total of 77 fish were captured and observed in this tributary's extensive clearwater plume, combining results from angling and boat-based and back-pack electrofishing surveys conducted during two separate events. Fish captured or observed included Arctic grayling (n=26), round whitefish (n=3), humpback whitefish (n=1), longnose sucker (n=1), and sculpin (n=12). This was the only location where a humpback whitefish was identified.

The presence of adult Chinook salmon was documented in the 1980s (ADF&G 1985). Aerial surveys to document the adult salmon presence were conducted downstream of the barrier in 2012; no salmon were observed.

PRIMARY TRIBUTARIES UPSTREAM OF PROPOSED DAM SITE

PRM 189.3 -Deadman Creek – Proposed for Habitat Mapping (HRM 186.6)



Deadman Creek flows into the Susitna River on river right at PRM 189.3. The stream drains approximately 453.5 km² (175.1 mi², Sautner and Stratton 1983) and includes a number of tributaries and lakes, including Deadman Lake. The mainstem of Deadman Creek is roughly 67.4 km (41.9 mi) in length. A large waterfall located roughly 1.0 km (0.6 mi) is a barrier to adult salmon. The barrier falls is located below the proposed reservoir elevation of 2,050-feet.

Fish distribution sampling was conducted at one location downstream of the barrier, and two locations upstream from the barrier, including an unnamed lake. The relatively small clearwater plume was sampled using a boat-based electrofisher on July 27, 2012. Arctic grayling (n=2) was the only species captured from the plume. Arctic grayling and sculpin were captured and observed upstream from stream and lake habitat upstream of the falls. In addition to grayling and sculpin, lake trout presence was documented in the lake.

Upstream of a falls (and upstream of the 2,050-foot elevation), a boat-based electrofishing survey was conducted over a distance of roughly 1 km (0.6 mi). The upstream start was located roughly 4.3 km (2.7 mi) downstream of Deadman Lake. Velocities were extremely slow throughout the area sampled; mesohabitat included primarily long, slow runs and deep pools; few riffles were encountered within the stream reach sampled. Many large, adult fish were observed swimming outside of the electrical field multiple times throughout the survey. Boat-based electrofishing resulted in the capture of sculpin (n=3) and juvenile Arctic grayling (n=1). The juvenile Arctic grayling was captured from an aggregate of juveniles visible along the margin of the stream. Angling was found to be a more effective method for capturing adult fish in these conditions. A total of 10 Arctic grayling were captured with angling gear.

One unnamed lake in this drainage was sampled in 2012, using angling gear, fyke nets, and minnow traps. Arctic grayling (n=6) and lake trout (n=1) were captured.

Aerial surveys to document the adult salmon presence were conducted downstream of the barrier in 2012; no salmon were observed. Chinook salmon presence has not been documented in Deadman Creek by previous investigators (ADF&G 1985; Buckwalter 2011).

PRM 189.7 (R) - Unnamed Tributary HRM 186.9



This small unnamed tributary flows into the Susitna River on river right at PRM 189.7. The stream drains less than 50 km² (31 mi²). The mainstem of the stream is roughly 2.9 km (1.8 mi) in length. High gradient cascades and bedrock chutes located roughly 0.6 km (0.4 mi) upstream from the Susitna River are considered potential barriers to adult salmon. This habitat is located below the proposed reservoir elevation of 2,050-feet.

The stream channel in the vicinity of the mouth is high gradient cascade, with boulders present. Less than 2 m of limited backpack electrofishing was attempted at the mouth of the stream. No fish were captured or observed. Habitat throughout this stream does not appear suitable for adult salmon.

This stream is similar in species composition and drainage area (less than 31 square miles), but accessible stream length is significantly shorter than the four small tributaries that were selected for habitat mapping.

PRM 194.8 - Unnamed Tributary – Proposed for Habitat Mapping (HRM 192.0)



This unnamed tributary flows into the Susitna River on river right at PRM 194.7. The tributary drains over 200 km² (124 mi²) and includes a few tributaries and many lakes. The main stream channel is roughly 11.4 km (7.1 mi) long. This stream was assessed for the presence of adult salmon passage barriers in 2012; no barriers were identified.

Backpack electrofishing was conducted in two discrete segments, over a total distance of 205 m. Runs were the dominant mesohabitat sampled (n=5, 54.1 percent). The remaining mesohabitat sample units were riffle (n=2, 15.1 percent), pocket-water riffle (n=2, 14.1 percent), backwater pool (n=1, 8.3 percent), and scour pool (n=2, 8.3 percent). A total of 34 fish were captured or observed, including Dolly Varden (n=2), Arctic grayling (n=3) and sculpin (n=28).

One sample segment was located downstream of the proposed inundation zone and the other was located upstream of the 2,050-foot elevation. Arctic grayling and sculpin were present in both segments; the presence of Dolly Varden was documented only at the upstream segment.

The boat-mounted electrofisher was used to sample habitat in the tributary plume. A total of 21 fish were captured, including Arctic grayling (n=9), longnose sucker (n=5), round whitefish (n=4), and sculpin (n=3). The netter reported an additional 35 Arctic grayling that were turned by the electrical field but were unable to be captured.

PRM 196.8 - Watana Creek – Proposed for Habitat Mapping (HRM 194.1)



Watana Creek flows into the Susitna River on river right at PRM 196.8. The stream drains approximately 452.7 km² (174.8 mi², Sautner and Stratton 1983) and includes a number of tributaries and lakes, including Sally Lake and Big Lake. The main channel of the stream is roughly 43.3 km (26.9 mi). Melting permafrost and other unstable soils create turbid conditions throughout portions of this drainage. This stream was assessed for the presence of adult salmon passage barriers in 2012; barriers were not identified.

Fish distribution sampling was conducted in Watana Creek, and within five secondary tributary streams and one lake in its drainage. The small plume of Watana Creek was also sampled from the mainstem Susitna River. Backpack and boat-mounted electrofishing were the primary capture methods used in stream habitat. Angling gear and minnow traps were used at a subset of the stream segments sampled.

A total of 414 fish were captured or observed from stream habitat sampled throughout the Watana Creek drainage, including Dolly Varden (n=7), Arctic grayling (n=85), round whitefish (n=2), and sculpin (n=316). Backpack electrofishing was conducted in main channel (73.6 percent), side channel (21.8 percent), and off channel (4.6 percent) over a total distance of 1,202 m. Mesohabitat in most sample units was defined as run or riffle (n= 26, 50.5 percent and n=8, 27.0 percent, respectively); the remaining 22.5 percent of stream length sampled was cascade (n=1), backwater pool (n=1), scour pool (n=1), pocket-water riffle (n=2), pocket-water run (n=2) and slough (n=2).

Backpack electrofishing effort was relatively well distributed throughout Watana Creek. Of the 1,202 m of stream habitat sampled using the backpack electrofisher, approximately 471 m of habitat sampled was located below (or downstream of) an elevation of 2,050-feet, and the

remaining 731 m of habitat was located above an elevation of 2,050-feet, or farther upstream. Without taking sampling effort into account, Arctic grayling dominated the fish catch from habitats sampled downstream of 2,050-feet, but were not captured as frequently farther upstream. Dolly Varden were captured from only two locations on Watana Creek. One Dolly Varden was captured from riffle habitat in a side channel located roughly 14 km (8.7 mi) upstream from the mouth, and the 6 Dolly Varden were captured farther upstream.

A boat-electrofishing survey was conducted over a distance of approximately 4.9 km (3 mi) on July 20, 2012. The upstream start was located approximately 12.6 km (7.9 mi) upstream of the Susitna River confluence. Mesohabitat within the stream segment sampled was dominated by riffles and runs. Boat-based electrofishing resulted in the capture of 16 fish, including Arctic grayling (n=14), and round whitefish (n=2). Additionally Arctic grayling (n~15) were observed but not captured during the survey. The boat-mounted electrofisher was used to sample habitat in the tributary plume. No fish were successfully netted; however, Arctic grayling (n=2), and longnose sucker (n=1) were observed.

Backpack electrofishing, angling, minnow traps and a fyke net were used to sample Sally Lake. Fish captured and observed in Sally Lake included lake trout (n=4), Arctic grayling (n=22), and sculpin (n=55). Sally Lake is located below the proposed reservoir elevation of 2,050-feet.

PRM 197.6 - Unnamed Tributary – Proposed for Habitat Mapping (HRM 194.9)



This unnamed tributary flows into the Susitna River on river left at PRM 197.6. The stream drains less than 50 km² (31 mi²), and includes a number of tributaries. The main channel of the stream is roughly 8.7 km (5.4 mi). The channel forks at a point roughly 1.2 km (0.75 mi) upstream from the Susitna River. Multiple falls located on the main (west) channel roughly 2.1

km (1.3 mi) upstream from the Susitna River confluence likely present a barrier to adult salmon. This habitat is located below, or downstream of the proposed reservoir elevation of 2,050-feet.

Fish distribution sampling was conducted in two segments in this tributary, one located near the mouth and the other located farther upstream (above an elevation of 2,050-feet), on the east channel. Sampling was conducted on July 18, 2012. The plume was also sampled from the mainstem Susitna River on July 26, 2012. Sampling was not conducted upstream of the suspected barrier in the west channel.

Backpack electrofishing was conducted over a total combined distance of 148.5 m. Sampling occurred at nine discrete mesohabitat units; mesohabitat was defined as run (n=5, 64.0 percent), riffle (n=3, 26.9 percent), and scour pool (n=3, 9.1 percent). Additionally, two minnow traps were used at the upper segment. A total of 17 fish were captured or observed at the downstream site; no fish were captured or observed at the upstream segment. Fish captured or observed near the mouth included Arctic grayling (n=3) and sculpin (n=14).

The boat-mounted electrofisher was used to sample habitat in the direct vicinity of tributaries' mouth, within the Susitna River. The size of the plume was very small. Only one fish, an Arctic grayling, was captured; one additional unidentified fish was observed but not netted.

PRM 203.4 - Unnamed Tributary (HRM 200.7)



This unnamed tributary flows into the Susitna River on river right at PRM 203.4. The stream drains less than 50 km² (31 mi²) and includes a few secondary tributaries and lakes. The main channel of the stream is roughly 16.1 km (10.0 mi). A series of five permanent falls located roughly 0.3 km (0.2 mi) upstream from the confluence would present a barrier to adult salmon. The falls are located below, or downstream of, an elevation of 2,050-feet. Fish distribution sampling occurred downstream of the adult salmon barriers.

Backpack electrofishing was conducted over a distance of 45 m of stream. Mesohabitat sampled was defined as pocket-water riffle and cascade (55.6 percent and 44.4 percent, respectively). A total of 24 fish were captured and observed, including sculpin (n=21) and Arctic grayling (n=3).

This stream is similar in species composition and drainage area (less than 31 square miles), but accessible stream length is significantly shorter than the four small tributaries that were selected for habitat mapping.

PRM 204.3 - Unnamed Tributary – Proposed for Habitat Mapping (HRM 201.8)



This unnamed tributary flows into the Susitna River on river left at PRM 204.3. The stream drains less than 50 km² (31 mi²) and includes a few tributaries and lakes. The main channel of the stream is roughly 10.0 km (6.2 mi) long. High gradient cascades and falls located roughly 0.6 and 1.0 km (0.4 and 0.6 mi) upstream from the Susitna River were identified as potential barriers to adult salmon. These habitats are located below, or downstream of an elevation of 2,050-feet. Sampling occurred downstream of these barriers.

Backpack electrofishing was conducted in the main channel of the stream over a total distance of 10 m. Mesohabitat sampled was documented as 100 percent riffle. No fish were captured or observed. The tributary plume was sampled with a backpack electrofisher. A total of 35 fish were captured or observed, including Arctic grayling (n=21), sculpin (n=13), and burbot (n=1).

PRM 206.0 - Unnamed Tributary (HRM 203.4)

This small unnamed tributary flows into the Susitna River on river right at PRM 206.0. The stream basin drains less than 50 km² (31 mi²) and originates from a small lake. The main channel of the stream is roughly 0.8 km (0.5 mi) in length. The stream is free of adult salmon passage barriers to the unnamed lake. Sampling did not occur in the stream; the unnamed lake was sampled with fyke nets and minnow traps. No fish were caught or observed. The lake is below an elevation of 2,050-feet.

This stream was not selected for habitat mapping because of its small size and small discharge.

PRM 206.2 - Unnamed Tributary – Proposed for Habitat Mapping (HRM 203.7)



This unnamed tributary flows into the Susitna River on river left at PRM 206.2. The stream drains less than 50 km² (31 mi²) and includes a few tributaries and lakes, including Watana Lake. The main channel of the stream is roughly 11.9 km (7.4 mi) long. This stream was assessed for the presence of adult salmon passage barriers in 2012; no barriers were identified. Fish distribution sampling occurred downstream of an elevation of 2,050-feet.

Backpack electrofishing was conducted in the main channel over a distance of 30 m of stream. Mesohabitat sampled was defined as cascade and pocket-water run (60.0 percent and 40.0 percent, respectively). A total of 29 fish were captured or observed, all of which were sculpin. The tributary plume was also sampled with a boat-mounted electrofisher. Sculpin was the only fish captured or observed.

PRM 209.1 - Kosina Creek – Proposed for Habitat Mapping



Kosina Creek flows into the Susitna River on river left at PRM 209.1. The stream drains approximately 1,036.5 km² (400.2 mi², Sautner and Stratton 1983) and includes numerous tributaries and lakes. The named secondary tributaries include Tsihi Creek, Gilbert Creek, Terrace Creek, John Creek, and George Creek². Clarence Lake, one of the larger lakes, is one of hundreds of lakes in the basin. The main channel of Kosina Creek is roughly 47.5 km (29.5 mi). This stream was assessed for the presence of adult salmon passage barriers in 2012; no barriers were identified.

Fish distribution sampling was conducted throughout Kosina Creek and within two secondary tributaries: Gilbert Creek and Tsihi Creek. Backpack and boat-mounted electrofishing were the primary capture methods used in 2012. Angling gear and gill nets were used at a subset of the segments sampled. A total of 412 fish were captured or observed from stream habitats sampled throughout the Kosina Creek drainage, including Dolly Varden (n=1), Arctic grayling (n=75), round whitefish (n=1), and sculpin (n=327). Additionally, the presence of unspecified whitefish (n=3) and salmonids (n=4) was recorded. No Chinook salmon were captured or observed during the ground-based surveys. However, adult Chinook salmon were observed in Kosina Creek during the adult salmon aerial surveys conducted in July and August, 2012.

Kosina Creek's extensive clearwater plume was also sampled from the mainstem Susitna River using the boat-mounted electrofisher. The survey started within the vicinity of the mouth and extended nearly 1 mi downstream. A total of 28 fish were captured or observed in the plume on July 25, 2012, including Arctic grayling, longnose sucker, and sculpin.

² Terrace Creek and Gilbert Creek both drain lakes known to support Arctic grayling and lake trout (Sautner and Stratton 1983).

Backpack electrofishing was conducted over a total distance of 1,541 m within the Kosina Creek basin. Sampling occurred in main channel (30.9 percent), side channel (62.1 percent), and off channel (7.0 percent) throughout eight spatially distinct areas, which included 19 mesohabitat sample units. Most mesohabitat was defined as run (n=10, 52.7 percent), pocket-water riffle (n=3, 20.8 percent), and slough (n=2, 14.9 percent). Cascade (n=1), scour pool (n=1), riffle (n=1), and pocket-water run (n=1) were also sampled and combined accounted for 11.6 percent of total stream length sampled.

Fish distribution sampling within the Kosina Creek drainage occurred on July 19, July 28, August 1, and August 12, 2012. The plume was sampled on July 25, 2012. Sample segments were relatively well distributed spatially throughout Kosina Creek. Sample activity extended from its plume to roughly 23.7 km (14.7) mi upstream from its confluence with the Susitna River. The majority of stream habitat sampled (1625 m) was located upstream of the 2,050-foot elevation. Backpack electrofishing was also conducted at two sample segments downstream of the 2,050-foot elevation, in both slough and main channel habitats, over a total distance of 276 m. Fish composition was relatively consistent throughout the areas sampled. Fish captures at elevations upstream of 2050-ft were dominated by sculpin and Arctic grayling; round whitefish were also present. Although Arctic grayling were not captured from the downstream segments; Arctic grayling were captured from the Kosina Creek plume.

A boat-based electrofishing survey was conducted over a distance of approximately 5.7 km (3.6 mi) on July 19, 2012. The upstream start was located approximately 23.2 km (14.4 mi) upstream of the Susitna River confluence. Mesohabitat within the stream segment sampled was dominated by riffles and runs. Boat-based electrofishing resulted in the capture of Arctic grayling (n=1), round whitefish (n=1), and sculpin (n=3). Adult Arctic grayling (n=3) and whitefish (n=3) were observed swimming outside of the electrical field multiple times throughout the survey. Angling was found to be an effective method for capturing adult grayling in Kosina Creek. Five adult Arctic grayling were landed with angling gear. Lakes in the Kosina Creek drainage were not sampled in 2012.

The presence of adult and juvenile Chinook salmon in Kosina Creek was recently documented by ADF&G (Buckwalter 2011; ADF&G 2011). Adult Chinook salmon were observed in Kosina Creek during aerial salmon spawning survey in 2012. However, no juvenile Chinook salmon were captured from Kosina Creek in 2012.

PRM 211.0 - Jay Creek – Proposed for Habitat Mapping



Jay Creek flows into the Susitna River on river left at PRM 211.0. The stream drains approximately 160.1 km² (61.8 mi², Sautner and Stratton 1983) and includes numerous tributaries; beaver pond complexes are present in its upper reaches. The main channel of the stream is roughly 31.5 km (19.6 mi). Jay Creek splits into multiple channels just upstream from its mouth. This stream was assessed for the presence of adult salmon passage barriers in 2012; no barriers were identified.

Backpack electrofishing was the primary method used in Jay Creek; angling was conducted at a subset of segments sampled. Backpack electrofishing was conducted over a total distance of 754 m in Jay Creek. Six stream segments were sampled, which included 19 discrete mesohabitat sample units. Backpack electrofishing occurred in main channel (80.0 percent), side channel (12.6 percent), and off channel (7.4 percent) habitats. Most mesohabitat sampled was defined as riffle (n=7, 41.2 percent), run (n=5, 32.8 percent, and scour pool (n=4, 13.5 percent). Alcove (n=1), percolation channel (n=1), and slough (n=1) were also sampled.

A total of 103 fish were captured from stream habitats sampled throughout Jay Creek. Catch was dominated by Dolly Varden (n=65), followed by Arctic grayling (n=27) and sculpin (n=11). All fish were captured by backpack electrofishing with the exception of one Arctic grayling. The grayling was captured with angling gear, roughly 9.5 km (5.9 m) upstream from the confluence. Jay Creek was 1 of 13 streams where Dolly Varden were captured and was 1 of 3 streams where backpack electrofishing catch was dominated by Dolly Varden.

Additionally, the small plume at the mouth of Jay Creek was sampled from the mainstem Susitna River using the boat-mounted electrofisher. Flow from Jay Creek enters the Susitna River in three small channels. The mixing zone of clear and turbid water at the base of each channel was estimated to be roughly 2 m by 2 m. Arctic grayling (n=2) and burbot (n=1) were captured from within 2 of the 3 plumes sampled on July 25, 2012.

Access to stream habitats within the lower portion of Jay Creek is limited. Jay Creek is confined by steep canyon walls for roughly 5.3 km (3.3 mi), starting at a point roughly 6.8 km (4.2 mi) upstream from its confluence with the Susitna River. The channel is less confined and more accessible within the lower 1.4 km (0.9 mi). Sampling was not conducted within the canyon reaches. Backpack electrofishing was conducted in five spatially distinct areas in Jay Creek, including one segment near its mouth. The upstream-most sample segment was located roughly 15.1 km (9.4 mi) upstream from the confluence.

The majority of stream habitat sampled (670 m) was located upstream of the 2,050-foot elevation. Backpack electrofishing was conducted at just one segment downstream of the 2,050-foot elevation, over a distance of 84 m. Fish species presence was relatively consistent throughout the areas sampled. Arctic grayling were captured from most segments sampled. Dolly Varden were captured from four of the five segments located upstream of 2,050-foot elevation, but were not captured from the plume or from the downstream backpack electrofishing segment. Dolly Varden dominated the catch at the two upstream-most segments.

PRM 232.6 - Goose Creek – Proposed for Habitat Mapping



Goose Creek flows into the Susitna River on river left at PRM 232.6. Goose Creek drains approximately 269.1 km² (103.9 mi², Sautner and Stratton 1983) and includes a few small tributaries, including Busch Creek. The main channel of Goose Creek is roughly 40.6 km (25.2 mi). This stream was assessed for the presence of adult salmon passage barriers in 2012; no barriers were identified.

Backpack electrofishing was the only fish collection method used and was conducted over a total distance of 637 m. Sampling occurred in main channel (42.5 percent) and side channel (57.5 percent), over six stream segments. A total of seven distinct mesohabitat units were classified as

pocket-water riffle (n=3, 63.3), run (n=1, 30.0 percent), and riffle (n=3, 6.7 percent). The tributary plume habitat and small lakes were not sampled in the Goose Creek drainage.

A total of 123 fish were captured from stream habitats sampled throughout Goose Creek; catch was dominated by sculpin ssp. (n=79), followed by Arctic grayling (n=44). In addition, one Arctic grayling was visually observed but not captured.

Backpack electrofishing was conducted in three spatially distinct areas in Goose Creek including: two segments approximately 1.9 km (1.1 mi) upstream of the confluence, two segments approximately 4.2 km (2.6 mi) upstream of the confluence, and two segments approximately 5.1 km (3.2 mi) upstream of the confluence. Sculpin and Arctic grayling were captured in each of the three distinct areas; however, the majority of fish in the stream were from the two stream segments closest to the confluence with 41 Arctic grayling and 51 sculpin.

PRM 235.2 - Oshetna River – Proposed for Habitat Mapping



The Oshetna River flows into the Susitna River on river left at PRM 235.2. The stream drains approximately 1,424.5 km² (555.0 mi², Sautner and Stratton 1983) and includes numerous tributaries, including Black River, Little Oshetna River, Conglomerate Creek, Roaring Creek, Landslide Creek, and Nowhere Creek. The basin contains several hundred lakes including Black Lake, Crater Lake, and Square Lake. The main channel of the stream is roughly 89.5 km (55.6 mi). This stream was assessed for the presence of adult salmon passage barriers in 2012; no barriers were identified.

Backpack electrofishing was the only fish collection method used. Sampling occurred in main channel (28.6 percent), side channel (36.7 percent), and off channel (34.7 percent) over five sample segments, totaling 608 m of stream. Of the total 608 m sampled, two sample segments totaling 220 m of stream were located in the Black River. Overall, eleven mesohabitat units of stream were sampled. Most mesohabitat was defined as percolation channel (n=3, 34.7 percent)

followed by riffle (n=3, 28.6 percent), run (n=3, 25.8 percent), and scour pool (n=2, 10.9 percent). An additional 120 m of backpack electrofishing was conducted in the tributary plume of the Oshetna River. No lake habitats were sampled in the Oshetna River drainage.

A total of 168 fish composed of Arctic grayling (n=10), longnose sucker (n=1), and sculpin (n=157) were captured by backpack electrofishing in stream habitats throughout the Oshetna River drainage. Of these, 72 fish (n=71 sculpin, n=1 Arctic grayling) were from the Black River. Additionally, one Arctic grayling was visually observed but not captured in the Black River.

Backpack electrofishing in the tributary plume of the Oshetna River resulted in the capture of 19 fish; catch was dominated by sculpin (n=16) with fewer Arctic grayling (n=3).

Backpack electrofishing was conducted in four spatially distinct areas of the Oshetna River drainage including: one segment located at the mouth, one segment approximately 3.1 km (1.9 mi) upstream of the confluence, one segment approximately 12.4 km (7.7 mi) upstream of the confluence, and two segments in the Black River 20.2 km (12.6 mi) upstream of the confluence. Sculpin were captured in each of the four distinct areas; however, the majority of them (n=71) were from the segments located in the Black River followed by the segment located 3.1 km upstream of the confluence (n=65). Arctic grayling were distributed from the mouth up to the uppermost segment located in the Black River, however they were not captured in all segments. The majority (n=6) were captured in the segment located at the mouth. The single longnose sucker was located in the segment 12.4 km from the confluence.

The presence of adult and juvenile Chinook salmon in the Oshetna River was recently documented by ADF&G (Buckwalter 2011; ADF&G 2011). No Chinook salmon were captured or observed in the Oshetna River in 2012.

SECONDARY TRIBUTARIES PROPOSED FOR HABTIAT MAPPING

Black River – Tributary to Oshetna River at PRM 12.6



Fog Creek Tributary LB1 - Tributary to Fog Creek at PRM 5.2



Watana Creek Tributary - Tributary to Watana Creek at PRM 8.7



Tsisi Creek - Tributary to Kosina Creek at PRM 7.4



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