State of Alaska
Department of Fish and Game
Habitat and Restoration Division

Nomination for Waters Important to Anadromous Fish

Region: ARCTIC

USGS Quad: SAGAVANIRKTOK A-1, A-2

Anadromous Water Catalog Number of Waterway: 330-00-10310

Name of Waterway: SHAVIOVIK RIVER ☐ USGS Name ☐ Local Name

☐ Addition ☐ Deletion ☐ Correction ☒ Backup Information

For Office Use

Nomination #	01 170		
Revision Year:	2001	Regional Supervisor	Date
Revision to:	Atlas ___ Catalog ___ Both N/A	[signature]	6/6/01
		AWC Project Biologist	Date
Revision Code:	F-3		
		Drafted	Date

OBSERVATION INFORMATION

Species	Date(s) Observed	Spawning	Rearing	Present	Anadromous
					☐
					☐
					☐
					☐
					☐

IMPORTANT: Provide all supporting documentation that this water body is important for the spawning, rearing or migration of anadromous fish, including: number of fish and life stages observed; sampling methods, sampling duration and area sampled; copies of field notes; etc. Attach a copy of a map showing location of mouth and observed upper extent of each species, as well as other information such as: specific stream reaches observed as spawning or rearing habitat; locations, types, and heights of any barriers; etc.

Comments: See ATTACHED INFO. RE: OVERWINTERING AREAS

Name of Observer (please print): William Morris

Signature:

Date: 6/6/01

Address:

This certifies that in my best professional judgment and belief the above information is evidence that this waterbody should be included in or deleted from the Catalog of Waters Important for Spawning, Rearing or Migration of Anadromous Fishes per AS 16.05.870.

Signature of Area Biologist: [signature]

Revision 3/97

STATE OF ALASKA

TONY KNOWLES, GOVERNOR

DEPARTMENT OF FISH AND GAME

HABITAT & RESTORATION DIVISION

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March 23, 2001

ALASKA DEPT. OF
FISH & GAME

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REGION II
HABITAT AND RESTORATIO
DIVISION

Mr. Bret C. Schafer, Supervisor - Alaska
Western Geophysical Company
351 E. Int'l. Airport Rd.
Anchorage, AK 99518-1299

Dear Mr. Schafer:

RE: Shaviovik River Overwintering Area Investigation

Enclosed is a copy of a trip report titled "Shaviovik River Overwintering Area Investigation" prepared by Mr. William Morris of the Alaska Department of Fish and Game (ADF&G). Field work was conducted in mid-February in an area of the river previously documented to support overwintering fish. We want to thank Western Geophysical Company for providing transportation and logistical support. If there are any questions regarding the trip report, please contact Mr. Morris at 907-459-7282.

Sincerely,

Alvin G. Ott, Regional Supervisor
Habitat and Restoration Division
Alaska Department of Fish and Game

cc: Caryn Rea, PHILLIPS, Anchorage
Ken Taylor, ADF&G, Juneau
Ed Weiss, ADF&G, Anchorage
Gordon Brower, NSB, Barrow
Larry Bright, USFWS, Fairbanks
Bill Fowler, Anadarko, Texas
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Gary Schultz/Leon Lynch, ADNR, Fairbanks
Sverre Pedersen, ADF&G, Fairbanks
Craig George, NSB, Barrow

AGO/ago

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Shaviovik River Overwintering Area Investigation
February 2001
William A. Morris

Background:

The Shaviovik River flows north from the foothills of the Philip Smith Mountains roughly 70 miles before flowing into the Beaufort Sea between Foggy Island and Mikkelson bays. The river is fed primarily from mountain and tundra run-off; however, one spring area was located during the early 1970's (Ward and Craig 1974). The spring area identified was approximately 4 miles long and started roughly 25 miles upstream from the mouth of the river (downstream of a large braided section of the river). Site investigations identified Dolly Varden (*Salvelinus malma*) and Arctic grayling (*Thymallus arcticus*) in the spring affected area (Ward and Craig 1974). Winter 2000-2001 seismic exploration on the North Slope of Alaska targeted this area (and many others) for "3-D" seismic exploration. In response to this exploratory interest and the potential sensitivity of the area to disturbance, the Alaska Department of Fish and Game (ADF&G) determined that the area should be investigated again. Initial investigations in the 1970's provided location information for the spring area in general terms, an exact location was not known. Analysis of USGS topographic maps of the area illustrated a large braided section of river five miles long by 1.5 miles wide, upstream of the area located during earlier investigations. An aerial photograph of the braided section of river showed a large ice field in the braided region of the river during July. Researchers flying in the area during summer have indicated that the ice field persists well into August (Richard Shideler pers. comm.). Compilation of this information lead the ADF&G to believe that the actual source of water providing Dolly Varden and Arctic grayling overwintering habitat was most likely at the upstream end of the braided section of river, roughly seven miles upstream from the original area identified in the 1970's. For these reasons, the ADF&G traveled to this area of the Shaviovik River during February 2001 to further investigate the overwintering area and to help determine how seismic exploration could safely be conducted.

Site Inspection:

On February 14, 2001, Bret Schafer, Brian Brigandi (Western Geco), Doug Klak (Phillips Alaska, Inc.) and I, traveled in a Tucker Sno-Cat to near the northern boundary of the seismic survey planned for the Shaviovik River area (Figure 1 shows the area investigated).

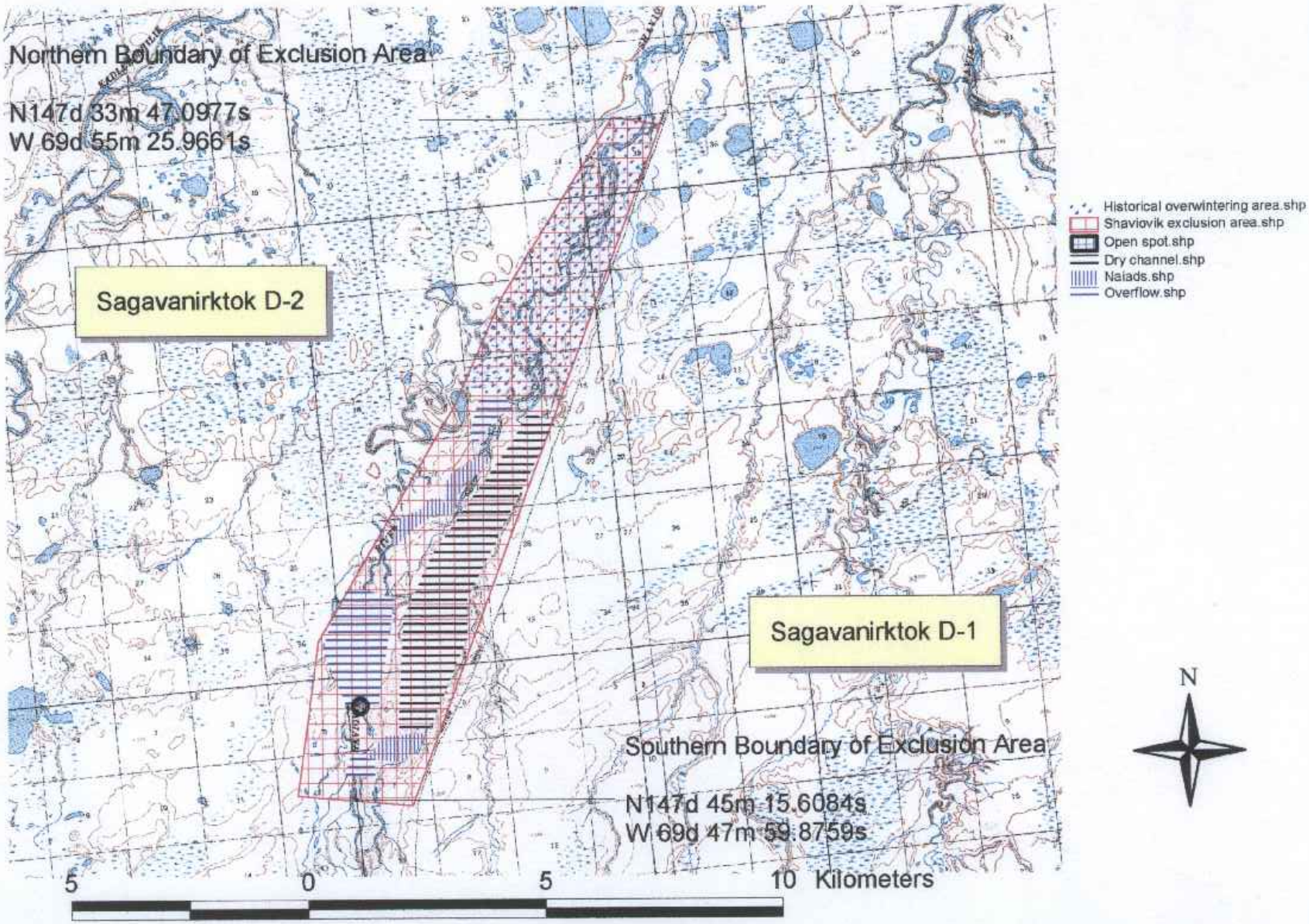

Figure 1. Map of the Shaviovik River fish overwintering area. Map illustrates areas of naiads, active overflow, open water, and dry river channels.

Our investigation began at this point on the river and continued south, towards and through the braided section of river. The overwintering area described in Ward and Craig essentially begins at the location our survey began and extends north (all downstream of the braided section of river). We conducted our investigation to the south for three reasons: 1) seismic exploration was located in a very small portion of the area located in the 70's but was directly situated in the braided area of the Shaviovik River (upstream), 2) overflow water had been encountered upstream (south) of the historical overwintering site by Western Geco employees, moving across the tundra in the vicinity of the braided area and, 3) aerial photographs and topographic maps showing the braided river channels and the location of two native allotments along the river, just south of the braided section of river, strongly suggested that fish overwintering was more likely in and upstream of the braided section of stream, than downstream of the braided section. The area inspected is characterized by a series of active overflow reaches, reaches with naiads (pressure mounds in the ice), and bottom-fast ice reaches (Figure 1). Figure 1 shows the area investigated during this trip and in the early 1970's. There appears to be a general pattern of alternating naiads with downstream active overflow.

Using a 2" diameter cordless drill mounted auger to test ice thickness and document water presence (Figure 2), we determined that no water below the ice was present at the downstream-most end of our survey. Holes were drilled 30 yards downstream of an area of active overflow and slush seeping north (Figure 3). The overflow area was extensive and portions of tundra

Figure 2. 2" diameter drill used to test ice thickness and locate water.

Figure 3. Downstream-most end of active overflow area encountered in the survey area. Overflow was slowly advancing downstream and freezing into layers.

adjacent to the main channel were being filled with water (Figure 4). Some tundra areas appeared to have active intergravel flow as they were glaciated, had water below the ice but showed no evidence of surface water having spilled into the area to cause the icing. Small volcano like mounds appeared to be the source of water in these areas (Figure 5). Immediately upstream from the flowing overflow were ponded areas in the tundra that appeared to have been filled by water through intergravel flow (Figure 5). The area of active overflow continued upstream approximately 0.8 miles.

Figure 4. Tundra depressions actively filling with overflow water. Photograph illustrates the extent of active overflow.

Figure 5. Isolated depression in a gravel portion of the floodplain. Water glaciating this depression appeared to be from intergravel flow, no spillover from adjacent overflow was present.

Upstream of the cessation of overflow we encountered the first of a series of naiads (ridges in the ice associated with under-ice water) that persisted for approximately two miles. This first series of naiads appeared to follow the west channel of the river, and those inspected occurred directly over what should have been the deep, main channel. Naiads encountered in the area approached 2 meters taller than surrounding river ice (Figure 6). Some naiads were up to 200 meters long and essentially followed the main channel as it moved from bank to bank.

Figure 6. One of many large naiads encountered in this reach of the Shaviovik River. Naiads generally ran from bank to bank following the main channel of the river. Surrounding areas of river channel were much lower in elevation, and dry.

We drilled low-lying portions of the river ice around one large naiad and found no water. The naiad; however, had 3 feet of water below 6 feet of black ice. Another, smaller naiad had six feet of white ice with an undetermined depth of water below. This site was approximately 0.9 miles from the first naiad we encountered in this reach of the river. We drilled a hole into the mound through about 6.5 feet of ice. Once through the ice, water under pressure began to flow from the hole with an initial pressure head almost 12 inches in height (Figure 7). We plugged the two-inch diameter hole immediately using a racquetball to avoid reducing the water volume in

Figure 7. Water under pressure encountered while drilling a hole in a white-ice naiad.

upstream habitats. A phone conversation with Mr. Bret Schafer indicated that his inspection of this site on February 19 (five days later) revealed that the hole was completely frozen back with no additional outflow.

We continued upstream, past the area of naiads, into the lower portion of the east Channel of the Shaviovik River braided area. The area appeared to be hydrologically inactive so we moved to the west channel to continue our inspection. At the upstream end of the west channel naiad area, we encountered a large expanse of active overflow. In this same area was a large, 10-foot tall, ice volcano that appeared to have been the location of significant outflow. The ice volcano was located in the tundra, 75 yards from the main channel of the river (Figure 8). This area of active overflow continued south to the source of the water, 2 miles upstream. Overflow was actively filling low-lying areas within the tundra throughout this region.

Figure 8. Photograph of the overflow extending from a large (10 foot tall) ice volcano in the tundra 75 yards from the river channel. The Tucker Sno-Cat is on tundra 100 yards from the peak of the mound.

The source of the overflow water was an area of open, flowing water (greater than 1cfs)(Figure 2 and Figure 9). We could not inspect the source of the open water because it was inaccessible.

Figure 9. Photograph of a large open water source near the head of the braided section of river. Water in the foreground of this photograph is flowing. The dark area in the middle of the photograph is the source of this water. Video footage of this site is available.

The origin of the open water area was 200 yards from dry land and surrounded by flowing water up to 2 feet deep. The location of the open water source we observed during this inspection is almost the exact spot the ice field appears to begin on the aerial photograph. It is likely that this site is the main source of water for fish overwintering in the Shaviovik River.

Thick, grounded ice was found in most areas upstream of the open water. A small area of large naiads was encountered upstream of the open water area (Figure 2): however, one naiad drilled was dry. Just above and adjacent to this area of naiads was active overflow water originating from the two allotments upstream. This area is relatively small in comparison with the large open water source area located downstream. A seismic train river crossing just south (upstream) of the allotments showed no signs of any active overflow this season, indicating the source was slightly upstream of the end of our survey. We drilled several areas along a large bluff system just east of the naiads and overflow that appeared to be likely candidates for the main channel of the river (probably deep holes during summer). Holes drilled through the seven feet of ice in these spots indicated the channels were dry. We continued back downstream, this time along the east channel of the braided section of river. No areas along this channel had experienced any overflow and no naiads were observed. It is likely that this channel of the river is dry during winter.

Conclusion:

The braided region of the Shaviovik River investigated exhibits high hydroligic activity during winter. A groundwater source (or sources) provides water to the river year round and hence consistently has produced overwintering habitat in the same general location for at least 26 years. The location of the native allotments at the upstream end of the braided region of the Shaviovik River suggests the area has been active and has harbored fish for much longer. We did not attempt to document fish use during this inspection but we did identify large quantities of usable fish overwintering habitat. Water is available to fish in several modes throughout this region of the river. Fish can use water located in naiads, water below the ice under overflow areas, and the open water reaches (relatively small) for overwintering. This area is extremely sensitive to

disturbance and should be afforded high levels of protection. Investigations of the area in the 1970's identified Arctic grayling and Dolly Varden using the river. Given the limited availability of water during winter in the Shaviovik River it is likely that all age classes of these species of fish can be found in these wintering areas. It is feasible that the entire Shaviovik River Dolly Varden stock is 100% dependent on this 10-mile stretch of river.

This inspection resulted in an amendment to the Fish Habitat Permit obtained by Western Geco for their 2000/2001 seismic exploration program. The amended permit allows Western Geco to conduct seismic exploration in the vicinity of this overwintering area with the following stipulations: 1) Open water areas shall be avoided by all equipment, 2) Active overflow and overflow areas shall be avoided by all heavy equipment, recorder lines may be placed across overflow areas by hand or by light equipment (Tucker), if ice thickness is deemed adequate to support the Tucker, use of and crossing of these overflow areas by vibrators is prohibited, 3) Drilling of holes to check ice depth for safety purposes is allowed except in areas where occupancy is prohibited, 4) Ice pressure mounds and ridges shall be avoided by a minimum of 50 yds on all sides, by all equipment, drilling these areas is prohibited, 5) Prior to equipment moving on to any ice surface, a dry access point on the bank should be located and used to avoid creating trenches along the river bank, and 6) All heavy equipment crossings shall be checked for adequate ice thickness prior to crossing.

Literature Cited:

Ward, D. and P. Craig. 1974. Catalogue of streams, lakes and coastal areas in Alaska along routes of the proposed gas pipeline from Prudhoe Bay, Alaska to the Alaskan/Canadian border. Prepared by: Aquatic Environments Limited. Arctic Gas Biological Report Series Vol. 19. 381 pgs.

Shideler, R.T. 2001. Alaska Department of Fish and Game, Habitat and Restoration Division. Personal Communication.