State of Alaska
Department of Fish and Game
Nomination for Waters
Important to Anadromous Fish

ALASKA DEPT. OF FISH & GAME
OCT 27 1999
REGION II HABITAT AND RESTORATION DIVISION

Region ARCTIC ▾ USGS Quad Beechey Point A-3

Anadromous Water Catalog Number of Waterway 330-00-10360-?? ~~2090~~

Name of Waterway Deadhorse Gravel Pit ☐ USGS Name ☒ Local Nam

☑ Addition ☐ Deletion ☐ Correction ☐ Backup Information

For Office Use OK LHT

Nomination # 99 234	Rob F McLean	Regional Supervisor	10/22/99 Date
Revision Year: 1999			
Revision to: Atlas ____ Catalog ____ Both X	[signature]	AWC Project Biologist	1/24/00 Date
Revision Code: A-2	J. Drone	Drafted	1/31/00 Date

OBSERVATION INFORMATION

Species	Date(s) Observed	Spawning	Rearing	Present	Anadromous
Dolly Varden	7/98, 8/98, 6/99		X		☑
Broad Whitefish	8/99			X	☑
Least Cisco	6/99, 8/99			X	☑
					☐
					☐

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:

Carl Hemming and I began monitoring this waterbody in 1998 after it was connected to a tundra stream flowing to the Sagavanirktok River. Dolly Varden juveniles were rearing in the pit as of July 1998 and have been captured in fyke nets during subsequent sampling trips in '98 and '99. Least Cisco were captured in fyke nets during June + August 99 sampling and 1 juvenile broad whitefish was captured in Aug 99. Attached are Trip Reports from '98 & '99 documenting the presence of these species.

Name of Observer (please print) William A. Morris

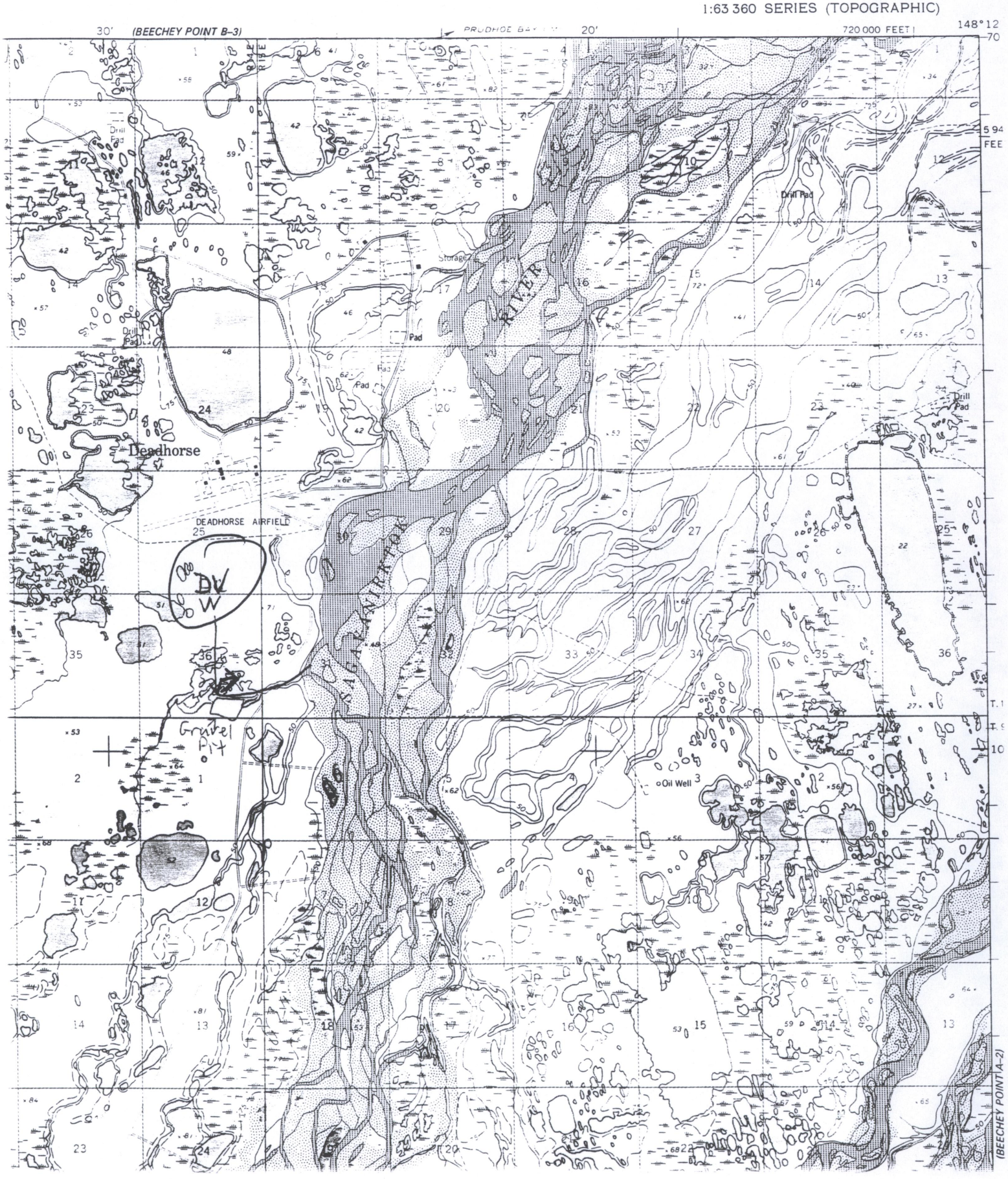
Date: 10/22/99 Signature: William A. Morris

Address: 1300 College Rd.
Fairbanks AK 99701

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: Rob F McLean

Revision 11/96


BEECHEY POINT (A-3) QUADRANGLE
ALASKA - NORTH SLOPE BOROUGH
1:63 360 SERIES (TOPOGRAPHIC)
30' (BEECHEY POINT B-3)
20'
720 000 FEET
148°12
Deadhorse
DEADHORSE AIRFIELD
SAGAVANIRKTOK RIVER
Gravel Pit
Oil Well
Drill Pad
Storage
Pad
(BEECHEY POINT A-2)

STATE OF ALASKA

DEPARTMENT OF FISH AND GAME

HABITAT & RESTORATION DIVISION

TONY KNOWLES, GOVERNOR

1300 COLLEGE ROAD
FAIRBANKS, ALASKA 99701-1599
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October 7, 1998

Mr. David T. Bloom
Environmental Engineering Manager
Alaska Department of Transportation and Public Facilities
2301 Peger Road
Fairbanks, Alaska 99709-5316

Dear Mr. Bloom

RE: Deadhorse Gravel Site

The purpose of this letter is to transmit a report with the results of fish and water quality sampling from the Deadhorse Gravel Site. This report is the second for the 1998 season and contains the results of field investigations conducted between August 24 and 26. Our sampling has documented colonization of the pit by five species of fish; ninespine stickleback, Dolly Varden, Arctic grayling, round whitefish and slimy sculpin. The fish sampling also indicates that the pit complex including the inlet and outlet channels are used by spawning Arctic grayling. Dissolved oxygen concentrations are at or near saturation providing conditions favorable for wintering fish. Should you have any questions regarding the report please contact Carl Hemming at 459-7282.

Sincerely

Alvin G Ott
Regional Supervisor
Habitat and Restoration Division

Enclosure

cc: Patrica Miller, ADOT&PF, Fairbanks
Philip Martin, USFWS, Fairbanks
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Larry Moulton, MJM Research
Eric Gerke, ADOT&PF, Fairbanks
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ADOT Deadhorse Mine Site
Fish and Water Quality Monitoring Report, August 24-26, 1998

By : Carl Hemming and William Morris

Introduction

In 1997, a gravel mine site was opened to provide construction materials for Deadhorse Airport improvements. The site is located west of the Dalton Highway approximately 2 miles south of Deadhorse. In a cooperative planning effort involving the Alaska Department of Transportation (ADOT), Fish and Game, Natural Resources, and federal resource agencies, a site design and rehabilitation plan was developed. The plan followed the guidance provided in ADF&G Technical Report 93-3, "North Slope Gravel Pit Performance Guidelines" (McLean 1993). It was determined during the planning phase that the site would be closed out and rehabilitated after gravel removal for the airport project was complete. Long term goals were freshwater for road maintenance and deep water habitat for wintering fish. Site design features for fish included an outlet connection to a tundra stream that joins the Sagavanirktok River, and shallow water zones around the perimeter of the site. The outlet connection was designed to allow fish to access the site using the existing stream channel and the shallow water zones were designed to foster colonization by aquatic plants and to increase production of fish food organisms.

Site restoration was completed in late summer 1997, and flooding occurred rapidly aided by heavy rainfall. This report describes monitoring of fish colonization and water quality in the mine site during 1998, the first full season after site restoration and flooding. This is the second report on this project and includes data collected between August 24 and 26, 1998.

Methods

We fished fyke nets at two locations between August 24 and 26. A net was fished in shallow water on the south side of the pit at a point midway between the access ramp and the inlet channel and a second net was fished in the inlet channel. The net at on the south side of the site was larger with two 1.2 m (4 ft) square entrance frames, five hoops, a 1.8 m (6 ft) cod end, and 7.6 m (25 ft) net wings attached to the entrance frames. The net fished in the inlet channel was similar but smaller with two 0.9 m (3 ft) entrance frames and a 15.2 m (50 ft) center lead attached to the entrance frame and to shore. The species of each fish captured was determined, the fork length was measured to the nearest millimeter, and the fish was released at the capture site. Ninespine stickleback (*Pungitius pungitius*) were identified, enumerated, and released without length measurement. When large catches of fish in the same size class occurred a subsample was measured and the remainder were enumerated and released.

A water quality sampling station was selected in the deepest area of gravel excavation at the southwest end of the reservoir. We used a aluminum riverboat with an antiquated sputtering outboard motor for access, anchored in the deep area, and used the boat as a work platform. Water measurements were taken at the surface and at one meter intervals through the water column to the bottom. Water measurements were taken with a Hydrolab®, MiniSonde®, water quality multiprobe connected by a cable to a Surveyor® 4 water quality data display unit. Parameters measured included temperature ° C, dissolved oxygen concentration (mg/l), dissolved oxygen percent saturation (temperature and barometrically corrected), pH, salinity, and depth (measured with cable calibrations). The meter was calibrated to suggested specification prior to use in the field and rechecked after sampling was completed. The dissolved oxygen concentration was calibrated using the Winkler Titration method (average of three measurements) and pH and conductivity were calibrated with standard solutions.

Results

Fish Sampling

We captured ninespine stickleback, Dolly Varden (*Salvelinus malma),* Arctic grayling (*Thymallus arcticus),* round whitefish *(Prosopium cylindraceum),* and slimy sculpin (*Cottus cognatus)* (Table 1).

Table 1. Results of fyke net fish sampling at ADOT Deadhorse Gravel Site, August 24-26, 1998.

Date	Net Location	Fish Species	Number
August 25	South side	Arctic grayling	46
		Dolly Varden	3
		Ninespine stickleback	858
		Round whitefish	1
	Inlet	Arctic grayling	9
		Ninespine stickleback	572
August 26	South side	Arctic grayling	85
		Dolly Varden	3
		Ninespine stickleback	2288
	Inlet	Arctic grayling	14
		Ninespine stickleback	572
		Slimy sculpin	1

Water Quality

Water measurements were taken at 9 depth intervals from the surface to the bottom at 7.1 m (Table 2). The measurements indicate a well mixed waterbody as all parameters had uniform values through the water column.

Table 2. Water quality characteristics of ADOT Deadhorse Mine Site August 25, 1998.

Depth (m)	Temp ° C	D.O. Concentration mg/l	D.O. % Saturation	Salinity ppt	pH
Surface	10.16	10.83	97.5	0.15	8.71
1	10.14	10.81	97.1	0.15	8.71
2	10.11	10.76	96.8	0.15	8.71
3	10.09	10.78	96.9	0.15	8.71
4	9.97	10.77	96.7	0.15	8.71
5	9.95	10.74	96.3	0.15	8.69
6	9.93	10.74	96.2	0.15	8.69
7	9.91	10.73	96.0	0.15	8.67
7.1 (bottom)	9.91	10.64	95.4	0.15	8.71

Discussion

The number of fish species captured in the ADOT Deadhorse pit increased from two in July to five in late August. Ninespine stickleback and Dolly Varden were found during both sample periods while Arctic grayling, slimy sculpin, and round whitefish were only captured in the late August sample period. The August catch included only one slimy sculpin and one round whitefish, while 154 Arctic grayling were captured. Eighty percent of the Arctic grayling were young-of-the-year (y-o-y) size class fish (Appendix I). We measured 70 of the y-o-y grayling and they ranged from 48 to 65 mm in length, with a mean of 54 mm (SD 3.1 mm).

The number of ninespine stickleback increased in August from that found in July. In July, stickleback abundance ranged from 12 to 97 per trap, while August catches ranged from 572 to 2288. The catch rate and size distribution of Dolly Varden was similar in each of the two sample periods. In July we captured 7 Dolly Varden ranging from 110 to 282 mm, with a mean length of 235 mm (SD 57), and in August we captured 6 Dolly Varden ranging from 145 to 284 mm, with a mean length of 213 mm (SD 49).

In August, the most important finding was the large numbers of y-o-y grayling (Figure 1). Grayling fry are generally found close to spawning sites. Large numbers of y-o-y grayling indicate that spawning occurs in the stream system that flows through the ADOT pit. This system includes an outlet channel between the pit and the Sag River and the

inlet to the ADOT pit that drains a large shallow lake complex west of the pit (Figure 2). While adult (>300 mm) grayling were not captured in either July or August it is possible that larger fish entered the stream shortly after the spring flood, spawned and moved downstream out of the system into the Sag river or moved upstream into the shallow wetland complex above the pit.

We conducted visual surveys of the outlet channel between the pit and the Sag River on June 16, August 5, and August 26. Fish were not observed in the outlet channel during these surveys. On June 16, the channel had continuous flow with one section between the pit outlet and the Dalton Highway having a one meter cascading drop. It appeared that access to the pit was not obstructed for fish moving upstream from the Sag River in mid June. On August 5 the outlet channel was dry at a point immediately downstream from the Dalton Highway culvert crossing, but continuous flow occurred between the pit and the culvert crossing. On August 26, the outlet channel was continuous between the pit and the Sag River but water depths of only 1 cm were found in the shallow riffle areas.

Water quality sampling in both July and August indicate that dissolved oxygen concentrations are at or near saturation at all depths though the water column. The deeper areas of the pit provide 5 to 7 meters of water suitable for wintering fish under 2 meters of ice cover.

The ADOT Deadhorse pit complex including the outlet channel to the Sag River and the inlet connection to extensive upstream wetlands provide high quality freshwater fish habitat. The outlet channel to the Sagavanirktok River is a pathway for colonization of the pit and shallow ponds upstream. This channel is used by at least 5 fish species. The upstream ponds provide a rich source of fish food organisms. The mine site contains deep well oxygenated waters suitable for wintering fish. The presence of y-o-y grayling indicate that stream habitats upstream or downstream of the ADOT pit were used by spawning grayling in the spring of 1998.

Literature Cited

McLean, R.F. 1993. North Slope Gravel Pit Performance Guidelines. Alaska Department of Fish and Game, Habitat and Restoration Division Technical Report No. 93-3. Juneau. 37 pp. + appendices.

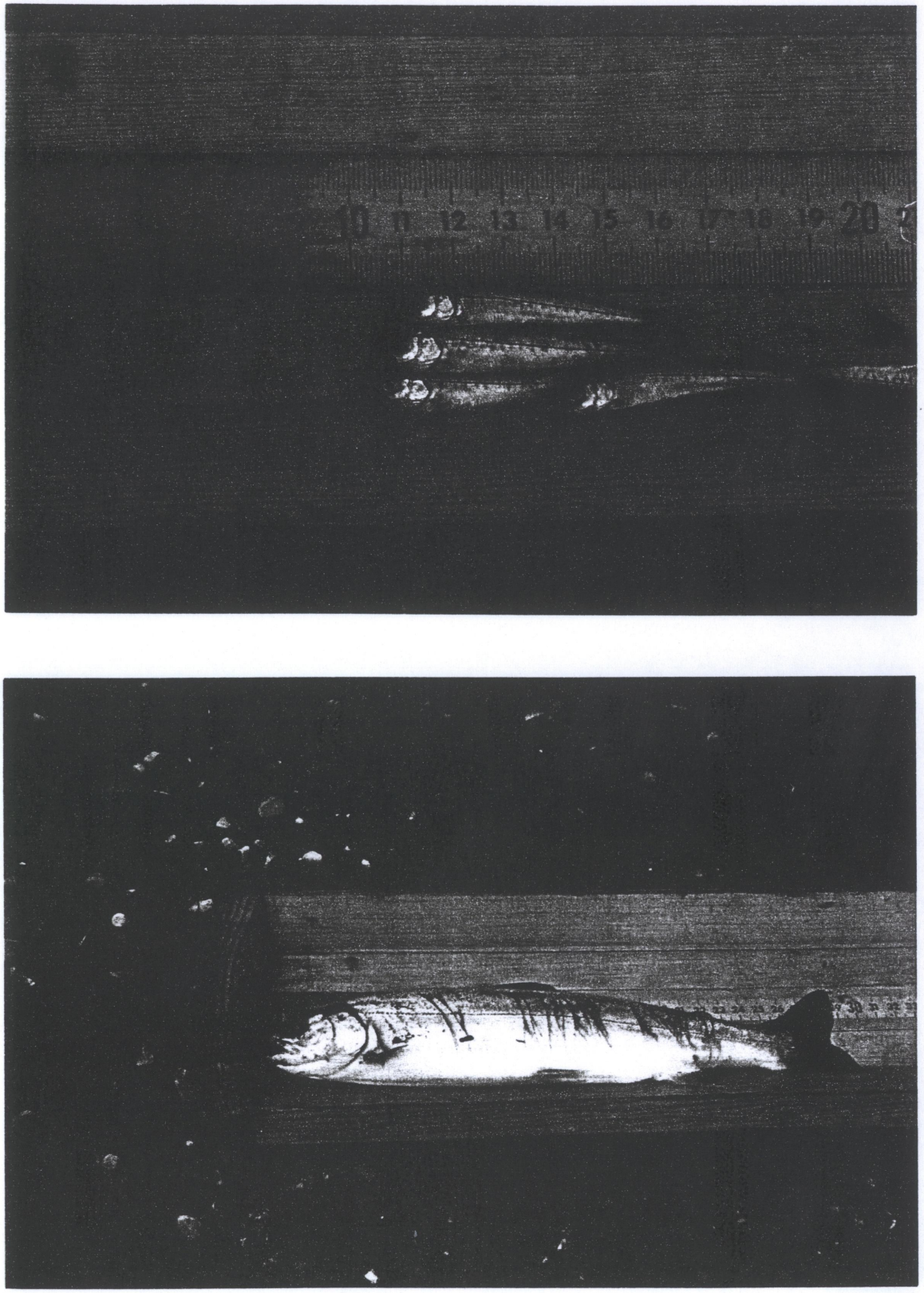

Figure 1. Young-of-the-year Arctic grayling (top) and juvenile Dolly Varden (bottom) captured in ADOT Deadhorse pit, August 1998.

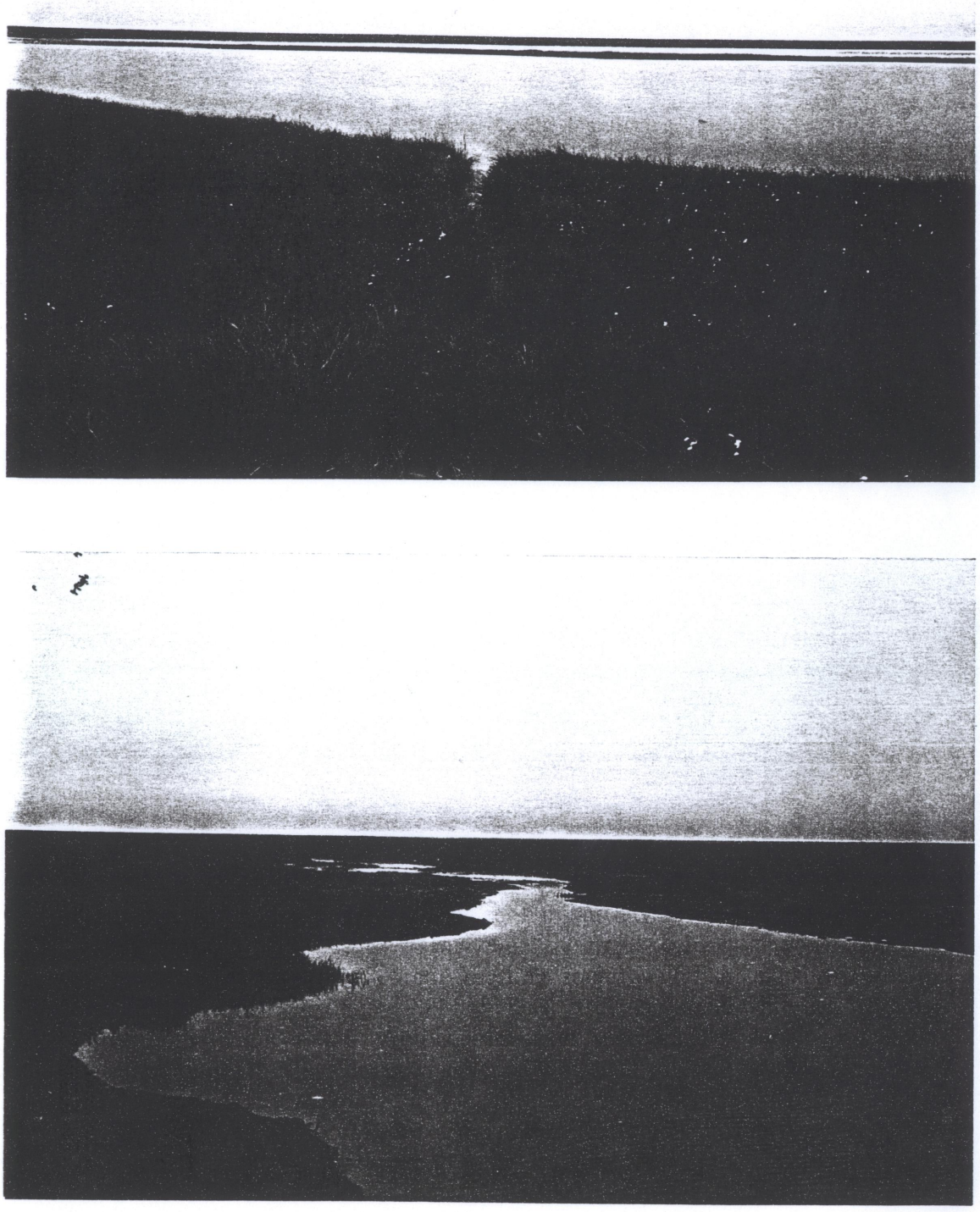

Figure 2. Shallow tundra pond upstream of ADOT Deadhorse pit with outlet channel (top), and inlet channel to ADOT pit (bottom).

Appendix I. Fork lengths of fish captured in ADOT Deadhorse Mine Site, August 24 to 26, 1998.

Date	Location	Fish Species and lengths (mm)							
		AG	AG	AG	AG	AG	DV	RWF	SSc
8/25/98	South	48	53	55	60	154	178	135	
		49	53	56	62	161	242		
		50	54	56	65	176	284		
		50	54	56	88	221			
		52	54	56	95	230			
		52	54	57	105	240			
		53	54	58	139				
		53	55	58	140				
		53	55	59	146				
		53	55	60	146				
	Inlet	48							
		51							
		52							
		54							
		55							
		57							
		58							
		91							
		133							
8/26/98	South	52	55	60	220		145		
		52	55	92	54 (yoy not measured)		205		
		53	55	92			225		
		53	55	96					
		54	55	101					
		54	55	105					
		54	56	108					
		54	56	128					
		54	57	141					
		54	58	150					
	Inlet	48	160						110
		51	192						
		51	232						
		52	236						
		53							
		55							
		55							
		56							
		58							
		157							

AG = Arctic grayling
DV = Dolly Varden
RWF = Round whitefish
SSc = Slimy sculpin

STATE OF ALASKA

TONY KNOWLES, GOVERNOR

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September 29, 1999

John R. Mazzitello
Environmental Coordinator
Department of Transportation and
Public Facilities
2301 Peger Road
Fairbanks, AK 99709-3399

Dear Mr. Mazzitello:

RE: Deadhorse Gravel Site, Summer 1999 Fish and Water Quality

Enclosed is a trip report written by Mr. William Morris summarizing fish and water quality sample results collected in summer 1999 at the Deadhorse Mine Site. A total of 41 fish (not including ninespine stickleback) were captured during two sample events. Fish colonization of the Deadhorse Mine Site, originally flooded in August 1997, has been extremely rapid. Seven fish species have been documented in the flooded mine site, including four freshwater and three anadromous species. Water quality results indicate that the pit is well mixed, high in dissolved oxygen, basic, and filled with fresh water. Successful reproduction of Arctic grayling in spring 1999 probably did not occur, but we did observe young-of-the-year Arctic grayling in summer 1998 and age 1+ fish were present in summer 1999. Monitoring of the mine site should be continued to document fish use, water quality, and the effects, if any, of overburden disposal during winter 1999/2000. We appreciate the financial assistance provided by your department to conduct the fish and water quality monitoring program at the Deadhorse Mine Site. If there are any questions regarding the enclosed report, please contact either Mr. Morris or me at 907-459-7289.

Sincerely,

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

Enclosure

cc: w/enclosure

Patti Wightman, ADOT&PF, Fairbanks
Patrica Miller, ADOT&PF, Fairbanks
Larry Bright, USFWS, Fairbanks
Ted Rockwell, EPA, Anchorage
Pete McGee, ADEC, Fairbanks
Jeanne Hanson, NMFS, Anchorage
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Charles Swanton, ADF&G, Fairbanks
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Erick Gerke, ADOT&PF, Fairbanks

AGO/ago

ADOT/PF Deadhorse Mine Site
Fish and Water Quality Monitoring, 1999.

By: William Morris

Introduction:

In 1997 a gravel mine site operated by the Alaska Department of Transportation and Public Facilities (ADOT/PF) was flooded as part of the site rehabilitation plan. The mine site was connected to a tundra stream draining a large wetland complex. The stream runs from the mine site to the Sagavanirktok River about 0.75 Km downstream. The pit was designed to create fish over-wintering habitat, and to provide a shallow bench around the margins of the pit for aquatic vegetation to take root and provide habitat for food fish organisms, once rehabilitated. The pit first flooded in August 1997 and fish and water quality sampling was first conducted during the open-water season, 1998. With the proximity to the Sagavanirktok River fish moved into the site almost immediately. In 1998, Arctic grayling (*Thymallus arcticus*), Dolly Varden (*Salvelinus malma*), round whitefish (*Prosopium cylindraceum*), slimy sculpin (*Cottus cognatus*), and ninespine stickleback (*Pungitius pungitius*) were captured in the pit and pit inlet (Hemming and Morris 1998). Arctic grayling captured were primarily young-of-the-year fish indicating Arctic grayling are using the upstream wetlands for spawning (Hemming and Morris 1998).

Rehabilitation work on the pit will continue during winter 1999/2000 when overburden piles on the pit margins will be removed by either moving the piles onto the ice and, thus, redistributing the material into the pit during break-up 2000, or complete removal and reuse. Fish and water quality monitoring will continue in 2000 to monitor for any potential effects of the overburden addition to the pit. Impacts should be minimal and virtually undetectable by fall 2000. This report summarizes fish and water quality sampling conducted during summer 1999.

Methods:

Fish sampling was conducted twice during the 1999 open-water season, once in late June and once in late August. Fish sampling gear consisted of 3.7 m long fyke-nets with two 0.9 m entrance frames, five hoops, a 1.8 m cod end (fish collection/holding area), and two 0.9 X 7.6 m wings attached to the sides of the first entrance frame. Nets were set from shore with a 15.2 m lead net designed to funnel fish into the fyke-net. Nets were set and checked at 24-hour intervals for up to four days. All fish captured were identified and measured to fork length (FL) in mm and released on site. Ninespine stickleback were counted and released with no length measurement. During June sampling, net sites were accessed with a PolarCraft™ riverboat.

Water quality sampling was conducted in late June upstream of the pit inlet and in the gravel mine site. A PolarCraft™ riverboat was used to access both sites and used as a work platform to collect water quality data. A Hydrolab® Minisonde® water quality

probe connected to a Surveyor 4® digital computer display unit was used to measure temperature (C°), dissolved oxygen (mg/L), percent dissolved oxygen saturation, conductivity (uS), and pH. Measurements were taken at one-meter intervals from just below the surface to the bottom of the pit.

Results:

A total of 41 fish (not including ninespine stickleback) were captured during summer 1999 sampling. Six species of fish were captured including, Arctic grayling, round whitefish, ninespine stickleback, Dolly Varden, least cisco (*Coregonus sardinella*), and broad whitefish (*Coregonus nasus*). Arctic grayling were the most numerous species captured (33 fish), representing 80% of the overall catch (Table 1). Species composition in the pit was similar to 1998 results, however; least cisco and broad whitefish were not found in 1998 and slimy sculpin were absent in 1999. Additionally, no young-of-the-year Arctic grayling were captured in 1999.

Table 1. Fish sampling results from the ADOT/PF Deadhorse Mine Site, 1999.

	Species measured to Fork Length (mm).					
Sampling Period	Round Whitefish	Arctic Grayling	Least Cisco	Broad Whitefish	Ninespine Stickleback	Dolly Varden
June	109	301	350		254 fish	122
		298				101
		67				121
		65				130
		67				
		67				
		67				
		58				
		66				
		319				
		62				
		200				
		72				
		68				
	Round Whitefish	Arctic Grayling	Least Cisco	Broad Whitefish	Ninespine Stickleback	Dolly Varden
August		154	212		207 3003 fish	
		227				
		142				
		186				
		103				
		112				
		94				
		109				
		105				
		125				
		107				
		100				
		142				
		98				
		100				
		126				
		107				
		107				
		110				

Water quality results indicate that the pit is well mixed, high in dissolved oxygen, basic, and filled with fresh water (Table 2). The inlet channel has similar water chemistry with slightly higher temperatures (in June) (Table 2). Water quality indicates the pit and inlet are suitable for fish survival and pit depth (7.5 m at sample site) is more than adequate to overwinter large numbers of fish.

Table 2. ADOT/PF Deadhorse Mine Site water quality monitoring, June 1999.

Inlet Channel					
Depth (m)	Temp. C	DO. mg/L	%Sat.	Cond. uS	pH
0	9.07	11.7	95.5	305.3	8.00
1.75	6.34	11.9	100.0	296.3	8.15
Pit Basin					
Depth (m)	Temp. C	DO. mg/L	%Sat.	Cond. uS	pH
0	5.17	12.28	95.6	297.6	8.09
1	5.11	12.28	95.6	297.3	8.10
2	5.05	12.33	95.7	297.5	8.12
3	4.69	12.5	96.2	298.0	8.12
4	4.49	12.65	96.7	299.8	8.11
5	4.42	12.7	97.0	300.0	8.11
6	4.39	12.68	96.8	300.2	8.11
7	4.39	12.67	96.7	300.6	8.10
7.5	4.37	12.63	96.3	300.0	8.11

Discussion:

Fish colonization and use of the Deadhorse mine site has been extremely rapid. The pit has been flooded for two full open-water seasons, and already, most freshwater resident and anadromous species that use freshwater habitats have been documented using the pit. Ninespine stickleback and Dolly Varden were the first species documented using the pit in June 1998. By August 1998 Arctic grayling, round whitefish, and slimy sculpin were identified in the pit. By August 1999 both least cisco and broad whitefish were documented in the pit as well. At this point seven species have been documented using the pit, including 4 freshwater species (round whitefish, Arctic grayling, ninespine stickleback, and slimy sculpin), and 3 anadromous species (least cisco, broad whitefish, and Dolly Varden). The proximity of the mine site to the Sagavanirktok River, one of the most productive fish systems in the Prudhoe Bay area, is undoubtedly aiding in the rapid use of the pit by fish.

In 1998 many young-of-the-year Arctic grayling were identified in the inlet stream and the pit itself, indicating Arctic grayling spawning may have occurred in the upstream wetland complex. However, 1999 sampling failed to show the presence of young-of-the-

year Arctic grayling, this finding is consistent with low recruitment seen in other North Slope gravel pits this year. Some Arctic grayling captured in 1999 were in the 1+ age class and may represent fish spawned from the system last year (fish with fork length 90-110 mm). This indicates that some Arctic grayling probably are overwintering in the pit.

Monitoring of fish use and water quality will continue in summer 2000. 2000 monitoring will allow us to keep track of changes in fish use, such as additional species using the pit for spawning, and water quality. This is especially important as pit remediation measures to be conducted this winter could have some minor effects on pit water quality. Overburden moved back onto the pit should be redistributed quickly during break-up and should settle out by fall. There is some potential for changes in fish use based on increased turbidity; however, even if this is the case the impact should be limited to 2000.

Literature Cited:

Hemming, C. R., and W.A. Morris. 1998. ADOT Deadhorse mine site fish and water quality monitoring, August 24-26, 1998. Alaska Department of Fish and Game, Habitat and Restoration Division, Fairbanks. 7 pp.