

FEDERAL AID IN SPORT FISH RESTORATION

Fort Richardson Hatchery

by
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Carmen Olito
F-14
Volume 1, Number 4

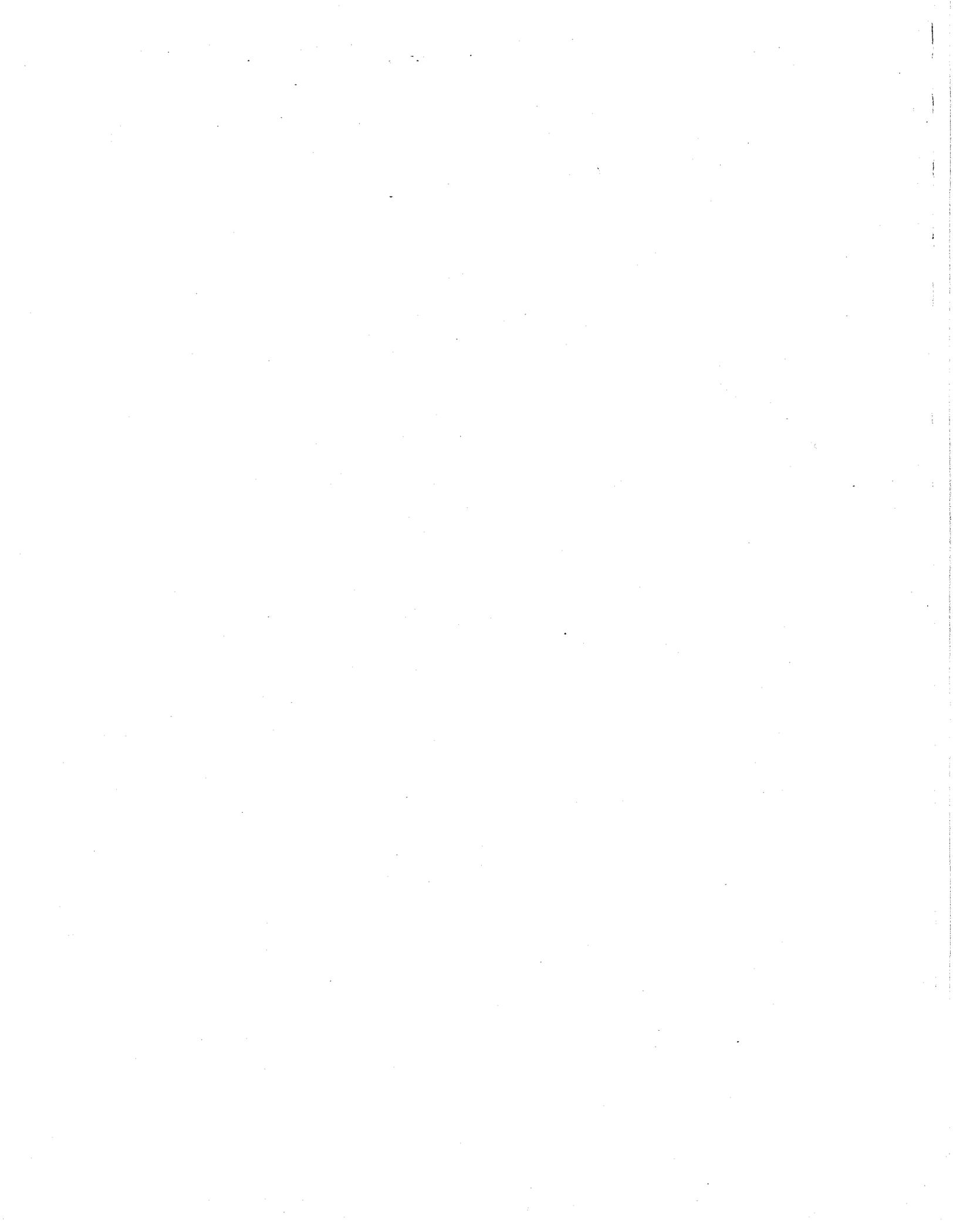
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Juneau, Alaska 99802

December 1986



Volume 1, Number 4

Study

RESEARCH PROJECT SEGMENT

State: Alaska

Name:

Project: F-14

Study: D-1

Study Title: Fort Richardson
Hatchery

Cooperator: Gary Wall and Carmen Olito

Period Covered: October 1, 1985 to September 30, 1986

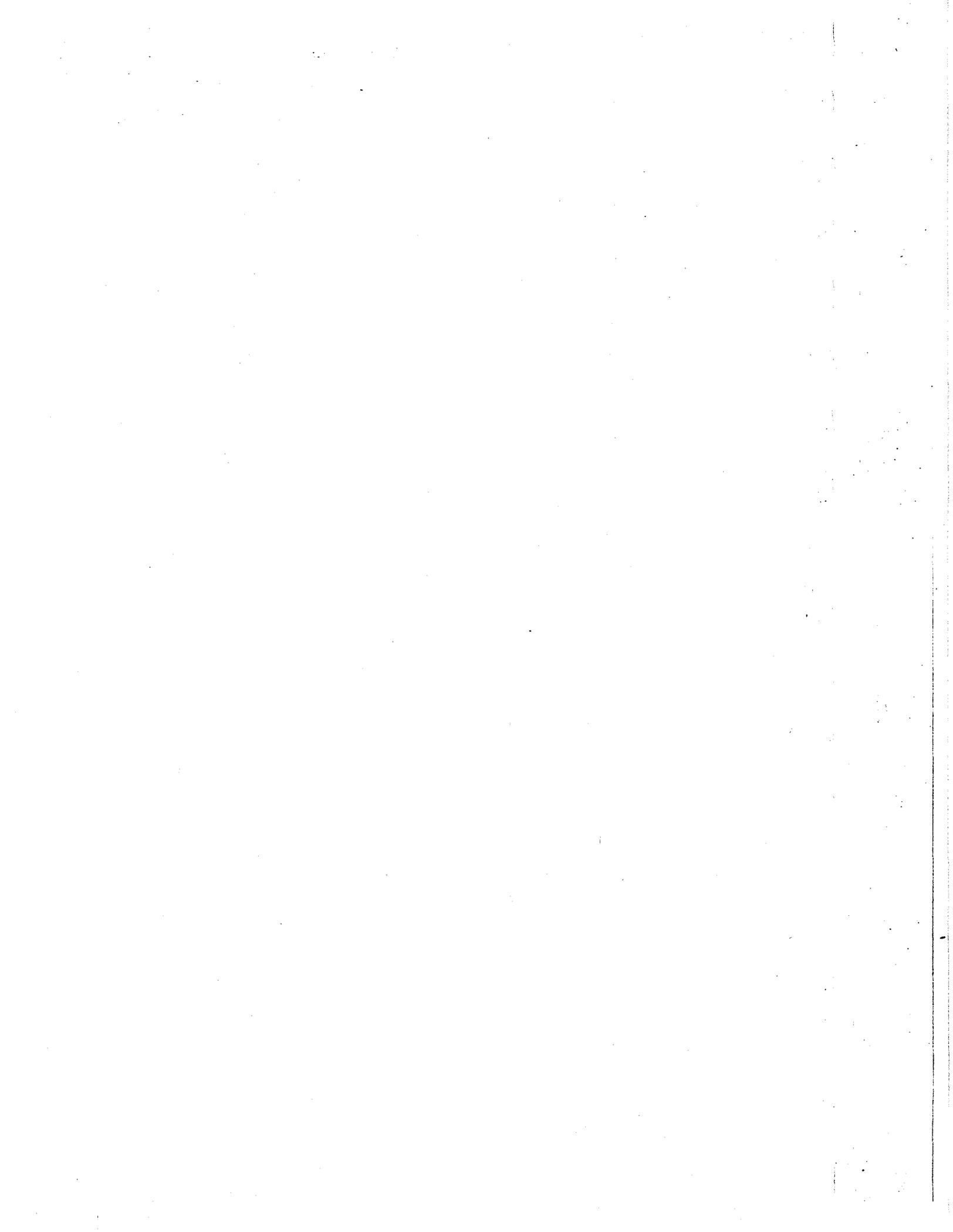


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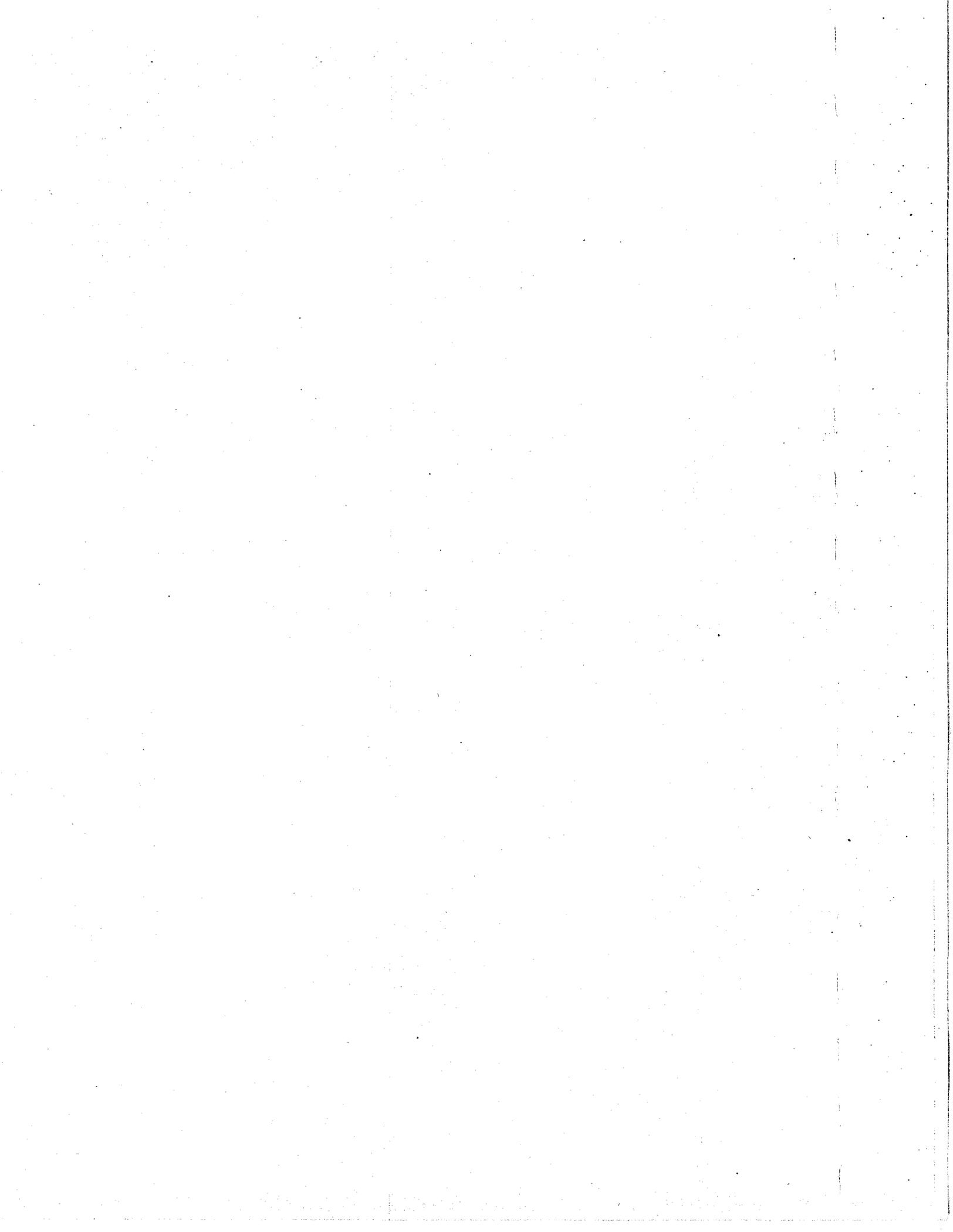
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ABSTRACT

Fort Richardson Hatchery has two components: (1) fish production and (2) the Brood-stock Development Center. A total of 4.4 million fish weighing 40,527 kg was released from Fort Richardson Hatchery during 1986. All production goals were met, except rainbow trout, *Salmo gairdneri*, fingerlings. A minimal water supply hampers fish production at Fort Richardson Hatchery; consequently, production will be curtailed during 1987 to implement remedial actions. A heat exchanger system will be installed to allow more efficient use of well water, and an oxygen contactor system will be installed to remove nitrogen gas at the final use-point. In addition, fish cultural techniques will be adjusted to improve the quality and survival of the fish.

Brood stock from both the Swanson River and Big Lake strains have been maintained at the Brood-stock Development Center. During 1986 approximately 4.9 million eggs were taken for the rainbow trout production program. For the Brood-stock Selection Project, seven traits were included in a performance index to select 15 families of rainbow trout from a total of 64 families to obtain the first select lot for future production.

KEY WORDS: Fort Richardson Hatchery, Brood-stock Development Center, rainbow trout, *Salmo gairdneri*, steelhead, chinook salmon, *Oncorhynchus tshawytscha*, coho salmon, *Oncorhynchus kisutch*, fish production, brood-stock selection, enhancement, brood-stock maintenance.

INTRODUCTION

Fish released from Fort Richardson Hatchery play a very important role in the sport fisheries enhancement program in central Alaska. This complex central incubation facility is designed and

operated for the production of juvenile rainbow trout and steelhead, *Salmo gairdneri*, (landlocked vs. anadromous), chinook salmon, *Oncorhynchus tshawytscha*, and coho salmon, *Oncorhynchus kisutch*, for stocking in numerous streams, lakes, and marine waters to create or enhance a wide variety of sport fisheries. The hatchery's most important program consists of the production of rainbow trout (both fingerlings and catchable-sized). This program is composed of two discrete operations requiring separate activities: (1) fish production and (2) brood-stock development and maintenance. Both operations are conducted at the hatchery, but each one has a separate objective, manager, and budget.

The objectives for the Fort Richardson Hatchery Project are to provide good quality rainbow trout, steelhead, and chinook and coho salmon, for use in sport fisheries enhancement projects and to develop several strains of Alaskan rainbow trout for use as brood stock in that species production program.

FORT RICHARDSON HATCHERY FISH PRODUCTION

Introduction

Hatchery Name and Location:

The Fort Richardson Hatchery is a state facility operated by the Fisheries Rehabilitation, Enhancement and Development (FRED) Division of the Alaska Department of Fish and Game (ADF&G). The hatchery is located on the Fort Richardson Military Reservation at Mile 0.5 Arctic Valley Road (Figure 1). It is accessible from Anchorage via the Glenn Highway (Figure 2). The design capacity is approximately 5 million fish, or 113,500 kg yearly. These include 2.5 million rainbow trout fingerlings, 120,000 catchable-sized rainbow trout, 60,000 steelhead smolts, 3.0 million chinook and coho salmon smolts, and up to 1 million salmon fingerlings.

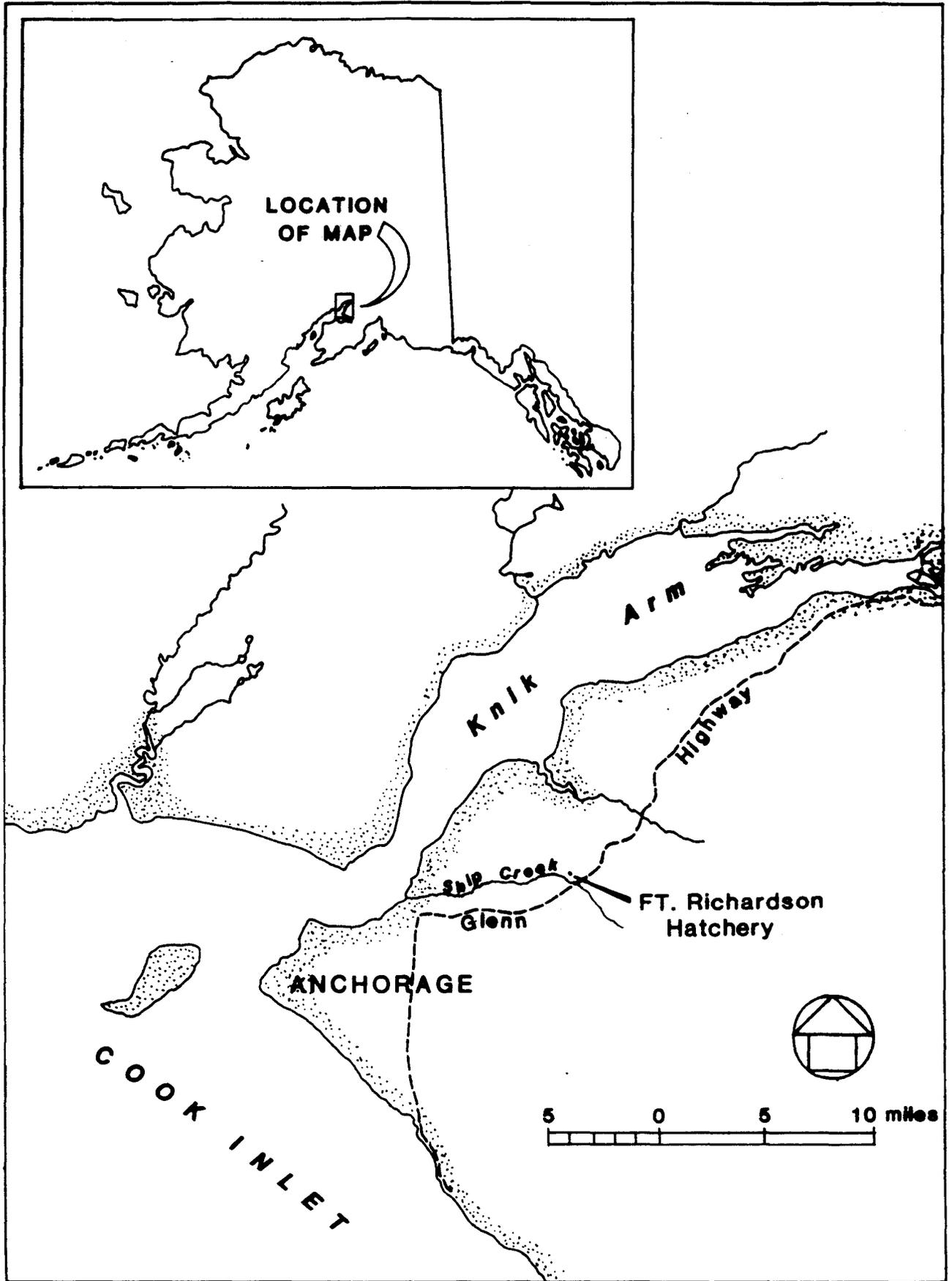


Figure 1. Geographical location of Fort Richardson.

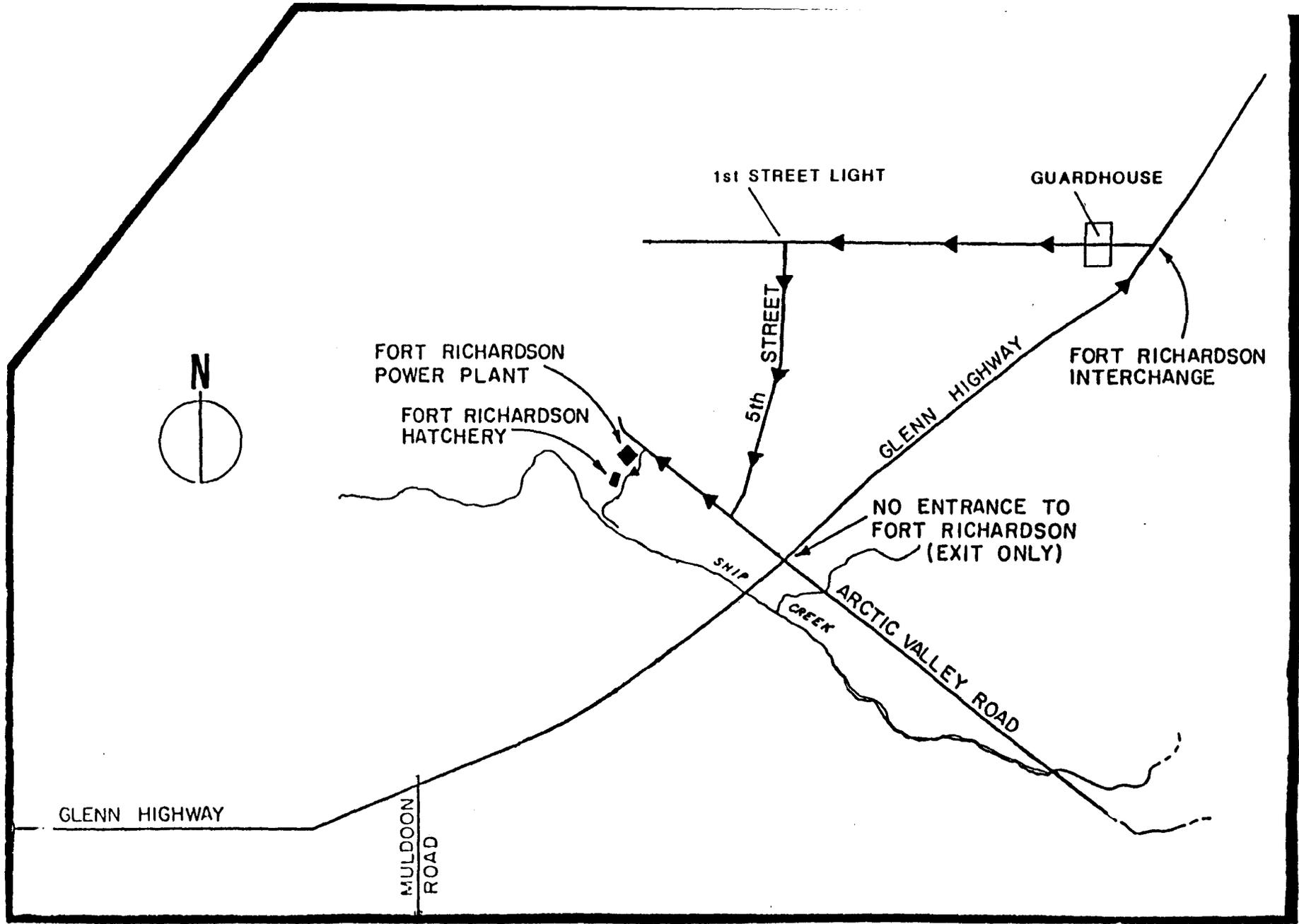


Figure 2. Access route to Fort Richardson Hatchery.

Description of Physical Plant:

The hatchery is sited on 5.1 ha leased from the U.S. Army (Figure 3). Major structures include the following:

1. Incubation building: disinfection room, incubation room with 40 Heath[®] stacks, start-up tanks, 24 indoor raceways (0.9 x 9.1 x 0.8 m), and a mechanical room.
2. Twenty-four outdoor raceways (2.4 x 24.4 x 0.8 m) that provide extended rearing space for salmon smolts and catchable-sized rainbow trout.
3. Brood-stock Development Center: laboratory and rearing area for rainbow trout brood-stock development, laboratory for water quality analysis and basic fish health inspections, rainbow trout spawning area, and nine adjacent uncovered rainbow trout brood-stock raceways (3.0 x 30.5 x 0.9 m).
4. Aeration building that provides primary gas stabilization and aeration for both warm and cold water for incubation and rearing.
5. Manifold building with associated pipelines and motor controls for the water supply; nine wells and associated process piping on the hatchery site.
6. A Visitor's Center building.
7. Shop with an open storage area for facility maintenance.

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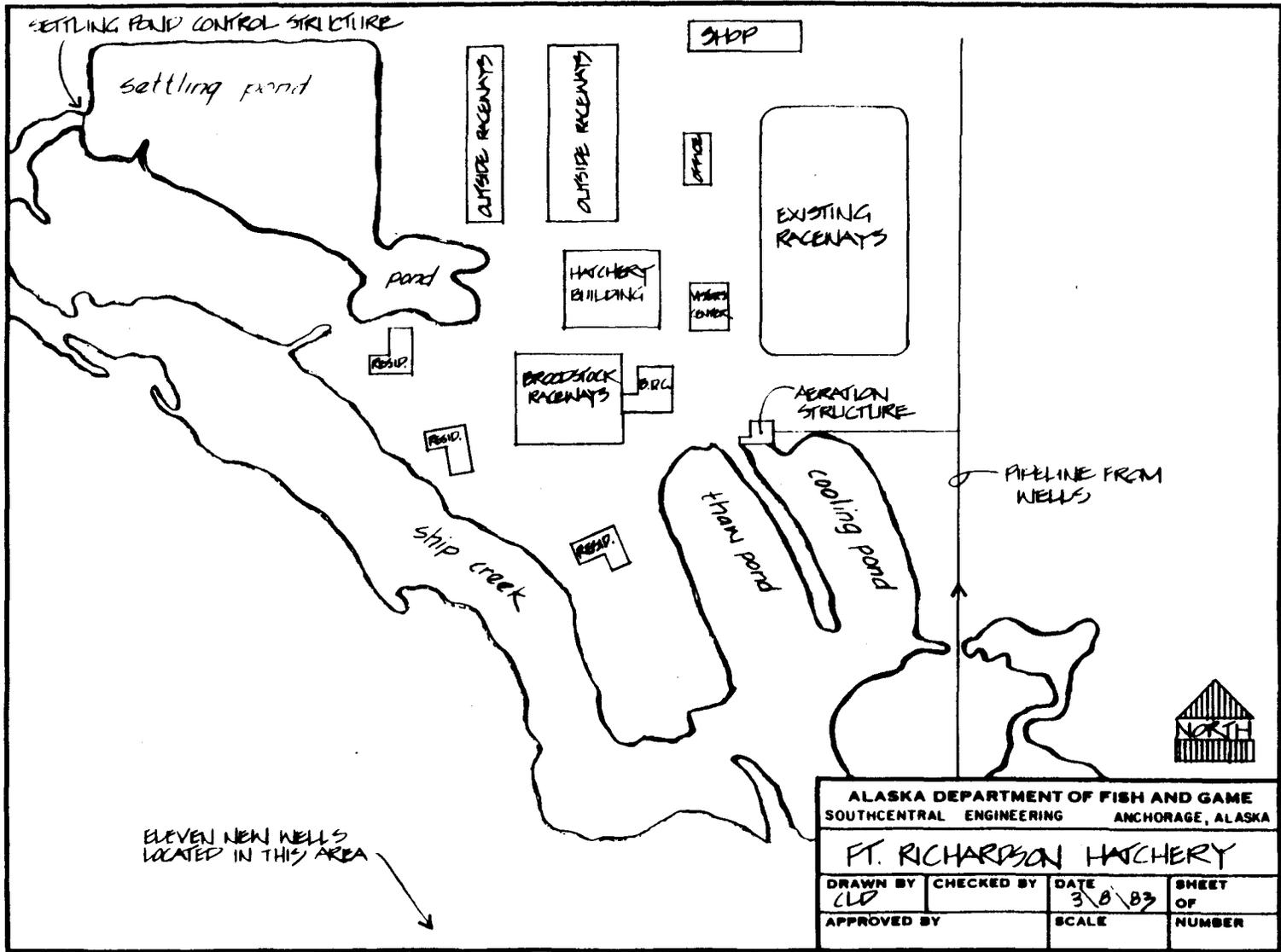


Figure 3. Fort Richardson Hatchery site plan.

8. Office.

9. Three single-family residences for hatchery staff.

Electricity is provided to the facility by the U.S. Army power plant that is located adjacent to the hatchery. Dual lines from two different substations and automatic switching gear provide alternate power. Space heating is by natural gas.

Water Source, Delivery and Treatment:

The hatchery uses only well water for fish production. Nine wells are located on property leased from the U.S. Army, and another 14 wells are on U.S. Army property south of and adjacent to the hatchery site (Figure 4); three of these wells are owned by the U.S. Army and are available for hatchery use when not needed to supply potable water for the military base.

Cold water is pumped from the south well field to the power plant where it is heated to approximately 20°C. This warm-water is then returned to the warm water sump in the aeration building, pumped through the warm water gas stabilization system to remove excess nitrogen, and routed to various use-points. Cold well water is pumped to the cold-water sump in the aeration building, pumped through the cold-water gas stabilization system to add oxygen, and routed to various use points. The warm and cold water are then mixed to achieve the desired temperature. The indoor raceways use water only once (single pass); however, this water can be reused in outdoor production raceways in a four-pass configuration (i.e., the water is used four times) with aeration between each pass. The brood-stock raceways, however, are arranged in a two-pass system with re-aeration between each pass. Finally, the water is discharged into a large earthen settling pond before it empties into Ship Creek. Figure 5 is a diagram of the water flow pattern in Fort Richardson Hatchery.

e 1. Continued

BROOD STOCK	LIFE STAGE	NUMBER STOCKING STOCKED	LOCATION	TRIP DATE	AVG WT (GMS)	AREA
SWANSON R	CATCHABLE	5,950	CLUNIE LAKE	7/14/86	73.10	ANCHORAGE
SWANSON R	CATCHABLE	5,900	DELONG LAKE	5/21/86	81.00	ANCHORAGE
BIG LAKE	CATCHABLE	1,270	DERBY POND	6/13/86	85.60	ANCHORAGE
SWANSON R	CATCHABLE	994	DISHNO LAKE	6/26/86	55.58	ANCHORAGE
BIG LAKE	CATCHABLE	1,300	EGAN POND	4/18/86	90.00	ANCHORAGE
SWANSON R	CATCHABLE	2,520	FISH LAKE	6/26/86	55.58	ANCHORAGE
SWANSON R	CATCHABLE	995	GREEN LAKE	7/18/86	75.50	ANCHORAGE
SWANSON R	CATCHABLE	1,898	GWEN LAKE	6/04/86	87.50	ANCHORAGE
SWANSON R	CATCHABLE	2,100	GWEN LAKE	6/06/86	68.60	ANCHORAGE
SWANSON R	CATCHABLE	995	HILLBERG L	7/18/86	75.50	ANCHORAGE
BIG LAKE	CATCHABLE	1,800	IRENE LAKE	6/13/86	51.40	PALMER
SWANSON R	CATCHABLE	7,844	JEWELL LAKE	5/21/86	81.00	ANCHORAGE
SWANSON R	CATCHABLE	5,800	KEPLER-BRADLEY	6/06/86	40.20	PALMER
SWANSON R	CATCHABLE	995	LAKE OTIS	7/21/86	75.50	ANCHORAGE
SWANSON R	CATCHABLE	2,461	LOWER FIRE L	7/17/86	75.50	ANCHORAGE
SWANSON R	CATCHABLE	19,878	LUCILLE LAKE	5/12/86	40.30	PALMER
SWANSON R	CATCHABLE	6,200	MATANUSKA	6/06/86	40.20	PALMER
SWANSON R	CATCHABLE	2,985	MIRROR LAKE	7/17/86	75.50	ANCHORAGE
SWANSON R	CATCHABLE	2,983	OTTER LAKE	6/04/86	87.50	ANCHORAGE
SWANSON R	CATCHABLE	6,167	OTTER LAKE	7/14/86	73.10	ANCHORAGE
BIG LAKE	CATCHABLE	1,245	OTTER LAKE	7/16/86	79.40	ANCHORAGE
SWANSON R	CATCHABLE	20,099	SAND LAKE	5/22/86	81.00	ANCHORAGE
SWANSON R	CATCHABLE	2,023	SPRING LAKE	6/26/86	55.58	ANCHORAGE
SWANSON R	CATCHABLE	2,434	TAKU	7/16/86	73.10	ANCHORAGE
SWANSON R	CATCHABLE	2,514	TAKU LAKE	6/16/86	54.26	ANCHORAGE
SWANSON R	CATCHABLE	994	THOMPSON LAKE	6/26/86	55.58	ANCHORAGE
SWANSON R	CATCHABLE	1,988	TRIANGLE LAKE	6/26/86	55.58	ANCHORAGE
		160,181				
SWANSON R	EYED EGGS	606,372	CLEAR H	5/22/86	0.11	FAIRBANKS
		606,372				
SWANSON R	FINGERLING	4,137	3-MILE	9/12/86	2.53	GLENNALLEN
SWANSON R	FINGERLING	1,745	ABERCROMBIE	9/02/86	1.76	KODIAK
SWANSON R	FINGERLING	3,000	AUREL	10/01/86	4.10	KODIAK
SWANSON R	FINGERLING	9,000	BARBARA	9/10/86	2.34	SOLDOTNA
BIG LAKE	FINGERLING	2,600	BARLEY	9/04/86	2.06	PALMER
SWANSON R	FINGERLING	2,600	BARLEY	9/04/86	2.11	PALMER
SWANSON R	FINGERLING	12,248	BENKA	9/11/86	2.38	PALMER
SWANSON R	FINGERLING	13,041	BEVERLY	9/20/86	3.27	PALMER
SWANSON R	FINGERLING	1,800	BIG	9/18/86	3.27	KODIAK
SWANSON R	FINGERLING	13,731	BIG NO LUCK	9/11/86	2.68	PALMER
SWANSON R	FINGERLING	1,500	BLUEBERRY	9/04/86	1.90	GLENNALLEN
SWANSON R	FINGERLING	782	BUFFALO	9/04/86	1.90	GLENNALLEN
SWANSON R	FINGERLING	1,000	BULL	10/01/86	4.10	KODIAK
SWANSON R	FINGERLING	11,932	CABIN	9/03/86	2.38	SOLDOTNA
SWANSON R	FINGERLING	1,400	CAROLINE	10/01/86	4.10	KODIAK
SWANSON R	FINGERLING	9,300	CARTER	9/10/86	2.40	SEWARD

-Continued-

Table 1. Continued

SPECIES	BROOD STOCK	LIFE STAGE	NUMBER STOCKING STOCKED	LOCATION	TRIP DATE	AVG WT (GMS)	AREA
RAINBOW	SWANSON R	FINGERLING	3,300	CASCADE	10/01/86	4.10	KODIAK
RAINBOW	SWANSON R	FINGERLING	17,942	CHRISTIANSEN	9/11/86	3.79	PALMER
RAINBOW	SWANSON R	FINGERLING	10,073	CHUGACH ESTATES	9/03/86	2.38	SOLDOTNA
RAINBOW	SWANSON R	FINGERLING	1,200	CICELY	10/01/86	4.10	KODIAK
RAINBOW	SWANSON R	FINGERLING	3,185	CRATER	9/04/86	1.90	GLENNALLEN
RAINBOW	SWANSON R	FINGERLING	5,000	CRATER	9/10/86	2.34	CORDOVA
RAINBOW	SWANSON R	FINGERLING	26,340	CRYSTAL	9/05/86	2.05	PALMER
RAINBOW	SWANSON R	FINGERLING	400	D-J	9/04/86	1.90	GLENNALLEN
RAINBOW	BIG LAKE	FINGERLING	1,550	DAWN	9/04/86	2.06	PALMER
RAINBOW	SWANSON R	FINGERLING	1,550	DAWN	9/04/86	2.11	PALMER
RAINBOW	SWANSON R	FINGERLING	2,430	DOLGOI	9/18/86	3.27	KODIAK
RAINBOW	SWANSON R	FINGERLING	1,070	DRAGONFLY	9/18/86	3.27	KODIAK
RAINBOW	SWANSON R	FINGERLING	8,361	EAST TWIN	9/11/86	2.38	PALMER
RAINBOW	SWANSON R	FINGERLING	2,300	ECHO LAKE	8/27/86	2.96	PALMER
RAINBOW	SWANSON R	FINGERLING	183,130	ELMENDORF	9/19/86	3.47	ANCHORAGE
RAINBOW	SWANSON R	FINGERLING	36,040	FINGER LAKE	8/29/86	2.26	PALMER
RAINBOW	BIG LAKE	FINGERLING	11,058	FLORENCE	8/29/86	1.55	PALMER
RAINBOW	SWANSON R	FINGERLING	9,130	GERGIE	9/12/86	2.53	GLENNALLEN
RAINBOW	SWANSON R	FINGERLING	3,250	HAITMAN	10/01/86	4.10	KODIAK
RAINBOW	SWANSON R	FINGERLING	117,215	HARDING	9/25/86	3.34	FAIRBANKS
RAINBOW	BIG LAKE	FINGERLING	47,522	HARDING LAKE	10/02/86	4.45	FAIRBANKS
RAINBOW	SWANSON R	FINGERLING	22,740	HARDING LAKE	10/02/86	3.62	FAIRBANKS
RAINBOW	BIG LAKE	FINGERLING	11,600	HONEYBEE	8/29/86	1.55	PALMER
RAINBOW	SWANSON R	FINGERLING	1,000	HORSESHOE	10/01/86	4.10	KODIAK
RAINBOW	SWANSON R	FINGERLING	1,000	IRENE LAKE	8/27/86	2.96	PALMER
RAINBOW	SWANSON R	FINGERLING	21,064	ISLAND	9/03/86	2.38	SOLDOTNA
RAINBOW	SWANSON R	FINGERLING	1,000	JACK	9/19/86	3.27	KODIAK
RAINBOW	SWANSON R	FINGERLING	6,600	JEROME	9/10/86	2.34	SOLDOTNA
RAINBOW	BIG LAKE	FINGERLING	4,030	JOHNSON	9/03/86	2.06	PALMER
RAINBOW	SWANSON R	FINGERLING	4,030	JOHNSON	9/03/86	2.56	PALMER
RAINBOW	SWANSON R	FINGERLING	17,000	JOHNSON	9/03/86	2.38	SOLDOTNA
RAINBOW	BIG LAKE	FINGERLING	12,999	KALMBACK	9/08/86	2.10	PALMER
RAINBOW	SWANSON R	FINGERLING	13,013	KALMBACK	9/08/86	1.90	PALMER
RAINBOW	SWANSON R	FINGERLING	5,800	KEPLER-BRADLEY	8/27/86	2.96	PALMER
RAINBOW	SWANSON R	FINGERLING	10,035	KNIK	8/29/86	2.26	PALMER
RAINBOW	SWANSON R	FINGERLING	1,388	LEE	9/02/86	1.76	KODIAK
RAINBOW	SWANSON R	FINGERLING	799	LILLY	9/02/86	1.76	KODIAK
RAINBOW	SWANSON R	FINGERLING	385	LITTLE CRATER	9/04/86	1.90	GLENNALLEN
RAINBOW	SWANSON R	FINGERLING	7,185	LITTLE NO LUCK	9/11/86	2.38	PALMER
RAINBOW	SWANSON R	FINGERLING	3,600	LONG	9/18/86	3.27	KODIAK
RAINBOW	SWANSON R	FINGERLING	10,266	LONG LAKE	9/05/86	3.67	PALMER
RAINBOW	SWANSON R	FINGERLING	14,972	LONG LAKE	9/11/86	3.79	PALMER
RAINBOW	SWANSON R	FINGERLING	17,000	LONGMARE	9/03/86	2.38	SOLDOTNA
RAINBOW	SWANSON R	FINGERLING	20,000	LOWER BONNIE	9/11/86	2.41	PALMER
RAINBOW	SWANSON R	FINGERLING	1,600	LUPINE	10/01/86	4.10	KODIAK
RAINBOW	SWANSON R	FINGERLING	14,000	LYNNE	9/05/86	2.05	PALMER
RAINBOW	SWANSON R	FINGERLING	798	MARGARET	9/02/86	1.76	KODIAK
RAINBOW	BIG LAKE	FINGERLING	11,307	MARION	9/09/86	2.08	PALMER
RAINBOW	SWANSON R	FINGERLING	11,319	MARION	9/09/86	2.01	PALMER
RAINBOW	SWANSON R	FINGERLING	6,163	MATANUSKA L	8/27/86	2.96	PALMER

-Continued-

3. Numbers and survival rates at each lifestage of lots of fish at Fort Richardson Hatchery, 1986.

ORIGIN	GREEN EGGS	EYED EGGS	EYED EGGS		FRY	FINGERLING	FINGERLING	FINGERLING	CATCHABLE	
			SHIPPED	SEEDED					PONDED FINGERLING	RELEASED
TLE SUSITNA	599,000	517,000 (86.31)	0	517,000	516,000 (99.81)	511,000 (99.83)	203,000	308,000	0 (0.00)	308,000
MILE	180,000	119,000 (63.30)	0	119,000	119,000 (100.00)	118,000 (99.16)	50,000	67,900	0 (0.00)	67,900
W LAKE	730,000	296,000 (78.36)	276,000	296,000	289,000 (97.64)	276,000 (95.50)	276,000	0	0	0
WELL CREEK	54,400	35,100 (64.52)	0	35,100	33,500 (95.44)	32,900 (98.21)	0	32,900	0 (0.00)	32,200
KA RIVER	459,000	373,000 (81.26)	0	373,000	362,000 (97.05)	349,000 (96.41)	136,000	213,000	213,000 (100.00)	0
LOW CREEK	337,000	308,000 (91.39)	0	308,000	295,000 (95.78)	285,000 (96.61)	0	285,000	276,000 (96.84)	0
HOR RIVER	58,900	56,100 (95.25)	0	56,100	52,600 (93.76)	48,700 (92.59)	0	48,700	44,900 (92.20)	0
NSON RIVER	2,500,000	1,194,000 (72.00)	743,000	1,194,000	908,000 (76.05)	712,000 (78.41)	562,000	150,000	128,000 (85.33)	0
LAKE	648,000	464,000 (71.60)	0	464,000	459,000 (98.92)	216,000 (47.06)	155,000	61,000	51,000 (83.61)	0
NSON RIVER	3,900,000	1,844,000 (52.82)	506,000	1,844,000	1,392,000 (75.49)	1,048,000 (75.29)	1,038,000	10,000	0 (0.00)	10,000
LAKE	969,000	416,000 (42.93)	0	416,000	296,000 (71.15)	167,000 (56.42)	157,000	10,000	0 (0.00)	10,000
KA RIVER	249,000	0 (91.97)	229,000							
TLE SUSITNA	495,000									

MILE

N = Chinook Salmon
 E = Steelhead Trout
 R = Rainbow Trout

Numbers in parantheses are the survival rates from the previous lifestage)

temperature of 15°C during the winter and spring could not be maintained because of insufficient water, pump and valve failures, and fluctuations in power-plant effluent.

It is recognized that these performance records for rainbow trout production are unacceptable. An action plan to correct the causes has been developed and is being implemented. Aspects of this plan include (1) nitrogen gas removal, (2) new diet, (3) better control techniques for water temperature and flow, and (4) improved efficiency of water use through installation of heat exchangers. In addition, detailed procedures have been developed to improve fish culture and data collection.

Steelhead Trout:

A total of 45,000 steelhead smolts was released in 1986. Although a production goal of 60,000 smolts had been established according to the raceway capacity, ADF&G restricted the number of steelhead for brood stock to a total of 20 fish, and only 58,900 green eggs were taken. Survivals between each lifestage was excellent (Table 3), and the survival rate from green eggs to smolts was 76%.

Coho Salmon:

The 1986 coho salmon production was substantially higher than the goals. Approximately 273,000 eyed eggs were transferred to the private nonprofit hatchery at Esther Island. Approximately 536,000 coho salmon fingerlings and 726,000 smolts were released.

A heat exchanger system is scheduled for installation at Fort Richardson Hatchery during the second quarter of 1987. This remedial construction will interrupt the hatchery's water supply, so it was necessary to minimize the number of fish on hand, and this factor resulted in the evident production goal discrepancies. The eggs transferred to Esther Island Hatchery

had been taken according to a schedule to produce smolts during 1987. The increase in the number of coho salmon fingerlings released also is attributed to the anticipated installation of the heat exchanger system and the consequent need during construction to minimize the number of fish as well as to outstanding survival among these lots during incubation and rearing. The production of coho salmon smolts, however, resulted primarily from larger-than-planned egg takes and outstanding survival rates among these lots of fish (Table 3).

Chinook Salmon:

Over 488,000 chinook salmon smolts and 135,000 fingerlings, representing 122% and 97% of the original objectives, respectively, were released during 1986. In addition, approximately 228,000 eyed chinook salmon eggs were transferred to Esther Island Hatchery to assist the operators in developing a brood stock for a sport fishery in Prince William Sound.

Facility Budget:

The budget allocation for the FY 1986 operation of Fort Richardson Hatchery was \$775,305. Actual expenditures for the year were \$839,169 (8% over budget).

This over-expenditure occurred partly because coho smolt production exceeded the goal, but mostly it was associated with increases in costs for utilities (water and electricity) caused by poor well performance. As a result, more wells were operated than originally planned. This inefficiency will be partially corrected when the heat exchangers are installed during 1987.

Projects and Evaluation

Marking Program:

During 1986 approximately 89,000 salmon were marked with adipose fin clips and a coded-wire tag. Catch data from these marked fish will provide information on contribution to fisheries and survival rates. In addition, 44,639 Swanson River rainbow trout were marked with a left-ventral fin clip, and 33,624 Big Lake rainbow trout were marked with a right-ventral fin clip for a study by Sport Fish Division personnel to evaluate survival rates.

Seawater Challenge:

The seawater challenge test, an annual project to determine smolt osmoregulatory competency in full-strength seawater, was administered to two lots of fish: the Deshka River chinook salmon smolts destined for saltwater release and the Anchor River steelhead smolts. The sodium ion concentration in the blood serum of the smolts from both lots were at or near the desired level (i.e., 170 mg/liter) when released (Table 4, Figure 6). These two lots of smolts were the only ones included in the seawater challenge tests, because most lots of smolts were released into freshwater systems where adaption to seawater is not required immediately.

Facility Development

The fish production goals for Fort Richardson Hatchery were met in 1986, except for rainbow trout fingerlings. Production goals for salmon, however, were accomplished with difficulty; the facility was plagued with problems associated with a minimal water supply and a faulty delivery system. Knowledge gained during this production cycle has led to a plan for corrective action that will allow the rainbow trout fingerling production

4. Average sizes and average concentrations of sodium ion in blood serum of chinook salmon and steelhead smolts released from Fort Richardson Hatchery, 1986.

Sex	Broodstock	Date	Length (mm)	Weight (gm)	Sodium Conc (meq/liter)
JK	DESKA RIVER	5/08/86	106.00	13.20	197.20
JK	DESKA RIVER	5/16/86	114.60	16.50	179.60
JK	DESKA RIVER	5/22/86	116.90	16.60	169.80
JK	DESKA RIVER	5/29/86	114.10	14.70	190.00
JK	DESKA RIVER	6/06/86	115.40	15.70	169.20
JK	DESKA RIVER	6/12/86	119.00	16.60	168.20
JK	DESKA RIVER	6/27/86	118.00	17.00	162.40
JK	DESKA RIVER	7/12/86	122.50	18.10	176.20
JK	DESKA RIVER	7/25/86	123.40	18.50	185.30
HEAD	ANCHOR RIVER	5/08/86	166.10	45.60	183.00
HEAD	ANCHOR RIVER	5/16/86	170.30	48.70	178.00
HEAD	ANCHOR RIVER	5/22/86	169.60	45.70	175.30
HEAD	ANCHOR RIVER	5/29/86	168.00	42.60	193.90
HEAD	ANCHOR RIVER	6/06/86	174.20	46.70	172.10
HEAD	ANCHOR RIVER	6/12/86	178.60	48.30	170.00
HEAD	ANCHOR RIVER	6/19/86	179.20	50.10	169.70

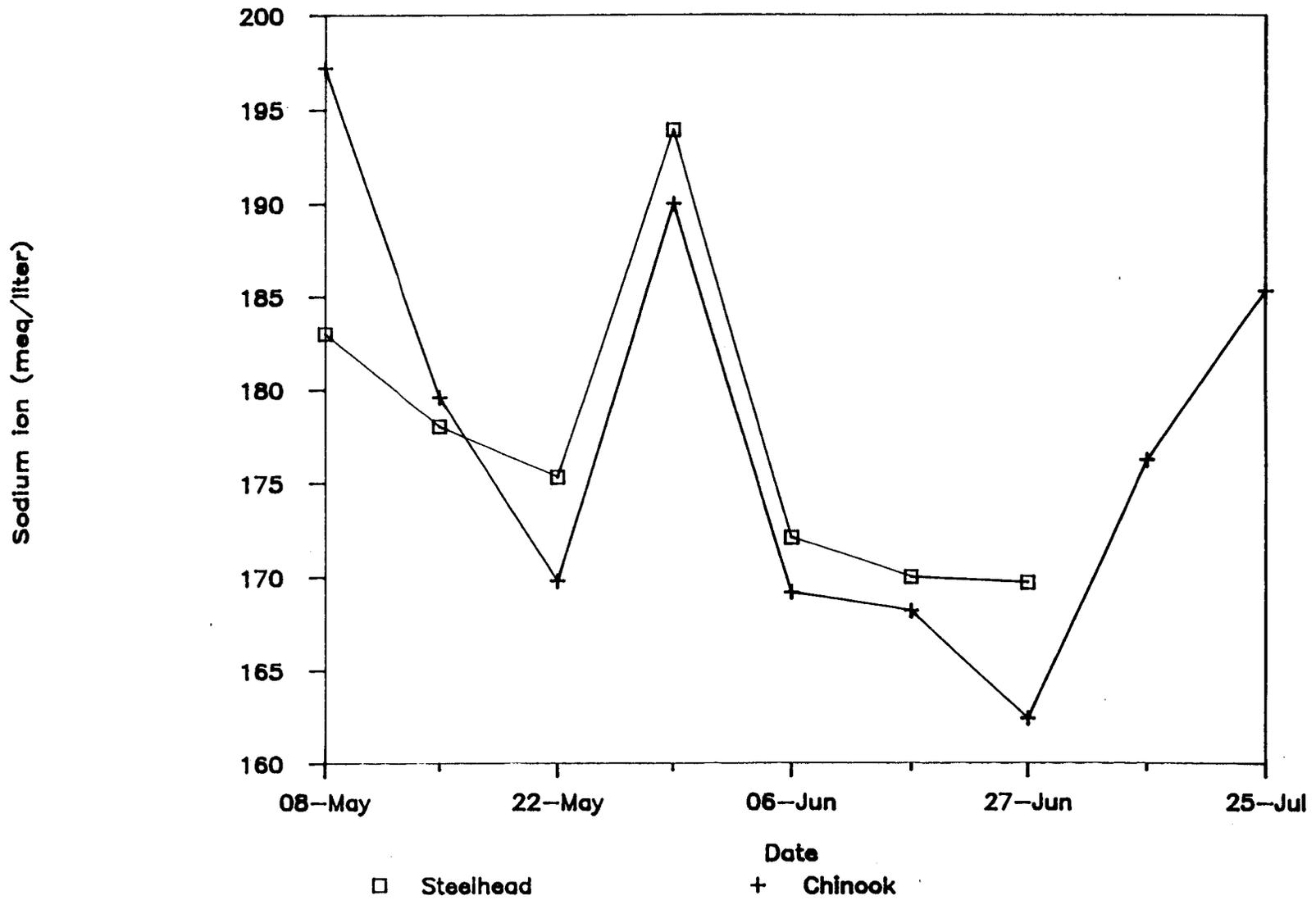


Figure 6. Average concentrations of sodium ions in blood serum of chinook salmon and steelhead smolts, 1986.

to meet expectations and all production will be more predictable. Important aspects of this plan include the installation of nitrogen gas removal equipment at the final use-points and the installation of a heat exchanger system.

Operationally, Fort Richardson Hatchery continues to use only well water. Experience gained during 1985 and 1986 clearly indicates that water-saving strategies will be necessary if the full potential of this facility is to be reached. Such strategies include more intensive water use and better control of water temperatures and flows. Consequently, a CIP request for a heat-exchanger system, raceway control valves, and a deep well was submitted for funding in 1986. Although the CIP request was not approved, other funding sources were identified for installation of the heat exchanger system. This system will not allow any increased production, but it will allow more efficient and reliable use of the available water.

The construction associated with the installation of the heat exchanger will interrupt the hatchery's water supply. Thus, fish production at Fort Richardson Hatchery will be substantially reduced during 1987 (Table 5). In addition, rainbow trout fingerlings were transferred to Elmendorf Hatchery where they will be reared to catchable-size, since none will be produced at Fort Richardson Hatchery in 1987. Any monetary savings resulting from this reduction will be used for other remedial construction such as individual raceway water control valves. Tests completed during 1986 indicate that the development of additional well water in sufficient quantities to be cost-effective is unlikely.

Summary

This was the second year of significant production from this newly renovated hatchery. A total of 4.4 million fish weighing 41,726 kg was released (2 times 1985 release); two strains of rainbow trout were used in the rainbow trout production program.