



RENOVATIONS AT NIAGARA SPRINGS HATCHERY: BENEFITS AND CHALLENGES

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IDAHO DEPARTMENT OF FISH AND
GAME**

NIAGARA SPRINGS HATCHERY

- HATCHERY IS OWNED AND FINANCED BY IDAHO POWER COMPANY
- OPERATED AND STAFFED BY IDAHO DEPT. OF FISH AND GAME
- 1.9 MILLION STEELHEAD SMOLTS (400,000 lbs.) RELEASED INTO HELLS CANYON AND THE SALMON RIVER DRAINAGE
- STARTED OPERATION IN 1965
- LOCATED IN THE HAGERMAN VALLEY AREA

INTRODUCTION

- **I WILL COVER THE HISTORY OF THE NIAGARA SPRINGS HATCHERY RENOVATION PROJECTS**
 - **WHAT BROUGHT ABOUT THESE CHANGES**
 - **WHAT WERE THE IMPROVEMENTS TO THE HATCHERY**
 - **BENEFITS FROM THESE IMPROVEMENTS**
 - **THIS PRESENTATION IS A WORK IN PROGRESS**

INTRODUCTION

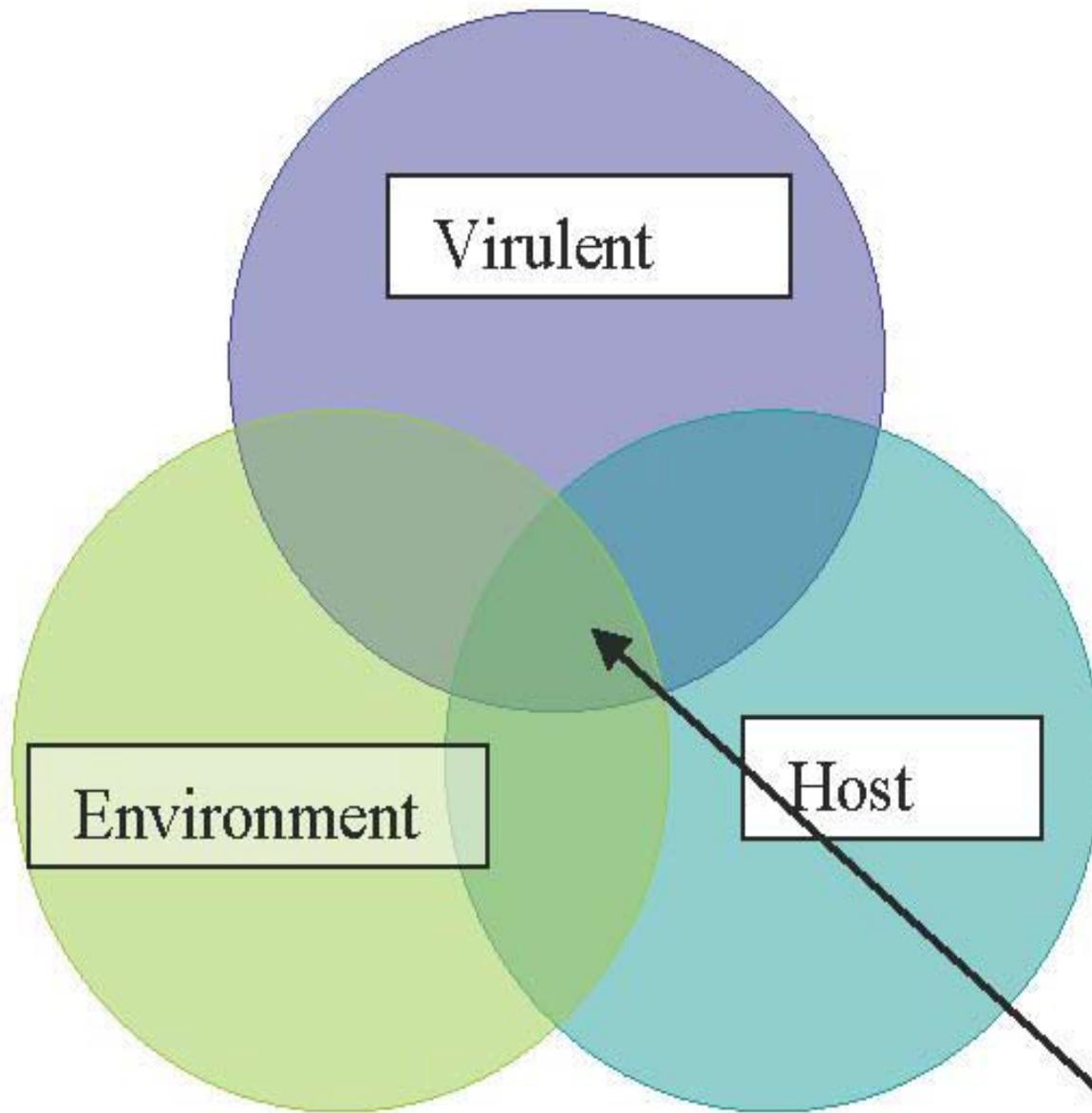
- **JANUARY 1991 : IDFG ANADROMOUS MTG**
- **HAD JUST PASSED MY PROBATION PERIOD**
- **WAS ASKED TO SPEAK ON WHAT I THOUGHT COULD BE IMPROVED**
 - **NIAGARA SPRINGS DENSITY SEEMED TO BE HIGH**
- **WAS DISMISSED WITH “YOU MUST HAVE PASSED YOUR PROBATION. WE CAN RAISE STEELHEAD AT WHATEVER DENSITY WE WANT”**

INTRODUCTION

- I REALIZED I MUST DOCUMENT CERTAIN PARAMETERS AND THE INCREASE IN MORTALITY
- EVENTUALLY DISCOVERED THAT D.O. VALUES WERE DROPPING BELOW 2 PPM FOR PERIODS OF 15 – 20 MINUTES AFTER FEEDING EVENTS
- MORTALITY CLIMBED SHARPLY AFTER DENSITY INDEX OF 0.34

DISEASES ENCOUNTERED CHALLENGES 1990-1993

- **FURUNCULOSIS** (*Aeromonas salmonicida*)
- **IHN**
- **CWD** (*Flavobacterium psychrophilum*)
- **NUCLEOSPORA (1991)** (*Nucleospora salmonis*)
- **IPN**
- **ENTERIC RED MOUTH** (*Yersinia ruckerii*)
- **MAS/BHS**
- **HYPOXIA (AFTER FEEDING EVENT)**



PNFHPC MODEL PROGRAM

Disease

HOST

- **FURUNCULOSIS VACCINE**
- **ERM VACCINE**
- **CHILLERS AT SPAWNING SITES TO SLOW EGG DEVELOPMENT (REDUCE FASTING)(STRESS)**
- **SELECT FOR LATER SPAWNING BROOD TO FURTHER REDUCE FASTING**
- **RECEIVE ½ of INVENTORY AS FRY FROM SPAWNING SITES (MITIGATE FOR INCUBATION AND NURSERY)**
- **NOT THE BEST**

PATHOGEN

- **EVERY YEAR REMOVE MATURE FISH FROM HEAD BOX**
- **100% SAMPLING OF ALL BROOD STHD FOR VIRAL REPLICATING AGENTS (3 CONSECUTIVE YEARS) ...CULLED IPN + EGGS**
- **CHLORINATION OF PIPELINE FROM SPRING TO HATCH HOUSE, ALL RACEWAYS, DITCHES, DAM BOARDS AND SCREENS**

ENVIRONMENT

- **REDUCE DENSITIES (TARGET MAXIMUM D.I. OF 0.34). ADDED 5 NEW RACEWAYS**
- **ADDED AIR LINES TO MOVE FECAL MATERIAL**
- **REPLACED CIRCULAR TANKS WITH RECTANGULAR VATS TO INCREASE TURNOVER**
- **BIRD EXCLUSION**
 - **BIRD SPRINKLER**
 - **BIRD EXCLUSION NETTING**

ENVIRONMENT

- **ADDED A THIRD TRANSPORT TANKER TO IPC FLEET (HELP FACILITATE LOWER DENSITIES DURING TRANSPORT)**
- **CONSTRUCTED A RACEWAY SCRUBBER TO REMOVE ALGAE (TRAPPED FECAL MATERIAL)**
- **ADDED NEW SETTLING PONDS TO IMPROVE EFFLUENT WATER QUALITY (NPDES COMPLIANCE)**

ENVIRONMENT

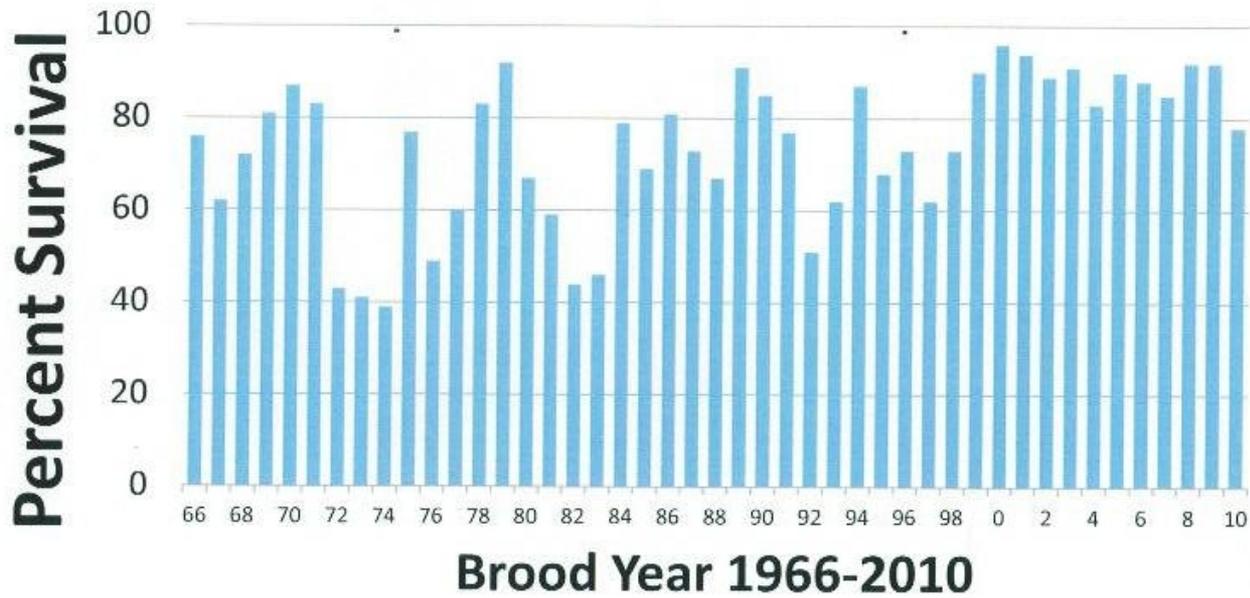
- **STRICT ADHERENCE TO D.I. AND F.I.**
- **FENCE PERIMETER FOR PUBLIC SAFETY AND PREDATOR EXCLUSION**
- **RACEWAY HEADSCREENS WERE MOVED BACK TEN FEET TO ELIMINATE FISH JUMPING INTO HEAD DITCH (HORIZONTAL TRANSMISSION OF ETIOLOGIC AGENTS)**

RETURN ON INVESTMENT

- NO EPIZOOTICS DUE TO FURUNCULOSIS
- NO DETECTIONS OF IPN, ERM, Ns
- LOSSES DUE TO MAS/BHS GREATLY REDUCED
- FEWER MEDICATED FEED APPLICATIONS
- REDUCE THE NUMBER OF EGGS TAKEN AT PFH AND OXFH
- MORE FISH RETURNING TO PFH AND OXFH

IPC INVESTMENT \$3,500,000+

Niagara Springs Hatchery Egg to Smolt Survival

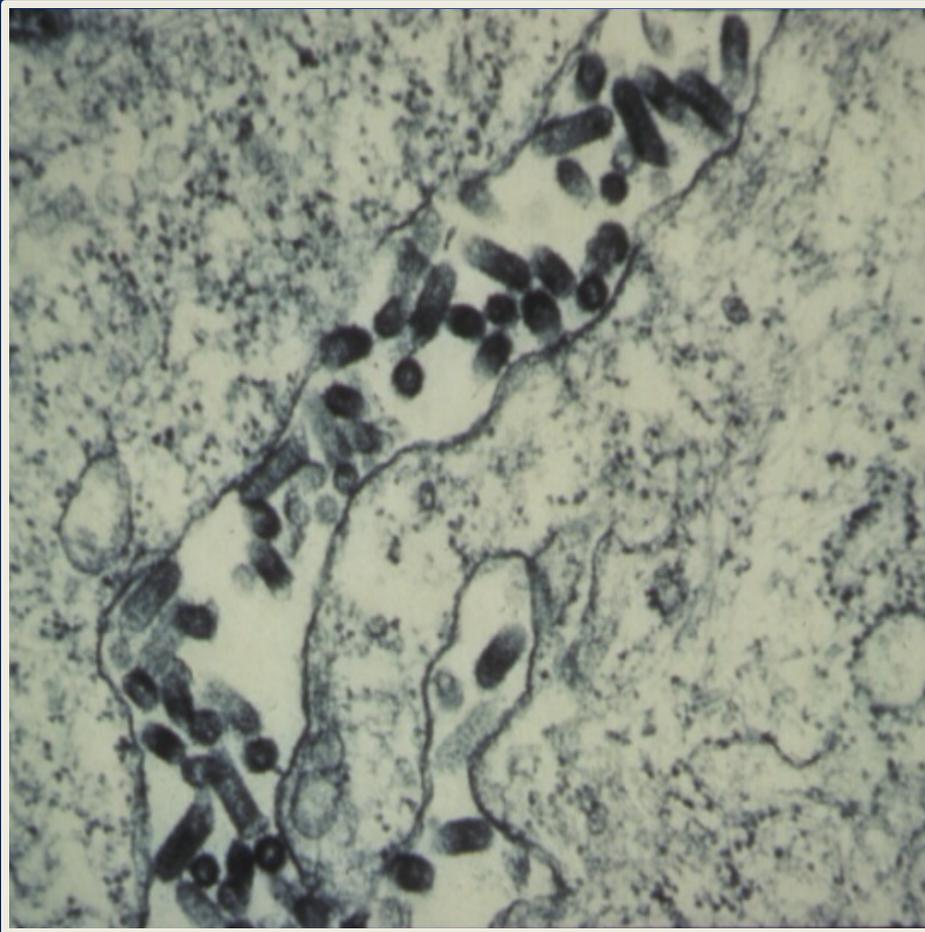


NOTE: 2010

BENEFITS

- **29 YEARS PRIOR TO 1994**
 - 6 YEARS THAT PAHSIMEROI HAD 4,000 (OR MORE) ADULT STEELHEAD RETURNING
- **17 YEARS SINCE 1994**
 - 14 YEARS THAT PAHSIMEROI HAD 4,000 (OR MORE) ADULT STEELHEAD RETURNING
- **SOME YEARS NO DIAGNOSTIC CASES**

IHN mG139M



- **NATIVE TO SALMONIDS IN NW North America.**
- **RHABDOVIRUS (BULLET-SHAPED, ssRNA).**
- **ATTACKS THE HEMATOPOIETIC TISSUES OF THE KIDNEY.**
- **TRANSMISSION FISH-TO-FISH AND VIA EGG.**
- **2009 DWORSHAK NFH: LOST 1 MILLION STHD**

CLINICAL SIGNS OF IHN

LETHARGY
DARKEN COLOR
EXOPHTHALMIA



ANEMIA
SPLEENS NORMAL SIZE
EXPONENTIAL
MORTALITY RATES



MANAGEMENT FOR IHN

- **AVOIDANCE**

- **BROODSTOCK SAMPLING**

- **TEST ALL PARENT FEMALES AT SPAWNING AND CULL EGGS FROM POSITIVE INDIVIDUALS**

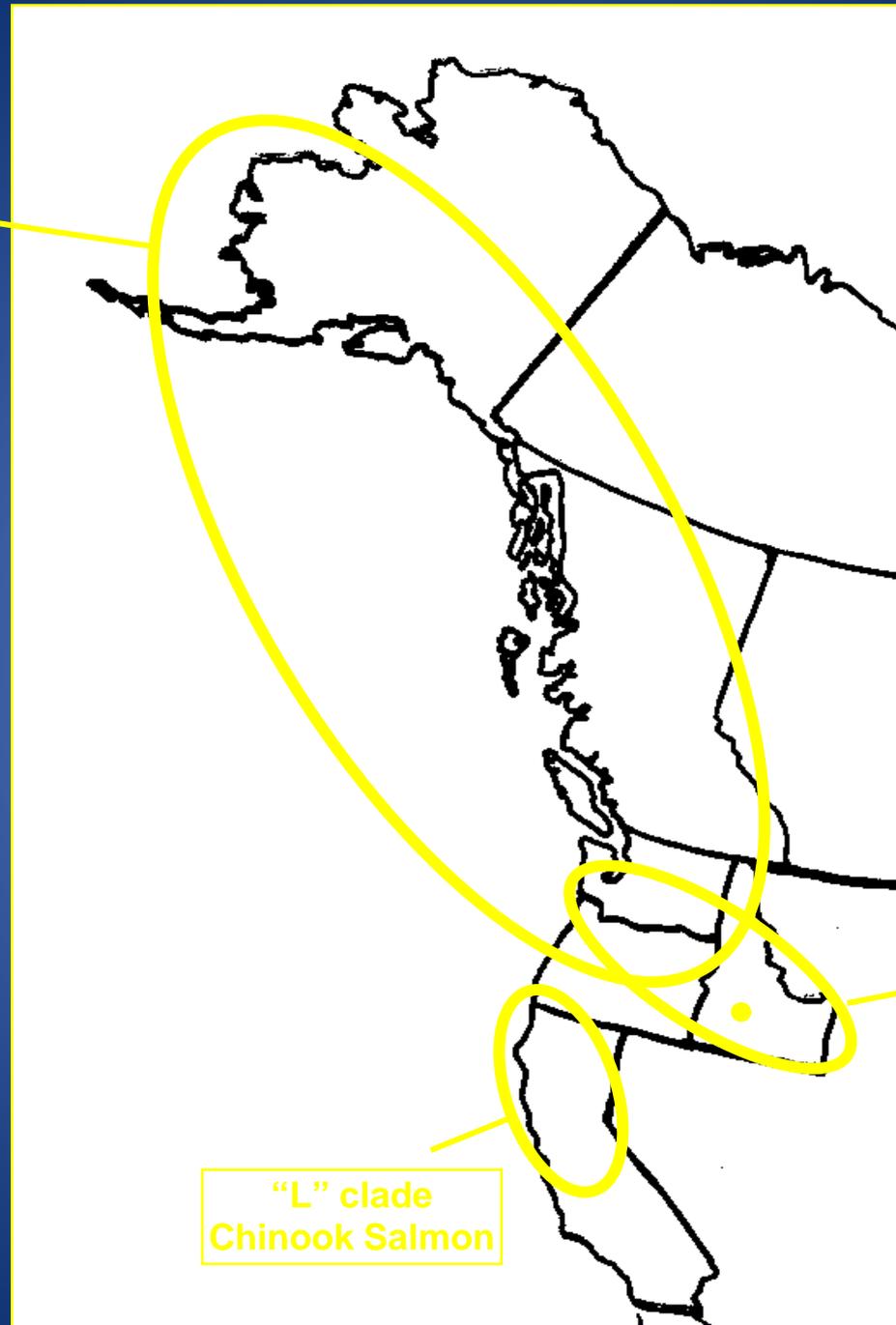
- **EGG DISINFECTION**

- **IODOPHOR IS AN EFFECTIVE SURFACE DISINFECTANT FOR BOTH WATER HARDENING AND EYED STAGES**

- **ISOLATION/QUARANTINE**

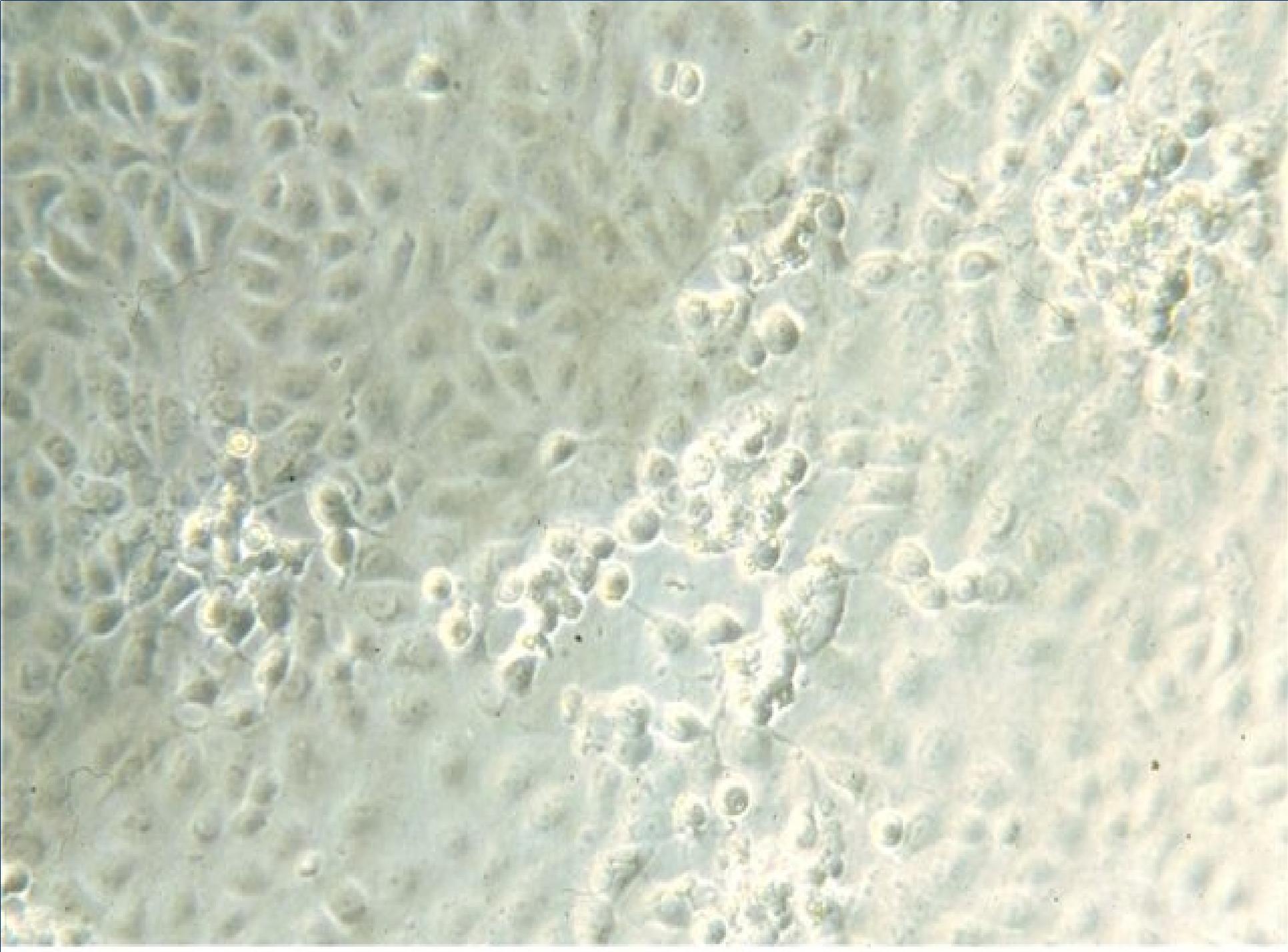
- **A PATHOGEN-FREE WATER SOURCE IS CRITICAL**
 - **DO NOT BRING A SOURCE ONTO YOUR HATCHERY**

**“U” clade
Sockeye Salmon**



**“M” clade
Steelhead/Rainbow**

**“L” clade
Chinook Salmon**



IHN mG139M

- **2010: OXBOW HATCHERY DETECTED IN BROOD STEELHEAD (+51%)**
 - PRIOR 2010 NO IHNV DETECTIONS FOR 10 YEARS
- **NIAGARA SPRINGS: MORTALITIES ABOVE 12,000/DAY (RWY 7)**
- **TRANSPORT TANKER STOPPED ON I-84 (ALL 12 POOLS WERE +)**

IHN mG139M

- STEELHEAD IN RWY 7 WERE DESTROYED, REPLACEMENT FRY WERE DESTROYED (300,000 FRY DESTROYED)
- NO OTHER DETECTIONS OF IHN (BY'2010)
- OUTBREAKS START IN FRY TRANSPORTS
 - GENOTYPE NOT FROM HAGERMAN VALLEY (mG139M)
- IPC FUNDS NURSERY BUILDING RENOVATION TO ACCEPT EGG SHIPMENTS ONLY
 - APPROXIMATELY \$12,000,000

IHN mG139M

- **NIAGARA SPRINGS HATCHERY ONLY TO RECEIVE EGGS**
- **BIO-SECURITY AT MAXIMUM**
 - **BIO-SECURITY AUDITS**
- **TO ACCOMMODATE HATCHERY RENOVATION**
 - **ONE YEAR RECEIVE 100% FRY FROM OXFH & PFH**
 - **SAMPLE 100% OF BROOD**
 - **CULL OUT IHNV+**

NEW NIAGARA SPRINGS HATCHERY BUILDING

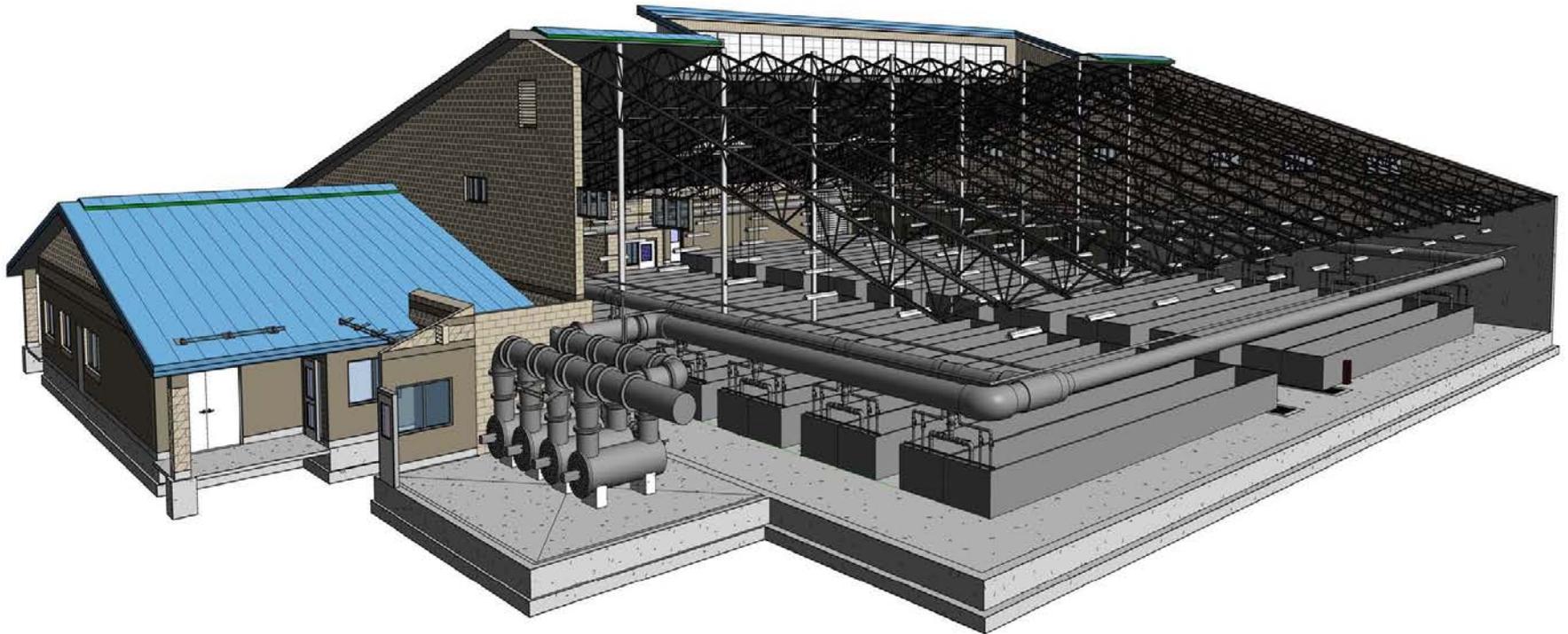


READY FOR BROOD YEAR 2013 STEELHEAD

**CAPACITY FOR 2 MILLION STEELHEAD FINGERLINGS
UNTIL AUGUST**

NURSERY AREA

38 VATS WITH OVERHEAD WATER SUPPLY



UV WATER SUPPLY TREATMENT: LARGEST IN IDAHO

OFFICE, CONFERENCE ROOM, VISITOR CENTER, EGG ROOM, AND FEED ROOM



BENEFITS

- **BY ONLY EGG TRANSPORTATION TO NIAGARA SPRINGS (OXBOW AND PAHSIMEROI HATCHERIES)**
 - **REDUCE THE RISK OF INTRODUCTION OF EXOTIC PATHOGENS INTO HAGERMAN AREA**
 - **WHERE 80+% OF THE WORLD'S COMMERCIAL TROUT CULTURE OCCURS**

BENEFITS

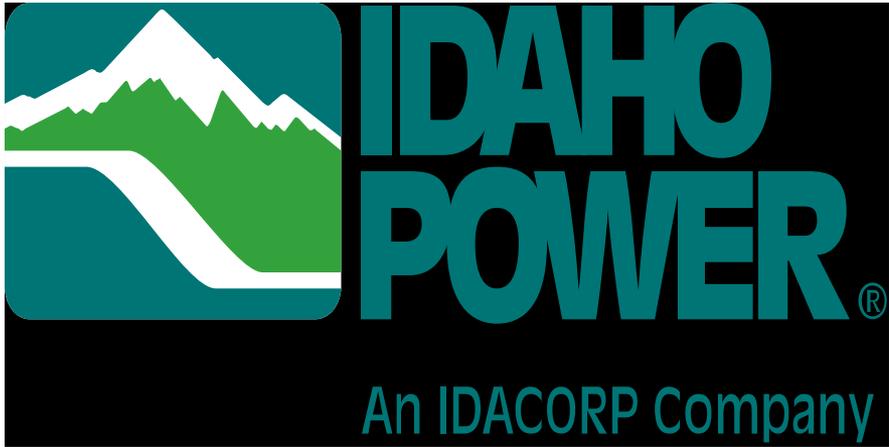
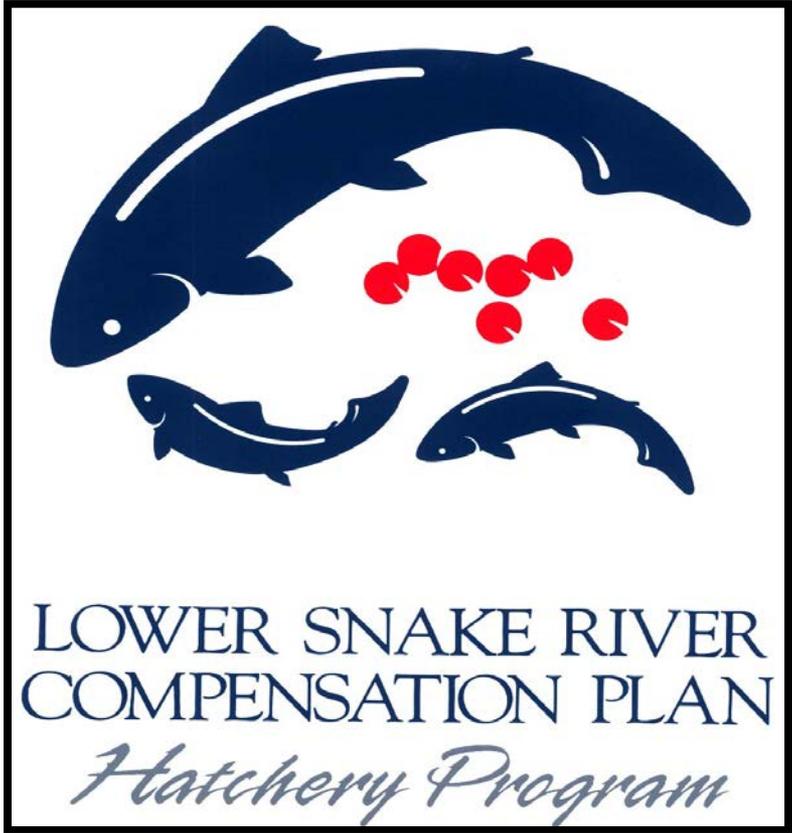
- **BY INCREASING THE BIO-SECURITY AT NIAGARA SPRINGS HATCHERY**
 - WE EXPECT TO INCREASE EGG TO SMOLT SURVIVAL, THUS CONSISTENTLY RELEASING HEALTHY STEELHEAD INTO THE SNAKE AND SALMON RIVERS (COLUMBIA RIVER)
 - THUS LIMITING THE INTRODUCTION OF EXOTIC PATHOGENS FROM THE HAGERMAN REGION INTO THESE RIVERS

OTHER CONSIDERATIONS

- **RENOVATIONS AT PAHSIMEROI AND OXBOW HATCHERIES HAVE PROVIDED BENEFIT TO THE NIAGARA SPRINGS HATCHERY PRODUCT**
- **THE “WORK IN PROGRESS” MENTIONED AT THE BEGINNING**
 - **WILL TIE IN THIS NETWORK OF HATCHERY OPERATIONS**
 - **LOOK AT SMOLT TO ADULT RETURNS (SAR)**
 - **RETURN ON INVESTMENT**



FISH IDAHO





QUESTIONS?