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DEPARTMENT OF
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Robyn M. Brody (ISB No. 5678)
Brody Law Office, PLLC
P.O. Box 554
Rupert, ID 83350
Telephone: (208) 420-4573
Facsimile: (208)260-5482
rbrody@cableone.net
robynbrody@hotmail.com

J. Justin May (ISB No. 5818)
May, Browning & May
1419 W. Washington
Boise, Idaho 83702
Telephone: (208) 429-0905
Facsimile: (208) 342-7278
jmay@maybrowning.com

Fritz X. Haemmerle (ISB No. 3862)
Haemmerle & Haemmerle, PLLC
P.O. Box 1800
Hailey, ID 83333
Telephone: (208) 578-0520
Facsimile: (208) 578-0564
fxh@haemlaw.com

Attorneys for Rangen, Inc.

BEFORE THE DEPARTMENT OF WATER RESOURCES
OF THE STATE OF IDAHO

IN THE MATTER OF THE PETITION DELIVERY CALL OF RANGEN, INC.'S WATER RIGHT NOS. 36-02551 & 36-07694	Docket No. CM-DC-2011-004 **AFFIDAVIT OF CHARLIE E. SMITH IN SUPPORT OF RANGEN, INC.'S MOTION FOR PARTIAL SUMMARY JUDGMENT**

STATE OF Washington)
) ss.
County of Walla Walla.)

CHARLIE E. SMITH, being sworn upon oath, deposes and states as follows:

1. My name is Charlie E. Smith. The matters contained in this affidavit are based on my personal knowledge, and I am over the age of eighteen (18) years old.

2. Attached hereto as Exhibit A is true and correct copy of a Report that I drafted for Rangen, Inc. ("Rangen") entitled "In the Matter of Distribution of Water to Rangen, Inc's Water Right Nos. 36-02551 and 36-07694." My experience and background are contained in the Report, and I incorporate that training and experience into this Affidavit.

3. After researching and studying Rangen Research Hatchery, I concluded that Rangen is using all available water at its facility, and it could utilize more water at the Research Hatchery if more water were available.

FURTHER YOUR AFFIANT SAYETH NOT.

DATED this 8 day of January 2013.

Charlie E. Smith
Charlie E. Smith

SUBSCRIBED AND SWORN to before me this 8 day of January 2013.

SUSAN L TAYSON
COMMISSION EXPIRES
NOTARY PUBLIC
09-19-15
STATE OF WASHINGTON

Susan L. Tayson
NOTARY PUBLIC FOR ~~IDAHO~~ Washington
Residing at: College Place
Commission expires: 9/19/15

CERTIFICATE OF SERVICE

The undersigned, a resident attorney of the State of Idaho, hereby certifies that on the 9th day of January, 2013 he caused a true and correct copy of the foregoing document to be served by email and first class U.S. Mail, postage prepaid upon the following:

Original: Director Gary Spackman Idaho Department of Water Resources P.O. Box 83720 Boise, ID 83720-0098 Deborah.Gibson@idwr.idaho.gov	Hand Delivery ☐ U.S. Mail ☐ Facsimile ☐ Federal Express ☒ E-Mail ☐
Garrick Baxter Chris Bromley Idaho Department of Water Resources P.O. Box 83720 Boise, Idaho 83720-0098 garrick.baxter@idwr.idaho.gov chris.bromley@idwr.idaho.gov	Hand Delivery ☐ U.S. Mail ☒ Facsimile ☐ Federal Express ☐ E-Mail ☒
Randall C. Budge Candice M. McHugh Thomas J. Budge RACINE, OLSON, NYE, BUDGE & BAILEY, CHARTERED P.O. Box 1391 101 South Capitol Blvd, Ste 300 Boise, ID 83704-1391 Fax: 208-433-0167 rcb@racinelaw.net cmm@racinelaw.net tjb@racinelaw.net	Hand Delivery ☐ U.S. Mail ☒ Facsimile ☐ Federal Express ☐ E-Mail ☒
Sarah Klahn Mitra Pemberton WHITE & JANKOWSKI Kittredge Building, 511 16th Street, Suite 500 Denver, CO 80202 sarahk@white-jankowski.com mitrap@white-jankowski.com	Hand Delivery ☐ U.S. Mail ☒ Facsimile ☐ Federal Express ☐ E-Mail ☒

Dean Tranmer City of Pocatello P.O. Box 4169 Pocatello, ID 83201 dtranmer@pocatello.us	Hand Delivery ☐ U.S. Mail ☒ Facsimile ☐ Federal Express ☐ E-Mail ☒
John K. Simpson Travis L. Thompson Paul L. Arrington Barker Rosholt & Simpson, L.L.P. 195 River Vista Place, Suite 204 Twin Falls, ID 83301-3029 Facsimile: (208) 735-2444 tlt@idahowaters.com jks@idahowaters.com	Hand Delivery ☐ U.S. Mail ☒ Facsimile ☐ Federal Express ☐ E-Mail ☒
C. Thomas Arkoosh Arkoosh Eiguren P.O. Box 2900 Boise, ID 83702 Tom.arkoosh@aelawlobby.com	Hand Delivery ☐ U.S. Mail ☒ Facsimile ☐ Federal Express ☐ E-Mail ☒
W. Kent Fletcher Fletcher Law Office P.O. Box 248 Burley, ID 83318 wkf@pmt.org	Hand Delivery ☐ U.S. Mail ☒ Facsimile ☐ Federal Express ☐ E-Mail ☒
Jerry R. Rigby Hyrum Erickson Robert H. Wood Rigby, Andrus & Rigby, Chartered 25 North Second East Rexburg, ID 83440 jrigby@rex-law.com herickson@rex-law.com rwood@rex-law.com	Hand Delivery ☐ U.S. Mail ☒ Facsimile ☐ Federal Express ☐ E-Mail ☒

Fritz X. Haemmerle

EXHIBIT A

Expert Report

In Matter of Distribution of Water to

Rangen, Inc's Water Right Nos. 36-02551

and 36-07694

Prepared for Rangen, Inc

by

Charlie E. Smith

I. Introduction

A. Experience

I make this statement as an independent fishery consultant. I am an expert in aquaculture science, fish histopathology, fish pathology, fish health management, and fish nutrition. My experience related to these areas spans over 50 years. I began my fisheries career with the U.S. Fish & Wildlife Service in 1961 at the Western Fish Nutrition laboratory in Cook, Washington, where I worked as a Fishery Research Biologist. I worked with a group of researchers studying the cause of liver cancer in rainbow trout and conducted studies on vitamin requirements of salmon. I also researched clinical and hematological changes in rainbow trout deficient vitamin B1, vitamin B6 and folic acid deficiency in Coho salmon. In 1968 I transferred to the U.S. Fish & Wildlife's Fish Culture Development Center (currently the Bozeman Fish Technology Center) in Bozeman, Montana where I worked for the next 25 years. I was director of the Center from 1985 until my retirement from the Service in 1993.

I was employed by Rangen, Inc. from 1993 until 2003 where I assisted in conducting nutrition research studies on trout, Atlantic salmon and tilapia, and on fish disease diagnosis/projects. Since retiring I work as an independent contractor/consultant.

A list of professional memberships, professional activities, research activities, publications, offices held in professional and scientific organizations is contained in a copy of my most recent biographical sketch attached as Exhibit 1.

B. Publications

A list of my publications is attached as Exhibit 2.

C. Compensation

My fee for this project is $65/per hour plus expenses.

D. Information Reviewed

I am familiar with Rangen's AquaCulture and Research Center ("Research Hatchery") since I worked part time for Rangen, Inc. from my home in Bozeman, MT from 1993 to 2002 after retiring from the U.S. Fish & wildlife Service. I was primarily involved with nutrition research projects and disease diagnosis, but spent considerable time at the Rangen Research Hatchery working on research projects. Because of my interest in hatcheries I spent time observing and discussing ongoing operations at the Research Hatchery with Doug Ramsey, Dan Maxwell & Lonny Tate.

I visited the Research Hatchery on July 23-25, 2012 where I reviewed the hatchery water system, the hatchery configuration, determined where pipelines originated and if all water was put to beneficial use. Based on the empty tanks in the Research Hatchery and hatch house/early rearing building, as well as the majority of empty outside raceways where most of the fish production occurs, it was clear that insufficient water flow was a major limiting factor at the hatchery.

I visited the Research Hatchery again on October 3 & 4, 2012. During my visits at the Research Hatchery, I spoke with Rangen employees including Doug Ramsey, Lonny Tate, and Wayne Courtney.

I also consulted and rely upon authoritative texts including the following:

- R.G. Piper et al. 1982. Fish Hatchery Management. U.S. Dept. Interior, Fish & Wildlife Service, Washington, D. C. 517 pp.

- Fornshell, G. 2002. Rainbow trout – challenges and solutions. Rev. in fisheries science 10 (3&4): 545-557.

- Wedemeyer, G. A. 1996. Physiology of fish in intensive culture systems. Chapman & Hall, 231 pp.

- Westers, H. 2001. Production. Pages 31 – 89 in G.A. Wedemeyer, editor. Fish Hatchery Management, second edition. American Fisheries Society, Bethesda, MD.

E. Previous expert testimony

Wyoming Trout Ranch vs. Miller, Fifth Judicial District, Cody, WY 2009 Civil Action No. 24863.

II. Opinions requested.

I have been asked to render opinions in this matter on the following issues:

A. Is Rangen using the available water at its Research Facility to raise fish and conduct research?

B. Could Rangen raise more fish and/or conduct more research if more water was available?

III. Summary of Opinions

Rangen is using all of the available flow of water currently going to the Research Hatchery to raise fish and conduct research.

There is no doubt that Rangen could utilize more water at the Research Hatchery. With the exception of three rows of 3 each 8 X 80 X 3 ft. raceways and 3, 180 X 16 X 3 ft. raceways receiving a total water flow of 15 CFS (cubic feet per second) and in which fish are currently being reared, there is insufficient water flow to raise additional fish. All 20 of the small 3.5 X 100 X 2 ft. raceways, 21 of 30, 8 X 80 X 3 ft. large production raceways (figure 1) and 6 of the 9, 16 X 180 X 3 ft (CTR) raceways are empty due to insufficient water flow to the Research Hatchery for fish rearing.

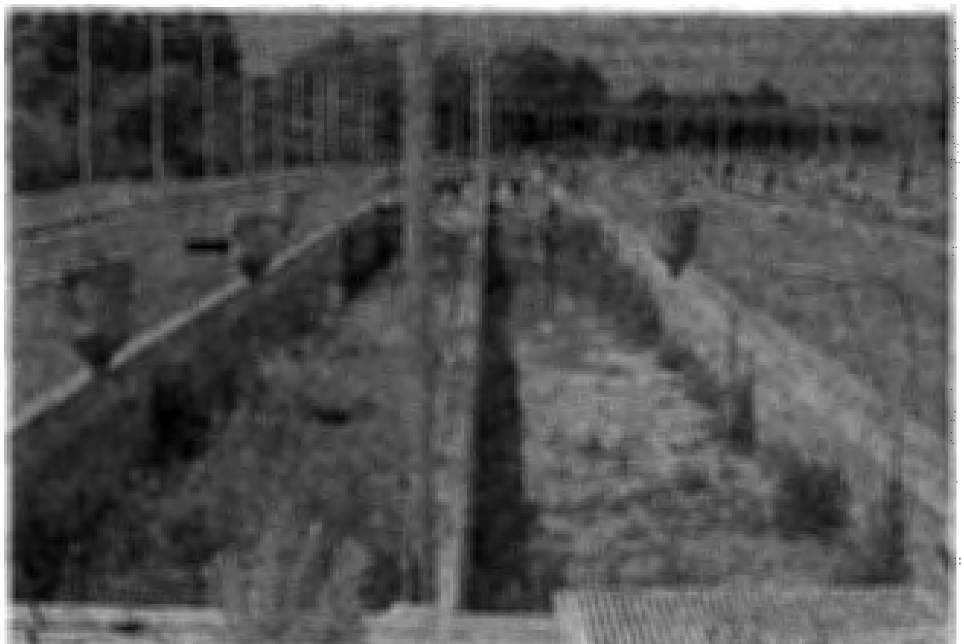

Figure 1. shows two rows of 3 raceways empty due to insufficient water flow to raise more fish. Note demand feeder (arrow). Currently 27 raceways are empty. Photo taken 10/3/12

IV. Background

A. Use of water at the Research facility

Rangen uses the water in its facility to raise fish. Rangen produces fish for sale and in order to conduct research.

i) Research

In 1963 the Rangen Research Hatchery was built. Based on an abundant water supply of excellent quality it was designed to raise fish under typical production conditions similar to those of other hatcheries in the area. This allowed replicate testing of different feeds and feed ingredients under typical pond loadings as well as water reused down through a series of ponds similar to those used at other hatcheries. Rangen was one of the first sources of reliable trout and salmon feeds and remains one of the most extensive manufacturers of nutritionally effective aquaculture feeds.

Design of the Research Hatchery allows side by side testing of different diets. Costs of fish feed have risen dramatically in the past 3-4 years based on the limited quantity and high cost of fish meals and some other key ingredients. Since Rangen is one of the major producers of fish feeds it is in their best interest to continually test new ingredients that may be replacements for fish meal and other costly ingredients as they become available. The design of the Research Hatchery allows replicate testing in both small & large ponds which improves the reliability of the data collected. Feed tests can also be done in first, second and third use water to determine how well they perform under each condition. Since Rangen is in the business to sell feed, the Research Hatchery plays an important role producing quality feeds at reasonable costs.

ii) Sale

Currently rainbow trout being raised at Rangen Research Hatchery are those being raised under contract for Idaho Power Company for planting in American Falls & Strike Reservoirs and the mid-Snake river. This is due to a much better price per pound than that paid for processed fish by processors in the area. However, the contract does require that fish are raised at lower fish loadings (lbs/gpm water flow) and fish densities (lbs/ft3 of space). Any excess fish are sold to a processor. Lack of sufficient water flow to the Research Hatchery prevents production of large numbers of fish for processors in the area. There is ample raceway space sitting empty, but insufficient water flows to the hatchery to raise additional fish.

B. Research Facilitity

Rangen raises trout in four areas of the research facility:

i) Greenhouse/early rearing hatchery

Egg incubation room: within the hatch house are located 12 upwelling incubators for hatching eyed-eggs. The incubators have a total egg capacity of 300,000 eggs. Water flow to each incubator is initially 8.5 gallons per minute (gpm) just prior to hatching, then increased to 10 gallons per minute

Eggs: eyed eggs are purchased from broodstock hatcheries and are available all year round. Historically, approximately 2,100,000 were purchased each year in batches of 300,000, 7 times each year approximately 52 days apart. However, these shipments depend upon available water flows throughout the year

Because of the extremely low water flows ordering of 125,000 eggs occurs twice a year and 60,000 once a year, all for Idaho Power Company (depends on disease etc.). Due to the difficulty of getting trout eggs it is necessary to order eggs one to two years in advance of purchase.

Fry stage: when button up fry are ready to commence feeding they are placed in the fiberglass tanks and are fed by hand for the first 2-3 days. They are then fed by automatic feeders at the head of the rearing troughs.

There are 12 fiberglass rearing troughs located within the hatch house for early rearing of fry to fingerlings stage. Each is 16' long, 2' wide and 1' deep and has a carrying capacity of 25,000 fingerlings and a total weight of 175 lbs (143/lb, (@2.5 inches). Water flow to each trough is 30 gpm.

ii) Small Raceways

Fingerlings are moved to outside concrete nursery ponds at 2.5 to 3.0 inches in length where they are held for 2.5 to 3.5 months. Currently, the nursery ponds are not being used due to insufficient water flow. Maximum capacity of each nursery pond is 30,000 fish weighing 1100 pounds.

iii) Large Raceways

Production fish: There are 30, 8 X 80 X 3 ft. wide concrete rearing ponds. The ponds are arranged in 10 rows with 3 raceways in each row. Water flows through the series of 3 ponds in each row, mixes and then flows into the 16 foot wide market ponds below. Currently only 9 of the 30 ponds are in use due to low water flows.

Fish from the nursery ponds are moved to the production ponds when they are 6 inches in length (12/lb) and are held in the 8 ft. wide rearing raceways for 3 to 4 months. They are then split into the other ponds of the same size as they outgrow their ponds. Total capacity of the production ponds varies depending on availability of water. They are then moved below to the nine, 16 X 180 X 3 ft. wide market ponds (CTR ponds) at 9 to 10 inches in length (3/lb) or larger. Each series of 3 ponds receives from 4,500 gpm water flow (10 CFS) to 6500 gpm (15 CFS) or more depending on availability.

iv) CTR Raceways

There are 4 rows of CTR Raceways, also arranged in a series of 3 raceways in each row. One of these rows of ponds is used at time of cleaning for collection of waste material from all the other raceways where fish are being raised.

Market fish are graded every 2 to 3 weeks and 11 to 13 inch (@1.2/lb) fish are shipped to market. Fish are in the market ponds for 2 to 3 months before being processed. Total capacity of the market ponds is normally 25,000 fish and 14,000 pound. With an increased flow and pristine water, production would increase considerably.

V. Factors affecting ability to grow fish

A. Carrying capacity

Carrying capacity is the animal load a system can support. Carrying capacity can be expressed as maximum allowable weight of fish per unit of flow (loading), or maximum allowable weight of fish per unit of space (density), (Piper et al. 1982).

Capacity is dependent on water flow, volume, exchange rate, temperature, oxygen content, pH, size and species of fish being reared as well as the accumulation of metabolic products, primarily ammonia. The oxygen supply must be sufficient to maintain normal growth. Oxygen consumption varies with water temperature and with fish species, size and activity (Piper et al, 1983). Water quality and quantity determine the carrying capacity and production of flow - through systems. The incoming water supplies oxygen and washes away toxic metabolic wastes. Loading rate (lbs of fish/gallon/minute flow) is a more accurate and practical indicator of the carrying capacity of the system than density (lbs of fish/ft3 of space). Loading rate depends on water flow rate, water exchange rate, temperature, oxygen content, metabolic product accumulation and the size and species of fish being cultured. Density refers to the relationship of fish weight and size to water volume and the spatial relationship of one fish with another (Piper, et al. 1982). In most situations, loading becomes limiting before density. A common misperception is that poor performance, as indicated by reductions of growth, poor feed conversion ratios, and disease problems, is due to high densities, when in fact, the problem is usually related to insufficient flow to sustain the biomass (Fornshell, 2002).

Usually, the first limiting factor in aquaculture production systems is oxygen and this is true for rainbow trout in raceways and ponds. It is recommended to keep minimum dissolved oxygen levels above 5.0 ppm and ideally at 7.0 ppm and above.

The second limiting factor is ammonia. Ammonia is a metabolic excretory product associated with catabolism of protein (amino acids). When ammonia is dissolved in water, an equilibrium is established between ammonia and ammonium ions: NH3 + H20 = NH4+ + OH-. As pH and water temperature increase, the proportion of unionized ammonia (toxic gaseous portion) increases. Fortunately, unionized ammonia rarely approaches toxic levels in flow-through systems. (Fornshell, (2002)

B. NPDES

Clean Water Act Requirements for Wastewater Treatment.

The 1972 Amendments to the Federal Water Pollution Control Act (Public Law 92-500), known as the Clean Water Act (CWA), established the foundation for wastewater discharge control in this country. The CWA's primary objective is to "restore and maintain the chemical, physical and biological integrity of the nation's waters."

Aquaculture is the cultivating of freshwater fish, such as salmon and trout, under controlled conditions for commercial, conservation, and recreation uses. Aquaculture operations in Idaho are regulated by the National Pollutant Discharge Elimination System (NPDES), a permitting system for wastewater discharges under the federal Clean Water Act. NPDES permits set limits on the types and amounts of pollutants that industries and municipalities can release into the nation's waterways. The water quality standards consist of designated uses, and an antidegradation statement. NPDES Permit limits are consistent with State Water Quality Standards.

In Idaho, the NPDES permitting program is administered by EPA. EPA has issued a general NPDES permit for aquaculture facilities and associated fish processing facilities in Idaho. The permit authorizes discharges from facilities engaged in the growing, containing, or holding of fish in ponds, raceways, and other similar structures. The hatcheries and fish farms permitted under the Idaho general permit include state, federal, tribal, and private facilities. There are approximately 115 permitted operations in Idaho, nearly 70% of which operate in the Magic Valley, discharging to the Snake River or its tributaries.

To be covered under the general permit, a facility must develop a best management practices plan as outlined in the Idaho Waste Management Guidelines for Aquaculture Operations and submit a permit application to EPA.

C. Water quality

Water quality is the term used to describe the chemical, biological and physical characteristics of water. Water being used at the Research Hatchery is of excellent quality having optimum temperature for growth of rainbow trout of 59 – 60°F, a pH of 7.8 – 8.1 & hardness of 130 ppm as calcium carbonate and, is saturated with dissolved oxygen. These parameters are typical for most of the hatcheries along the Northern rim of the Snake River in the Thousand Springs area. Along with the large volume of water these attributes provide the optimum environmental conditions for maximal rainbow trout production using flow-through fish culture management.

Rainbow trout are generally farmed in flow-through systems in which water is used down through a series of raceways perhaps as many as 4 or 5 times. Water quality suitable for intensive rainbow trout husbandry is diminished with each use of water resulting in the need to reduce loading of raceways due primarily to the consumption of oxygen and production of ammonia. Flow- through aquaculture using raceways is characterized by a linear water flow from one raceway to the next in which all elements of the water move with the same horizontal velocity. If sufficient drop in elevation is available, there is some degree of dissolved oxygen replenishment due to the agitation occurring between raceways. However, due to the small amount of drop in elevation at the Rangen Research Hatchery there is little to no replenishment of oxygen between the series of raceways using the same water flow.

Intensive trout farming requires more strict water quality conditions than that required for extensive aquaculture such as rearing in large ponds with little water flow. Thus, commercial trout farms usually raise a single species of fish such as rainbow trout at far greater densities than would occur in their natural habitat.

D. Stress

Fish in intensive aquaculture are often exposed to adverse conditions such as handling, crowding, grading, excessive densities, and a decline in water quality associated with high density rearing. These stressors often result in decreased oxygen content and increased ammonia concentrations in rearing waters. This is especially true when exposed to a combination of stressors at the same time.

Sub- acute and chronic stress often results in reduced growth and predisposes fish to infectious diseases if significant pathogens are present in the water source. In addition, stressed fish often have poor feed utilization and thus increased feed conversions resulting in poor performance and profitability.

Increased use of water through a series of ponds results in a decrease in water quality due to oxygen consumption and ammonia excretion, as well as an increase in suspended fecal material, and uneaten feed and other particulate material.

Stress and disease:

Efforts of the fish farmer to prevent mortality of fish from diseases and the use of drugs and chemicals for their treatment can be very costly. Fish diseases inevitably occur in intensive aquaculture operations; however risk can be minimized by taking proper precautions such as purchasing disease free eggs, hatching eggs in disease free water , use of proper pond loadings, vaccination programs, and maintaining sanitary conditions within the hatchery as well as outside raceways.

The most common diseases found at the Rangen facility are bacterial gill disease, and bacterial cold water disease. An occasional outbreak of Infectious Hematopoietic virus disease occurs, but is not a major problem as it has been in past years.

VI. Opinions

A. Rangen is using all of the currently available water.

I visited the Research Hatchery on two different occasions. Rangen was using all of the water available at those times in a reasonable manner to raise fish. Rangen was not wasting water. The following describes ongoing rearing at the time of my visit.

Rangen Research Center & hatch house (incubation & early rearing): There was no water flowing into this building for hatching, early rearing or research projects. Due to insufficient water flow the water was being used in other areas of the facility because with limited flows there was no ability to put another crop of fish through the facility.

Small Raceways: All 20 raceways were empty. Due to insufficient water flow the water was being used in other areas of the facility because with limited flows there was no ability to put another crop of fish through the facility.

Large Raceways: There are 10 rows of 8 X 80 X 3 ft raceways, 3 in each row. Of these only 3 rows were receiving water, each pond/raceway was receiving 3.8 CFS water flow. Maximum load in each of these was approximately 10-12,000 fish averaging 5 fish/lb. Normal flow at maximum loading when sufficient water is available is 5.5 CFS. Thus, there were 21 empty raceways because of insufficient water flow to raise more fish.

CTR Raceways: There are 12 concrete rearing ponds (180 X 16 X 3 ft) with 3 raceways having 3 ponds in a series. The center row is being used as a settling area for solid waste from rearing ponds during cleaning. Only one of these ponds, two raceways was being used for fish rearing at this time since there was not enough water to raise more fish. Water flow into the pond was 10.8 CFS. Since water has been used three times down through the series in the large raceways above, oxygen content in outflowing water is less than that of saturation reducing the pounds of fish that could be raised had oxygen content been saturated. Fish are harvested from these ponds at times of planting when they are approximately 0.9 fish/lb.

I visited the hatchery on two occasions this past summer/fall. A diagram showing facility usage is attached hereto as Exhibit 4. In both instances it was clearly evident that there was insufficient water flow at the facility to conduct research testing, egg hatching, or early fry rearing. All available water was being used in 9 of the 30 outside 8 X 80 foot raceways to meet contract needs with Idaho Power. The remaining 21 raceways were empty as were the 20 concrete nursery ponds, again due to insufficient water flow. Due to low water flows eggs are now only purchased 3 times a year, whereas in the past they were purchased every other month to allow continuous cropping of fish.

B. Rangen could raise more fish and/or conduct more research at the research facility if more water was available.

The primary factor limiting the carrying capacity of the Rangen Facility is the availability of water. All other factors being equal, each relative increase in the flow of water would allow Rangen to raise more fish at this facility. The following table summarizes my calculations of the fish that could be raised at various flows in order to illustrate this conclusion. The calculations were made using an unpublished spreadsheet program for estimating the carrying capacity of salmonids in hatcheries based on rate of oxygen consumption, level of crowding and feeding rate. Carrying capacity is the animal load a system can support. The program was developed by Mr. Joe Banks, Fishery Research Biologist, U.S. Fish & Wildlife (Retired). Determining the carrying capacity as related to oxygen in the water is based on the Cannaday and Piper Flow Index table in the book, Fish Hatchery Management on page 69 (Piper, et al. 1983, 2nd printing). See also pages 63-74. The parameters used for the calculations are detailed on attached Exhibit 3.

These calculations are conservative estimates of pounds of production at the Research Hatchery based upon water flows of 15 (current), 35, 55 & 75 CFS for the greenhouse/hatch house, small raceways, large raceways, and CTR raceways. Size of fish is average size at time of harvest from the small, large & CTR raceways.

Flow Index (0.8 for IPC fish and 1.0 for production fish)

Rearing Container	Current/15cfs Empty Sections	Current/15cfs Pounds	35 CFS Empty Sections	35 CFS Pounds	55 CFS Empty Sections	55 CFS Pounds	75 CFS Empty Sections	75 CFS Pounds	
Greenhouse/Hatchouse									
Small Raceways (20 total)	10	9880	0	19760	0	19760	0	19760	
Large Raceways (30 total)	21	58125	9	158515	0	198044	0	239530	
CTR Raceways (9 total)	6	93468	3	283796	0	378350	0	347822	adjusted for lower 0.
Totals	37	161473	12	462071	0	596154	0	607112	

Density Index (0.3 for IPC fish and 1.0 for production fish)

Rearing Container	Current/15cfs	35 CFS	55 CFS	75 CFS
Greenhouse/Hatchouse[1]				
Small Raceways[2]	8492	36799	36799	36799
Large Raceways[3]	45999	214656	367980	367980
CTR Raceways[4]	265653	719886	1079829	1079829
Totals	320144	971341	1484608	1484608

[1] At 15 cfs, only enough rearing space (greenhouse experimental tanks and hatchhouse troughs) for time period of September through February. March through August does not allow use of both and the small raceways at the same time at 15 cfs. At the higher flows, the entire research building (greenhouse and hatchhouse) and small raceways can be utilized at the same time throughout the year.

[2] At 15 cfs, only enough rearing space (10 sections) for Idaho Power fish at density index of 0.3. At the higher flows, the remaining rearing space (10 sections) can be used at density index of 1.0.

[3] At 15 cfs, only enough rearing space (9 sections) for Idaho Power fish at density index of 0.3. At 35 cfs, an additional 12 sections can be used with a total of 12 sections for Idaho Power fish and 9 sections at density index of 1.0 for production fish. At 55 cfs, enough space to rear Idaho Power fish (12 sections) and production fish (remaining 18 sections) utilizing the entire block of raceways. At 75 cfs, a total of 12 sections for Power fish, 15 sections for production fish, and 3 sections (1 run) to convey first use water to the CTR block for rearing.

[4] At 15 cfs, only enough rearing space for 1 section of Power fish and 2 sections of production fish. At 35 cfs, an additional 3 sections can be used with the total 6 sections available for density index 1.0 rearing. At 35 cfs, the CTR raceways are not needed for Idaho Power fish which will be reared exclusively in the large raceways. At 55 and 75 cfs, the total 9 sections can be used at density index of 1.0 for production fish.

Prepared and Submitted by Charlie E. Smith

Charlie E. Smith

Date 12/20/12