



Beating IHN at Dworshak National Fish Hatchery

Nate J. Wiese
December 7, 2011

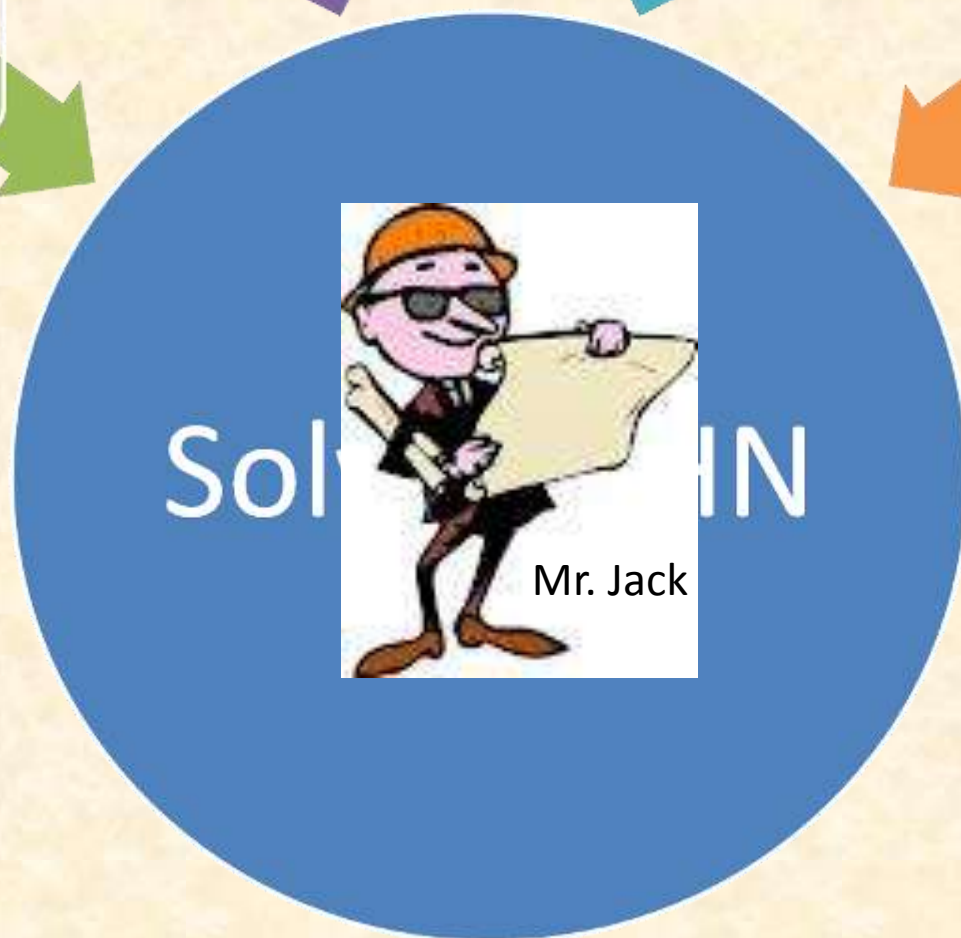
Dworshak Complex



IHN Problems

- BY2009 Survival was 50%
- IHN is present in the North Fork water supply





Addressing the Problems

- North Fork water supply is contaminated
- Reservoir water is available through a shared line from Clearwater Fish Hatchery (IDFG) and is used for nursery rearing
- Clearwater Fish Hatchery has a tremendously successful track record of avoiding IHN epizootics using the Dworshak Reservoir supply line



Making it Happen!

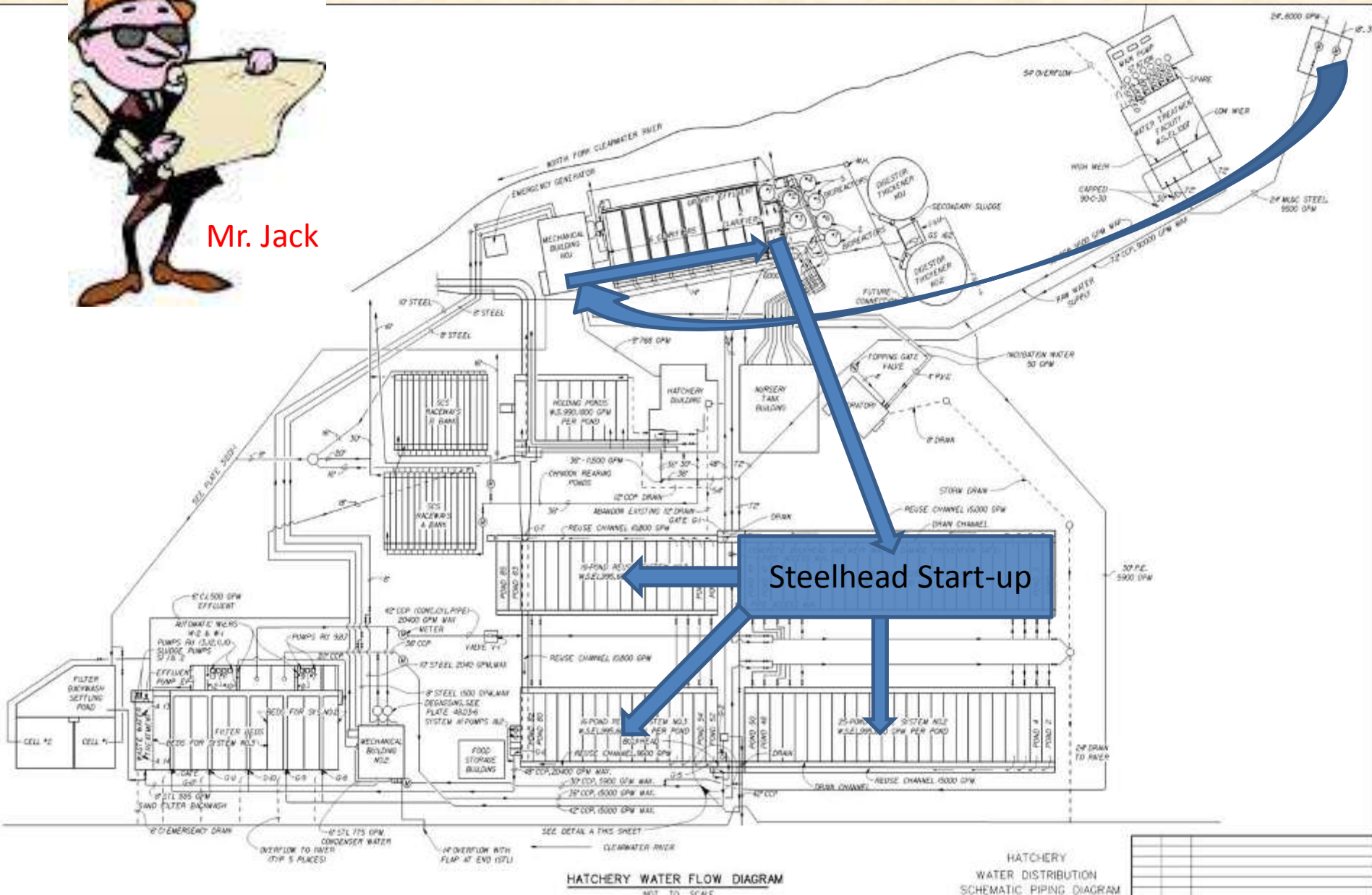
- Dworshak Steelhead are most susceptible to IHN below 90 mm (60 fpp)
- Clearwater Fish Hatchery has 10,000 gpm available for Dworshak during early rearing in July - August



How to Use the Water?



Mr. Jack

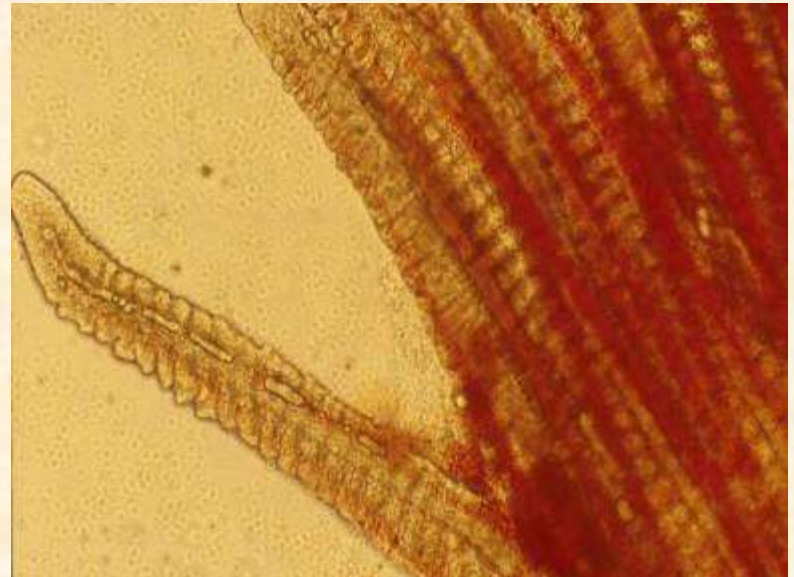




Open Heart Surgery

Water Degassing

- The new reservoir water had to be degassed
- The crew was able to construct a vacuum degassing system with Jack's design help to address the problem





New Degassing Towers to Reduce Nitrogen Saturation Levels From 107.5% to 98.6%

What Else to Address

- Biosecurity Issues
 - Virkon foot baths, sprayers, etc.
 - Separate equipment for each pond
 - Abandon shared re-use system
 - Replace wooden and porous equipment
 - Flagging IHN positive ponds



Reduce Stress

- Use pumping and fish counting technology
- High initial investment, but payoff in the long run!
- Limited reservoir water requires more splits/moves



New Rearing Containers

- Experimenting with Mixed Cell Designs – the results are promising.....but
- In 2010 the Hatchery experienced a severe windstorm that knocked out power and shut down water to both of the mixed cell units



What was the Result?

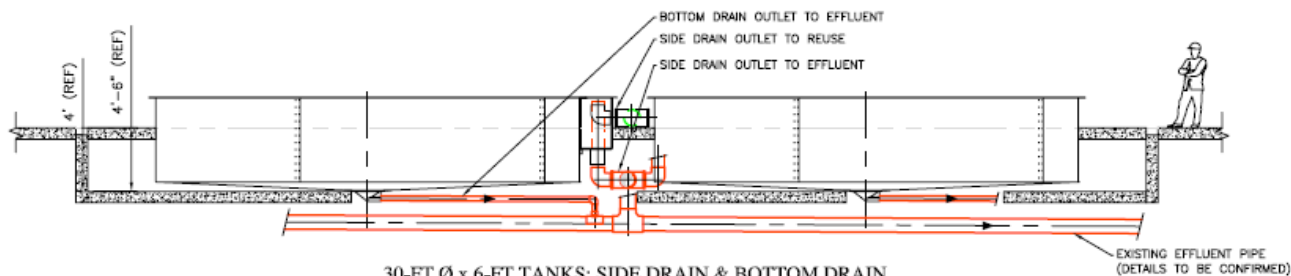
- Brood Year 2010 survival surpassed 90%!
- The Hatchery released 2.2 million steelhead and met its target release goal!
- The Hatchery will be able to start less fry which will reduce energy usage



What's in the Future?

- Mr. Jack worked with PR Aqua to develop plans for a new re-circ system
- This design would use available water from Clearwater to support the entire fish production goals
- The heart of the design is 30-foot circular tanks dropped into the existing Burrows Ponds



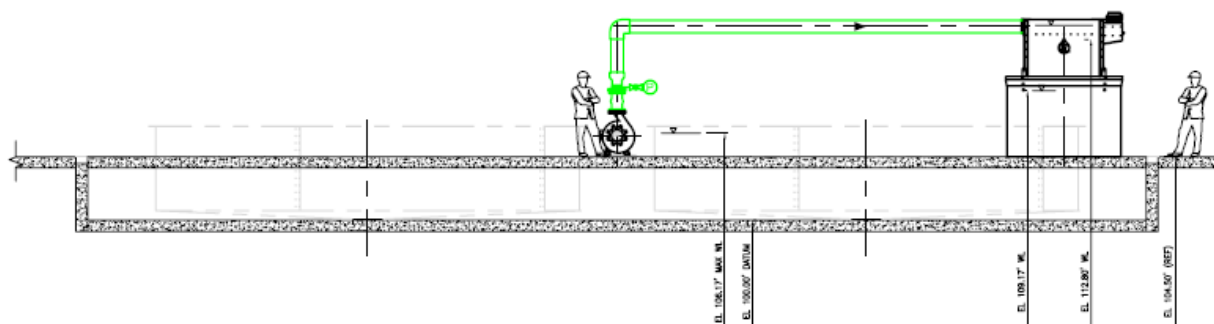


30-FT Ø x 6-FT TANKS: SIDE DRAIN & BOTTOM DRAIN

SCALE: 1/8" = 1'-0"

NOTES:

1. REFER TO PLAN VIEW FOR ORIENTATIONS.
2. SIDE DRAINS ON BOTH TANKS ARE SIMILAR (RIGHT TANK ASSEMBLY NOT SHOWN).
3. LEVEL CONTROL STANDPIPE ON BOTTOM DRAIN FLOW NOT SHOWN.



30-FT Ø x 6-FT TANKS: TREATMENT

SCALE: 1/8" = 1'-0"

CONCEPTUAL

FOR INFORMATION ONLY
NOT FOR CONSTRUCTION

NOTES:

1. DIMENSIONS ARE IN FEET & INCHES. DIMENSIONS MARKED "REF" ARE REFERENCE DIMENSIONS AND ARE TO BE CONFIRMED BEFORE CONSTRUCTION.

SEAL



PR Aqua Ltd.
1635 Harold Road
Nanaimo, BC, Canada
V9X 1T4
PH: (250)714-0141, FAX: (250)714-0171

U.S. FISH & WILDLIFE SERVICE

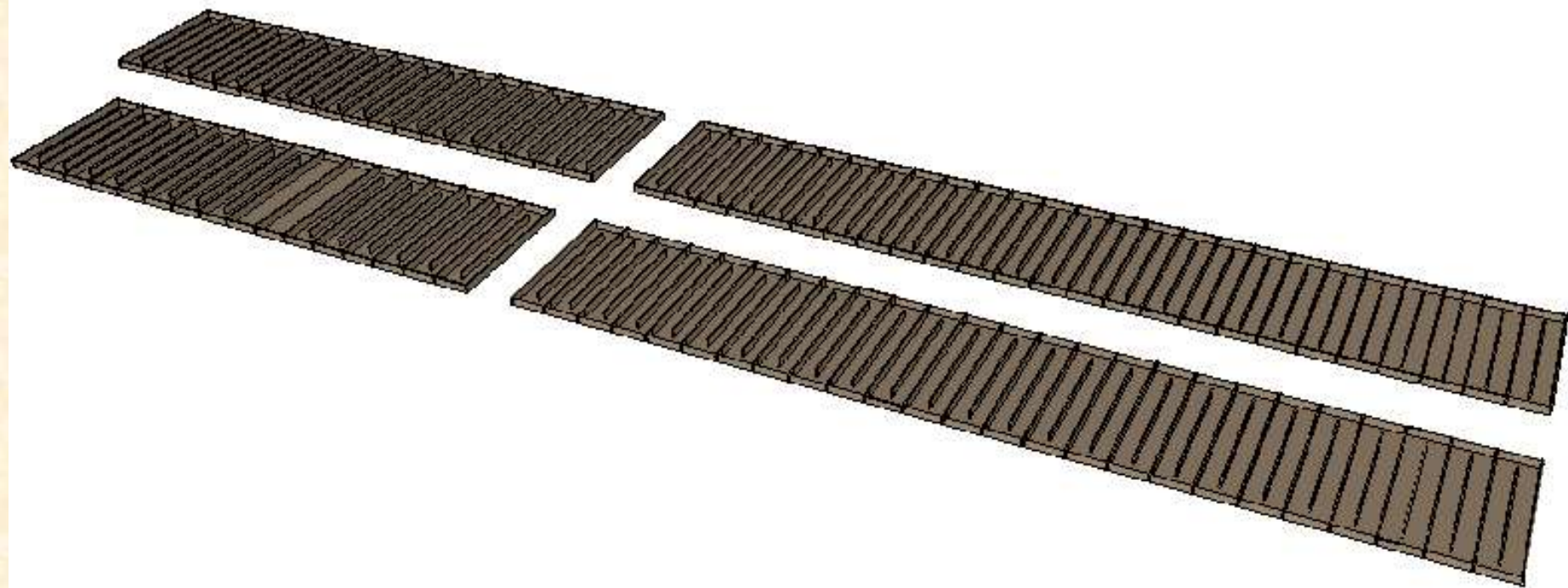
DWORSHAK FISHERIES COMPLEX
BURROUGHS POND RETROFIT
30-FT Ø x 6-FT TANK - SECTIONS

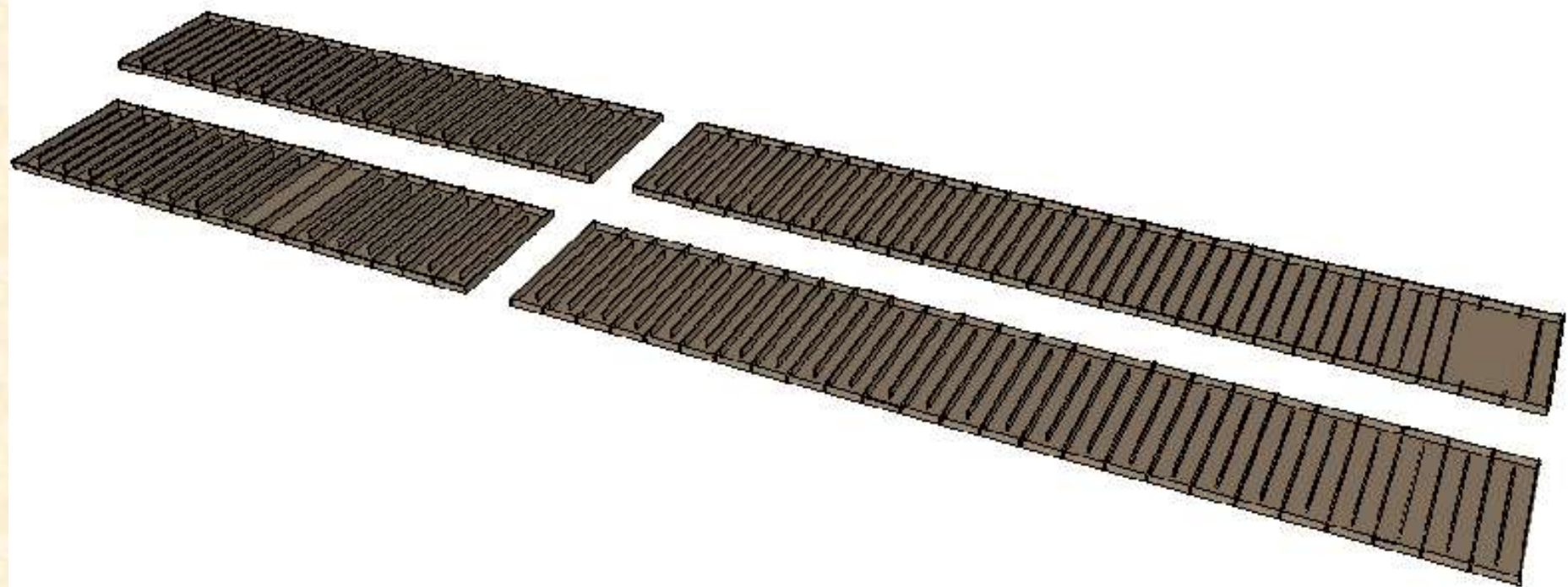
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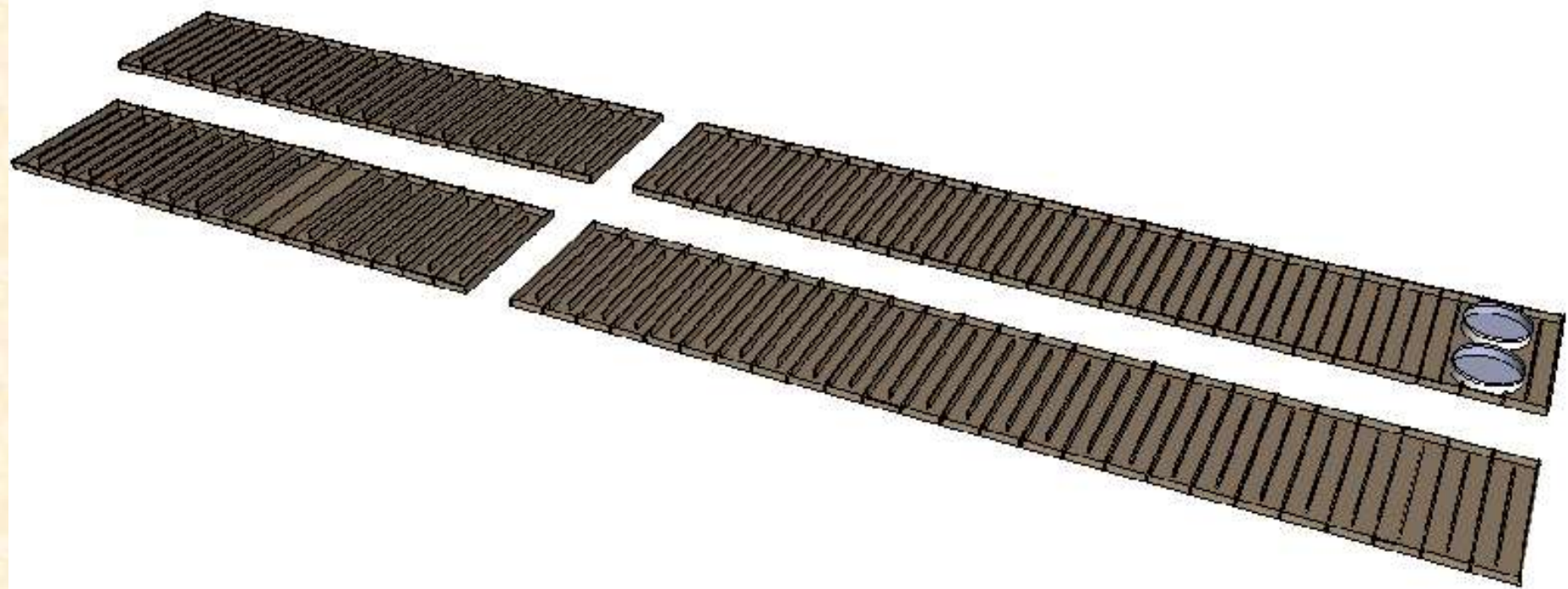
A 21DEC10 ISSUED FOR INFORMATION

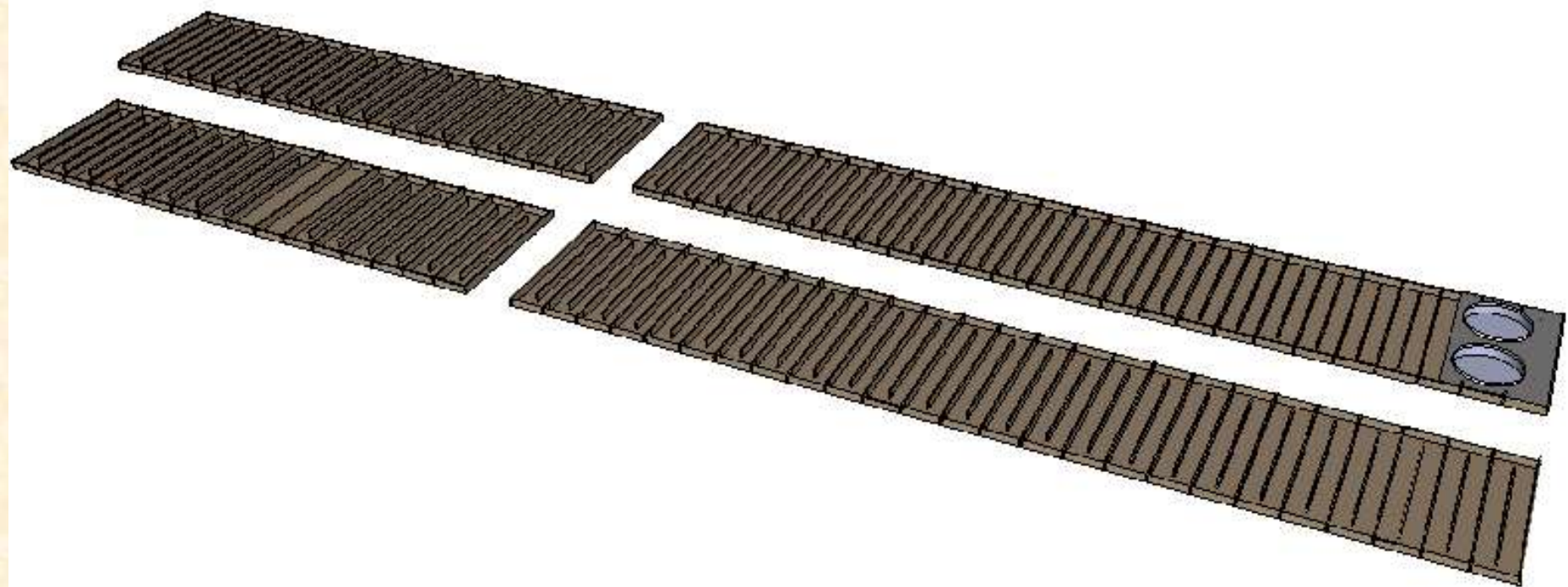
DRAWING IS ISSUED AS 280x430 MM [11"x17"]. IF LINE SHOWN ABOVE IS NOT 25.4 MM [1"] LONG, ACTUAL SCALE DIFFERS FROM STATED SCALE.

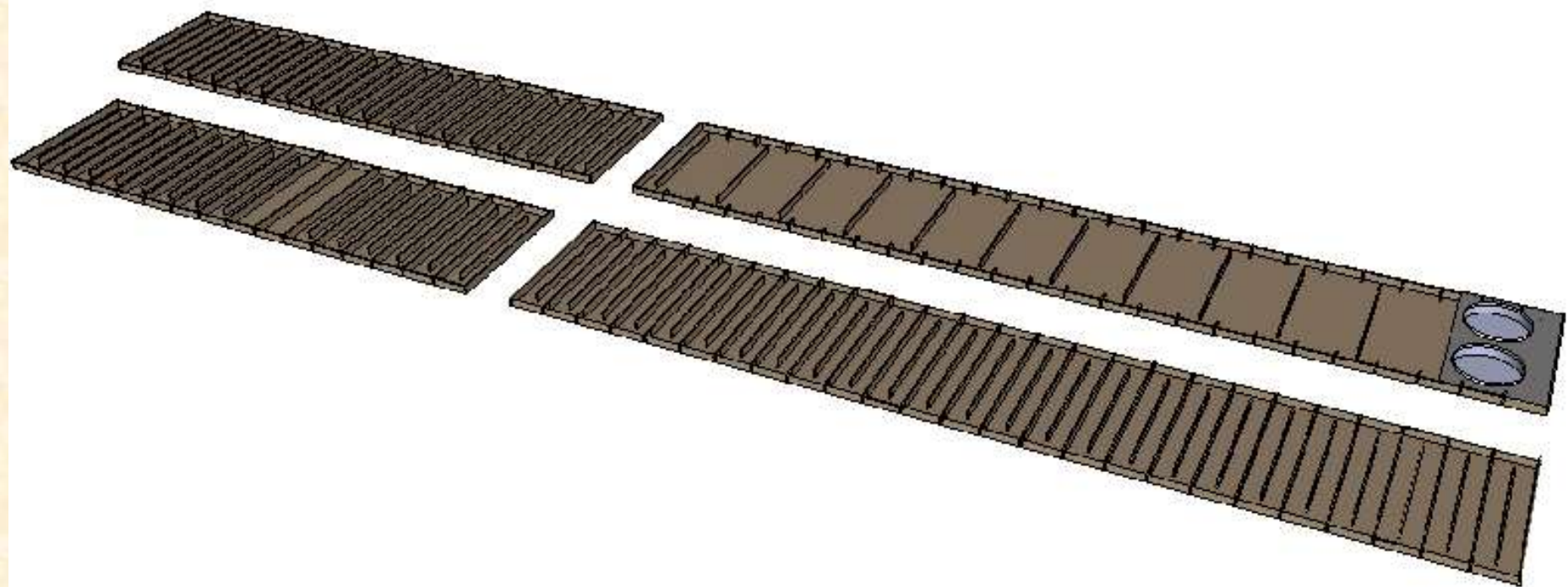
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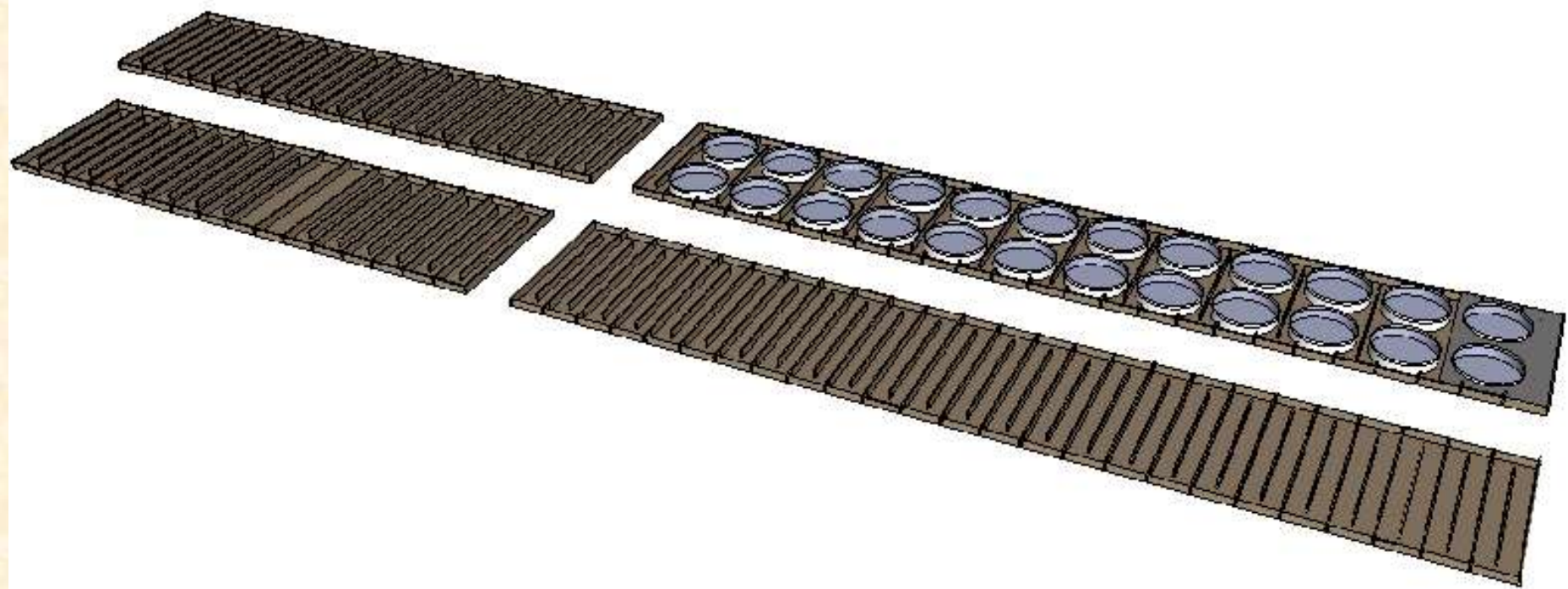


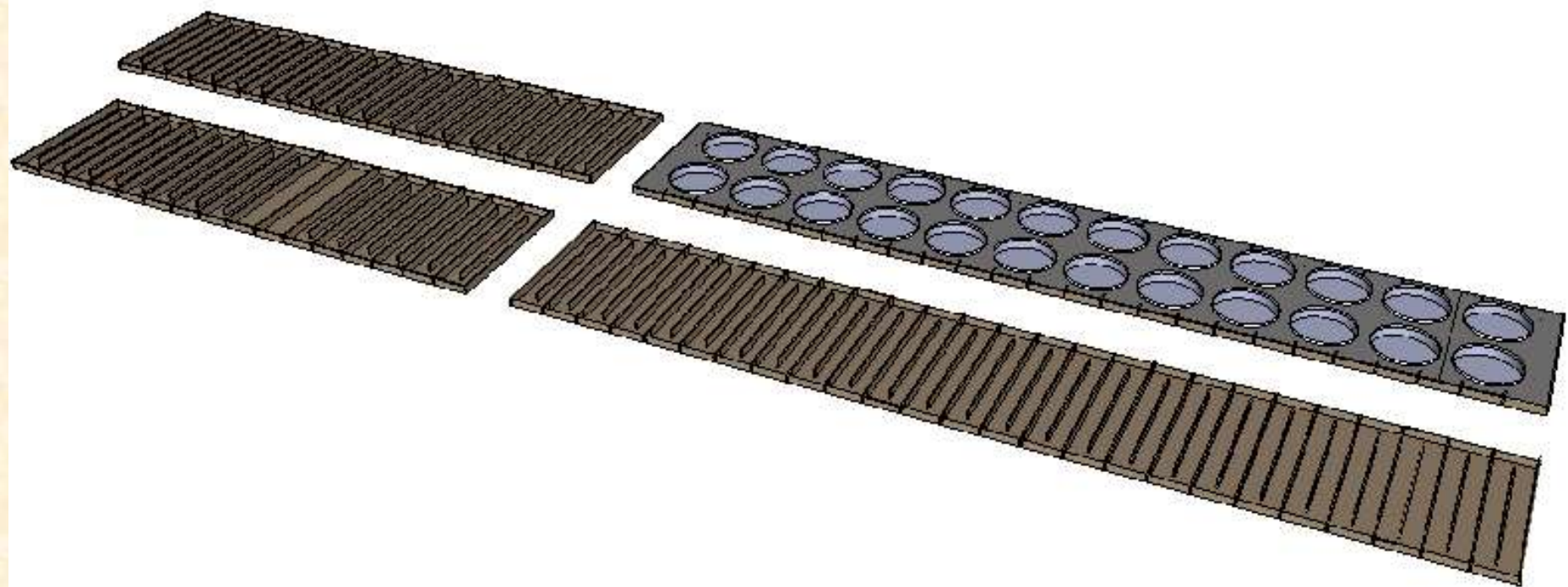


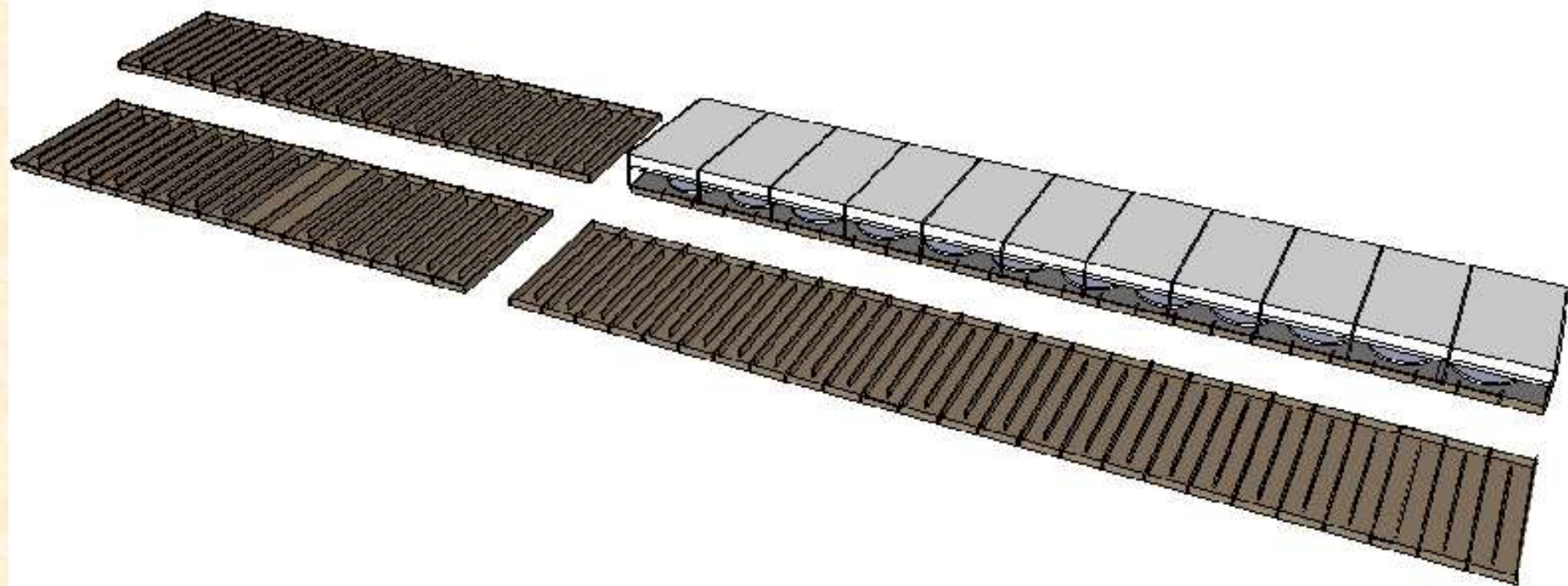


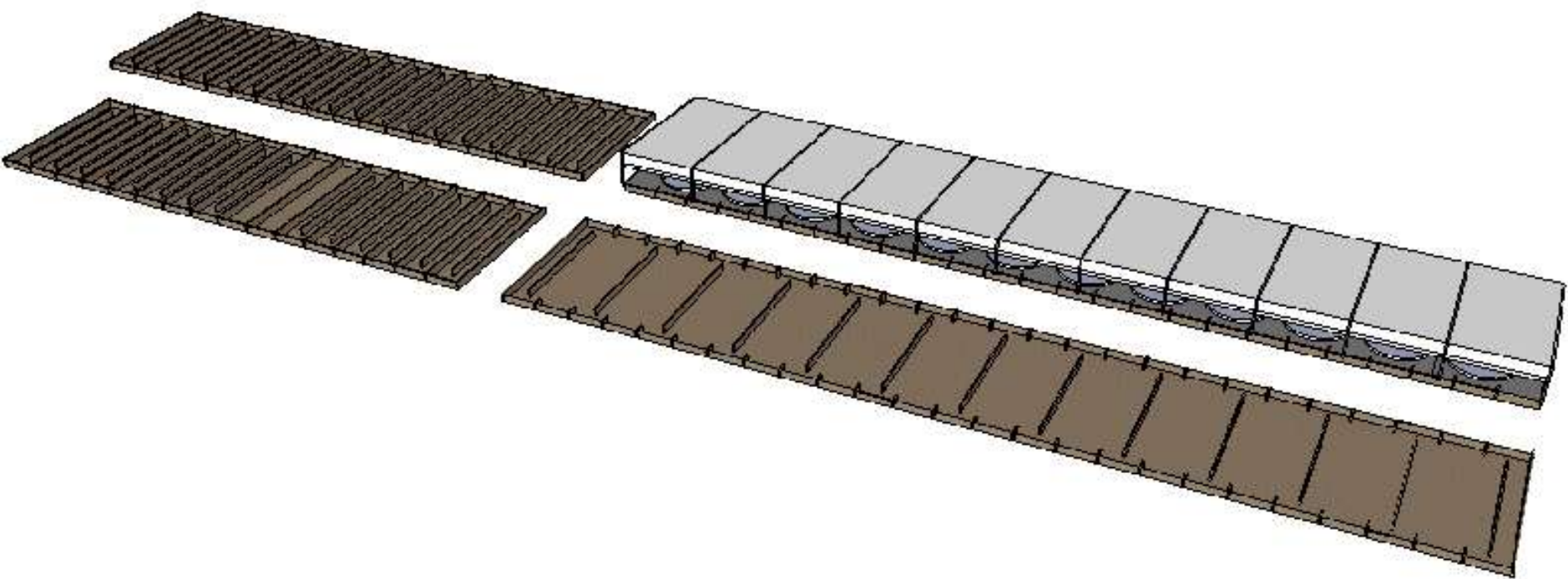


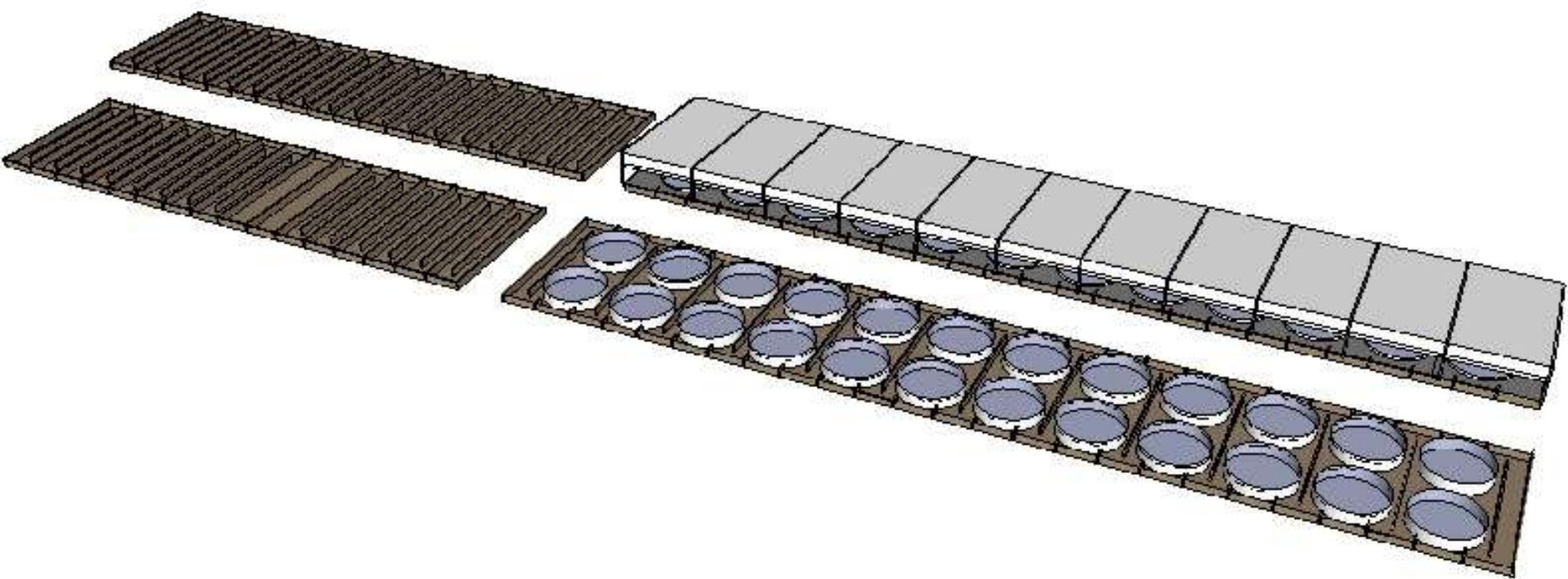


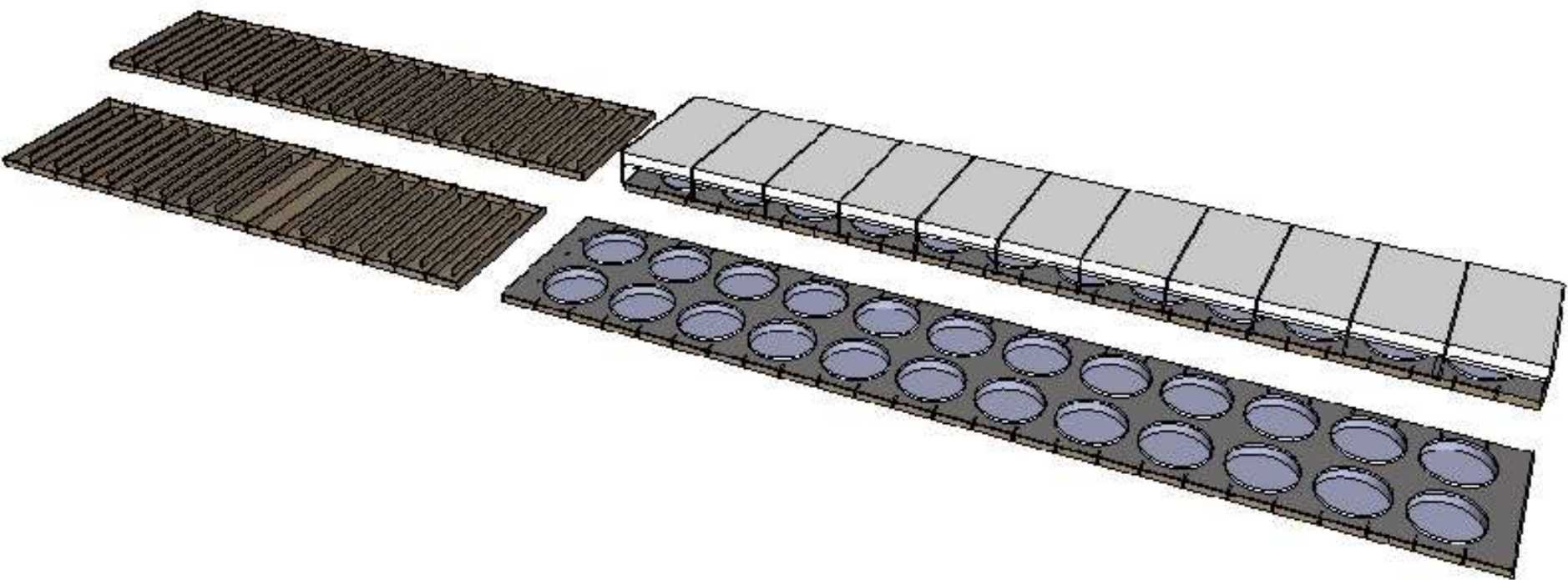


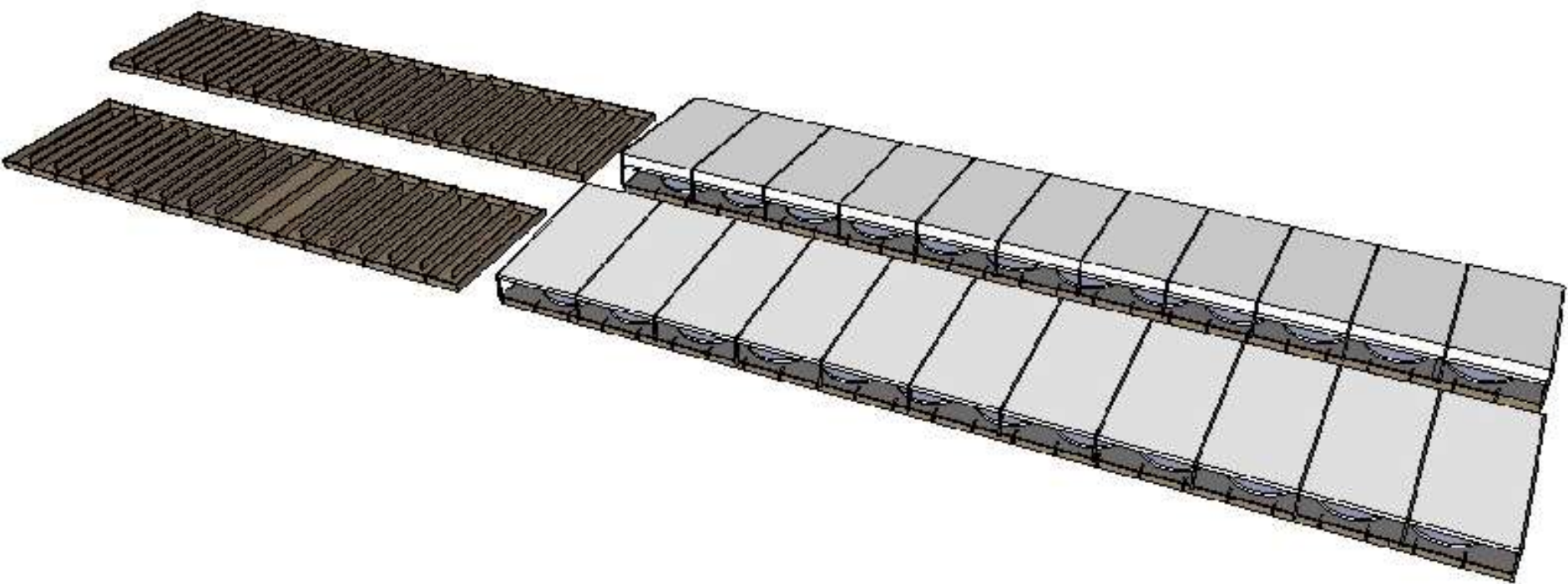














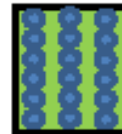
2.1 Million Steelhead @ 1.9 lbs/ft³ and 5.8 fpp
(48) 30' x 6' circular tanks - 24 separate reuse systems
10,000 gpm Reservoir water from System 1 reuse
43,700 fish/tank - 208 gpm/tank reservoir water



300,000 Coho @ 1.1 lbs/ft³ and 22 fpp
(21 grams & 17.6 kg/m³)
77,000 fish/tank - 750 gpm/tank river water
(4) 30' x 5' circular tanks w/4.5' deep water level

Could Be.....

550,000 Coho @ 1.9 lbs/ft³ and 22 fpp
(21 grams & 30 kg/m³)



2.65 Million Chinook @ 2.0 lbs/cu ft and 100 fpp
(48) 10' x 4' circular tanks



1.8 Million Chinook @ 1.3 lbs/ft³ and 22 fpp
(21 grams & 20.8 kg/m³)
91,000 fish/tank - 750 gpm/tank river water
(20) 30' x 5' circular tanks w/4.5' deep water level

Could Be.....

>2.6 Million Chinook @ 1.9 lbs/ft³ and 22 fpp
(21 grams & 30 kg/m³)

Next Steps



Any Questions?

