Upwelling Incubator
Modifications

Or

‘Go Up Young Man, Go Up!’
Kootenay Trout Hatchery

- Located in SE British Columbia
- Produces rainbow & westslope cutthroat trout, brook char
- Brood stocks for Gerrard rainbow and XX male brook char
- Conservation hatchery for Kootenay and Columbia River white sturgeon
- Eyeing station for kokanee salmon
Kokanee Salmon Program

- The first priority is for the provincial stocking program (which requires approximately 1,000,000 eggs)
- Requests from outside agencies for eyed eggs are filled on an as available basis
- Egg availability can be highly variable as we depend on natural runs
- 2003 requests for 5.7 million eyed eggs, including 4.6 million for US agencies; this seemed highly unlikely
- Two weeks before the Meadow Creek station opened, the fish showed up and the goal suddenly looked possible
Isolation Incubation Facility

- Built as a stand alone unit
- Operated as a quarantine unit until pathological examinations are complete
- Capacity for 16 upwellers @ 120-150,000 eggs
- For kokanee, 16 X 137,500 eggs = 2,200,000
- Up to 6 vertical stack incubators can also be installed for hatch out
- Maximum flow available is 300 l/min; 78 US gal/min

Remove footwear and wash up before entering
Incubation system

- Since 1994 we have utilized the Ennis-style upwelling incubator
- 22.7 liter (5.9 US gal) bucket, fitted with 2.5cm (1”) piping
- Uses 15-18 liters (4-5 US gallons) per minute
- Main feature is the diffuser plate which has a limited number of holes (8-10% of open area compared to standard perforated screens. Helps to reduce uneven flow or dead areas)
The Plan

- 3.3 million eggs assigned to Kootenay Hatchery
- 2.75 million eggs assigned to Clearwater Hatchery
- Kootenay’s capacity was 2.2 million eggs
- Plan was to build six 110 liter upwellers each with a capacity of 600,000+ eggs
- The containers were ordered and promised by Sept. 16, but didn’t arrive until after all eggs on site
- Eggs were to begin arriving Sept. 18
- A new approach had to be formulated at the last minute.
What do we now?
EUREKA!!!!
It works, 115%!

- By adding the 2nd bucket on top of the first, we went from 17 liters of usable volume to 36.75 liters.
- Over double the volume while utilizing basically the same flow.
- It appears that the flow required to run the upweller is dependant on the diameter of the unit with the height or depth making little difference.
- The most noticeable effect is that getting the upwelling effect takes slightly longer, so patience is a key.
Working on the eggs

- The eggs were loaded using a sieve
- Disinfecting the eggs required some modification to our upwelling disinfection system
- Shocking the eggs was done by the siphon method
- Eggs were sieved out for loading into the egg pickers
- Overall, they were easy units to work with slight modifications to the various methods
Costs

Per unit cost of the original Ennis – style upweller:
- parts - $35.50 CDN
- labor – $81.25 CDN*
- total - $116.75 CDN
  $87.80 US
* 3.25 hrs @ $25/hr

Per unit cost of modification:
- parts - $5.00 CDN
- labor - $25.00 CDN*
- total - $30.50 CDN
  $22.55 US
* 1 hr @ $25/hr
The Next Generation

- “Burt” – 110 liter upweller
- Capacity of 750,000 kokane eggs, (93 liters of useable volume)
- Flow rate 33-35 l/min
- Provides 5 times the egg capacity for twice the water usage of the original Ennis upweller
- Key feature again is the diffuser plate, which back pressures the water to provide even distribution, no dead spots
Parting comments

“God gives us wonderful opportunities brilliantly disguised as impossible problems.” Swindoll

Hang in there, the solution will come.

Talk it over with some people with a different perspective, they may see it from a fresh angle

Share your successes at next year’s NWFCC in Victoria!