

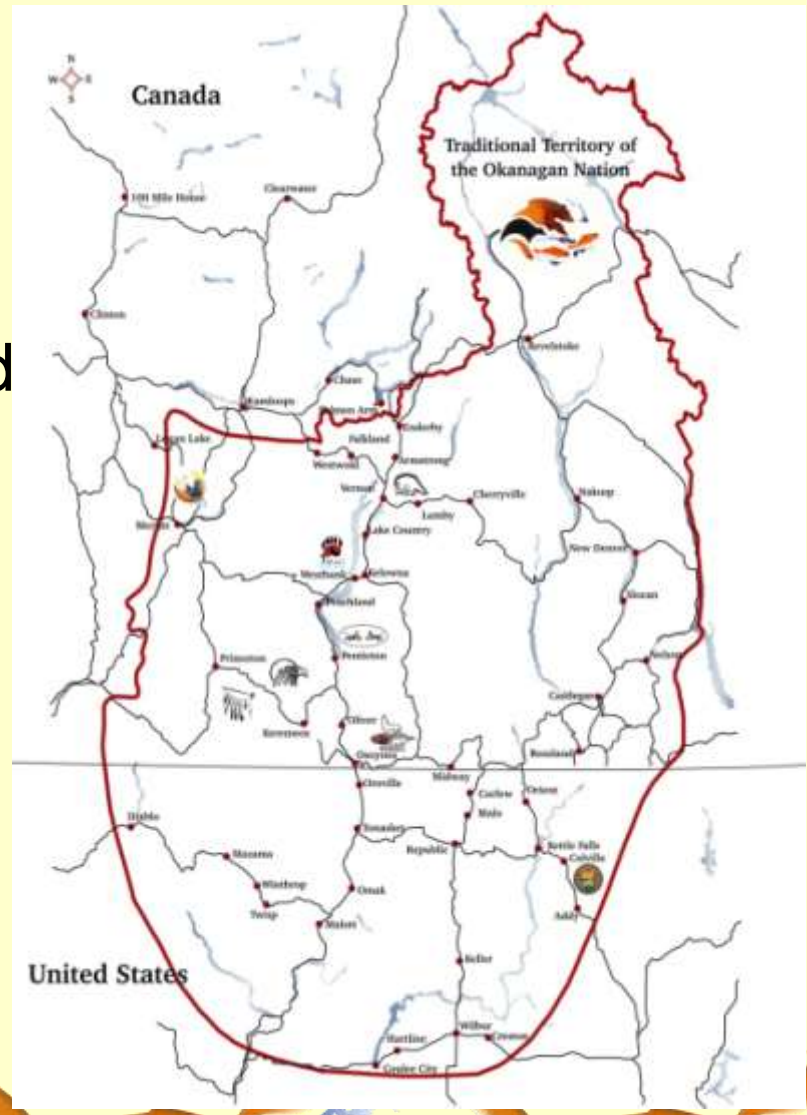
2008 Field Season



Chinook Salmon
Okanagan Population
Oncorhynchus tshawytscha

Introduction

- ❖ In the Columbia basin only anadromous Chinook that return to Canada
- ❖ In emergency assessment accepted as endangered and recommended for listing under Species at Risk Act (SARA) in May 2005 using an 'interim' report.
- ❖ In April 2006 status changed to threatened due to potential for strays from neighbouring populations



Life History

- ❖ Most closely related to the summer Upper Columbia River Chinook
- ❖ Northern extent is the McIntyre Dam and the southern limit is the Osoyoos Lake
- ❖ Recognized as DU based on 1) genetic differentiation; 2) geographic and reproductive isolation and 3) unusual life history characteristics





Spawning (October)

Fry Emerge
(April and May)

Move to ocean as
smolts (within weeks
or months of
emergence)

Ocean Migration

Migrate as adults to
spawning grounds

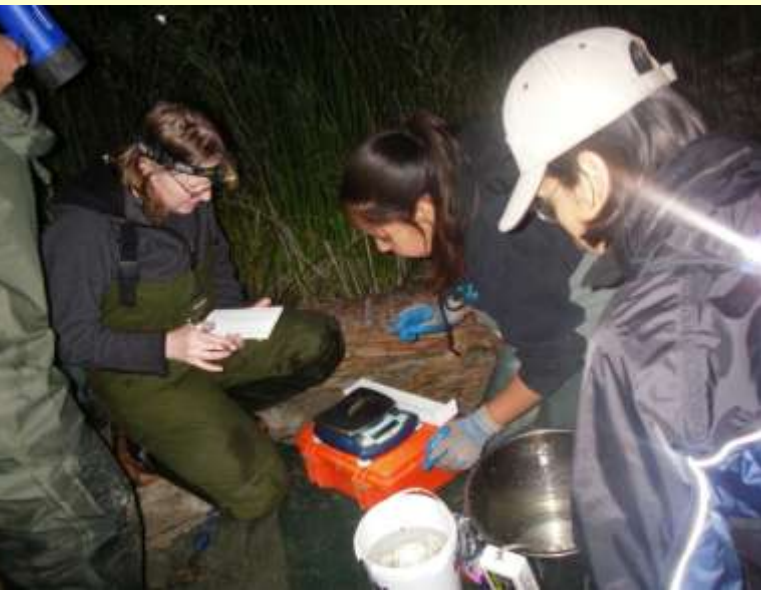
Current Research

- ❖ Interactions with other species in Osoyoos Lake
- ❖ Adult enumerations and biosampling
 - ❖ Genetics
 - ❖ Otoliths
- ❖ Redd surveys



Interactions in Osoyoos Lake

- ❖ Fish were beach seined at various locations around the northern end of Osoyoos Lake
- ❖ Juvenile Chinook were captured at the outlet of Okanagan River (23 June 3, 71 on June 11 and 29 on June 17)
- ❖ Juvenile Chinook were also located at Rattlesnake Point (7 on June 11, 1 on June 17)



Also filmed this year August 11 within the Okanagan River



Interactions with other Species

- ❖ The most common fish caught in the net were juvenile whitefish, followed by Yellow perch
- ❖ Also caught northern pikeminnow, peamouth, red-sided shiner, smallmouth and largemouth bass, sunfish, sockeye, sculpin, carp
- ❖ The yellow perch larger this year.
- ❖ No fish tissue were found in any of the stomachs.



Adult Enumeration

- ❖ Counts occurred in conjunction with SK floats
- ❖ Non lethally sampled using beach seining
- ❖ Any dead fish were also biosampled,
- ❖ Fish sampled that were caught with the sockeye broodstock collection



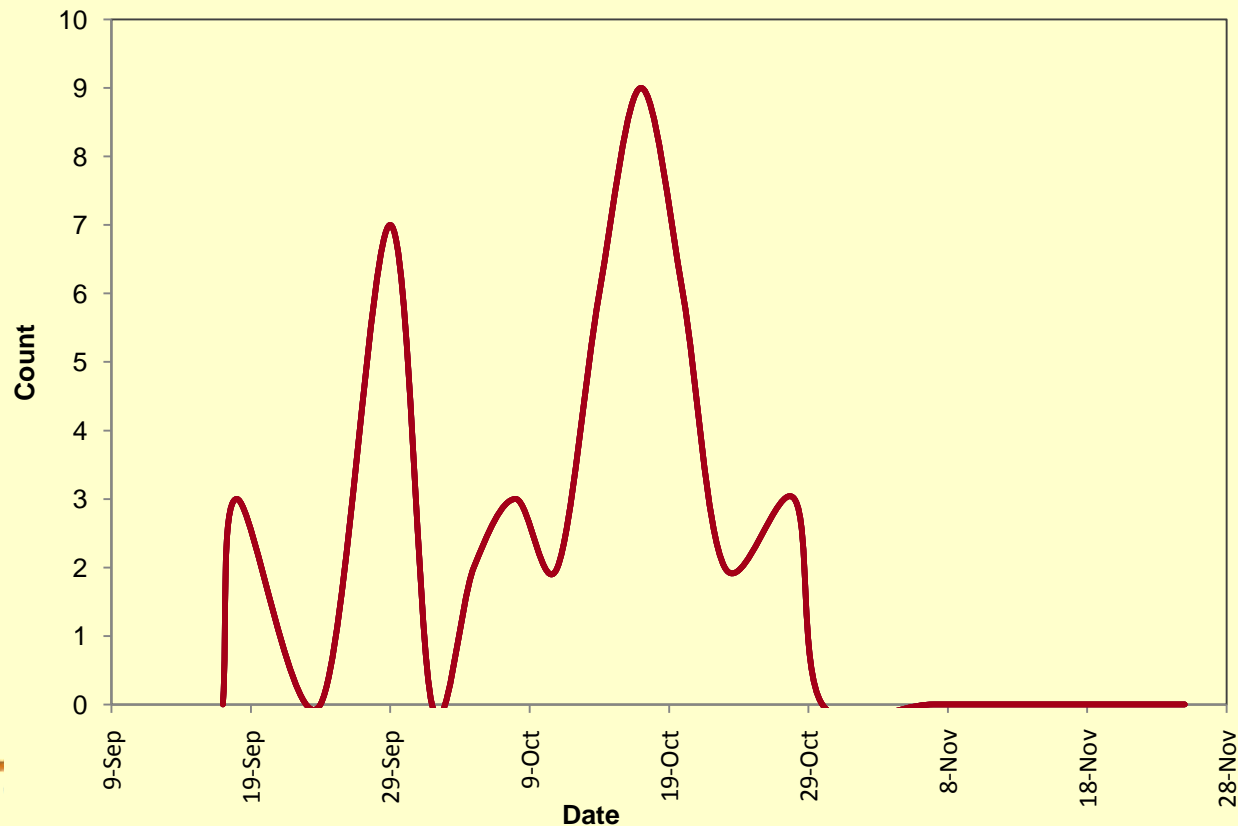
Biosampling

- ❖ Chinook were sampled for length, DNA, sex, and scales
- ❖ DNA collected from 13 fish
- ❖ Seined fish were also tagged in case of recapture
- ❖ Dead fish had otoliths removed, and sent to lab to confirm marine life history using strontium concentrations
- ❖ Three Chinook had a clipped adipose



Adult Enumerations

- ❖ Only 46 Chinook counted at Zosel Dam (454 in 2007, 496 in 2006)
- ❖ Peak count on October 20 with 9 fish

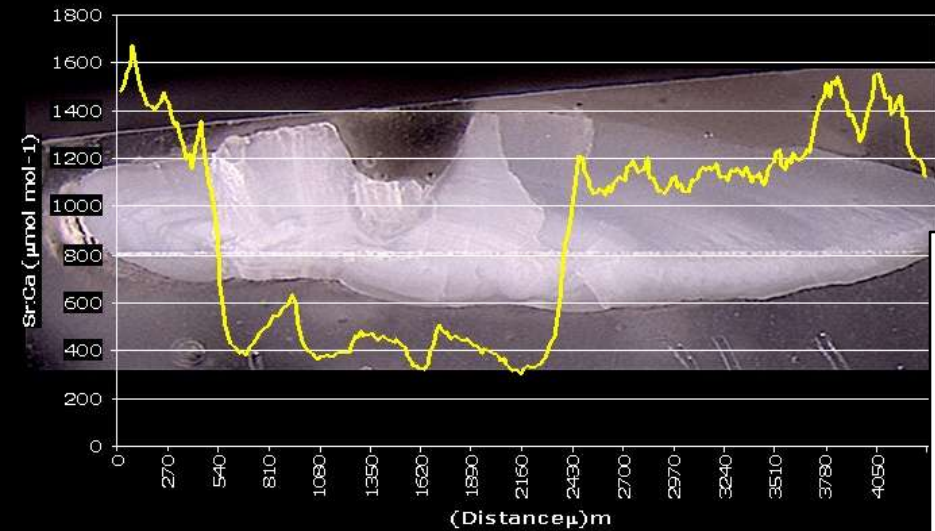


Otoliths

- ❖ Analyzed for strontium content
- ❖ Determine if fish went to the ocean
- ❖ All fish seemed to have patterns seen in previous years
- ❖ In 2007 four of the fish showed the same oscillations in the freshwater rearing some of the otolith
- ❖ In the adult fish sampled in 2008, eight fish showed the same pattern, including all the hatchery fish
- ❖ Possibility of extended freshwater rearing

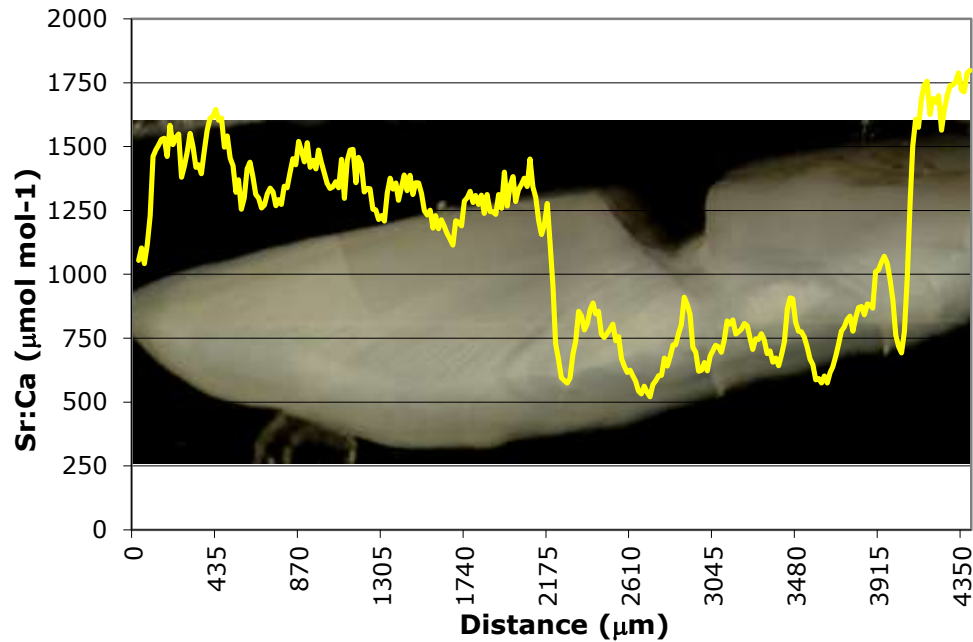
Strontium Isotopes in Otoliths

Sr in Otolith 4034

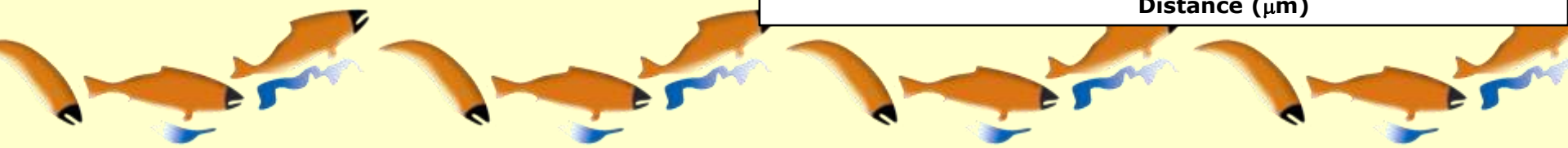


Hatchery reared fish 2008

Sr in Otolith O9 (23154h)

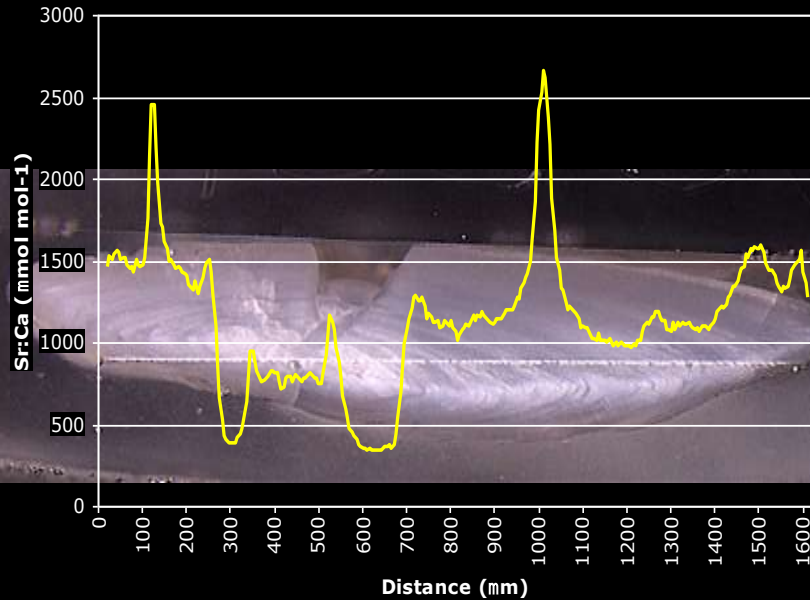


Hatchery reared fish 2006



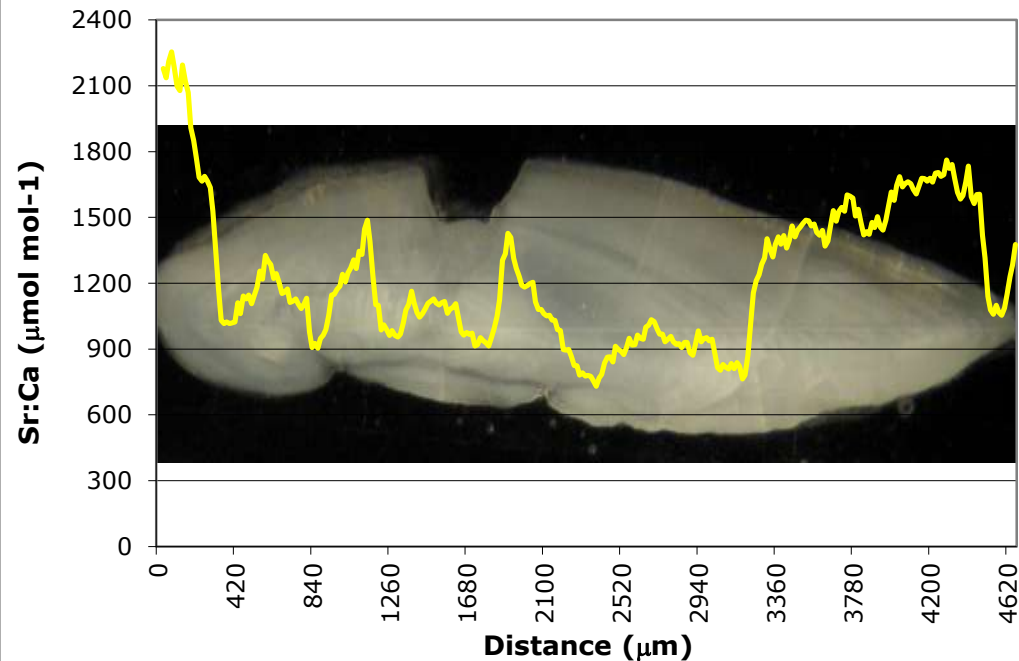
Strontium Isotopes in Otoliths

Sr in Otolith 4006

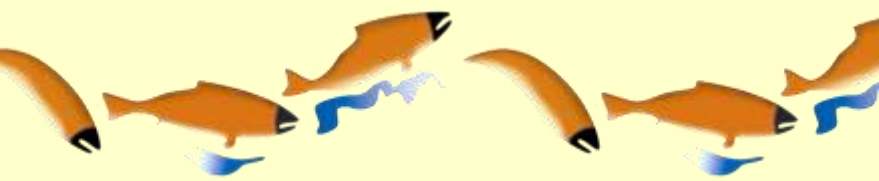


2008

Sr in Otolith O16 (23162)

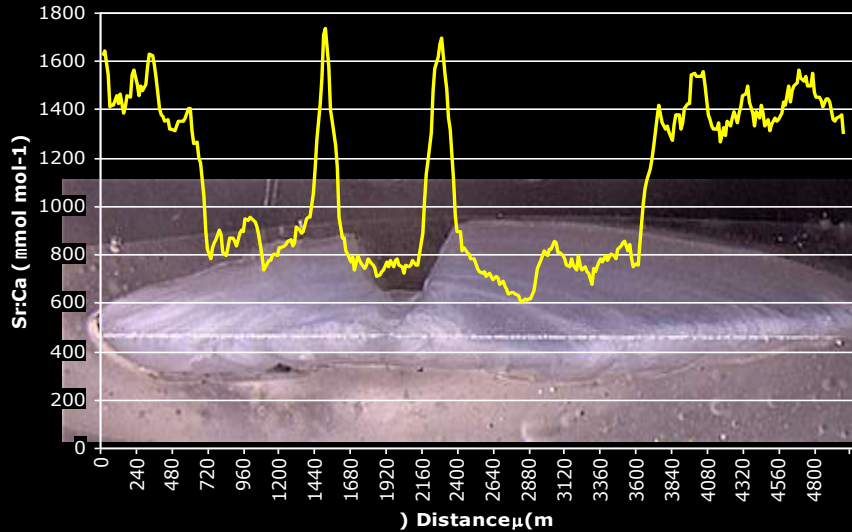


2006

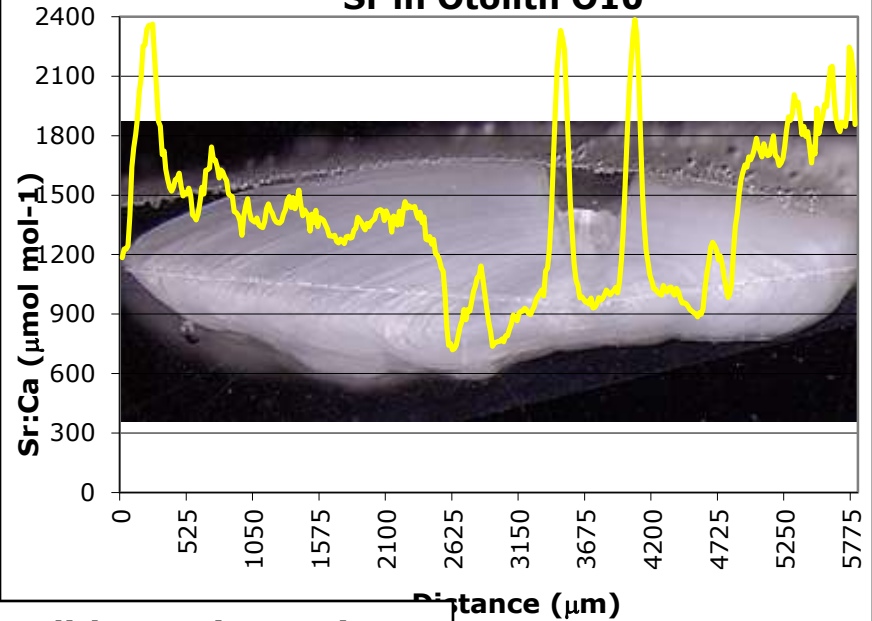


Strontium Isotopes in Otoliths

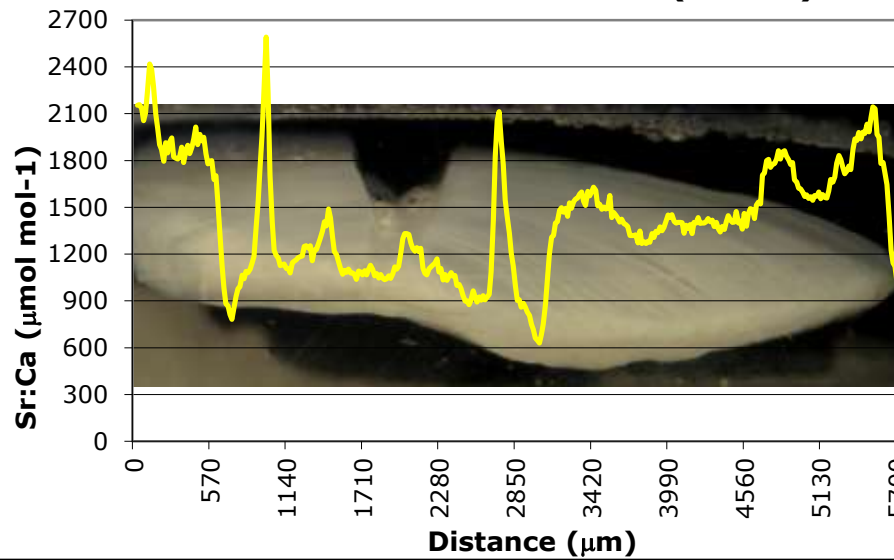
Sr in Otolith 4031



Sr in Otolith O10



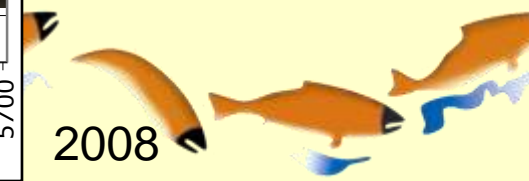
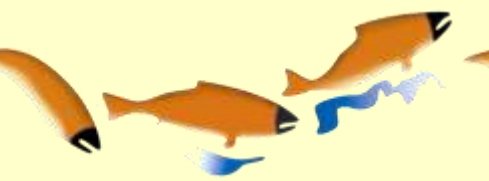
Sr in Otolith O11 (23156)



2006

2007

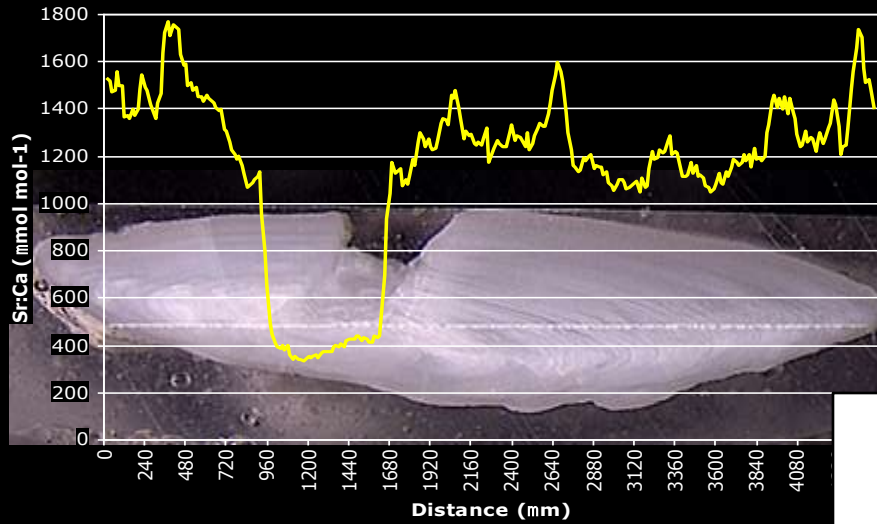
2008



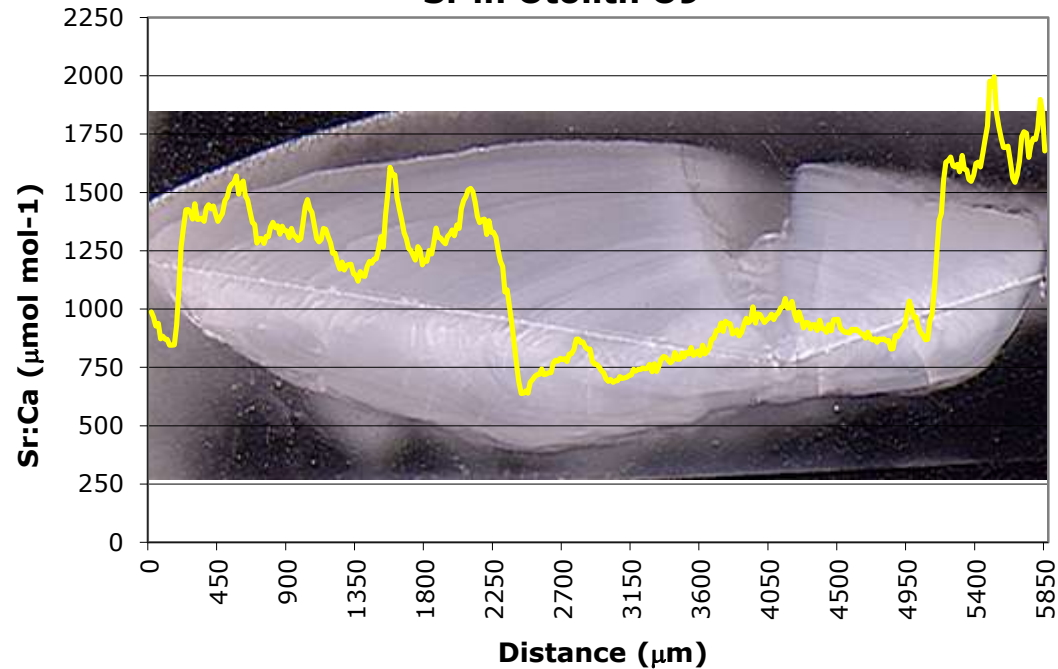
Strontium Isotopes in Otoliths

Fourth Type

Sr in Otolith 4027



Sr in Otolith O9



Spawning Habitat Surveys

- ❖ UBC PhD. Graduate student Natasha Neumann is conducting research regarding the role of hyporheic flow in redd site selection by Chinook salmon in the Okanagan River
- ❖ Bed profiles with depth and velocity profiles



Spawning Habitat Research Hyporheic Study 2007

- Major ions - low levels of nitrite and phosphate, while ion concentrations of sulphate, sodium and calcium were found in the highest concentrations.
- Only weak relationship between ion concentration gradients and the gradient of specific conductivity was observed
- Thirteen sites were classified as upwelling and five were determined to be downwelling, while the remaining sites were unclassified.
- Analyses of major ions (on-going) in the different waters will be used to better fingerprint surface water, groundwater and hyporheic flow.



Recommendations

- ❖ Continue to monitor Chinook spawn timing and escapement
- ❖ Continue yearly biological sampling
- ❖ Continue to focus on influences of groundwater (will have results from UBCO graduate's research as well as thermal imaging video)
- ❖ Continued analysis using laser ablation to determine marine life history phases
- ❖ Use information for recovery planning
- ❖ Stable isotope analysis for C/N to determine if marine life history



Conclusion

- ❖ Juvenile survival through the hydropower system most serious threat to the population
- ❖ Recovery target minimum population of 295 spawning adults by 2050
- ❖ Hatchery supplementation will be needed

