Selenium Concentrations in Fish & Zooplankton in Lake Mead

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Acknowledgements

• Las Vegas Wash Coordination Committee
• Bureau of Reclamation
• City of Las Vegas
• Nevada Dept of Wildlife
• Bio-West, Inc.
• Inorganic that occurs naturally in soil
• Leaches easily
• Is essential for bodily function in small quantities
• Toxic effects in larger quantities
Las Vegas Valley Watershed

Four tributaries under consideration of being listed on the 303(d) impairment list.
Wash Stabilization Effort

- First weir installed in 2000
- 15 of 22 planned weirs completed
- TSS have decreased by >60%
- Can create potential contaminant sink
Fish Collections


• Three locations
  • Las Vegas Wash
  • Las Vegas Bay
  • Pahranagat National Wildlife Refuge
Carp Tissue Selenium Results

Ave Se Concentration in Fish Tissue

Draft EPA criteria of 5.85 µg/g
Zooplankton Study

Hamilton, et al. 2004 targeted larval stage as most at risk from Se exposure
Methods

- Monthly collections/24 months
- Spawning Sites
  - Las Vegas Bay
  - Overton Arm
- Horizontal tows
- Wholesale plankton sample

www.lvwash.org
Results

Las Vegas Bay - Year 1

- Zooplankton (ppm)
- Water (ppb)
- 4.6 ppm zooplankton threshold

Graph showing zooplankton and water levels from Sep-10 to Aug-11.
LV Bay % Comp Year 1

- Ostracods
- Veligers
- Rotifers
- Copepods
- Cladocerans

Percent Composition

- September 2010 (Sep-10)
- October 2010 (Oct-10)
- November 2010 (Nov-10)
- December 2010 (Dec-10)
- January 2011 (Jan-11)
- February 2011 (Feb-11)
- March 2011 (Mar-11)
- April 2011 (Apr-11)
- May 2011 (May-11)
- June 2011 (Jun-11)
- July 2011 (Jul-11)
- August 2011 (Aug-11)
Results

Las Vegas Bay - Year 2

Zooplankton (ppm)

4.6 ppm zooplankton threshold

Water (ppb)
Results

Overton - Year 2

- **Zooplankton (ppm)**
- **4.6 ppm zooplankton threshold**
- **Water (ppb)**

Graph showing zooplankton and water levels from Sep-11 to Aug-12.
Conclusions

- Common Carp in LV Wash and LV Bay have exceeded EPA draft criteria.
- Zooplankton Se concentrations in both Las Vegas Bay and the Overton Arm can exceed levels found to cause rapid mortality of larval razorback suckers during critical life stage.
- Se spike observed in zooplankton during winter/spring, not reflected in water samples.
- Zooplankton composition data shows jump in copepod % during winter/spring.
- Se concentrations in water and zooplankton similar in Las Vegas Bay and Overton Arm.
- Las Vegas Wash isn’t unique contributor.
- Stabilization efforts not causing direct impact on larval razorback suckers in Las Vegas Bay; can’t rule out background Wash/Bay interaction effects.
Questions?