

Guide to 2017 Water Quality Monitoring Results from the Animas River at Rotary Park

Please keep in mind these results are from one location along the Durango stretch of the Animas River and are not representative of other reaches of the Animas River.

In 2017, Mountain Studies Institute (MSI) continued a water quality monitoring program on the Animas River at Rotary Park in Durango, CO



- MSI collected 21 water quality samples from May through August of 2017, capturing river conditions when river recreation was at its peak.
- MSI expedited laboratory analysis of samples to get water quality results to the public as quickly as possible.

Animas River at Rotary Park in Durango, CO from March to August 2017

Mar 15



April 14



May 2



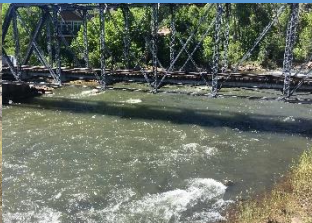
May 9



May 16



May 23



May 30



June 6



June 13



June 20



June 27



July 3



July 10



July 17



July 25



July 30



Aug 2



Aug 8



Aug 15



Aug 21



Aug 29

Click through the following pages to learn about the results from MSI's 2017 Animas River water quality monitoring.

We will address the following questions:



-How did metal concentrations in 2017 compare to water quality benchmarks?



-Was Animas River water quality in 2017 any different than previous years?

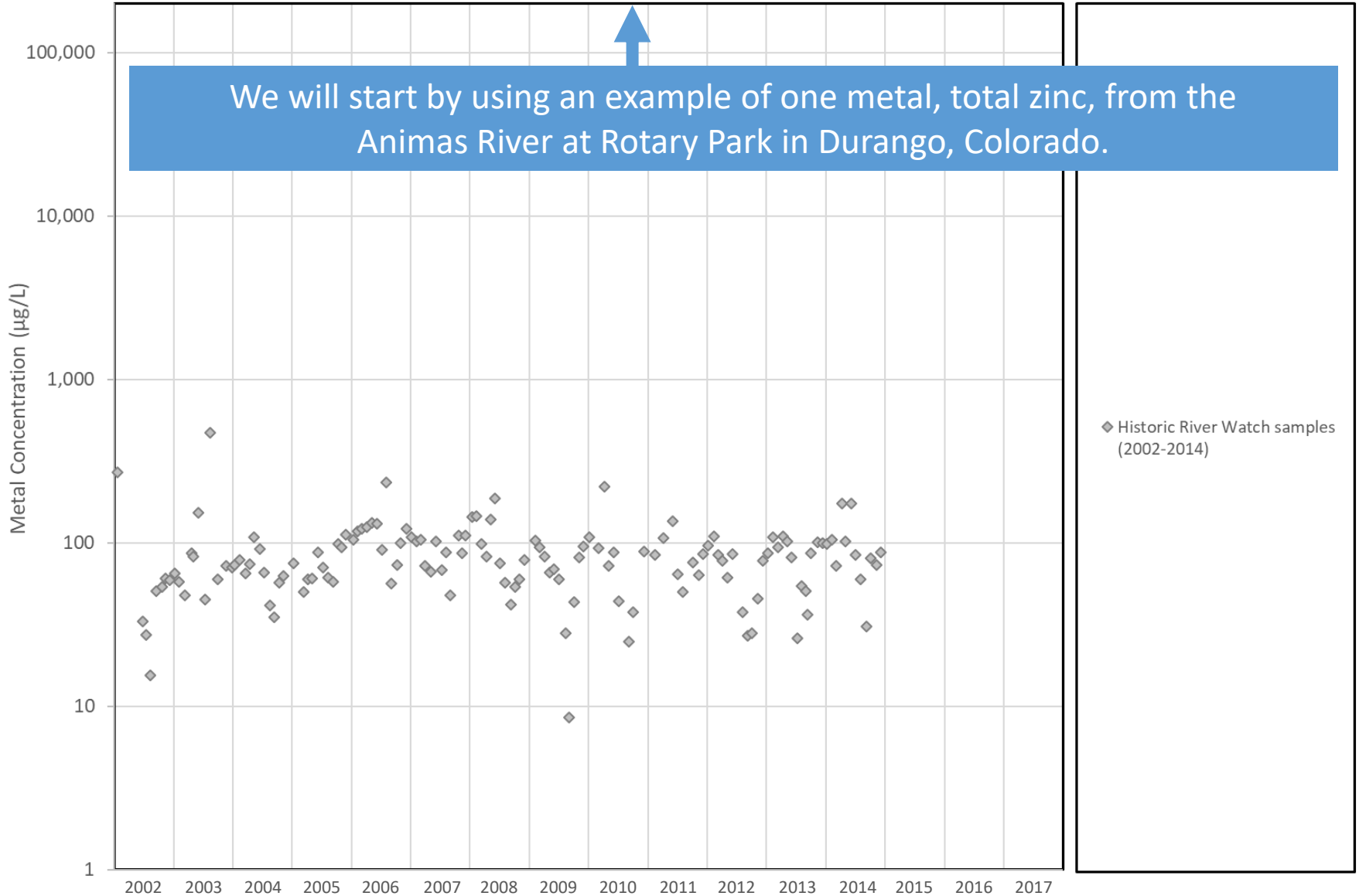


-Do metal concentrations in the Animas River correlate with other water quality parameters such as flow, pH, conductivity, and turbidity?

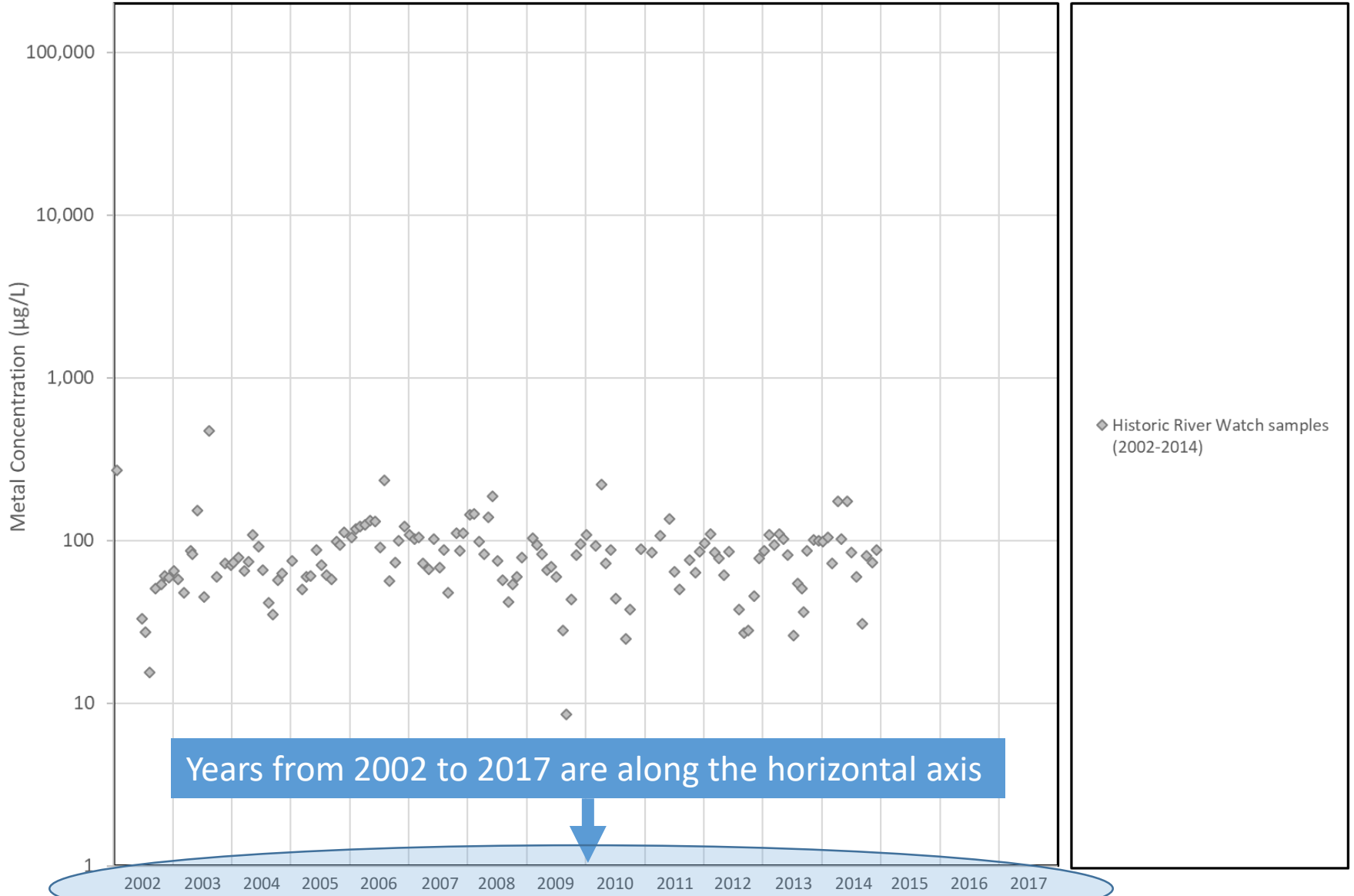


Total Zinc, Animas River at Durango, CO: 2002-2017

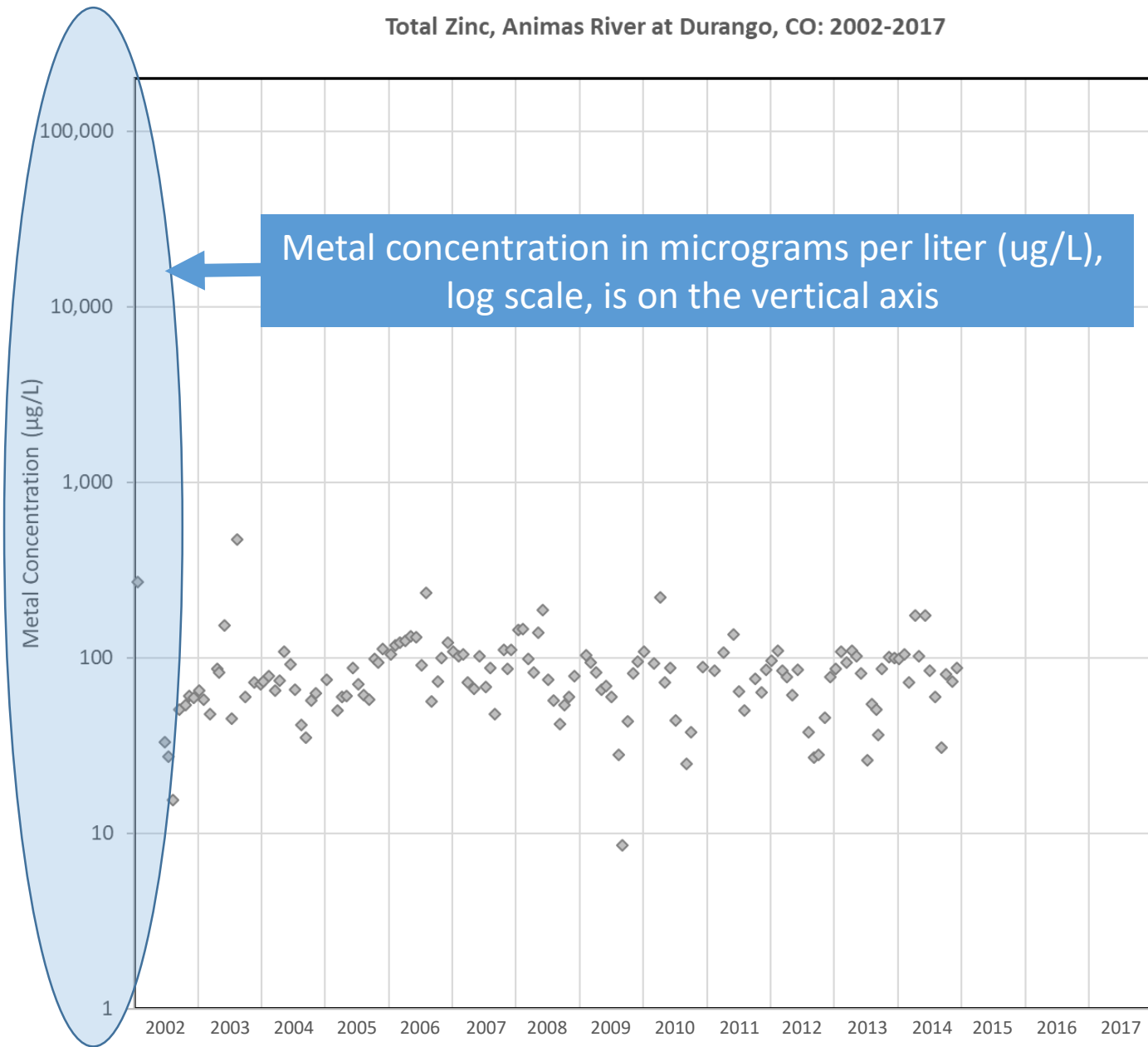
We will start by using an example of one metal, total zinc, from the Animas River at Rotary Park in Durango, Colorado.



Total Zinc, Animas River at Durango, CO: 2002-2017

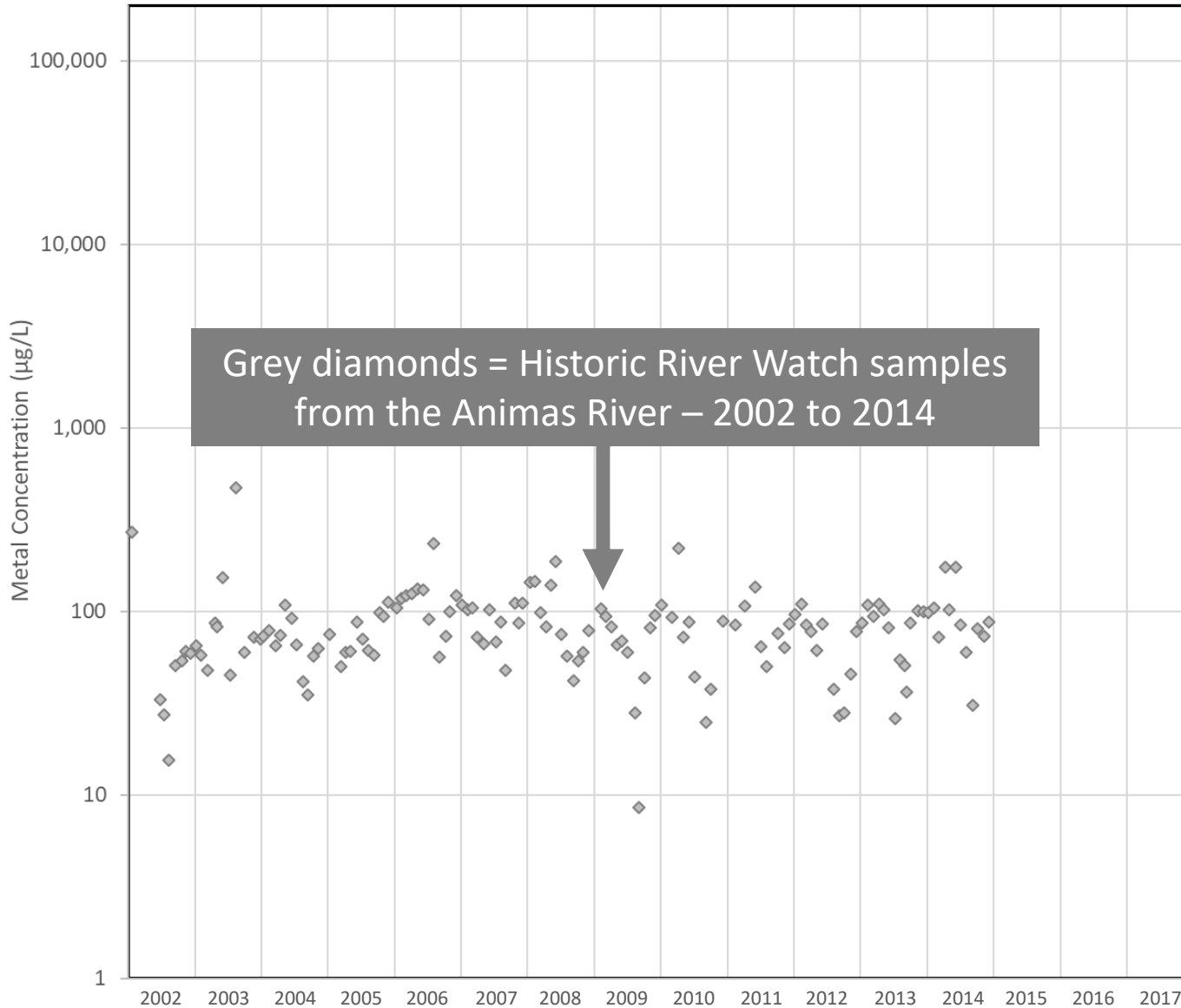


Total Zinc, Animas River at Durango, CO: 2002-2017



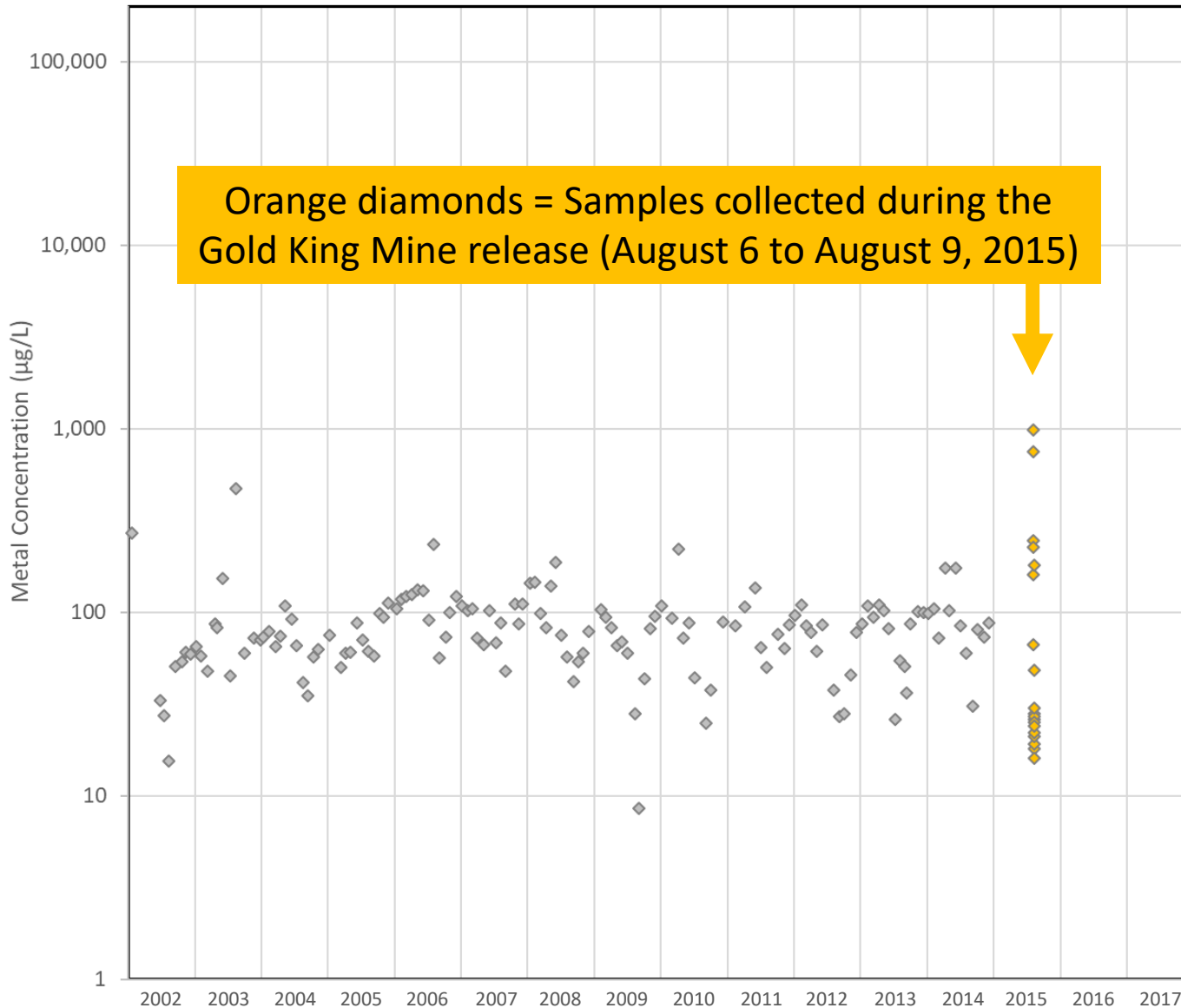
◆ Historic River Watch samples (2002-2014)

Total Zinc, Animas River at Durango, CO: 2002-2017



◆ Historic River Watch samples (2002-2014)

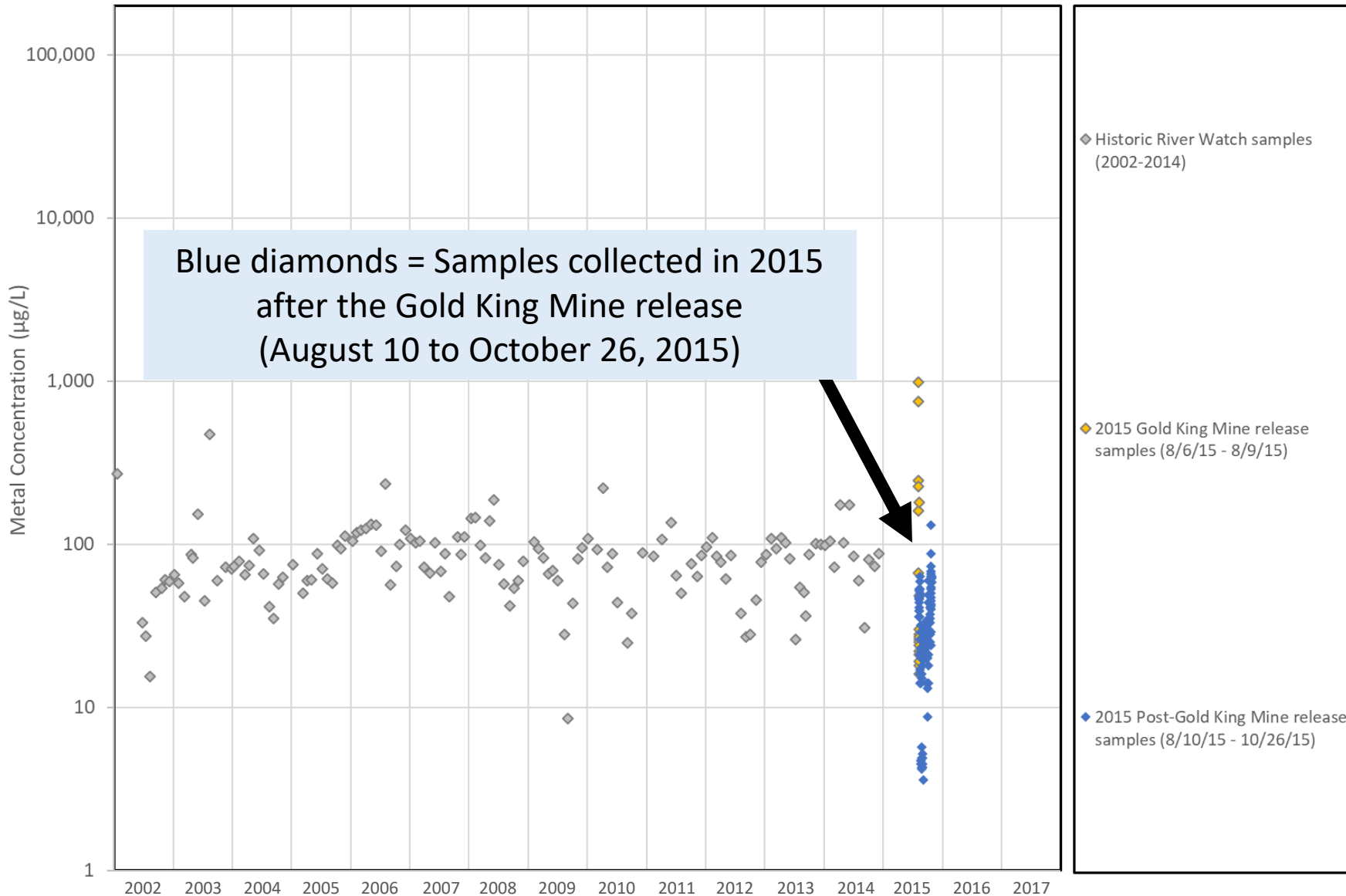
Total Zinc, Animas River at Durango, CO: 2002-2017



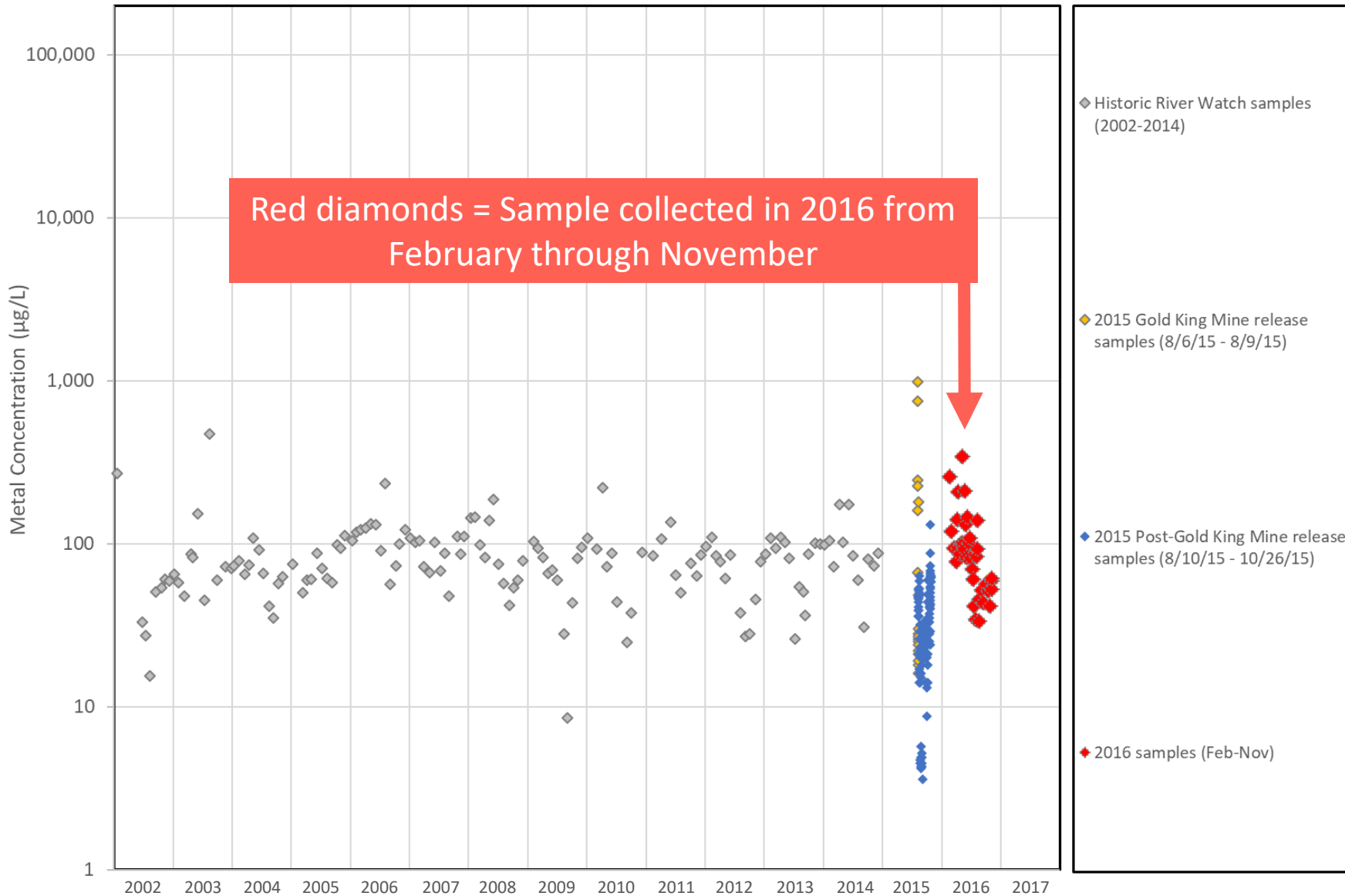
◆ Historic River Watch samples (2002-2014)

◆ 2015 Gold King Mine release samples (8/6/15 - 8/9/15)

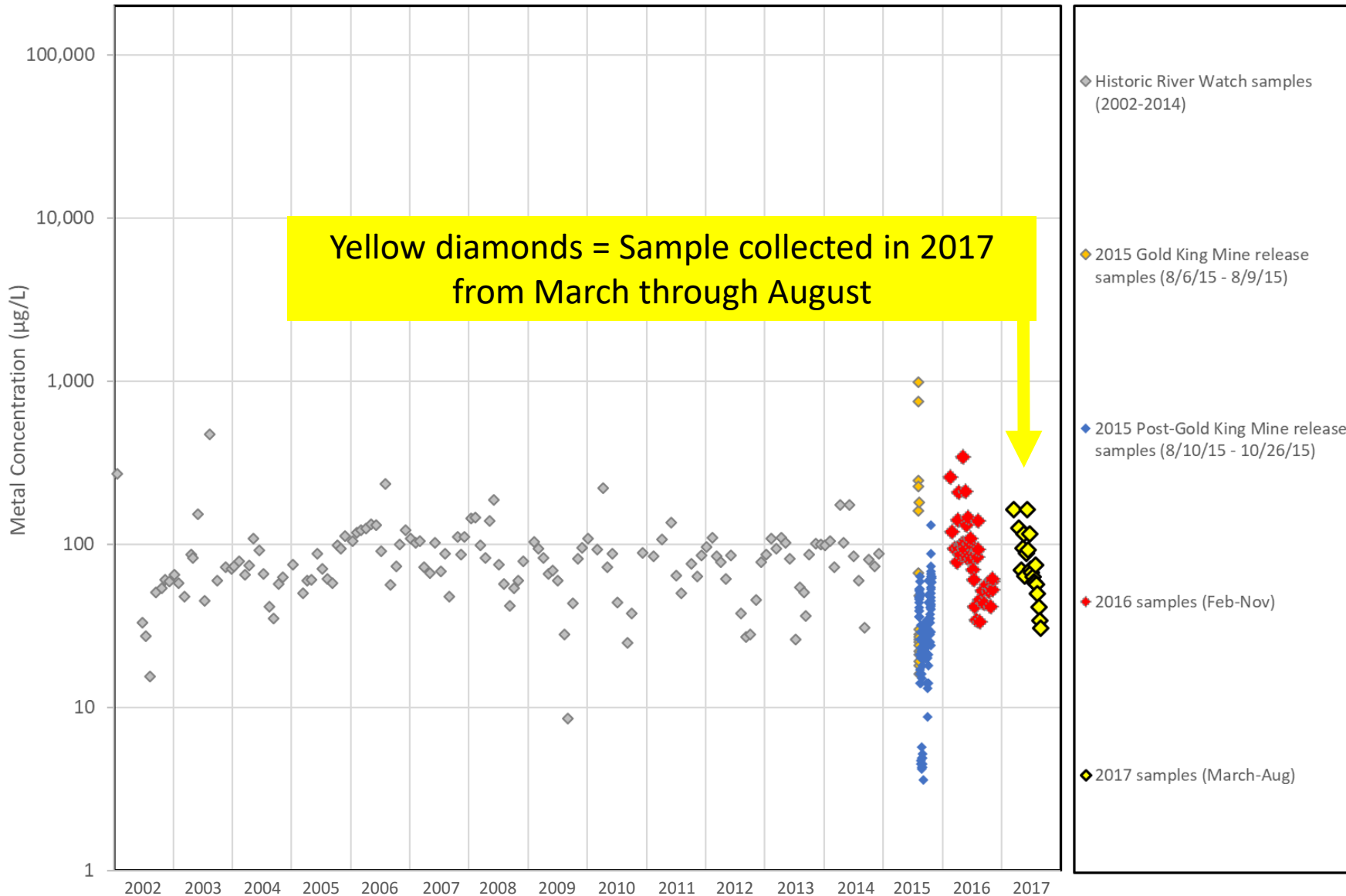
Total Zinc, Animas River at Durango, CO: 2002-2017



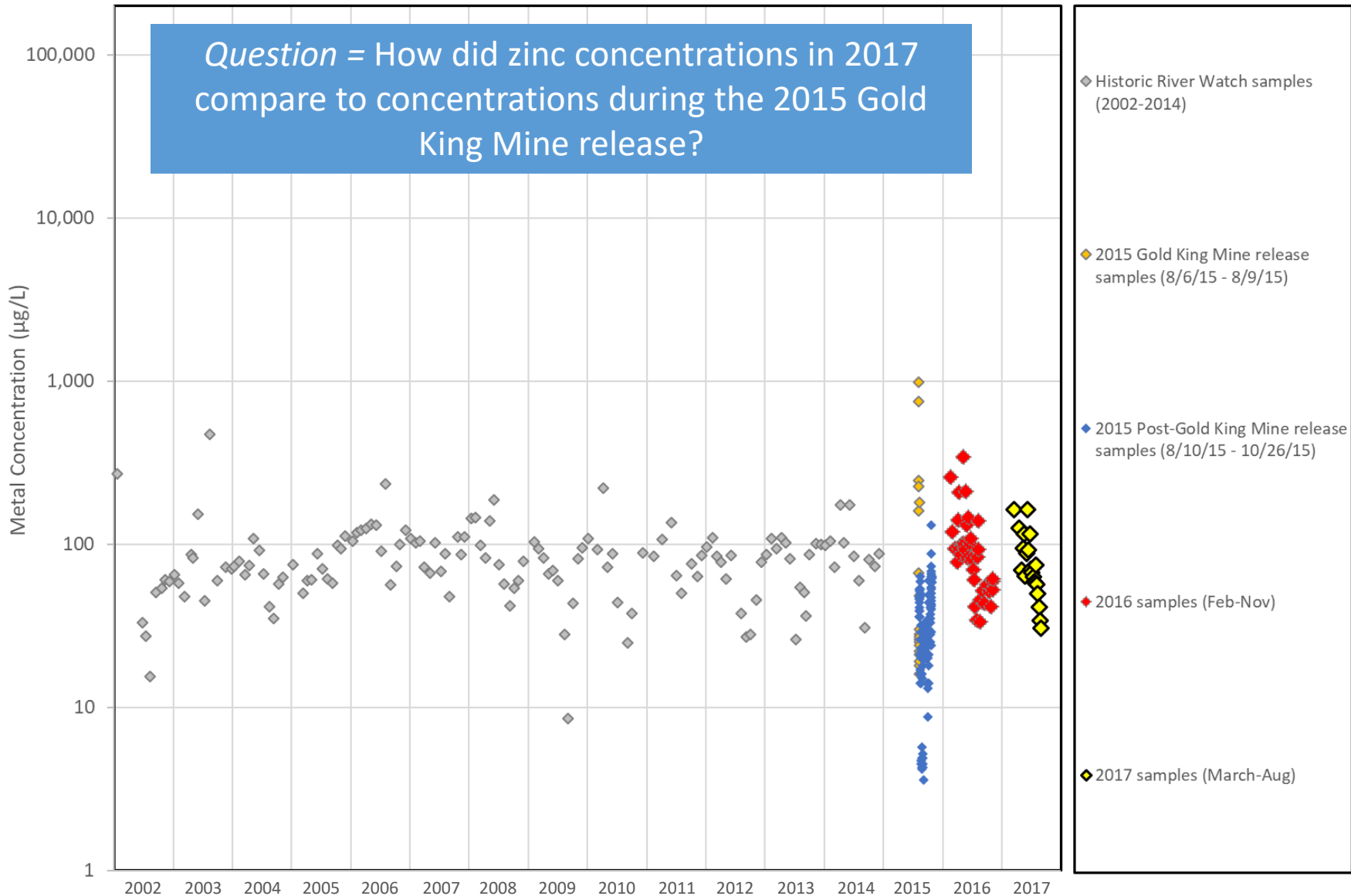
Total Zinc, Animas River at Durango, CO: 2002-2017



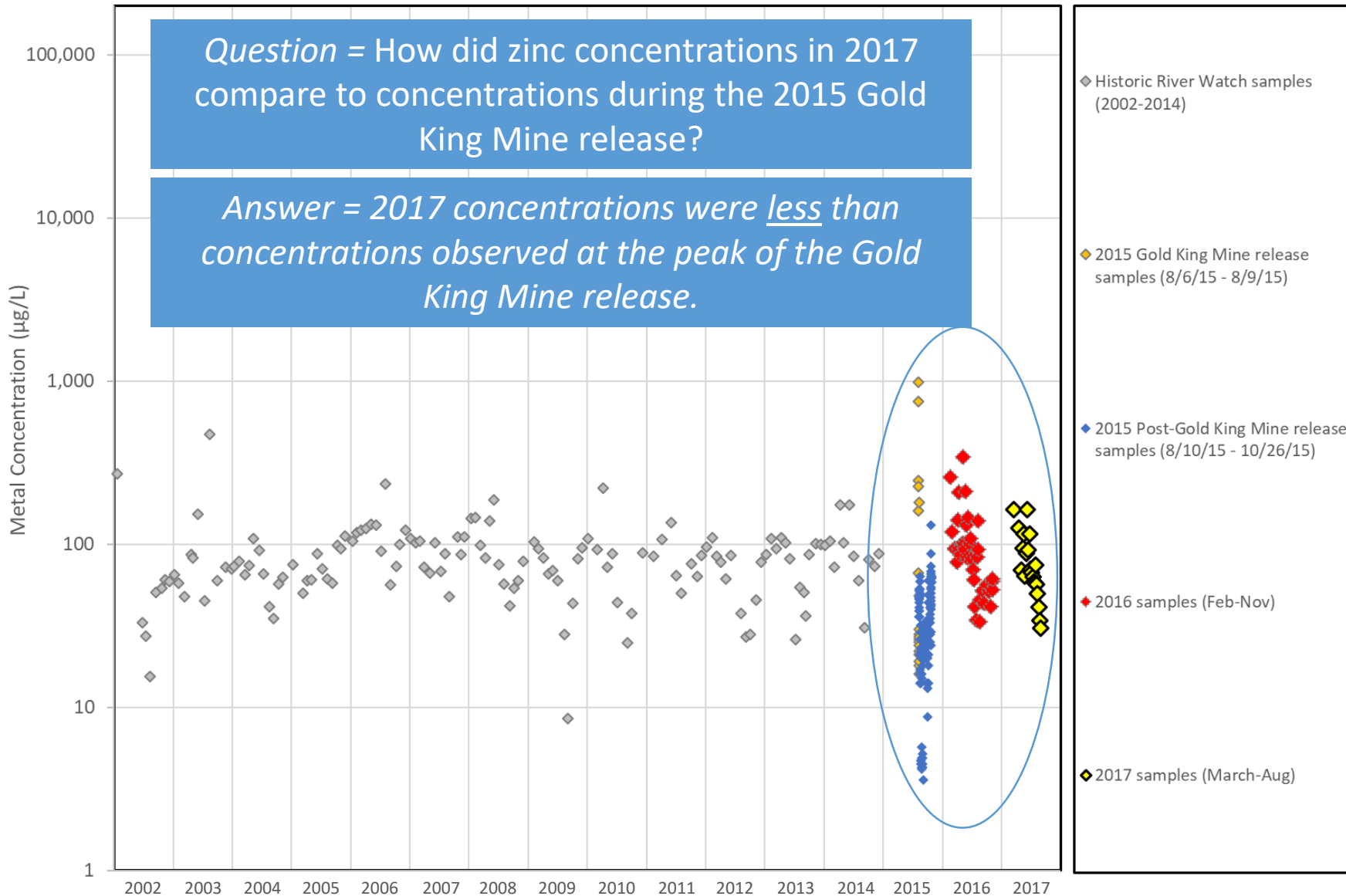
Total Zinc, Animas River at Durango, CO: 2002-2017



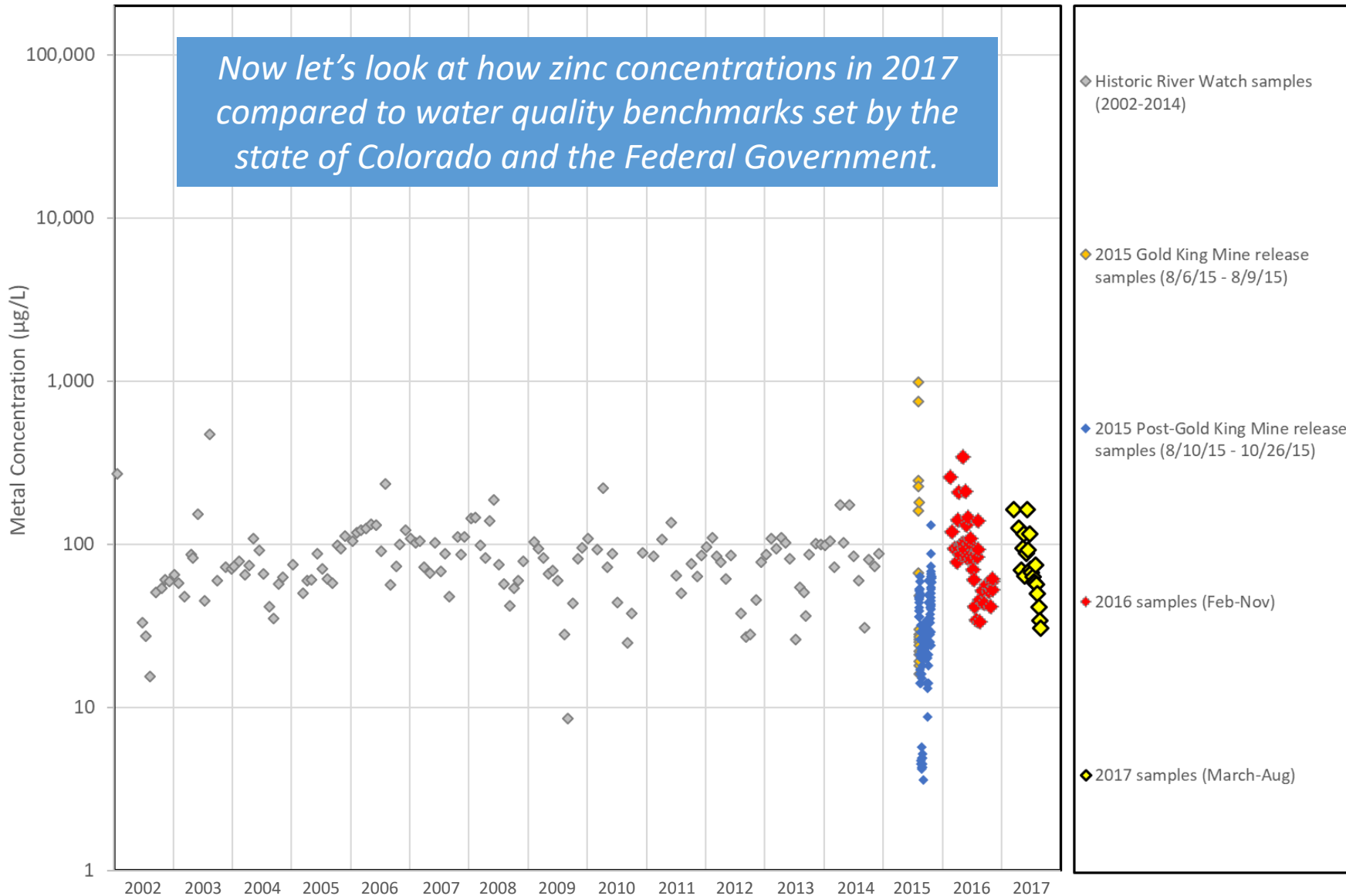
Total Zinc, Animas River at Durango, CO: 2002-2017



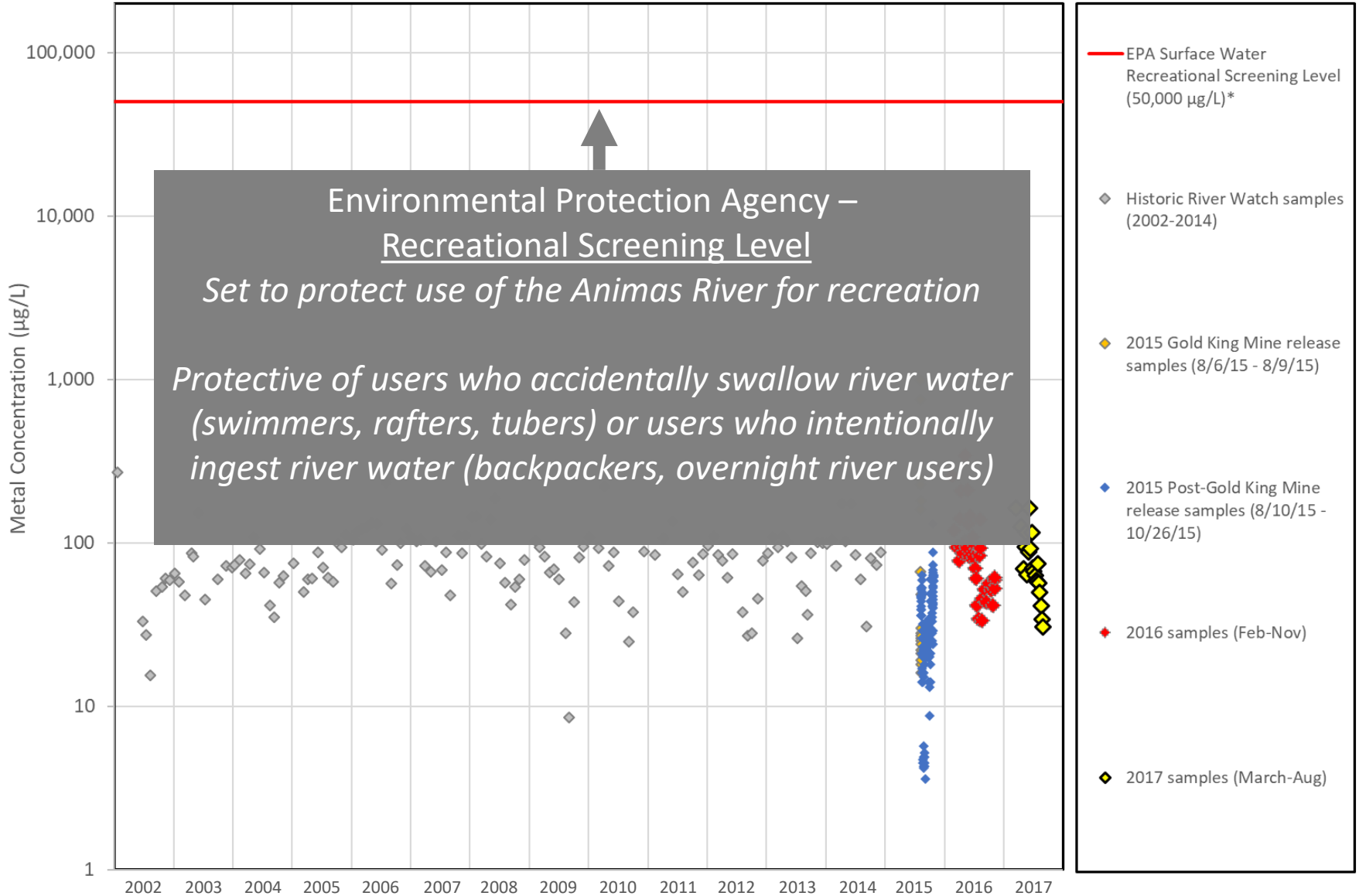
Total Zinc, Animas River at Durango, CO: 2002-2017



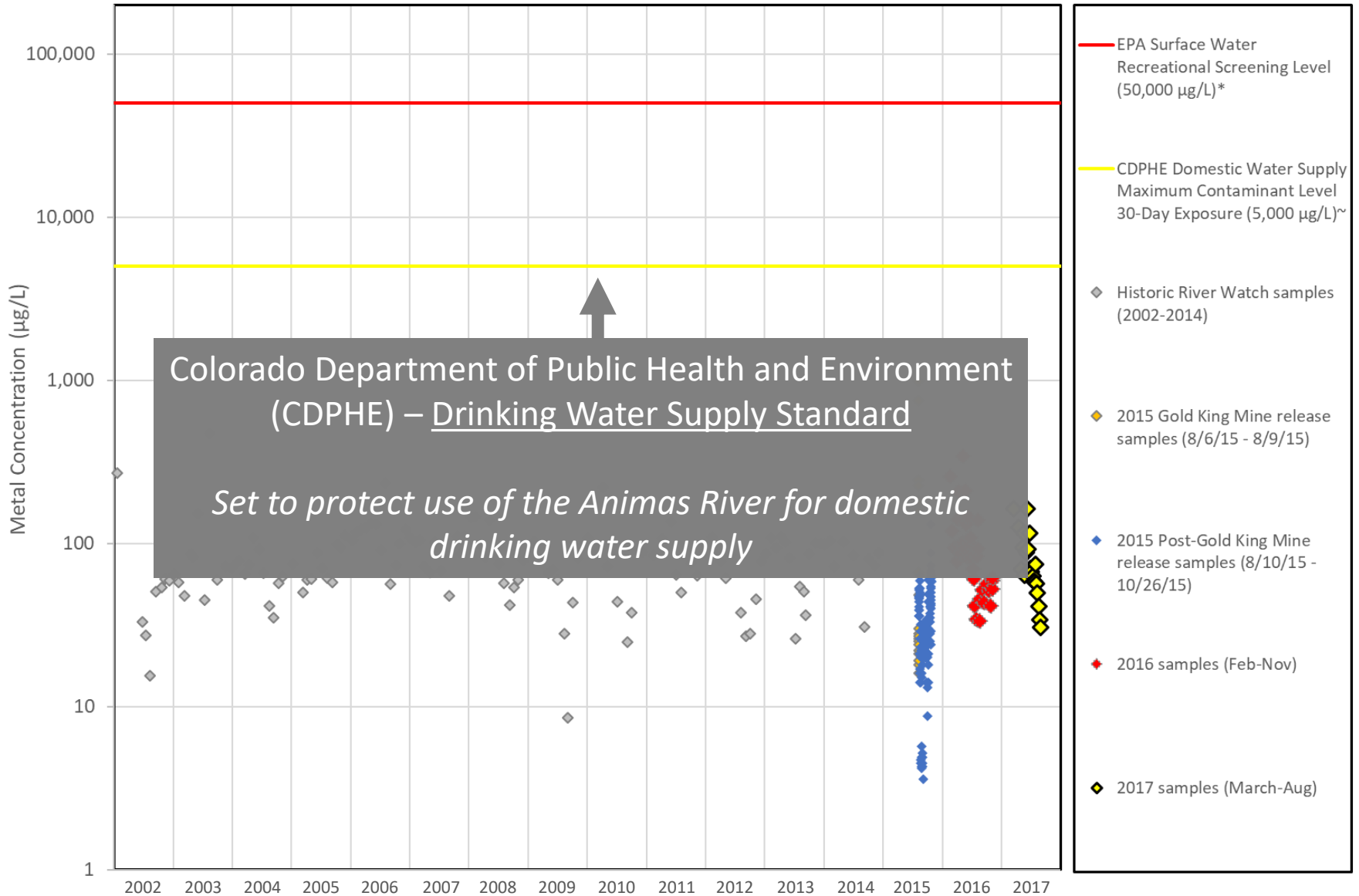
Total Zinc, Animas River at Durango, CO: 2002-2017



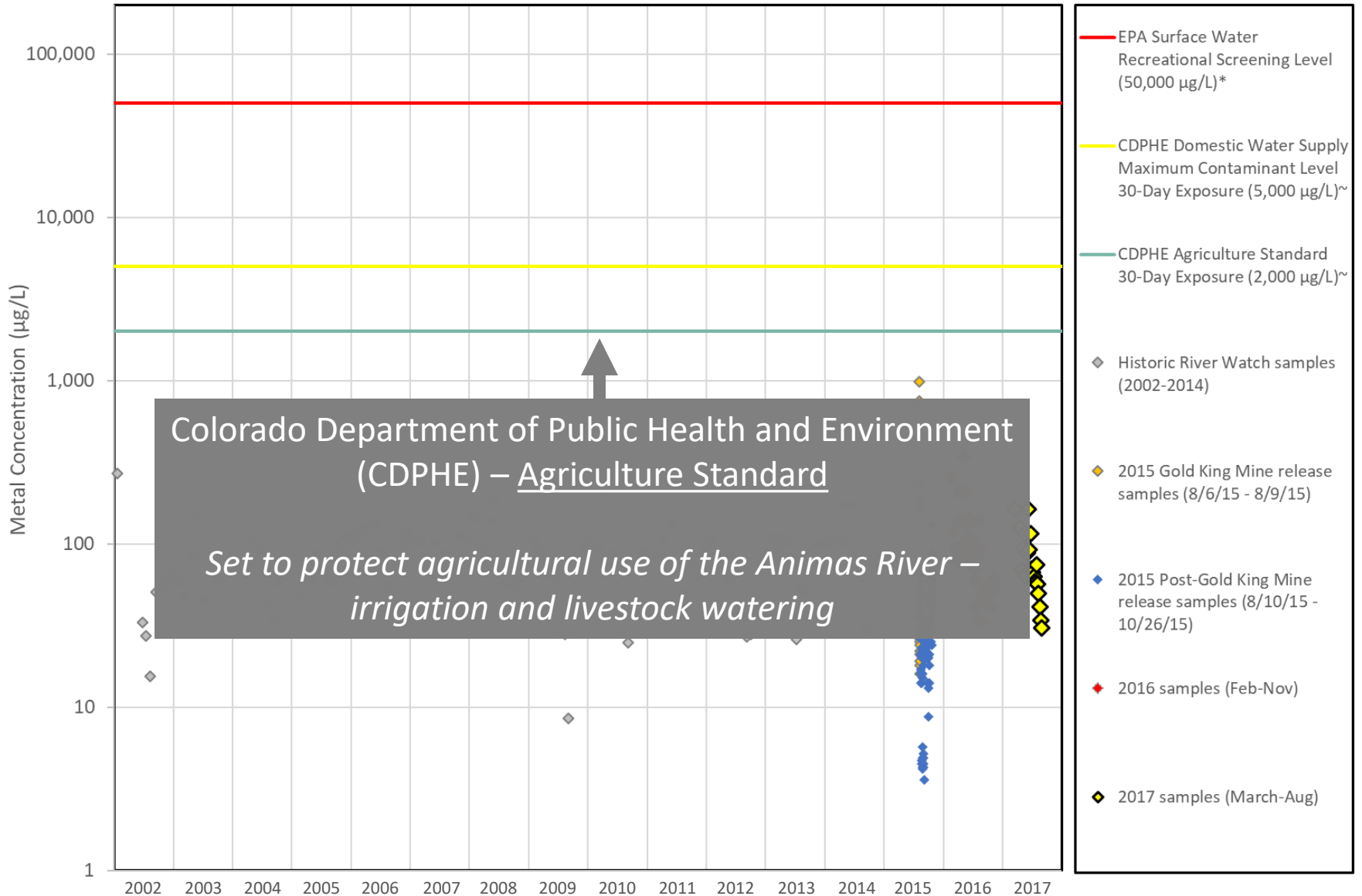
Total Zinc, Animas River at Durango, CO: 2002-2017



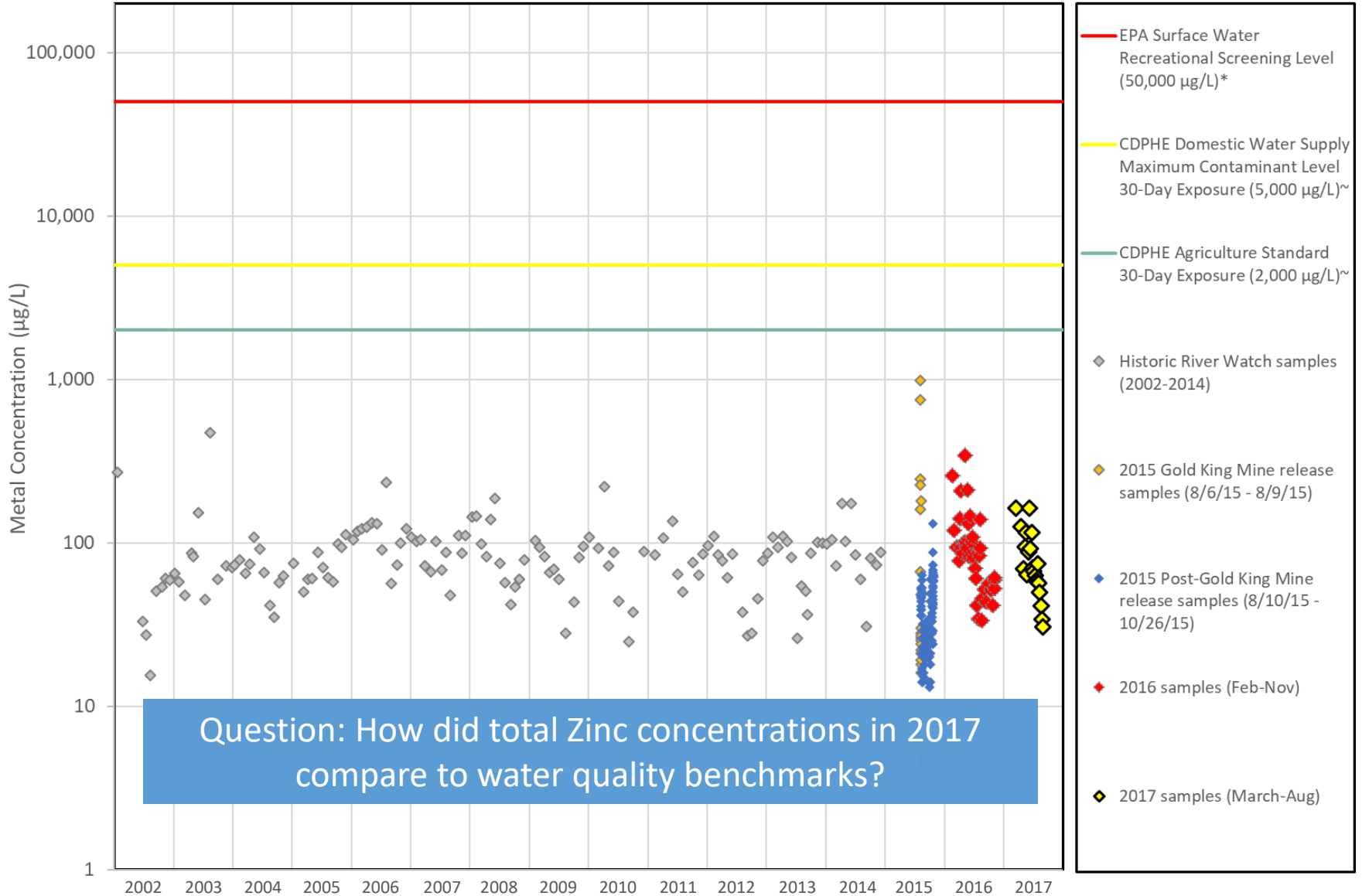
Total Zinc, Animas River at Durango, CO: 2002-2017



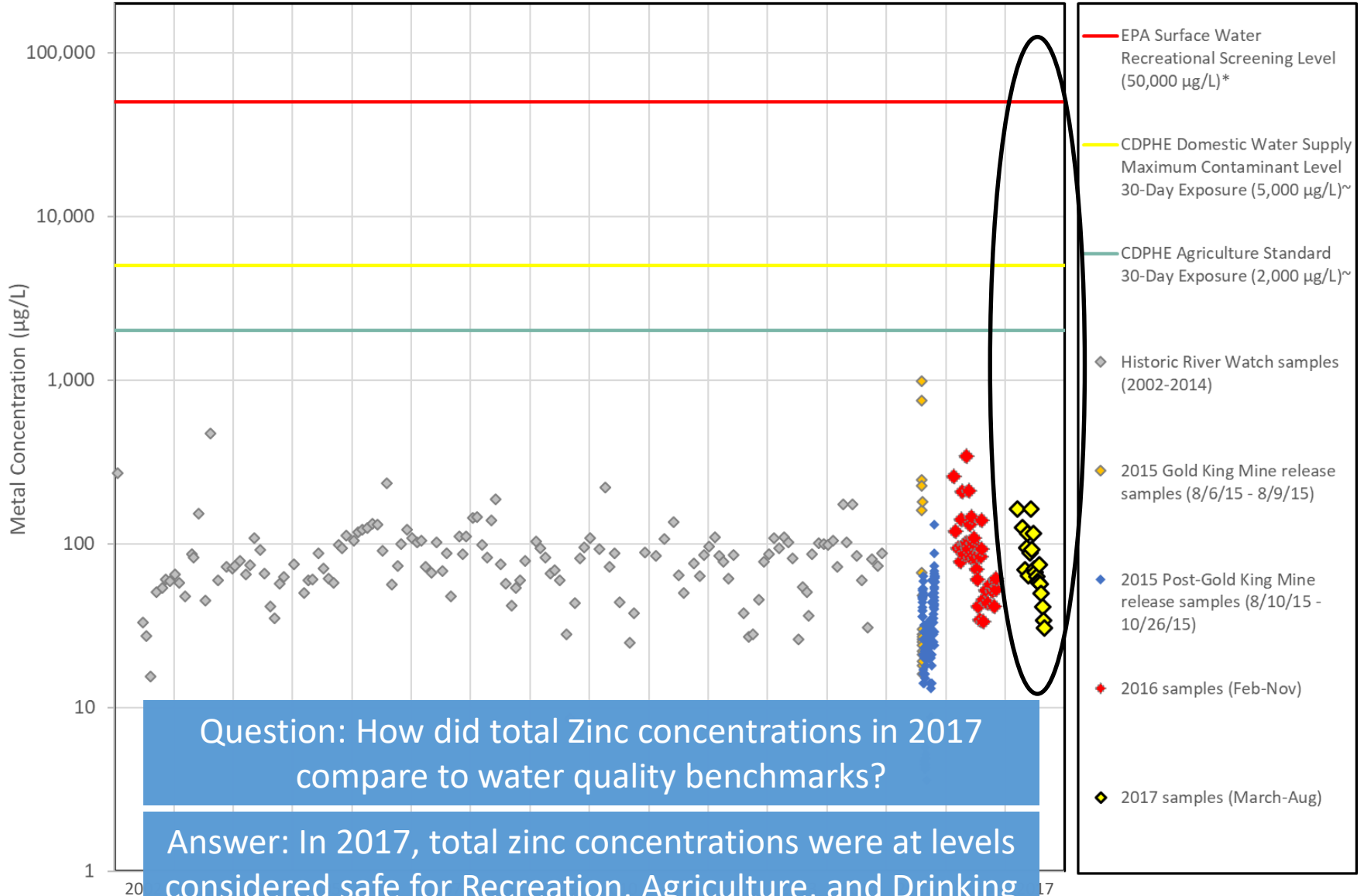
Total Zinc, Animas River at Durango, CO: 2002-2017



Total Zinc, Animas River at Durango, CO: 2002-2017



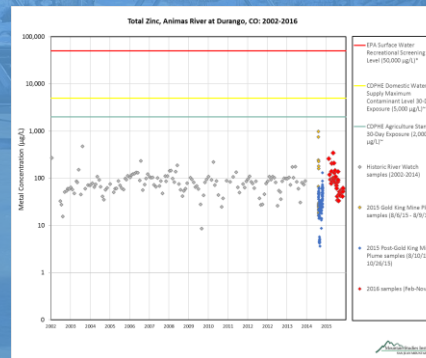
Total Zinc, Animas River at Durango, CO: 2002-2017



Question: How did total Zinc concentrations in 2017 compare to water quality benchmarks?

Answer: In 2017, total zinc concentrations were at levels considered safe for Recreation, Agriculture, and Drinking Water Supply (metal concentrations were *below water quality benchmarks*).

We looked at total zinc, but what about other metals?



Flip to the following pages for a summary of how other metals compared to water quality benchmarks in 2017.

First, what metals did MSI test for in 2017?

Al aluminum

Cu copper

Fe iron

Pb lead

Zn zinc

Total and dissolved metals

MSI analyzed for the total and dissolved fraction of metals. Why?

The pH of water is the main driver of whether a metal is present in a dissolved state or a solid particulate state. This is important because metals are generally more bioavailable and toxic to aquatic life in a dissolved state.

Did metal concentrations in 2017 at Rotary Park surpass water quality benchmarks?



Recreation

No



Agriculture

No



Domestic
Water Supply

No



Aquatic Life

Acute

Yes:



Chronic

**Aluminum was close to surpassing*



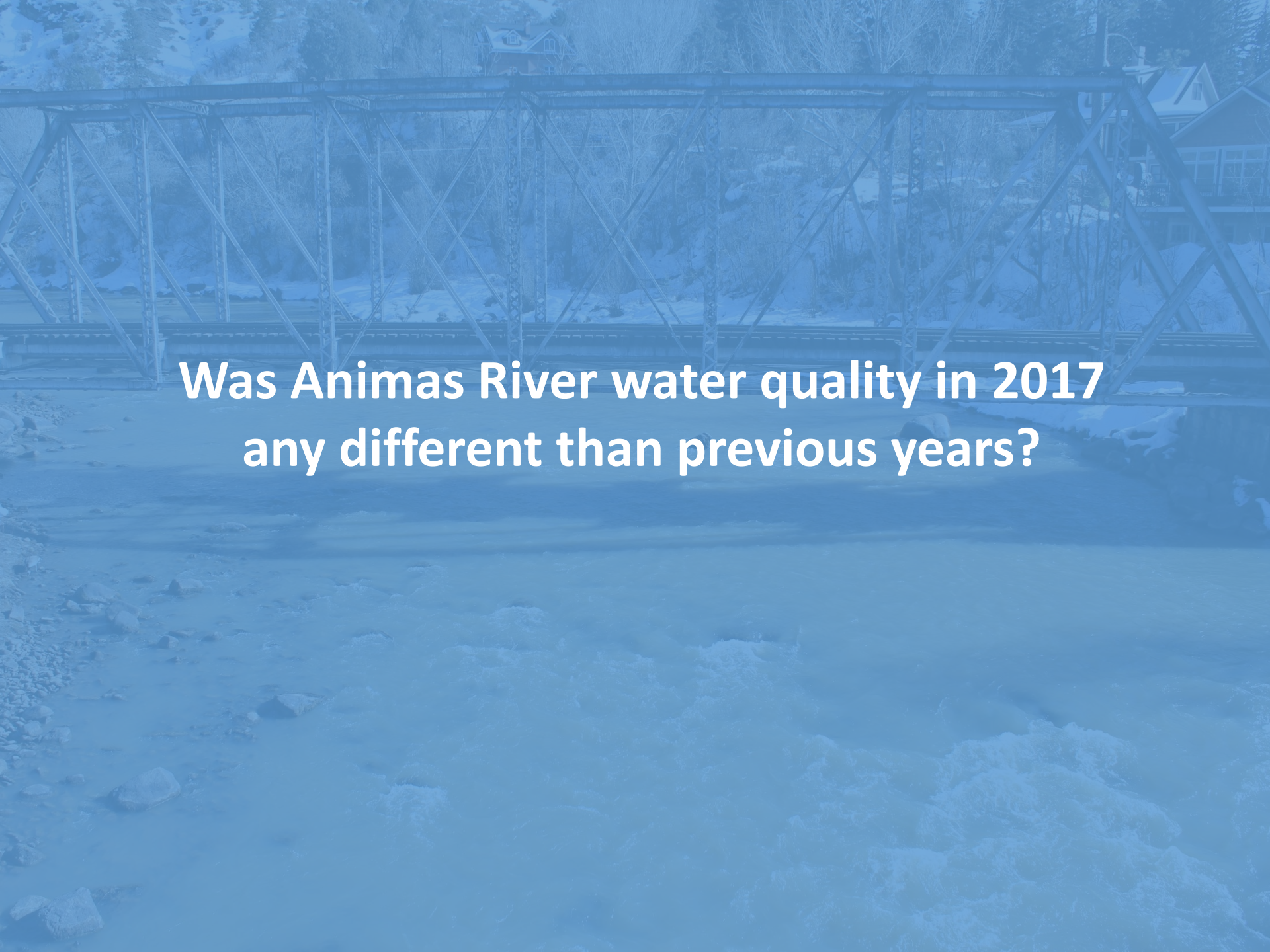
Safe Levels



t=total; d=dissolved

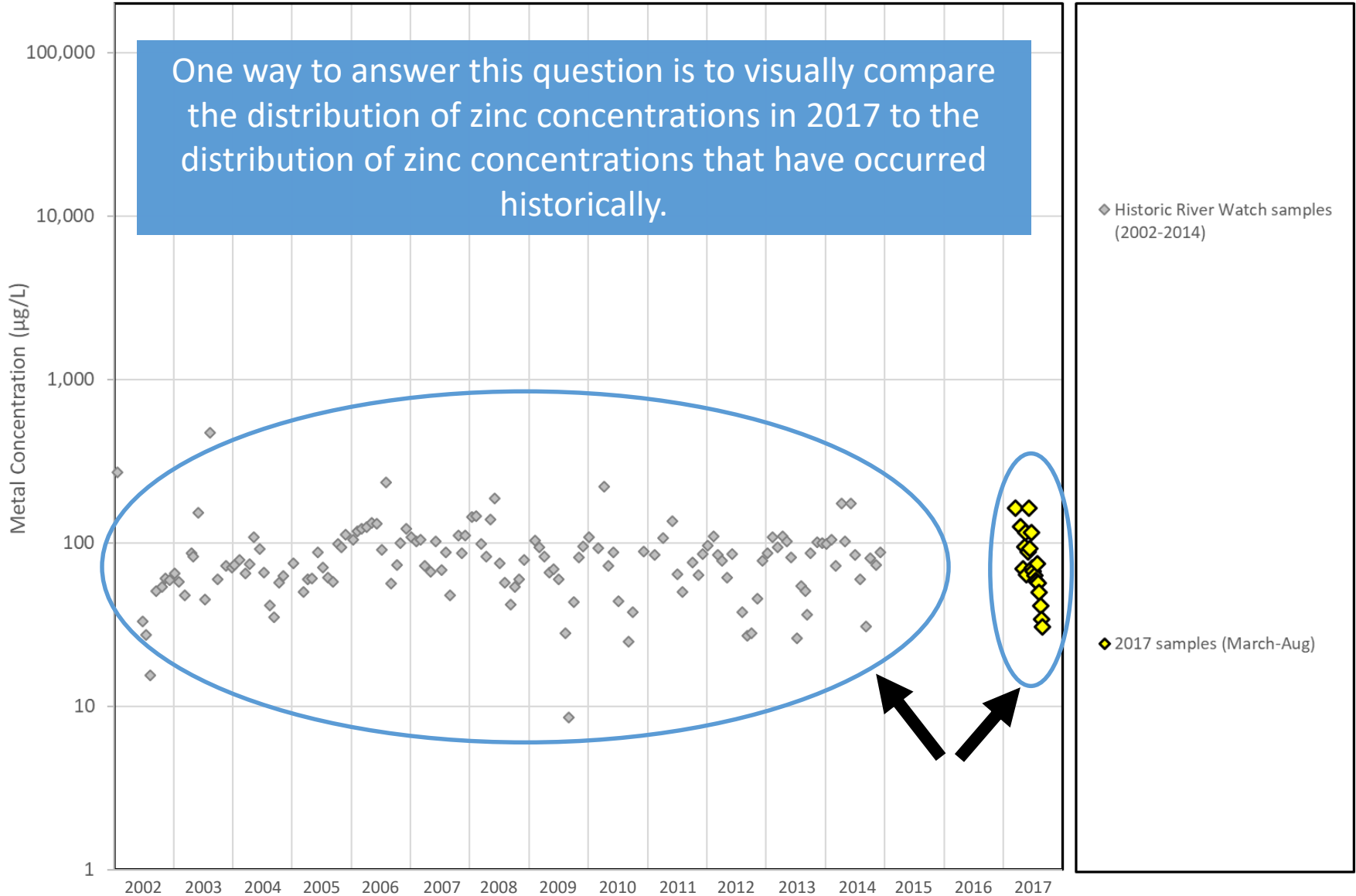


What else did the 2017 water quality monitoring reveal?

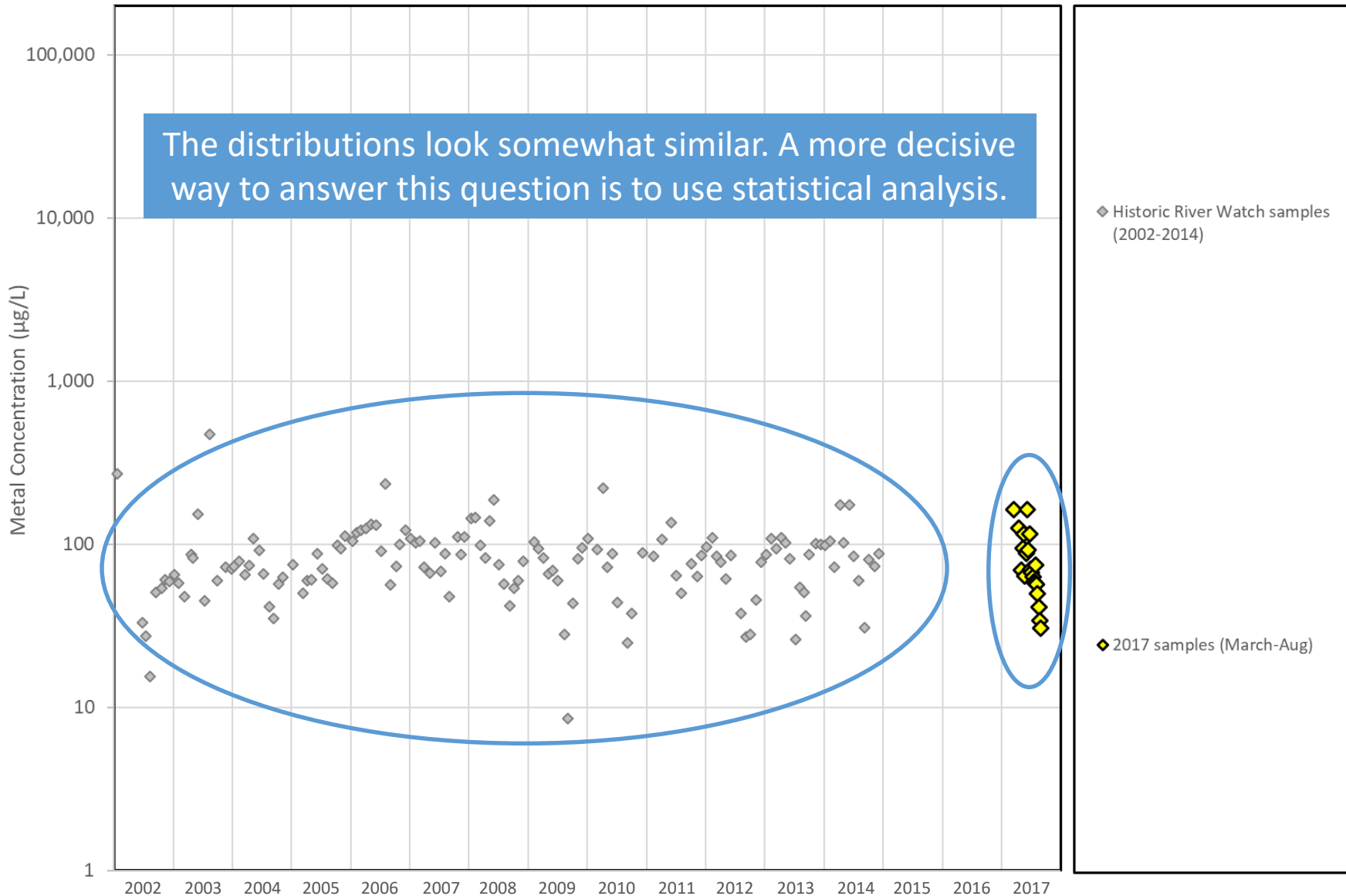


**Was Animas River water quality in 2017
any different than previous years?**

Total Zinc, Animas River at Durango, CO: 2002-2017



Total Zinc, Animas River at Durango, CO: 2002-2017



Was Animas River water quality in 2017 any different than previous years?



Statistical analysis indicated that metal concentrations in the Durango stretch of the Animas River were not significantly higher in 2017 than in previous years.



Most metal concentrations at Rotary Park in 2017 were consistent with previous years, but dissolved copper and total zinc were lower in 2017 than in previous years.

A blue-tinted photograph of a metal truss bridge spanning a river. The bridge has a complex lattice structure of steel beams. The river below is turbulent, with white water rapids. The background shows a snowy, mountainous landscape with some buildings visible on the hillside. The overall scene is serene and natural.

Metals and Other Water Quality Parameters

Metals and Other Water Quality Parameters



In 2016 and 2017, concentrations of several metals correlated at a statistically significant level with discharge, turbidity, pH, and conductivity.

For example, when river discharge (volume/time) *increased*, the following metals *increased*:



When turbidity (cloudiness of water) *increased*, the following metals *increased*:



Metals and other water quality parameters

When pH (measure of acidity) *decreased*, the following metals *increased*:



When conductivity (ability to conduct electricity) *decreased*, the following metals *increased*:



A blue-tinted photograph of a steel truss bridge spanning a river. The bridge has a complex lattice structure of steel beams. The river below is turbulent, with white water rapids. The background shows a snowy landscape with trees and houses on a hillside. The text "So What? Should I be concerned?" is overlaid in white on the bridge structure.

**So What?
Should I be concerned?**

Should I be concerned?



In 2017, MSI detected low levels of metals in the Animas River at Rotary Park.

So, what does that mean?
The good news is:

In 2017, metal concentrations from the Durango stretch of the Animas River were at levels considered SAFE for:



Recreation



Domestic Water Supply



Agriculture

Should I be concerned?

More good news:

It does not appear that Animas River metal concentrations at Rotary Park in 2017 were any higher than previous years (2002-2014).



We did detect elevated metal concentrations during spring runoff when turbidity and discharge rose, and conductivity and pH dropped. However, the elevated levels of metals observed in the Durango stretch of the Animas River during spring runoff were not high enough to pose a threat to human health.

Should I be concerned?

But, there were some concerns:



In 2016 and 2017, concentrations of aluminum and iron approached levels that could be harmful to aquatic life. These elevated levels occurred during spring runoff and were lower in late summer. High levels of aluminum and iron are not unprecedented, and are consistent with levels observed in previous years.

It is important to note that there are large natural sources of aluminum and iron in the Animas River watershed that are not related to mining activities.

Mountain Studies Institute, Colorado Parks and Wildlife, Southern Ute Indian Tribe, and other organizations will continue to monitor aquatic life to assess overall river health.

So...Should I be concerned?

We know that metal contamination from natural sources and mine-related sources have negatively impacted water quality of the Animas River for over a hundred years.

Some of the water quality data from 2017 have been encouraging – we have no indication of any threat to human health from Animas River water

(please also refer to the San Juan Basin Health Department, an authority for guidance on human health concerns related to the Animas River: <http://sjbpublichealth.org>),

but the data do raise some concerns for aquatic life in the Durango stretch of the Animas River. These concerns can only be addressed by continued monitoring of water quality and aquatic life.

Aluminum, total - Animas River at Durango, CO

100,000

— CDPHE Acute Standard

If you are interested in diving deeper into the data on your own or exploring technical details, visit The Mountain Studies Institute online at:

www.MountainStudies.org/animasriver

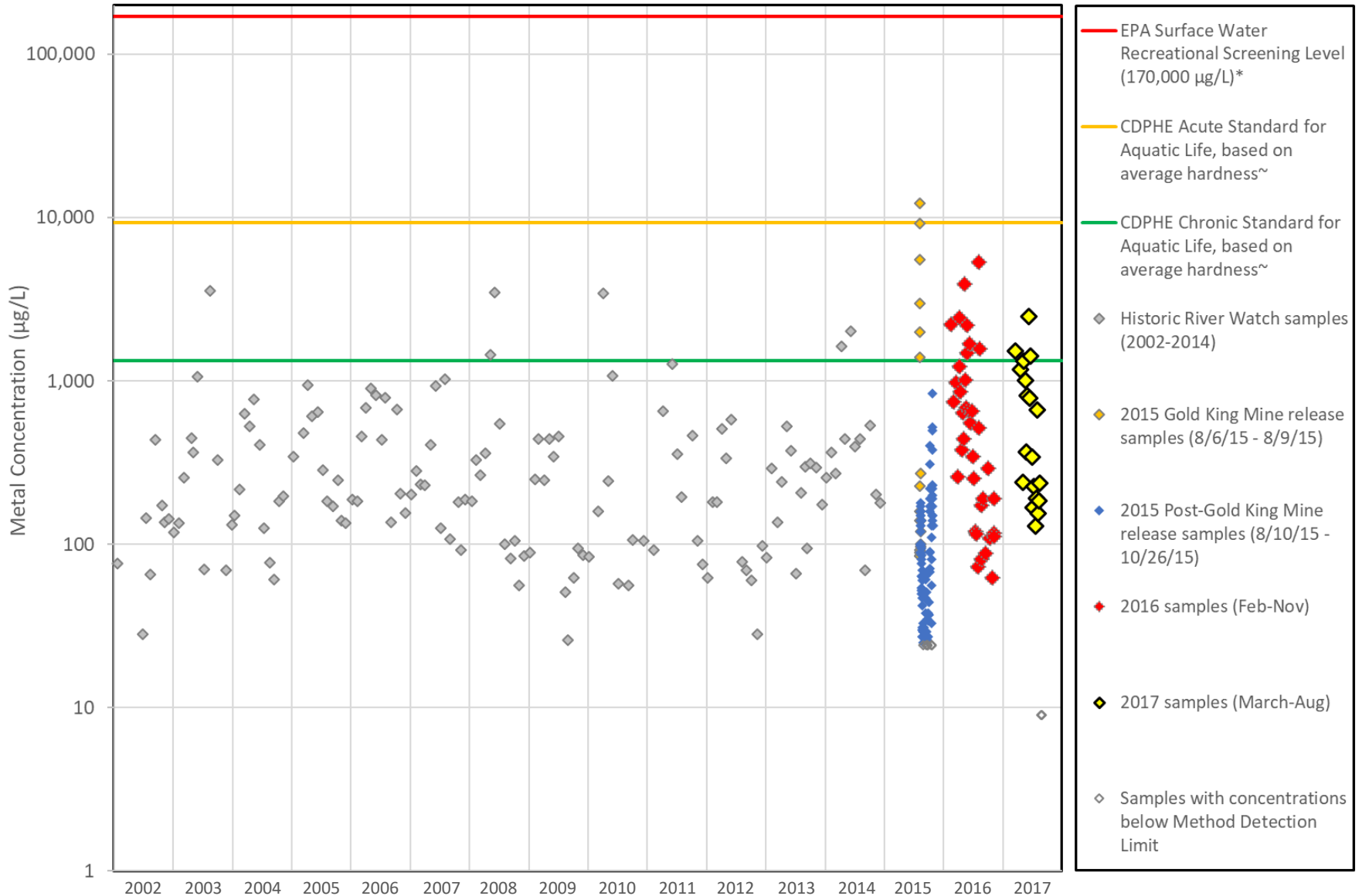
...or check out the following pages for graphs of more metals.

2002 2003 2004 2005 2006 2007 2008 2009 2010 2011 2012 2013 2014 2015 2016

~Colorado Department of Public Health and the Environment (CDPHE) standards based on Colorado surface water quality classifications and Reg. 31 and 34. Standards vary with water hardness.

Note: 2002 - 2014 data is River Watch data from the Animas River at the fish hatchery in Durango, CO. 2015 and 2016 data is Mountain Studies Institute data from the Animas River at Rotary Park in Durango, CO

Total Aluminum, Animas River at Durango, CO: 2002-2017

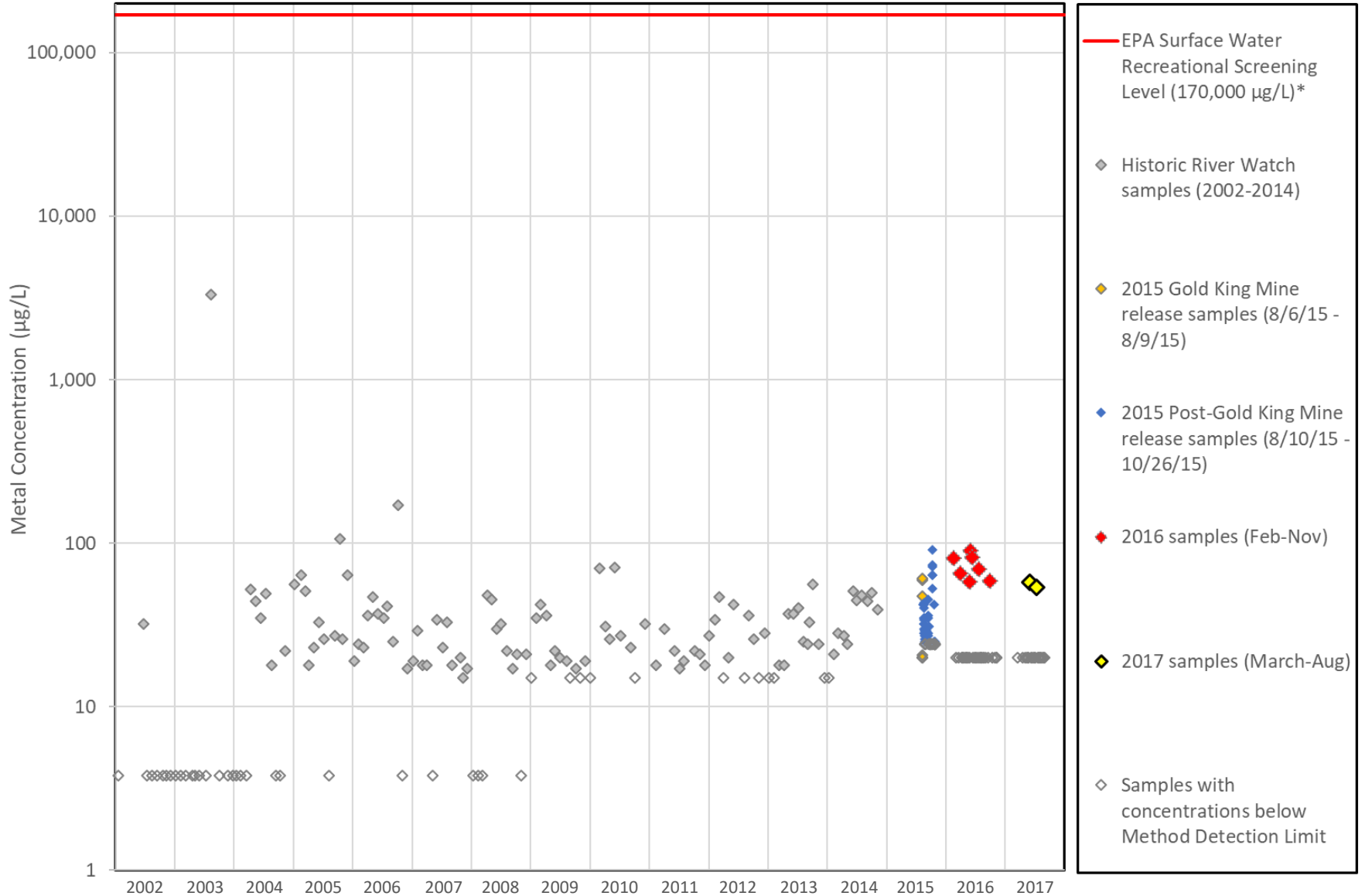


* The recreational screening level represents the level at which no adverse health effects are expected to occur in humans consuming 2L of water per day, from the Animas, orally, for 64 days each year for a total of 30 years.

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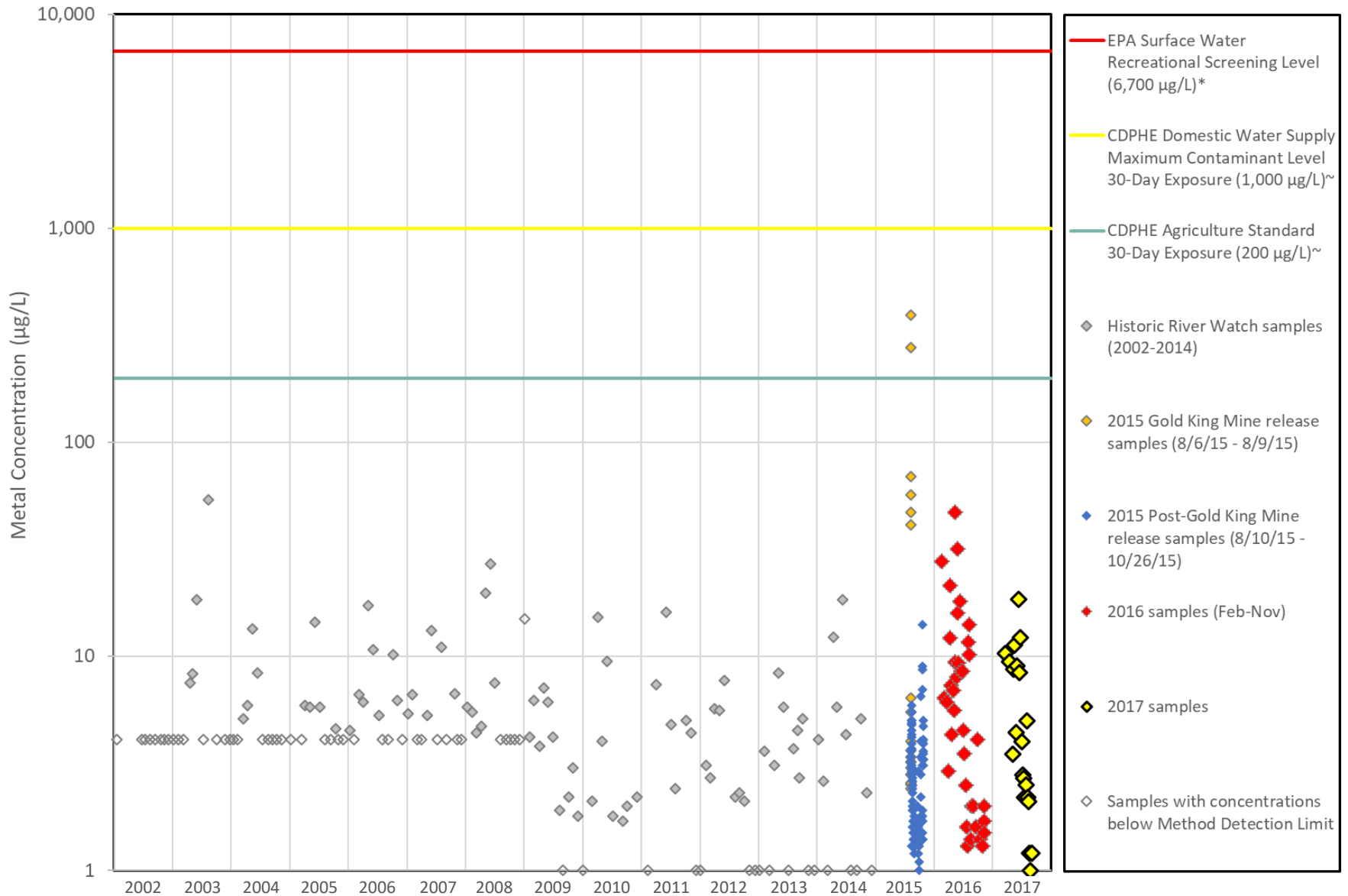
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Dissolved Aluminum, Animas River at Durango, CO: 2002-2017



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Total Copper, Animas River at Durango, CO: 2002-2017

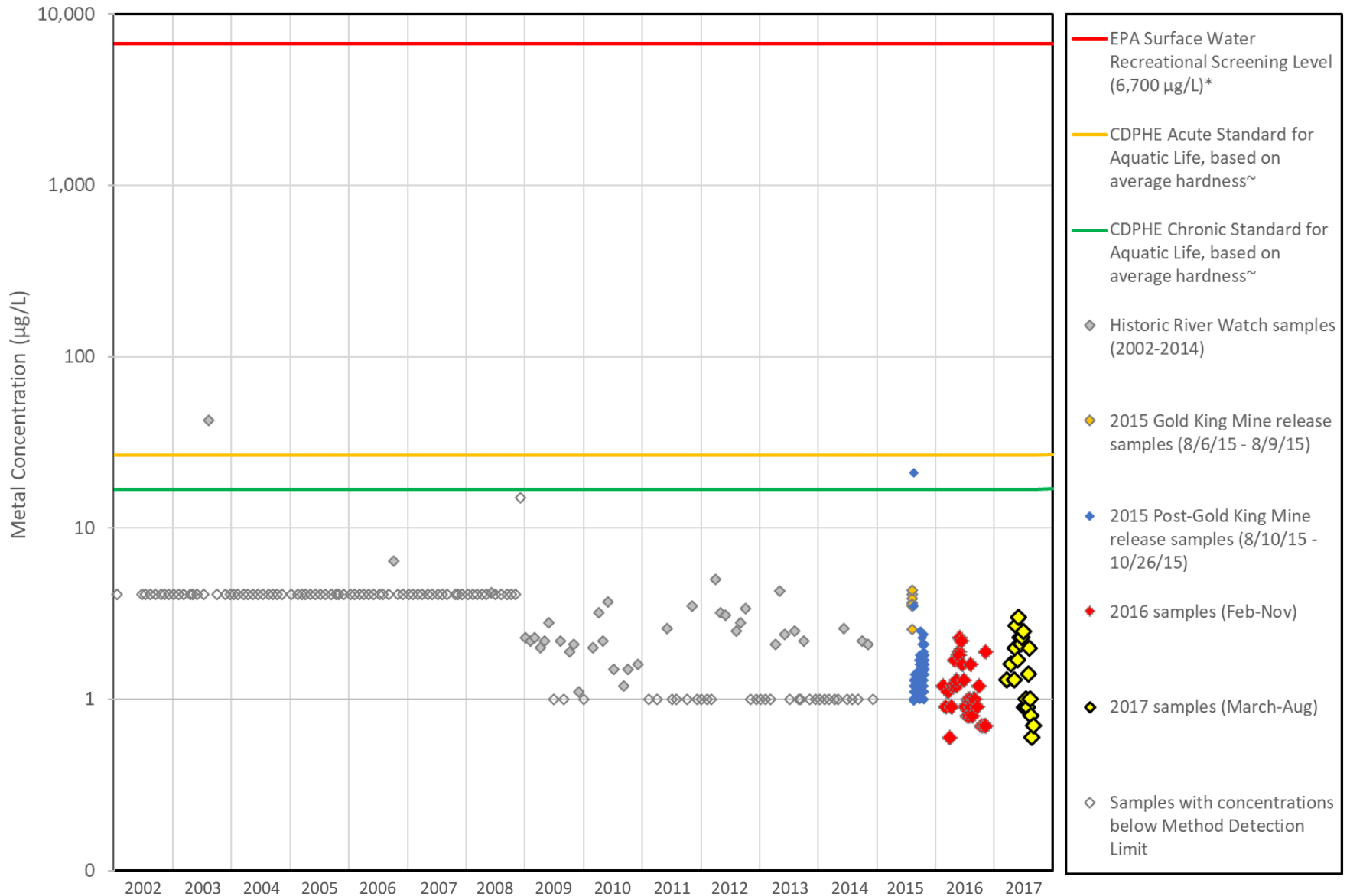


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Dissolved Copper, Animas River at Durango, CO: 2002-2017

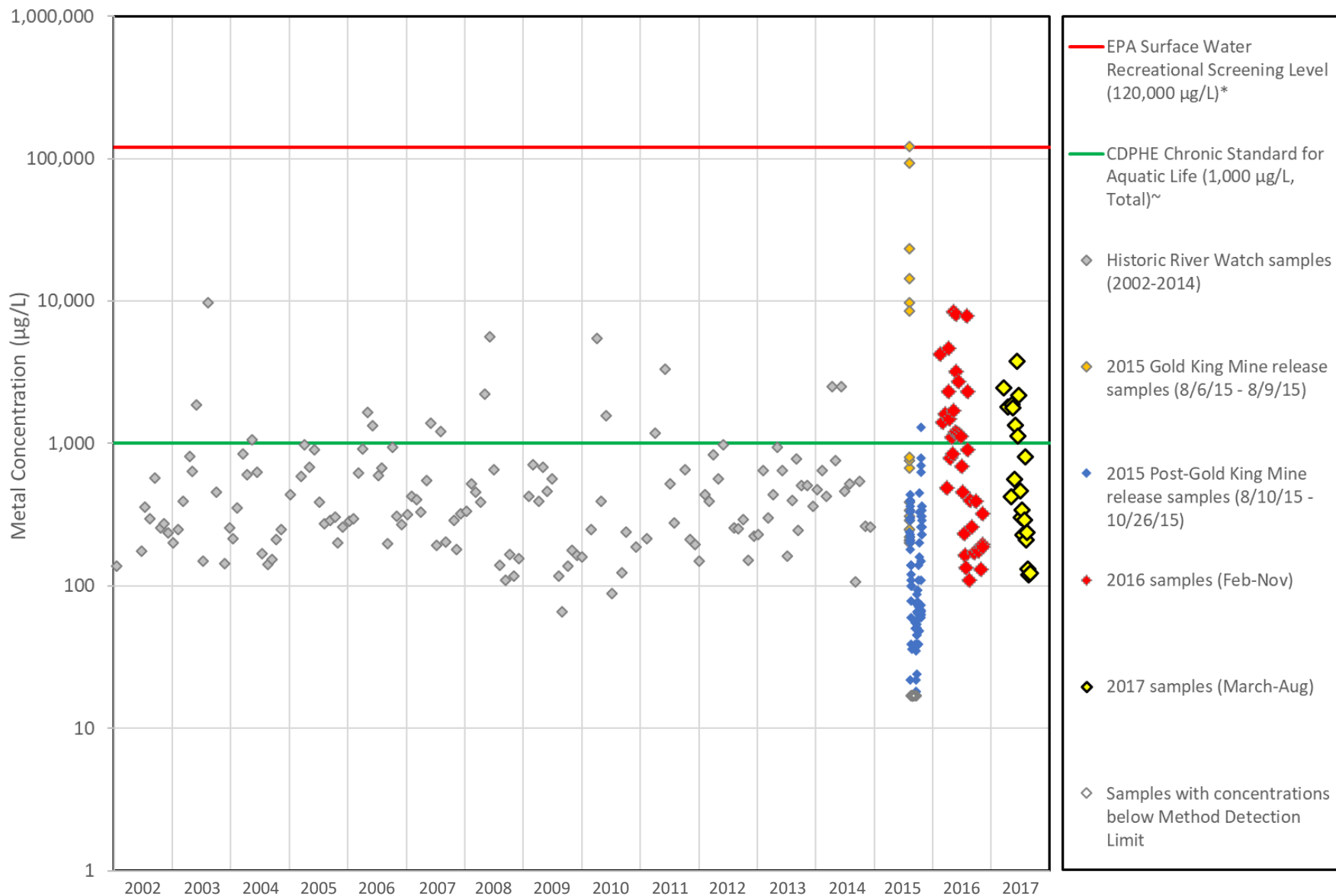


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Total Iron, Animas River at Durango, CO: 2002-2017

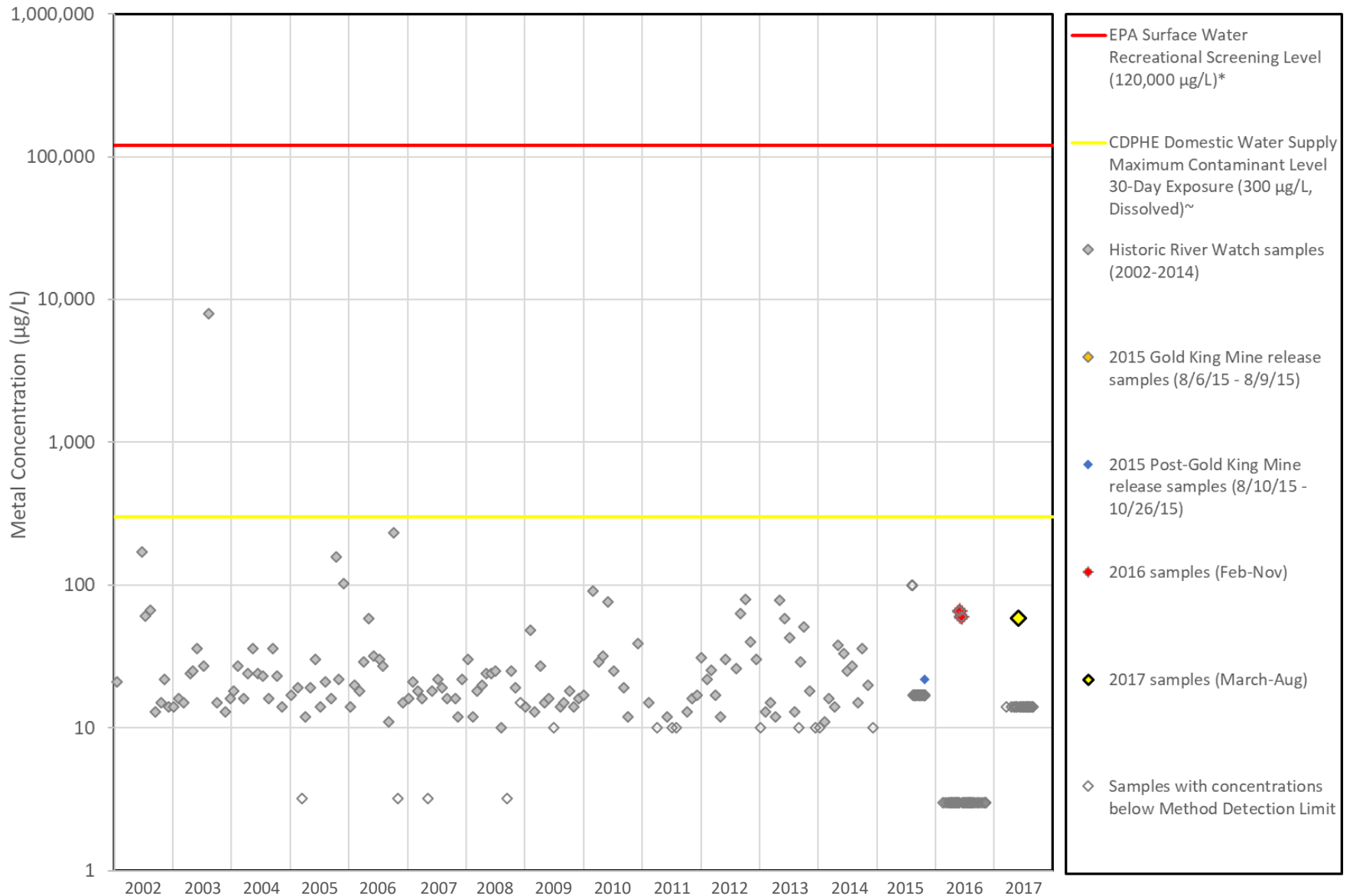


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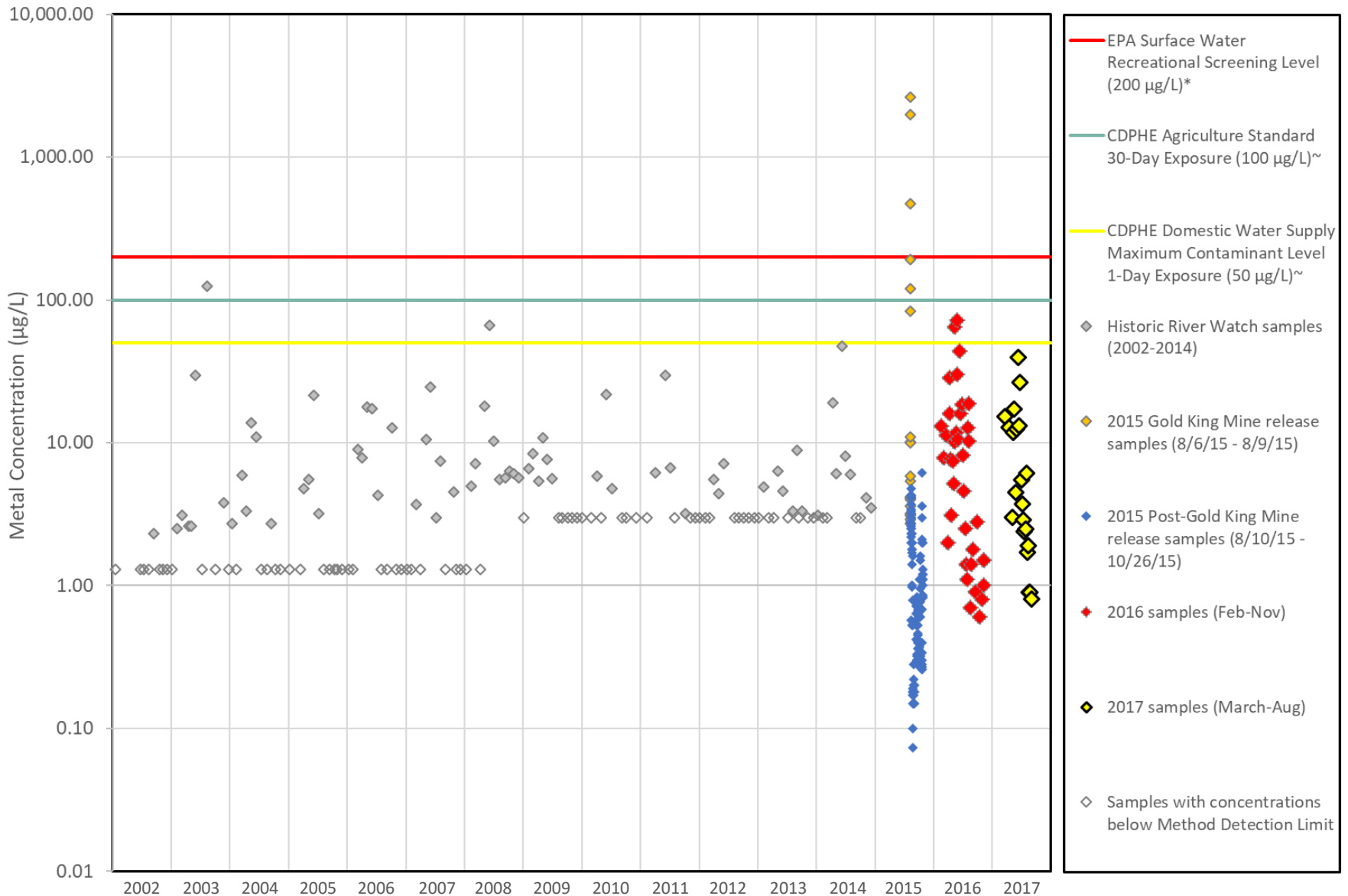
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Dissolved Iron, Animas River at Durango, CO: 2002-2017



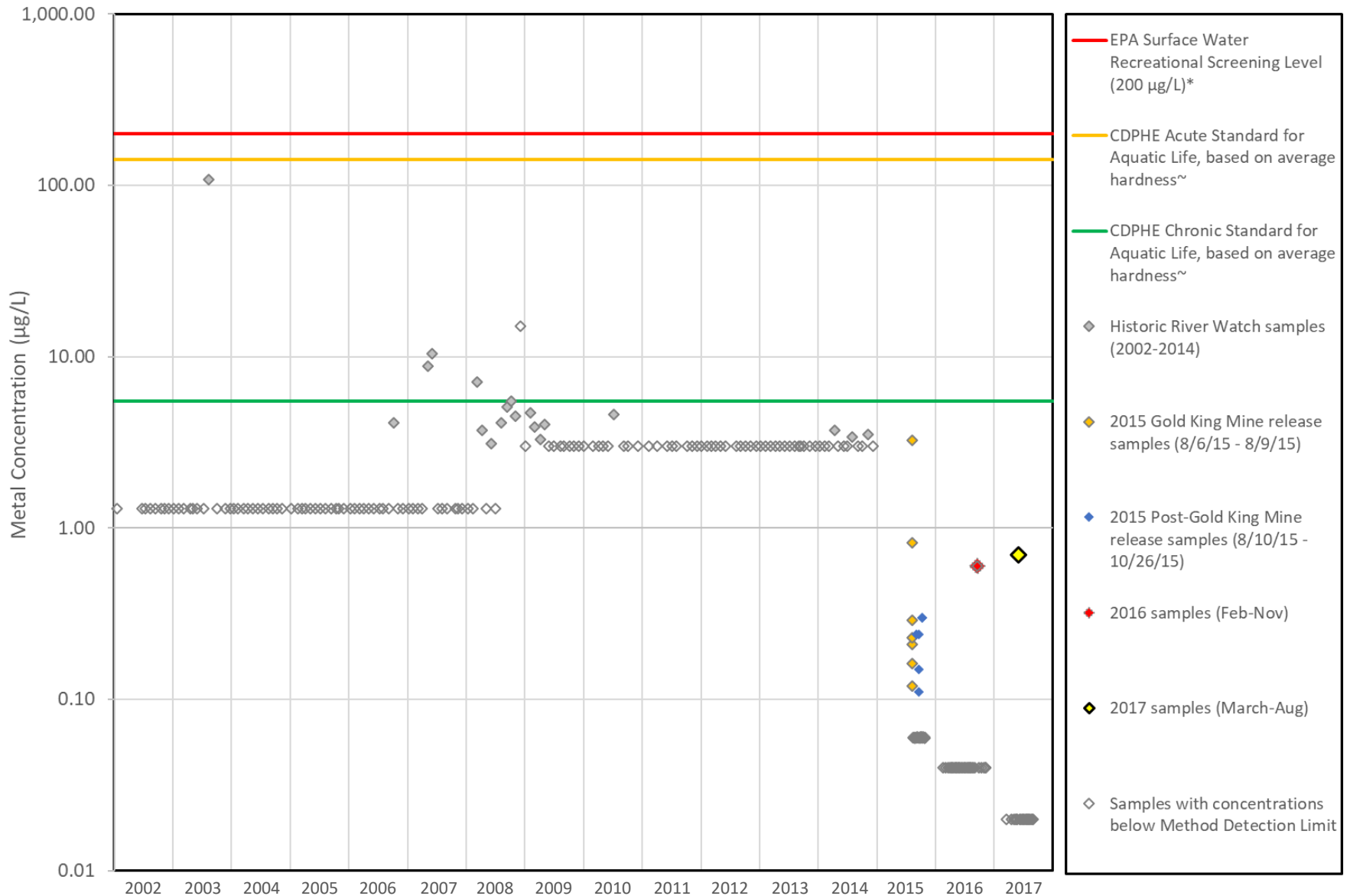
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Total Lead, Animas River at Durango, CO: 2002-2017



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Dissolved Lead, Animas River at Durango, CO: 2002-2017

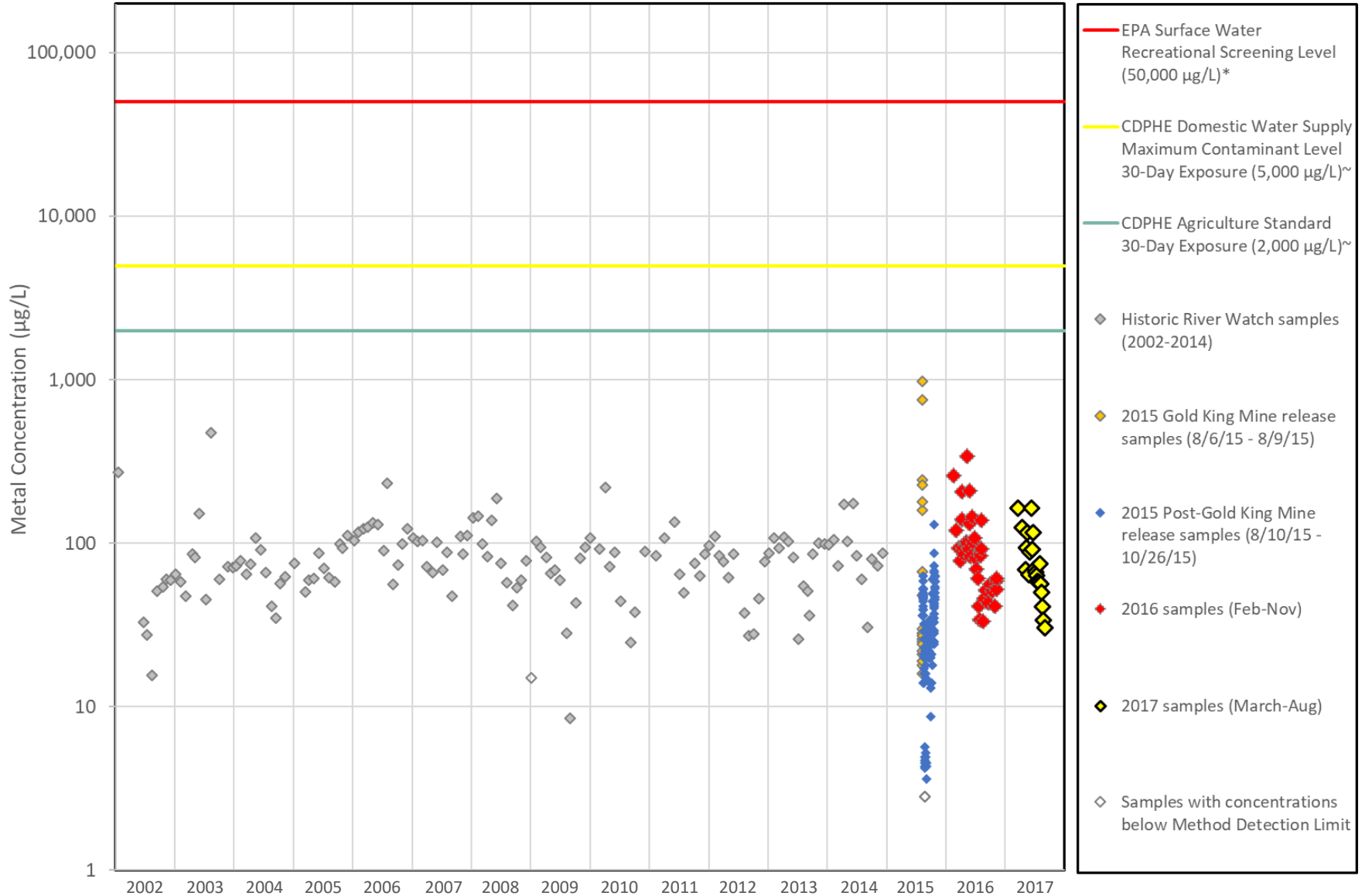


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Total Zinc, Animas River at Durango, CO: 2002-2017

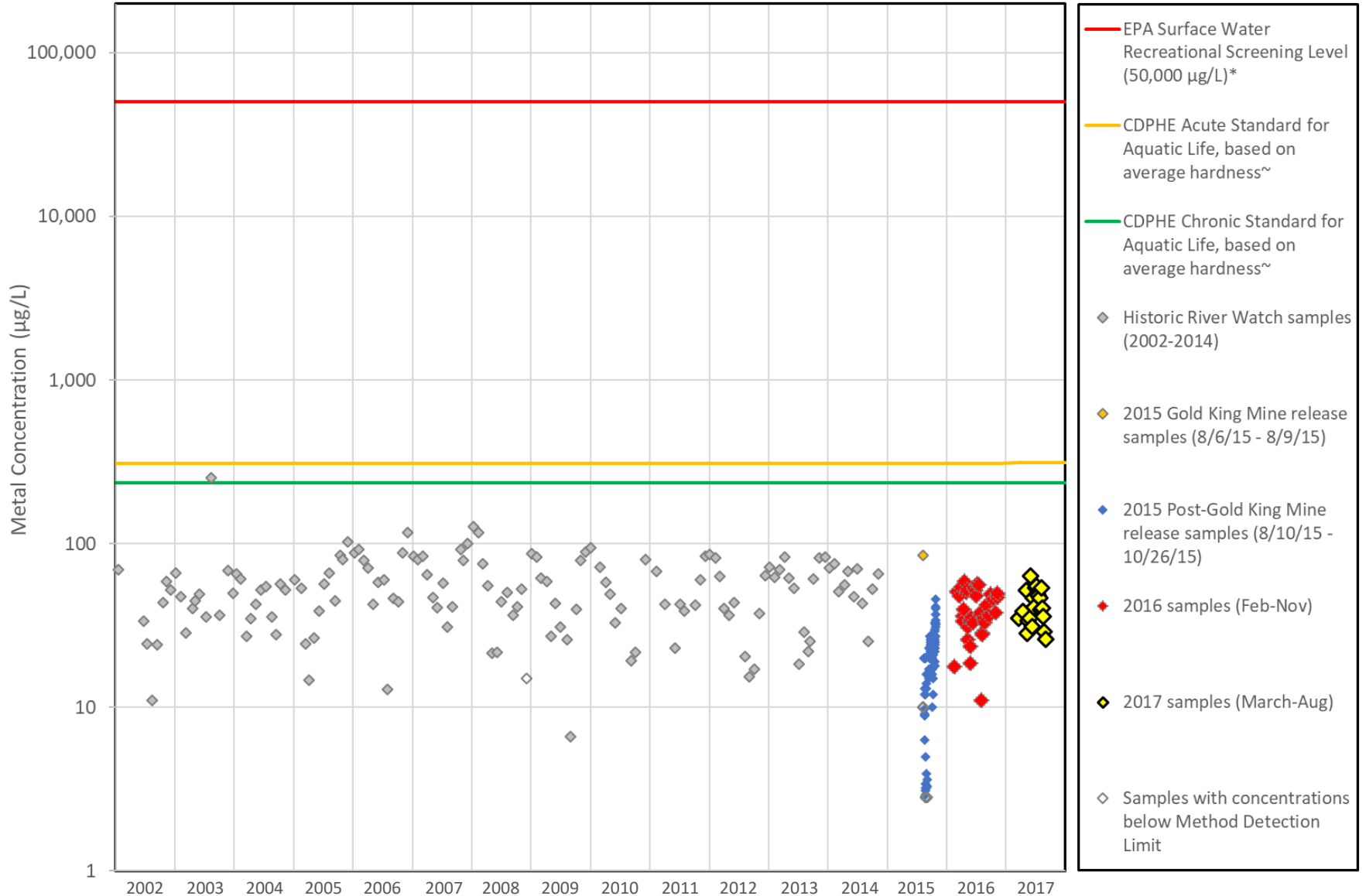


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Dissolved Zinc, Animas River at Durango, CO: 2002-2017



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