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DHHS' and EPA's Proposal to Lower Fluoride Levels in Drinking Water

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Abstract

On January 7th, 2011 the U.S. DHHS recommended setting the level of fluoride in drinking water to the lowest end of the current optimal range (0.7 to 1.2 ppm). EPA is initiating a review of the maximum amount of fluoride allowed in drinking water based on scientific assessments of health effects from too much fluoride. MCL (Maximum Contaminant Level) is the legal threshold limit on the amount of a substance allowed in public water systems. EPA sets the MCL to address adverse health effects. Current MCL for fluoride is 4 mg/L. The EPA is unsure if they will revise the MCL. U.S. DHHS is strictly concerned with the standard for optimal oral health which is 0.7 to 1.2 ppm.

Disciplines

Community Health and Preventive Medicine | Dentistry | Environmental Public Health

DHHS' and EPA's Proposal to Lower Fluoride Levels in Drinking Water

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INTRODUCTION

On January 7th, 2011 the U.S. DHHS recommended setting the level of fluoride in drinking water to the lowest end of the current optimal range (0.7 to 1.2 ppm). EPA is initiating a review of the maximum amount of fluoride allowed in drinking water based on scientific assessments of health effects from too much fluoride. MCL (Maximum Contaminant Level) is the legal threshold limit on the amount of a substance allowed in public water systems. EPA sets the MCL to address adverse health effects. Current MCL for fluoride is 4 mg/L. The EPA is unsure if they will revise the MCL. U.S. DHHS is strictly concerned with the standard for optimal oral health which is 0.7 to 1.2 ppm.

PURPOSE

- To summarize the scientific reasons driving these new recommendations.
- To outline the effect that the proposed lowering will have on managing Idaho's Drinking Water Programs.

REASONS FOR RECOMMENDATIONS

1. Fluoride in drinking water is one of several available sources.

"exposures to fluoride come from drinking water, foods, beverages, dental products, supplements, industrial emissions, pharmaceuticals and pesticides." – EPA Report

Commodity Group	Sample #1 (ppm)	Sample #2 (ppm)	Sample #3 (ppm)	Sample #4 (ppm)
Dairy products	0.19	0.22	0.15	0.11
Meat, fish and poultry	0.55	1.00	1.04	0.42
Grain and cereal products	0.49	0.44	0.26	0.59
Potatoes	0.13	0.17	0.17	0.45
Leafy vegetables	0.46	0.15	0.13	0.85
Legume vegetables	0.24	0.19	0.24	0.25
Root vegetables	0.08	0.06	0.07	0.22
Garden fruits	0.41	0.09	0.07	0.18
Fruits	0.11	0.10	0.11	0.10
Oils, fats, shortenings	0.45	0.24	0.25	0.12
Sugar and adjunct	0.44	0.30	0.33	0.56
Beverages ^a	1.22	1.07	1.10	1.10

Food	Average Fluoride Content (mg/kg) ^a			
	Non-fluoridated Process Water		Fluoridated Process Water (1 mg F/L)	
	Liquid	Solid	Liquid	Solid
Mixed vegetables	0.30	0.37	1.03	1.05
Green beans	0.14	0.20	0.71	0.89
Whole potatoes	0.13	0.38	0.87	0.76
Diced carrots	0.30	0.19	0.55	0.61
Kernel corn	0.10	0.20	0.48	0.56
Green peas	0.15	0.10	–	–
Wax beans	–	–	0.49	0.60

2.3.2. Alcoholic Beverages

Fluoride is present in a number of alcoholic beverages, especially wines, due to the use of cryolite as a pesticide on grapes. Burgstahler and Robinson (1997) reported fluoride levels of 0.23–2.80 ppm (mean 1.02 ppm) in California wines. Seven of 19 samples tested above 1 mg/L. Fluoride was determined using a fluoride ion-specific electrode. Martinez et al. (1998) reported mean fluoride concentrations ranging from 0.08 to 0.68 mg/L in 70 wines from the Canary Islands. The overall mean concentration was 0.16 mg/L. USDA (2005) found a mean concentration of 1.05 ppm from 14 red wine samples and 2.02 ppm for 17 white wine samples.

Wamakulasuriya et al. (2002) reported mean fluoride concentrations of 0.08–0.71 mg/L in eight kinds of beers available in Great Britain. The concentrations were the equivalent of 0.03–0.31 mg fluoride in one 440 mL can. USDA (2005) reported a mean of 0.45 ± 0.023 ppm for 142 light beer samples and 0.44 ± 0.025 ppm for 102 regular beer samples. The average fluoride in distilled alcoholic beverages was 0.08 ppm in the USDA (2005) database.

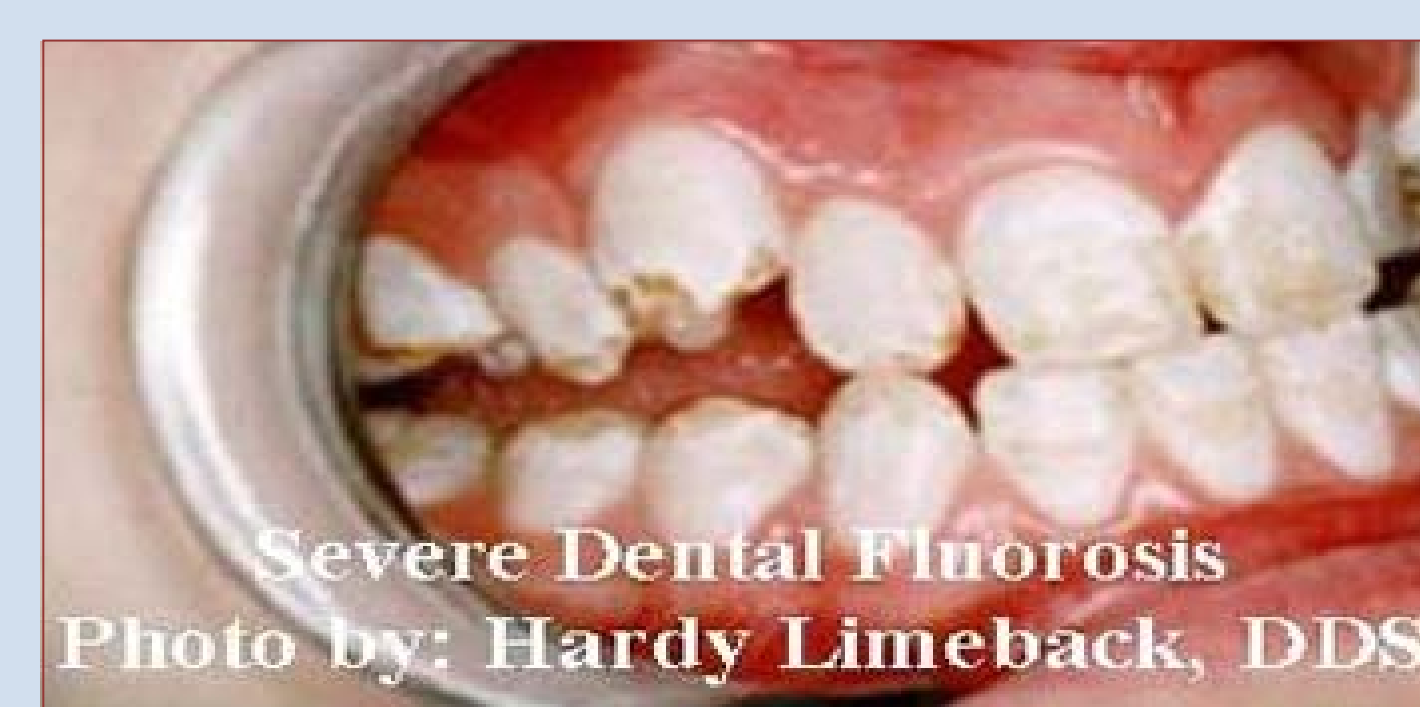
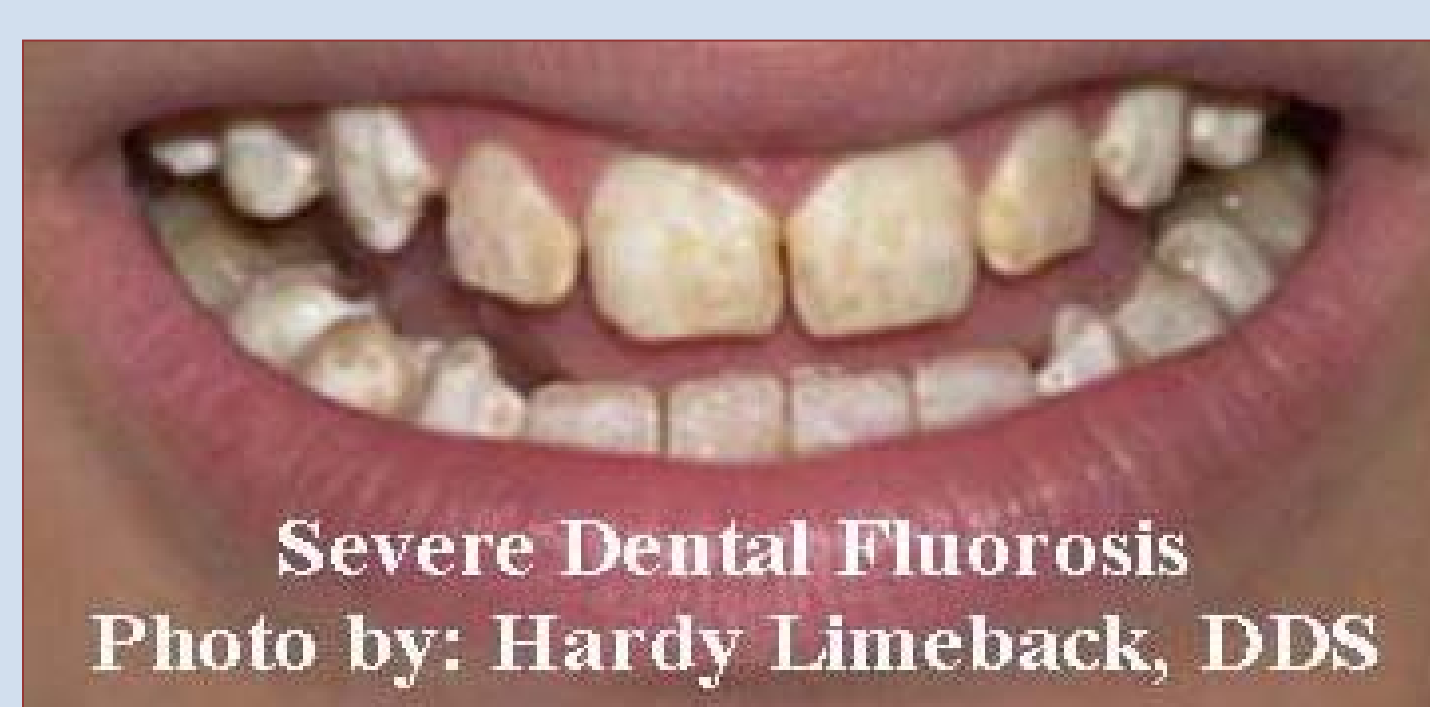
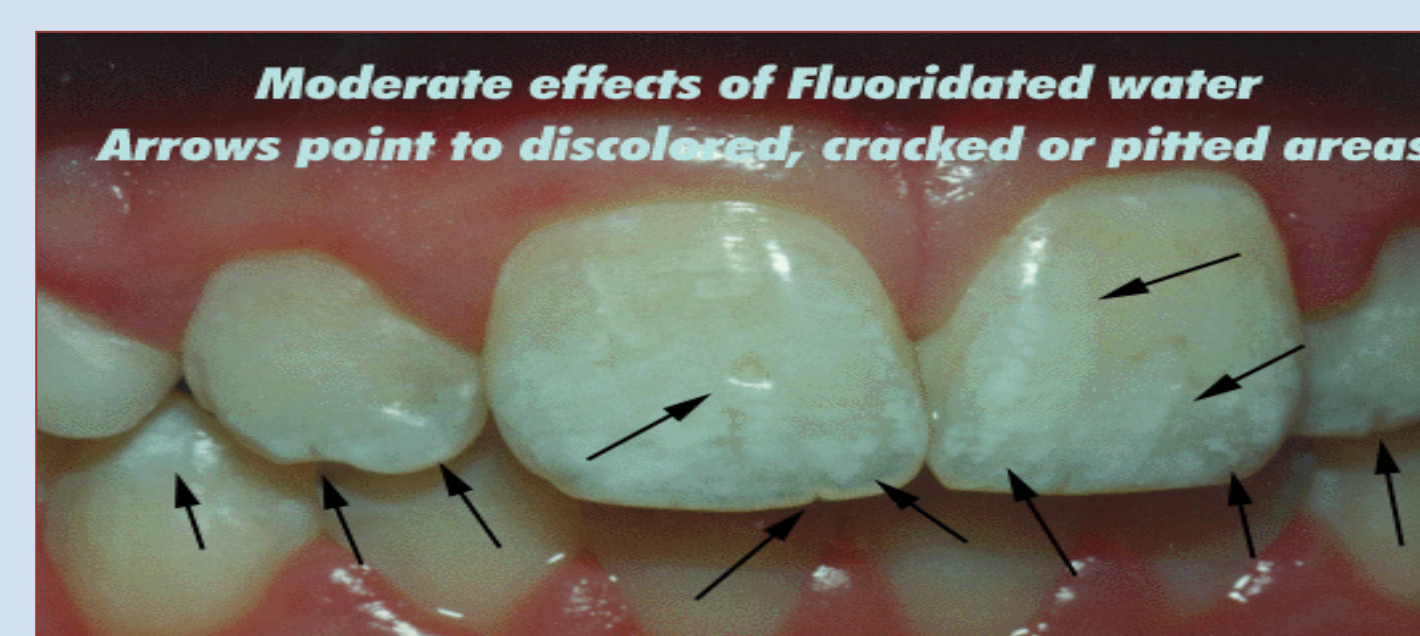
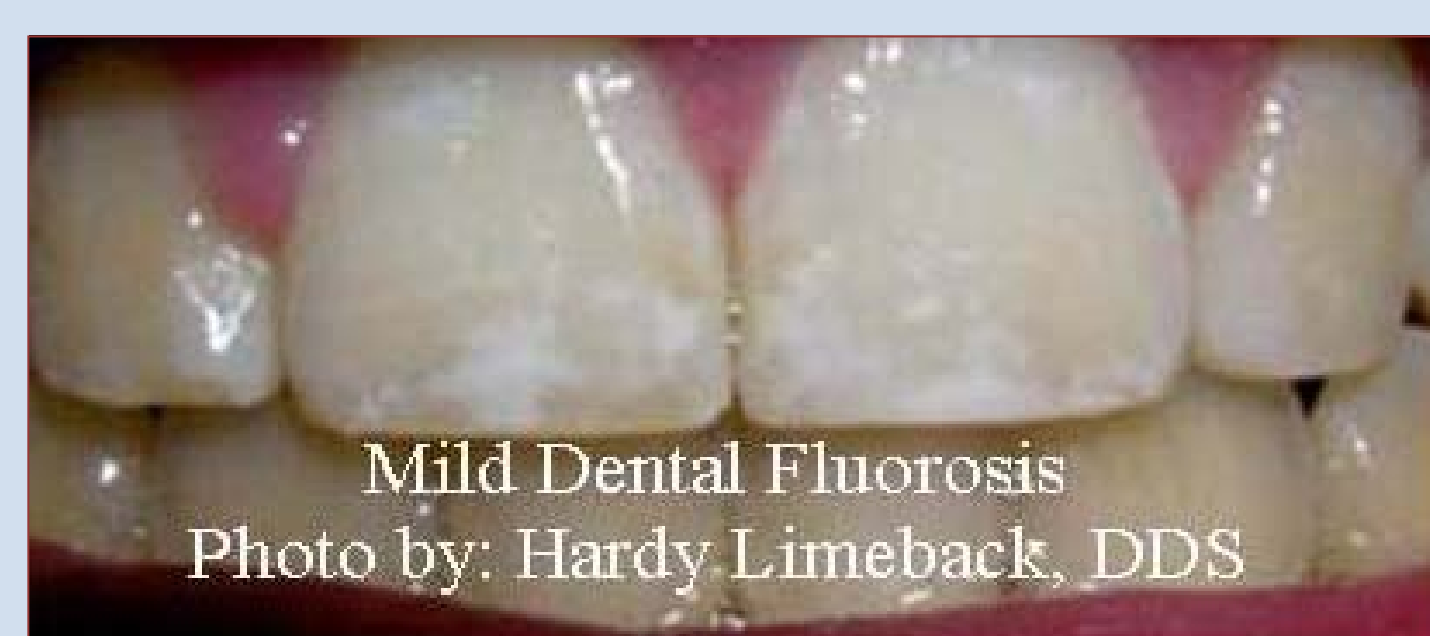
2. Trends in prevalence and severity of dental fluorosis.

Dental fluorosis – changes in appearance of tooth enamel caused by long-term ingestion of fluoride during the time teeth are forming. The highest risk of fluorosis in permanent teeth is between birth to 8 yrs. (this is when the pre-eruptive maturation of tooth enamel is complete).

Dental fluorosis classifications:

- Normal** - Translucent enamel. Tooth surface smooth, glossy, and usually has a pale creamy white color.
- Very Mild** - Small, opaque, paper white areas scattered irregularly over less than 25% of the tooth surface.
- Mild** - More extensive opaque areas but do not cover more than 50% of surface.
- Moderate** - White opaque areas affect more than 50% of the enamel surface.
- Severe** - All enamel surfaces are affected and hypoplasia (underdevelopment) is so marked that it may affect the tooth form. Discrete or confluent pitting, widespread brown stains and a corroded-like appearance signify this classification.

CLASSIFICATION IMAGES



Oral Health of United States Children Survey, (1986-1987)

Fluorosis Prevalence and Severity:

- 12-15 yr. olds: 23%
- Very mild: 17.2%
- Mild: 4.1%
- Moderate /Severe : 1.3%

National Health and Nutrition Examination Survey, (1999-2004)

Fluorosis Prevalence and Severity:

- 12-15 yr. olds: 41%
- Very mild: 28.5%
- Mild: 8.6%
- Moderate/Severe: 3.6%

Estimates for severe fluorosis for adolescents in both surveys were statistically unreliable since there were too few cases in the samples.

FOCUSING ON IDAHO FLUORIDATION

Fluoride is a naturally-occurring element in the Boise area. *United Water does not add supplemental fluoride to its water.*

Only three locations in Idaho add fluoride

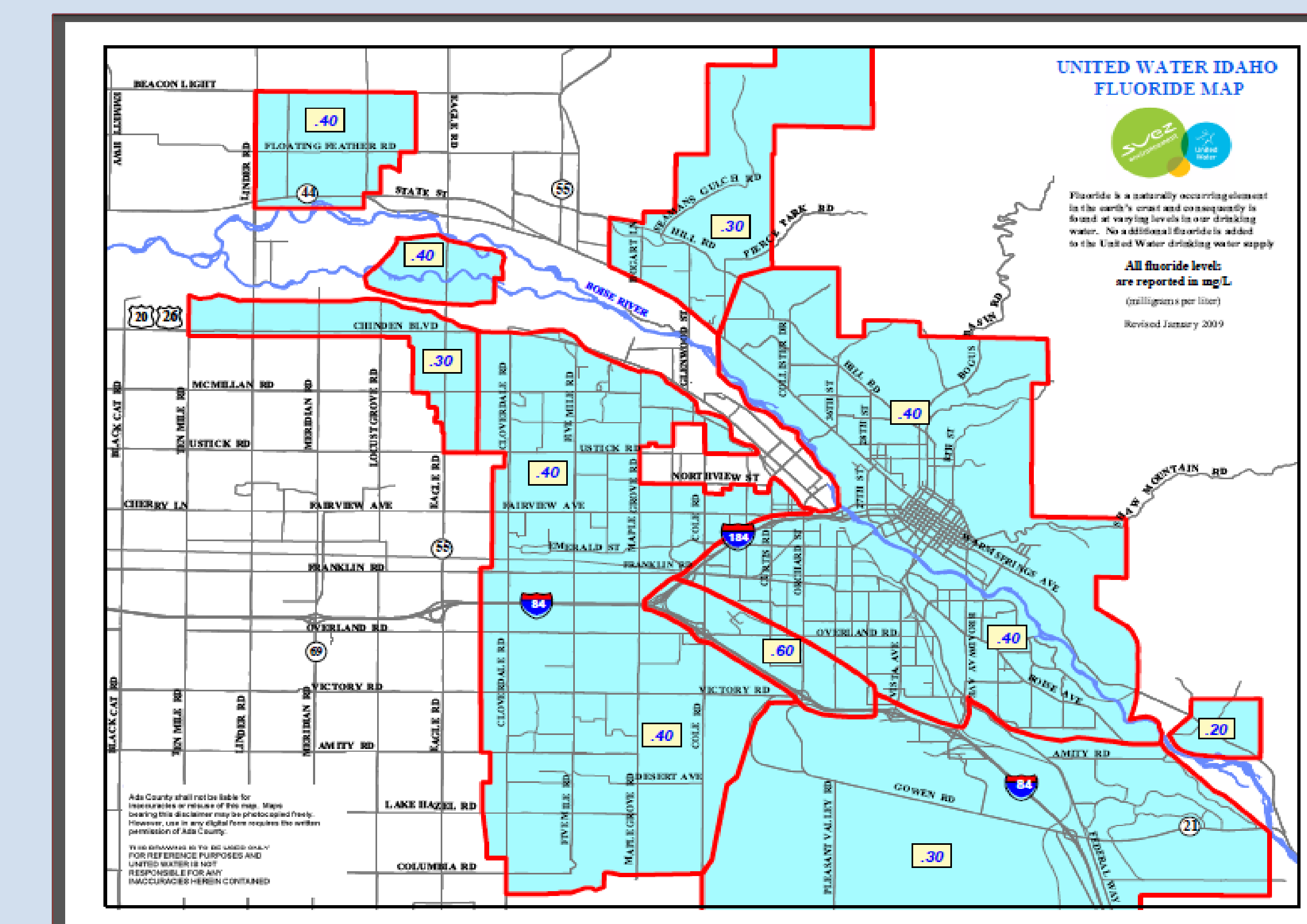
- Mountain Home Air Force Base
- Lewiston
- Clearwater County



Boise area system water comes from more than 80 wells and two surface water treatment plants which draw from the Boise River.

Over 30 locations are regularly sampled and the average concentration (after mixing) is 0.4 ppm.

The most recent United Water 'Annual Water Quality Report' posted the fluoride range for the Boise area as 0.2 – 1.3 ppm in 2008.



CONCLUSION

If approved, no actions needed to bring districts into compliance since fluoridation occurs naturally in Idaho and we are below MCL.

However, if EPA decides to change the MCL and we are in excess, actions will need to be taken.

Fluoride levels can be reduced many ways before reaching the customer, so there is little need for concern.

Ultimately, getting our already low fluoride levels to coincide with the newly recommended 0.7 ppm should not be an issue.