

From: [Jack, Richard](#)
To: [Koch, Ken \(ECY\);](#)
cc: [Braley, Susan \(ECY\); Brown, Chad \(ECY\); Coachman, Luanne;](#)
[Cooper, Betsy; Frodge, Jonathan; Abella, Sally; Bouchard, Debra;](#)
[Mickelson, Scott; Simmonds, Jim;](#)
Subject: 34-2008 303d list comments
Date: Thursday, March 20, 2008 2:41:29 PM
Attachments: [KC-WLR combined comments.doc](#)

Hi Ken,

I have attached King County Water & Land Resources consolidated comments on the draft 2008 impaired waterbody list. We have made every effort to put King County's comments into one consolidated file to help reduce confusion. While every contributing staff member is CCed here, please just respond to me and I will work with our staff to answer any follow-up questions.

<<KC-WLR combined comments.doc>>

Please keep me posted on any revisions, I look forward to continuing to work together with Ecology on the list to address impaired aquatic resources.

Best wishes,
Richard

Richard Jack

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New email address!

richard.jack@kingcounty.gov

Marine Waters and Sediments

Water Quality

King County would like to provide comments and recommendations for the following 2008 proposed 303(d) listings for impaired waters based upon impacts due to water quality. These comments and recommendations are for removing designated listings from the Category 5 status.

- 1. Listing 42475 (ammonia nitrogen)** The King County data on which this listing is based are for total ammonia nitrogen, while the Chapter 173-201A water quality criterion for ammonia nitrogen is for unionized ammonia nitrogen (Ecology, 2003). Therefore, King County's data cannot be compared to this criterion. The total ammonia nitrogen criterion (pH, temperature, and salinity dependent) would be 2.2 mg/L (chronic) based on the ambient conditions at the time of sampling (EPA, 1989). The two King County data points (0.039 and 0.013 mg/L) upon which this listing was based are well below the chronic total ammonia nitrogen criterion.
- 2. Listing 48986 (dissolved oxygen)** This listing does not take into account the seasonal intrusion of lower dissolved oxygen oceanic water in the late summer and fall, which occurs naturally throughout Puget Sound. There are no excursions below the critical dissolved oxygen concentration of 5.0 mg/L at this station. The critical dissolved oxygen concentration is that at which harm to marine organisms may occur. Refer to the letter of December 16, 2004 from Skip Albertson of Ecology, which is attached.
- 3. Listing 48995 (dissolved oxygen)** This listing does not take into account the seasonal intrusion of lower dissolved oxygen oceanic water in the late summer and fall, which occurs naturally throughout Puget Sound. There are no excursions below the critical dissolved oxygen concentration of 5.0 mg/L at this station. The critical dissolved oxygen concentration is that at which harm to marine organisms may occur. Refer to the letter of December 16, 2004 from Skip Albertson of Ecology, which is attached.
- 4. Listing 49000 (dissolved oxygen)** This listing does not take into account the seasonal intrusion of lower dissolved oxygen oceanic water in the late summer and fall, which occurs naturally throughout Puget Sound. There are no excursions below the critical dissolved oxygen concentration of 5.0 mg/L at this station. The critical dissolved oxygen concentration is that at which harm to marine organisms may occur. Refer to the letter of December 16, 2004 from Skip Albertson of Ecology, which is attached.
- 5. Listing 49002 (dissolved oxygen)** This listing does not take into account the seasonal intrusion of lower dissolved oxygen oceanic water in the late summer and fall, which occurs naturally throughout Puget Sound. There are no excursions below the critical dissolved oxygen concentration of 5.0 mg/L at this station. The critical dissolved oxygen concentration is that at which harm to marine organisms may occur. Refer to the letter of December 16, 2004 from Skip Albertson of Ecology, which is attached.
- 6. Listing 48981 (dissolved oxygen)** This listing does not take into account the seasonal intrusion of lower dissolved oxygen oceanic water in the late summer and fall, which occurs naturally throughout Puget Sound. There are no excursions below the critical dissolved oxygen concentration of 5.0 mg/L at this station. The critical dissolved oxygen concentration is that at which harm to marine organisms may occur. Refer to the letter of December 16, 2004 from Skip Albertson of Ecology, which is attached.
- 7. Listing 48985 (dissolved oxygen)** This listing does not take into account the seasonal intrusion of lower dissolved oxygen oceanic water in the late summer and fall, which occurs naturally throughout Puget Sound. There are no excursions below the critical dissolved oxygen concentration of 5.0 mg/L at this station. The critical dissolved oxygen concentration is that at which harm to marine organisms may occur. Refer to the letter of December 16, 2004 from Skip Albertson of Ecology, which is attached.
- 8. Listing 15395 (fecal coliform bacteria)** This listing is based on King County data collected in calendar year 2004. A sampling effort comparable to 2004 was conducted by King County in 2005 (12 monthly samples collected during the calendar year) and indicated that the station passed both the geometric mean

(10.06 CFU/100 ml) and percent (8.3%) criteria. The level of the 2005 sampling effort, along with the resultant data, are sufficient to change the Category 5 listing in accordance with Ecology's WQP Policy 1-11 (Ecology, 2006).

9. Listing 15802 (fecal coliform bacteria) This listing is based on King County data collected in calendar year 2003. Data collected by King County in both 2004 and 2005 show that this station passed the geometric mean and percent criteria both years. In 2004, only 1 out of 12 samples (8.3%) exceeded the percent criterion and the geometric mean was 5.73 CFU/100 ml. In 2005, only 1 out of 12 samples (8.3%) exceeded the percent criterion and the geometric mean was 7.35 CFU/100 ml.

10. Listing 45102 (fecal coliform bacteria) This listing is based on King County data collected in calendar year 2005. A sampling effort comparable to 2005 was conducted by King County in 2007 (12 monthly samples collected during the calendar year) and indicated that the station passed both the geometric mean (4.10 CFU/100 ml) and percent (0%) criteria. The level of the 2007 sampling effort, along with the resultant data, are sufficient to change the Category 5 listing in accordance with Ecology's WQP Policy 1-11 (Ecology, 2006).

11. Listing 45436 (fecal coliform bacteria) This listing is based on King County data collected in calendar year 2004. A sampling effort comparable to 2004 was conducted by King County in 2007 (12 monthly samples collected during the calendar year) and indicated that the station passed both the geometric mean (12.21 CFU/100 ml) and percent (8.3%) criteria. The level of the 2007 sampling effort, along with the resultant data, are sufficient to change the Category 5 listing in accordance with Ecology's WQP Policy 1-11 (Ecology, 2006).

12. Listing 42489 (fecal coliform bacteria) This listing is based on King County data collected in calendar year 2005. A sampling effort comparable to 2005 was conducted by King County in 2007 (12 monthly samples collected during the calendar year) and indicated that the station passed both the geometric mean (2.45 CFU/100 ml) and percent (8.3%) criteria. The level of the 2007 sampling effort, along with the resultant data, are sufficient to change the Category 5 listing in accordance with Ecology's WQP Policy 1-11 (Ecology, 2006).

13. Listing 45470 (fecal coliform bacteria) This listing is based on King County data collected in a partial calendar year (7 samples in 2006). A full year's sampling effort (12 monthly samples) was undertaken by King County in 2007 and indicated that the station passed both the geometric mean (3.55 CFU/100 ml) and percent (0%) criteria. The level of the 2007 sampling effort, along with the resultant data, are sufficient to change the Category 5 listing in accordance with Ecology's WQP Policy 1-11 (Ecology, 2006).

14. Listing 45625 (fecal coliform bacteria) This listing, both in "waterbody" name and location on the map, shows as being located in Quartermaster Harbor, near Dockton. The King County data on which this listing is based are from a monitoring station located just south of Alki Point (LSKS01), which is inappropriate.

15. Listing 7474 (pH) This listing is based on data from 5 samples collected by the Muckleshoot tribe during 1994 and 1995, with 3 out of 5 samples indicating "high pH" (range of values not provided). King County maintains a Duwamish River monitoring station near the Trimaran Flats area referenced in this listing. Station 0309 is located on the Duwamish River at the East Marginal Way bridge (N186038/E1280823 NAD83). Data collected by King County over the 5-year period from January 2003 through December 2007 (n = 60) indicate pH values all within the fresh water criterion in Chapter 173-201A (Ecology, 2003). A minimum pH value of 6.90 was measured during this monitoring period, along with a maximum pH value of 8.00. The mean and median pH values over the monitoring period were 7.37 and 7.35, respectively.

Marine Water References

Ecology, 2003. *Water Quality Standards for Surface Waters of the State of Washington, Chapter 173-201A WAC*. Washington State Department of Ecology. September 2, 2003.

Ecology, 2006. *Water Quality Program Policy (WQP Policy 1-11) Assessment of Water Quality for the Clean Water Act Sections 303(d) and 305(b) Integrated Report*. Washington State Department of Ecology. September 6, 2006 (p. 22).

EPA, 1989. *USEPA Ambient Water Quality Criteria for Ammonia (Saltwater) – 1989*. EPA 440/5-88-04. April, 1989.

Sediment Quality

King County would like to provide comments and recommendations for the following 2008 proposed 303(d) listings for impaired waters based upon impacts due to sediment quality. These comments and recommendations are for both removing designated listings as well as changing the listing category.

1. Sediment Listings Based on Incorrect Matrix

King County recommends that the following Category 5 listings be removed from the 303(d) list based upon the fact that they assume sediment impacts but are not based upon sediment data.

- a. **Listing 628286 (2,4-dimethylphenol)** is based on “. . . the average of 3 samples collected on or before July 29 1996 exceed the Sediment Management Standards CSL chemistry criterion.” The three samples upon which this listing is based are not all sediment samples. Sample L9011-4 is a sediment matrix, however, sample L9011-5 is butter clam tissue and sample L9011-6 is green algae.
- b. **Listing 632657 (2,4-dimethylphenol), Listing 632660 (2-methylphenol), Listing 632673 (benzoic acid), and Listing 632674 (benzyl alcohol)** are based on “. . . the average of 3 samples collected on or before July 30 1996 exceed the Sediment Management Standards CSL chemistry criterion.” The three samples upon which this listing is based are not all sediment samples. Sample L9012-1 is a sediment matrix, however, sample L9012-2 is butter clam tissue and sample L9012-3 is green algae.
- c. **Listing 633148 (2,4-dimethylphenol), Listing 633151 (2-methylphenol), Listing 633164 (benzoic acid), and Listing 633165 (benzyl alcohol)** are based on “. . . the average of 3 samples collected on or before July 30 1996 exceed the Sediment Management Standards CSL chemistry criterion.” The three samples upon which this listing is based are not all sediment samples. Sample L9012-10 is a sediment matrix, however, sample L9012-11 is butter clam tissue and sample L9012-12 is green algae.

2. Sediment Listings Based on Incorrect Interpretation of SEDQUAL Data

King County recommends that the following Category 5 listings be removed from the 303(d) list based upon the fact that they assume sediment impacts but are based upon an incorrect interpretation of SEDQUAL data.

- a. **Listing 631596 (bis(2-ethylhexyl)phthalate)** is based on “. . . the average of 3 samples collected on or before July 21 1997 exceed the Sediment Management Standards CSL chemistry criterion.” The three samples upon which this listing is based have dry weight-normalized bis(2-ethylhexyl)phthalate concentrations of 17U µg/Kg (L11505-19), 230 µg/Kg (L9010-1), and 153 µg/Kg (L9010-3). None of these concentrations and, therefore, the average concentration exceeds either the LAET or 2LAET of 1,300 and 1,700 µg/Kg, respectively (Ecology, 1999). The LAET and 2LAET are equivalent to the Sediment Management Standards SQS and CSL respectively. The total organic carbon (TOC) content of these three samples is 0.02, 0.03, and 0.03%, respectively. This is below the 0.5% TOC concentration at which organic carbon normalization of sediment data becomes appropriate. Sediment chemistry data from samples in which the TOC concentration is below 0.5% should be compared to the LAET and 2LAET rather than the SQS and CSL (Ecology, 1992).
- b. **Listing 632038 (bis(2-ethylhexyl)phthalate)** is based on “. . . the average of 3 samples collected on or before October 12 2000 exceed the Sediment Management Standards CSL chemistry criterion.” The three samples upon which this listing is based have dry weight-normalized bis(2-ethylhexyl)phthalate concentrations of 589 µg/Kg (L18956-2), 676 µg/Kg (L18956-5), and 137 µg/Kg (L18956-6). None of these concentrations and, therefore, the average concentration exceeds either the LAET or 2LAET of 1,300 and 1,700 µg/Kg, respectively (Ecology, 1999). The LAET and 2LAET are equivalent to the Sediment Management Standards SQS and CSL respectively. The total organic carbon (TOC) content of these three samples is 0.10, 0.18, and 0.10%, respectively. This is below the 0.5% TOC concentration at which organic carbon normalization of sediment data becomes appropriate. Sediment chemistry data from samples in which the TOC concentration is below 0.5% should be compared to the LAET and 2LAET rather than the SQS and CSL (Ecology, 1992).

3. Sediment Listings Based on Detection Limit Exceedences

King County recommends that the following Category 5 listings be removed from the 303(d) list based upon the fact that they assume sediment impacts from chemicals that have not been detected at the listing location.

Listing ID	Category	WRIA	Water Body Name	Parameter	Medium	Map Link
626932	5	8	PUGET SOUND (CENTRAL)	2-Methylphenol	Sediment	626932
627857	5	9	PUGET SOUND (S-CENTRAL) AND EAST PASSAGE	2,4-Dimethylphenol	Sediment	627857
627865	5	9	PUGET SOUND (S-CENTRAL) AND EAST PASSAGE	Hexachlorobutadiene	Sediment	627865
628043	5	9	PUGET SOUND (CENTRAL)	2,4-Dimethylphenol	Sediment	628043
628044	5	9	PUGET SOUND (CENTRAL)	Dibenzo(a,h)anthracene	Sediment	628044
628051	5	9	PUGET SOUND (CENTRAL)	Hexachlorobutadiene	Sediment	628051
628079	5	9	PUGET SOUND (CENTRAL)	N-Nitrosodiphenylamine	Sediment	628079
628192	5	9	PUGET SOUND (S-CENTRAL) AND EAST PASSAGE	2,4-Dimethylphenol	Sediment	628192
628200	5	9	PUGET SOUND (S-CENTRAL) AND EAST PASSAGE	Hexachlorobutadiene	Sediment	628200
628228	5	9	PUGET SOUND (S-CENTRAL) AND EAST PASSAGE	N-Nitrosodiphenylamine	Sediment	628228
628239	5	9	PUGET SOUND (S-CENTRAL) AND EAST PASSAGE	2,4-Dimethylphenol	Sediment	628239
628247	5	9	PUGET SOUND (S-CENTRAL) AND EAST PASSAGE	Hexachlorobutadiene	Sediment	628247
628275	5	9	PUGET SOUND (S-CENTRAL) AND EAST PASSAGE	N-Nitrosodiphenylamine	Sediment	628275
628482	5	9	PUGET SOUND (S-CENTRAL) AND EAST PASSAGE	2,4-Dimethylphenol	Sediment	628482
628490	5	9	PUGET SOUND (S-CENTRAL) AND EAST PASSAGE	Hexachlorobutadiene	Sediment	628490
628518	5	9	PUGET SOUND (S-CENTRAL) AND EAST PASSAGE	N-Nitrosodiphenylamine	Sediment	628518
628529	5	9	PUGET SOUND (S-CENTRAL) AND EAST PASSAGE	2,4-Dimethylphenol	Sediment	628529
628537	5	9	PUGET SOUND (S-CENTRAL) AND EAST PASSAGE	Hexachlorobutadiene	Sediment	628537
628810	5	9	PUGET SOUND (S-CENTRAL) AND EAST PASSAGE	2,4-Dimethylphenol	Sediment	628810
628818	5	9	PUGET SOUND (S-CENTRAL) AND EAST PASSAGE	Hexachlorobutadiene	Sediment	628818
628846	5	9	PUGET SOUND (S-CENTRAL) AND EAST PASSAGE	N-Nitrosodiphenylamine	Sediment	628846
629397	5	9	PUGET SOUND (S-CENTRAL) AND EAST PASSAGE	2,4-Dimethylphenol	Sediment	629397
629405	5	9	PUGET SOUND (S-CENTRAL) AND EAST PASSAGE	Hexachlorobutadiene	Sediment	629405
629433	5	9	PUGET SOUND (S-CENTRAL) AND EAST PASSAGE	N-Nitrosodiphenylamine	Sediment	629433
631580	5	8	PUGET SOUND (CENTRAL)	1,2-Dichlorobenzene	Sediment	631580
631581	5	8	PUGET SOUND (CENTRAL)	1,2,4-Trichlorobenzene	Sediment	631581
631582	5	8	PUGET SOUND (CENTRAL)	1,4-Dichlorobenzene	Sediment	631582
631583	5	8	PUGET SOUND (CENTRAL)	2,4-Dimethylphenol	Sediment	631583
631584	5	8	PUGET SOUND (CENTRAL)	Dibenzo(a,h)anthracene	Sediment	631584
631585	5	8	PUGET SOUND (CENTRAL)	2-Methylnaphthalene	Sediment	631585
631590	5	8	PUGET SOUND (CENTRAL)	Hexachlorobenzene	Sediment	631590
631591	5	8	PUGET SOUND (CENTRAL)	Hexachlorobutadiene	Sediment	631591
631601	5	8	PUGET SOUND (CENTRAL)	Benzo(ghi)perylene	Sediment	631601
631608	5	8	PUGET SOUND (CENTRAL)	Dibenzofuran	Sediment	631608
631614	5	8	PUGET SOUND (CENTRAL)	Indeno(1,2,3-cd)pyrene	Sediment	631614
631619	5	8	PUGET SOUND (CENTRAL)	N-Nitrosodiphenylamine	Sediment	631619
632038	5	8	PUGET SOUND (CENTRAL)	1,2-Dichlorobenzene	Sediment	632038
632039	5	8	PUGET SOUND (CENTRAL)	1,2,4-Trichlorobenzene	Sediment	632039
632040	5	8	PUGET SOUND (CENTRAL)	1,4-Dichlorobenzene	Sediment	632040
632048	5	8	PUGET SOUND (CENTRAL)	Hexachlorobenzene	Sediment	632048
632049	5	8	PUGET SOUND (CENTRAL)	Hexachlorobutadiene	Sediment	632049
632077	5	8	PUGET SOUND (CENTRAL)	N-Nitrosodiphenylamine	Sediment	632077
632480	5	8	PUGET SOUND (CENTRAL)	2,4-Dimethylphenol	Sediment	632480
632481	5	8	PUGET SOUND (CENTRAL)	Dibenzo(a,h)anthracene	Sediment	632481
632488	5	8	PUGET SOUND (CENTRAL)	Hexachlorobutadiene	Sediment	632488
632516	5	8	PUGET SOUND (CENTRAL)	N-Nitrosodiphenylamine	Sediment	632516
633054	5	8	PUGET SOUND (CENTRAL)	1,2-Dichlorobenzene	Sediment	633054
633055	5	8	PUGET SOUND (CENTRAL)	1,2,4-Trichlorobenzene	Sediment	633055
633064	5	8	PUGET SOUND (CENTRAL)	Hexachlorobenzene	Sediment	633064

An “undetected” analytical result for which the detection limit exceeds a sediment quality chemical criterion should not be considered presumptive evidence leading to a Category 5 – 303(d) listing. It is true that any analysis must have meaningfully low detection limits for the data to be useful and thus it is

reasonable to question the quality of the information obtained when a detection limit is higher than a sediment quality chemical criterion. However, it is quite a different matter to list a water body as “impaired” based on a sediment chemical concentration that is unknown, for the chemical in question may not even be present. Such data should result in additional testing and, if other factors indicate concern, initially listing the area as a Category 2 rather than an automatic listing process under Category 5.

4. Sediment Listings Based on Detection Limit Exceedances in the Lower Duwamish

These chemicals have sometimes been detected in the Lower Duwamish area. However non-detect values have been responsible for the majority of the exceedances of the SQS and CSLs. Ecology should check this large dataset to ensure that true detected concentrations are responsible for the Category 5 listing and not merely elevated detection/reporting limits. The table below taken from the Lower Duwamish Remedial Investigation illustrates that the vast majority of the exceedances for several Category 5 chemicals are for non-detect results.

Parameter	Number of results	Number of detects	Non-detect results	
			Number of RLs above SQS value	Number of RLs above CSL value
2-methylphenol	821	7	0	144
Hexachlorobutadiene	818	0	58	88
di-n-octyl phthalate	832	49	5	0
Acenaphthylene	818	128	0	1
diethylphthalate	832	41	4	0
di-n-butyl phthalate	822	189	0	0

Note 1) SQS and CSL same value for both 2-methylphenol and acenaphthylene so RL exceedances just shown for CSL 2) Numbers taken from Table 10-3 of Draft LDW RI (Nov 2007)

Marine Sediment References

Ecology 1992. *Technical Information Memorandum, Organic Carbon Normalization of Sediment Data*. Prepared by Teresa Michelsen for the Washington State Department of Ecology Sediment Management Unit. Olympia, Washington.

Ecology, 1999. *DRAFT Table NEW (Dry Wt). The 1999 suite of seven dry wt Puget Sound AETs (as of 07/07/99)*. Washington State Department of Ecology Sediment Management Unit. Olympia, Washington.

Ecology's prior determination of Natural Conditions for Marine Water(s) DO

December 16, 2004

Note: Interested parties at KCDNR include Kimberle Stark, Betsy Cooper, and Bruce Nairn all at: King County Department of Natural Resources, Water and Land Resources Division, 700 5th Avenue, Suite 2200, Seattle, WA 98104.

TO: Chad Brown, Monitoring Strategy & Operations
EAP

FROM: Skip Albertson, CEAU
EAP

THROUGH: Brian Grantham, CEAU
EAP
Bob Cusimano, CEAU
EAP

SUBJECT: REVIEW AND DISMISSAL OF 303D LISTINGS FOR KING COUNTY
DNR IN THE MAIN BASIN OF PUGET SOUND

I was asked to review the current Clean Water Act 303-d listings for the Main Basin in Puget Sound (Water Body Numbers WA-PS-0230 and WA-PS-0240) for King County Department of Natural Resources (KCDNR) for consideration of dismissal. The bases for doing this depend on: a) historical values and precedents, and b) natural interannual variability at the open seaward boundary, which is the origin of incoming replacement water of oceanic origin.

The standard for (dissolved) oxygen (DO) in class AA waters is 7.0 mg/l, which is not a significant departure from saturation (~9 mg/l at T=10°C and S=30 psu). As a result, monitoring stations within the jurisdiction of King County have routinely been added to the Clean Water Act's 303d list prior to oceanographic interpretation.

The current 303d-listings for DO from KCDNR have been corrected via monthly calibration procedures, and as such are deemed to be accurate (Bruce Nairn, pers. comm.). Based on the following analysis of existing data and the physical characteristics of Puget Sound, I recommend that water body numbers WA-PS-0230 and WA-PS-0240 not be listed for DO.

Historical Argument

Historically, oxygen values of < 7 mg/l occurred even in the early 1930s (Collias, 1970), so present values may not necessarily be attributable to increased levels of human activity. Between 1933 and 1974, approximately 30% of the water column samples fell below the 7.0 mg/l criteria at Point Jefferson, but these occurrences varied greatly by year (Fig. 1). Counting individual "exceedances" on a single vertical profile is not a statistically valid approach. For example, Collias and KCDNR have sampled at seven discrete depths while the Washington State Department of Ecology (Ecology) reports values every 0.5 m with the end result being that Ecology could have over 400 exceedances under the same conditions where Collias and KCDNR could record a maximum of seven. Collias sampled at depths of 0, 10, 25, 50, 100, 200 m, and near-bottom, so that the maximum number of exceedances per vertical profile was seven. KCDNR evaluates at seven depths but they are different: 1, 15, 25, 35, 55, 100, and 200 m. Ecology visiting the same station with a CTD reports values every 0.5 m, and it could have over 400 exceedances

under the same conditions. For this reason I calculated a percentage of the water column below standard and considered this a single exceedance for the time period in question, monthly in all (these) cases.

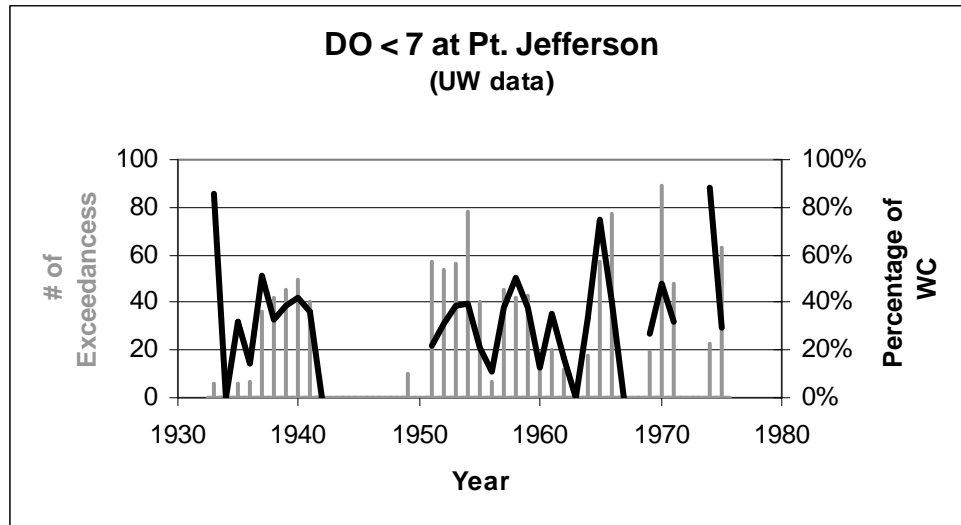


Figure 1. UW data at Point Jefferson re-cast for the quantity of <7 mg/l (dissolved) oxygen exceedances (gray bar chart) and percentage of water column (WC) under that level (black line).

Given the known flushing characteristics of the Main Basin, and the fact that there is only the slightest hint of an upward trend in these data, it is evident that there have been below-standard oxygen levels for as long as records have been kept.

Ocean Source Water at Open Boundary

Any argument to dismiss listings for DO from Main Basin stations should also be investigated relative to incoming replacement waters from the seaward boundary. In the summer these source waters typically derive from upwelled ocean water that have naturally low oxygen, high salinity and nitrate. Upwelling varies between years and is not necessarily part of any trend (Fig. 2). Notice that low levels of DO at Pt. Jefferson are in-phase with low DO at westward / seaward stations, ADM001 and JEMS. Perhaps these seaward stations would even presage the interior site except that all these stations are only occupied once a month, so the beginning of an upwelling event is often missed.

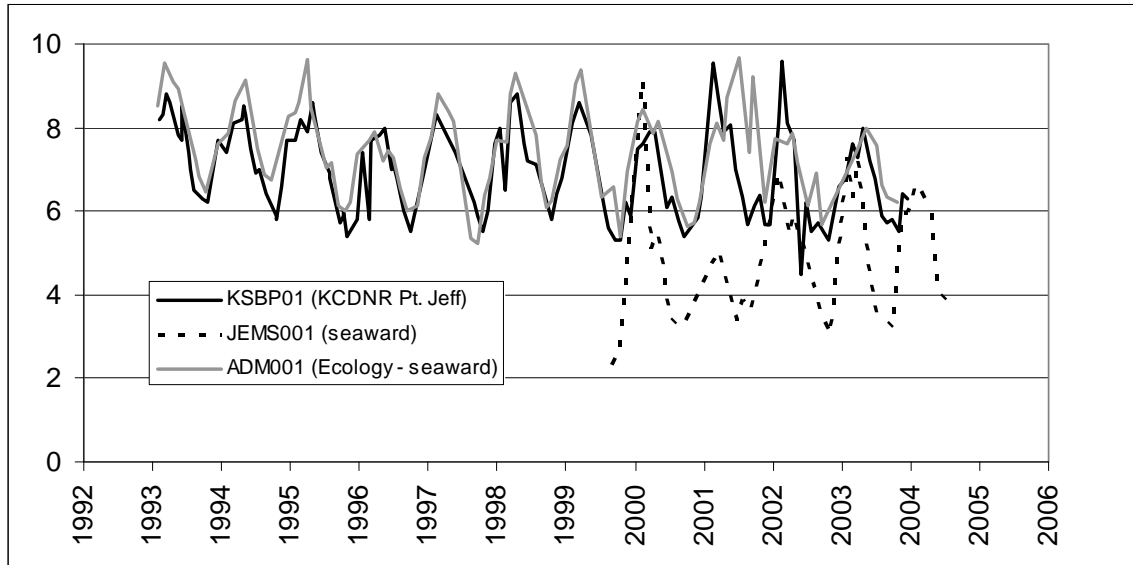


Figure 2. (Dissolved) oxygen levels at KCDNR station KSBP01 (listing 42479) at Point Jefferson – black line, as well as seaward stations (JEMS – dashed line) and Ecology’s monthly ADM001 – gray line.

Caveat -- Behind the Sill in the “Deep Hole”*

Perhaps the largest concern in the Main Basin is the possibility that the deeper waters landward of the sill (shallow reaches in Admiralty Inlet left over from glacial deposits) could be harboring old (not recently ventilated or in contact with the air) water that is in danger of becoming hypoxic as organic matter from the surface sinks and decays, using up oxygen. To determine whether this is happening, I looked at the density of incoming water over Admiralty Inlet and compared it to densities in the deepest landward location (e.g., Puget Sound Regional Synthesis Model (PRISM) station P5). As long as the density of incoming water is greater, flushing can occur and it is not interleaving above older denser water beneath it. The data to evaluate this possibility are available from the PRISM project stations (Fig 3a; P3 (NE in Saratoga Passage), P5 (Triple Junction and deep hole), P24 (seaward), and P28 (South Puget Sound)). Using June 2001 data as an example, there clearly was denser water seaward of the hole (Figs. 3 b&c), which is assuring. This can also be seen in the DO section (Fig. 3d). If the density of the deep water observed at Pt. Jefferson was denser than the incoming waters there could potentially be a reason for a listing, but this has not been the case.

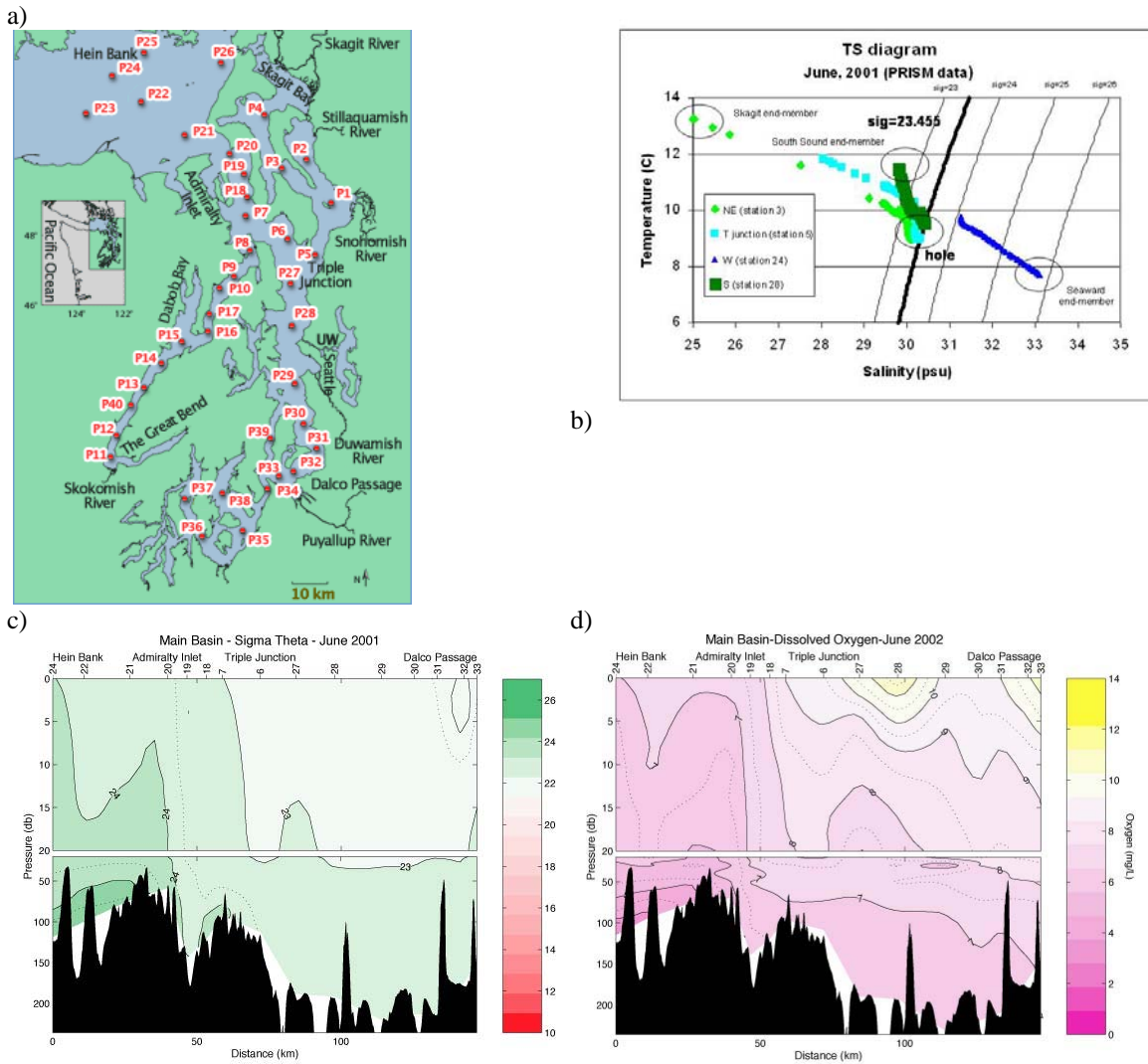


Figure 3. Data from the June 2001 PRISM cruise, a) stations, b) temperature-salinity (TS) diagram showing that seaward water is denser than deeper waters behind the sill, c) complete Main Basin density section, and d) complete Main Basin oxygen section both from www.psmem.org.

Reference

Collias, Eugene E., 1970. Index to Physical and Chemical Oceanographic Data of Puget Sound and Its Approaches, 1932-1966. University of Washington Department of Oceanography, Special Report No. 4 and Washington Sea Grant Publication WSG70-4.

Fresh Waters

Temperature

King County agrees with the freshwater temperature listings. We have not evaluated any listings that were carried over from 2004 listing and not based on additional data, or were based on data collected by other jurisdiction, even if data was collected in areas that are monitored by King County.

Small Lakes

The small lakes listing had one error. King County's remaining comments on small lakes are informational. King County requests that you include our ongoing management actions on these waterbodies to the "notes" section of their listings to inform the public.

1. **Listing 22947 (Total P) Dry (Grass) Lake:** This is not in King County, sounds like it might be in Chelan.
2. **Listing 6340 (Total P) Hicks (Garrett) Lake:** remarks, Alum treatment carried out by KC in 2005 for phosphorus reduction.
3. **Listing 4680 (invasive exotic spp. habitat) Lake Lucerne:** remarks, treatment ongoing since 1995
4. **Listing 4684 (invasive exotic spp. habitat) Pipe Lake:** remarks, treatment ongoing since 1995
5. **Listing 4670 (invasive exotic spp. habitat) Spring Lake:** remarks, treatment ongoing since 2003.
6. **Listing 4690 (invasive exotic spp. habitat) Lake Wilderness:** remarks, treatment ongoing since 2000.

Major Lakes

Lead

1. **Listing 8066 (locators 0512, 0518, 0527) Lake Union Pb.** Do not agree with listing for 0512 or 0518 (do not exceed any criteria as stated in http://apps.ecy.wa.gov/wats08/ViewListing.aspx?LISTING_ID=8066. Agree with the listing for 0527.

Total Phosphorus

The method for determining Total Phosphorus listing are stated in the Assessment of Water Quality for the Clean Water Act Sections 303(d) and 305(b) Integrated Report.

On page 33: Assessment Information and Specific Data Requirements - Total Phosphorus:

"The assessment is based on the calculated arithmetic mean of four or more total phosphorus samples collected from the epilimnion during the critical period or season."

The "critical season" is the summer growing season.

and on page 34: Category 5 Determination:

"A lake or lake grid segment will be placed in Category 5 when the calculated mean phosphorus concentration of a single season or critical period exceeds the criteria or action value for that waterbody. A Category 5 determination may also result from narrative criteria as described in section 6 of this policy." The "action value" for this ecoregion is 20 ug/L TP.

1. **Listing ID 52866 (locator A522) Lake Union:** Do not agree with the listing. Epilimnetic TP is less than 20 ug/L all years.
2. **Listing ID 52853 (locator 0804) Lake Washington:** Do not agree with the listing. Epilimnetic TP is less than 20 ug/L all years.

- Listing ID 52856 (locator 0817) Lake Washington:** Do not agree with the listing. Epilimnetic TP is less than 20 ug/L all years.

FECAL COLIFORM LISTINGS

Beaches are monitored for compliance with Washington Department of Health criteria of geometric mean <200 cfu/100 ml and closed if a single sample >1000 cfu/100ml. If a beach is out of compliance, additional samples are collected until the swimming beach is again in compliance with the WDOH criteria. This sampling design provides the most rapid approach to re-opening swimming beaches after closures, but biases sampling effort to periods when bacterial counts are above the criteria. This sampling design makes the criteria of less than 10% of collected samples below 100 cfu/100 ml an inappropriate criteria for listing swimming beaches as Category 5. All swimming beaches should be listed as Category 2 –requires additional sampling, as the measure of concern is the most recent bacterial counts at the respective swimming beach, not a long term evaluation of the water body.

- Listing 12162 (locator 0602SB)** Do not agree with the listing. The geometric means are all below both WDOH and WDOE criteria, and the locator was only listed because 2004 and 2005 had 13% of samples >100 cfu/100ml and <10% in 2006-7. This beach met all WDOH criteria 2004-2007.
- Listing 12167 (locator 0615SB)** Do not agree with the listing. The geometric means are all below both WDOH and WDOE criteria, and the locator was only listed because 2004-22%, 2005-21%, 2006-13%, and 2007-22%. This beach met all WDOH criteria 2004-2007.
- Listing 12182 (locator 0806SB)** Do not agree with the listing. The geometric means are all below WDOH criteria. The beach was only listed because exceeded of the % criteria, 2004-5%, 2005-58%, and 2007-48%.
- Listing 12184 (locator 0813SB)** Do not agree with the listing. The geometric means are all below both WDOH and WDOE extraordinary primary contact criteria. This listing is solely based on % of sample exceeded: 2004 – 14%, 2006 -14%, and 2007 -11%
- Listing 12187 (locator 0818SB)** Do not agree with the listing. The geometric means are all below WDOH and below WDOE extraordinary primary contact criteria in 2006.
- Listing 12188 (locator 0820SB)** Do not agree with the listing. The geometric means are all below both WDOH and WDOE extraordinary primary contact criteria. This listing is solely based on % of sample exceedances: 2004 – 14%, 2005-7 were <10%.
- Listing 12189 (locator 0825SB)** Do not agree with the listing. The geometric means are all below both WDOH and WDOE extraordinary primary contact criteria, and meet the 10% criteria.
- Listing 12191 (locator 0826OLA)** Do not agree with the listing. This locator is a designated off-leash area for dogs. The geometric means are all below both WDOH and WDOE criteria for primary contact.
- Listing 12198 (locator 0834SB)** Do not agree with the listing. The geometric means are all below both WDOH and WDOE extraordinary primary contact criteria except in 2004. This beach exceeds the % criteria in 2004-32%, 2005-15%, and 2007-17%.
- Listing 12199 (locator 083930SB)** Do not agree with the listing. The geometric means are all below WDOH criteria.
- Listing 12202 (locator 0860SB)** Do not agree with the listing. The geometric means are all below both WDOH and WDOE extra primary contact criteria. This beach only exceeds the 10% criteria in 2004 (15%).

12. **Listing 12208 (locator SD017SB)** Do not agree with the listing. The geometric means are all below both WDOH and WDOE primary contact criteria, and met % criteria.
13. **Listing 12205 (locator 4903SB)** Do not agree with the listing. The geometric means are all below WDOH criteria, and exceeds WDOE geometric mean only in 2006-60 and exceeded the % criteria in 2006-25% and 2007-14%.
14. **Listing 12204 (locator 4903) Lake Washington** Do not agree with the listing. This locator met the geometric mean and % criteria each year except for 2006-25% and 2007-17%).
15. **Listing 12162 (locator 4903) Lake Washington** Do not agree with the listing. This locator met the geometric mean and % criteria each year except for 2006-25% and 2007-17%).

Streams

Copper

1. **Listing 13765 (locator 0322) Newaukum Creek Cu.** Do not agree with the listing. This locator does not exceed chronic or acute toxicity. Copper concentration data and hardness data are provided.
2. **Listing 13815 (locator A315) Mill (Hill) Creek Cu.** Do not agree with the listing. This locator does not exceed chronic or acute toxicity. Copper concentration data and hardness data are provided.
3. **Listing 13839 (locator D322) Newaukum Creek Cu.** Do not agree with the listing. This locator exceed the chronic criteria three times in 2001 (11/13, 11/14, 12/13/2001). This stream has not exceed the criteria since 2001. Copper concentration data and hardness data are provided.

FECAL COLIFORM LISTINGS

1. **Listing 15815 (locator 0305) Hill (Mill) Creek.** Do not agree with the listing. This locator meets all criteria. The 2004 geometric mean was 12 cfu/100ml, and only 8% were above the 100 cfu/100ml.
2. **Listing 7485 (locator A315) Hill (Mill) Creek.** Agree with the listing. This locator exceeds the criteria. This stream met primary contact criteria in 2004-99 and 2007-66, and met secondary contact criteria.
3. **Listing 13122 (locator 0430) Lyon Creek.** Agree with the listing. This locator exceeds both criteria. This stream exceeds the primary and secondary contact criteria.
4. **Listing 13123 (locator 0434) Thornton Creek.** Agree with the listing. This locator exceeds both criteria. This stream exceeds the primary and secondary contact criteria.
5. **Listing 13124 (locator 0440) May Creek.** Agree with the listing. This locator exceeds the criteria. This stream exceeds the primary contact criteria and met the secondary contact criteria.
6. **Listing 13125 (locator 0442) Coal Creek.** Agree with the listing. This locator exceeds both criteria. This stream met the geometric mean in 2005 (34). This stream exceeds the primary and met secondary contact criteria.

7. **Listing 13127 (locator 0446) Juanita Creek.** Agree with the listing. This locator exceeds the criteria. This stream exceeds the primary and secondary contact criteria.
8. **Listing 13128 (locator 0450) Sammamish River mouth.** Agree with the listing. This locator exceeds the criteria. This stream exceeds the primary and met secondary contact criteria.
9. **Listing 13129 (locator 0456) Forbes Creek.** Agree with the listing. This locator exceeds the criteria. This stream exceeds the primary and met secondary contact criteria.
10. **Listing 13133 (locator 0484) Bear Creek.** Agree with the listing. This locator exceeds the criteria. This stream exceeds the primary and met secondary contact criteria.
11. **Listing 15773 (locator 0498) Fairweather Bay Creek.** Agree with the listing. This locator exceeds the criteria. This stream exceeds the primary contact criteria and met secondary contact criteria (except 2006-201).
12. **Listing 12561 (locator 0450A) Sammamish River.** Agree with the listing. This locator exceeds the criteria. This stream exceeds the primary and met secondary contact criteria.
13. **Listing 46974 (locator 0450B) Sammamish River.** Agree with the listing. This locator exceeds the criteria. This stream met the primary and secondary contact criteria.
14. **Listing 46943 (locator 0450C) Sammamish River.** Agree with the listing. This locator exceeds the criteria. This locator met the geometric mean criteria in 2005-45 and 2007-32. This stream exceeds the primary and met secondary contact criteria.
15. **Listing 12162 (locator 0450D) Sammamish River.** Agree with the listing. This locator exceeds the criteria. This stream exceeds the primary and met secondary contact criteria.
16. **Listing 12569 (locator 0311) Green River.** Do not agree with the listing. Locator 0311 met both criteria every year. 3106 met the geometric mean criteria. This locator exceeded the 10% criteria in 2004-15%, 2005-29%, 2006-20%, and 2007-13%. There is no explanation provided why these two sites are combined together and both mis-listed.
17. **Listing 13159 (locator A315) Green River.** Do not agree with the listing. Locator A319 the geometric mean criteria. This locator exceeded the 10% criteria in 2004-15%, 2005-29%, 2006-20%, and 2007-13%. There is no explanation why these two sites are combined together and both mis-listed.
18. **Listing 13160 (locator A320) Big Soos Creek.** Agree with the listing. This locator exceeds the criteria.
19. **Listing 13135 (locator A432) McAleer Creek.** Agree with the listing. This locator exceeds the criteria.
20. **Listing 40609 (locator A444, should be 0444) Mercer Slough.** Agree with the listing. This locator exceeds the criteria.
21. **Listing 13136 (locator A438) Cedar River.** Do not agree with the listing. This locator met the geometric mean criteria each year. This locator exceed the % criteria in 2004-19%, 2005-20%, 2006-19%, and 2007-13%.
22. **Listing 15796 (locator A499) Yarrow Bay Creek.** Do not agree with the listing. This locator met the geometric mean criteria each year except 2006 (76 cfu/100ml). This locator exceed the % criteria in 2004-14%, 2005-13%, 2006-33%, and 2007-19%.

23. **Listing 13137 (locator A617) Lewis Creek.** Agree with the listing. This locator exceeds the criteria. Met secondary contact criteria.
24. **Listing 13139 (locator A680) Pine Lake Creek.** Agree with the listing. This locator exceeds the criteria. Met primary and secondary contact criteria.
25. **Listing 13140 (locator A685) Ebright Creek.** Do not agree with the listing. This locator met the geometric mean criteria each year except 2006 (76 cfu/100ml). This locator exceed the % criteria in 2004-23%, 2005-20%, 2006-53%, and 2007-35%.
26. **Listing 13141 (locator A690) Eden (Eton) Creek.** Do not agree with the listing. This locator met the geometric mean criteria each year. This locator exceed the % criteria in 2004-36%, 2005-27%, 2006-25%, and 2007-21%.
27. **Listing 13142 (locator B484) Evans Creek.** Agree with the listing. This locator exceeds the criteria except 2007. Met primary and secondary contact criteria. This locator exceed the % criteria except 2007. Met primary and secondary contact criteria.
28. **Listing 13162 (locator C320) Covington Creek.** Do not agree with the listing. This locator met the geometric mean criteria each year. This locator exceed the % criteria in 2004-13%, 2006-25%, and met the criteria in the last two years, 2006-2007.
29. **Listing 7491 (locator C370) Longfellow Creek.** Agree with the listing. This locator exceeds the criteria. This locator also exceeded the primary and secondary contact criteria.

Dissolved Oxygen

The method for determining Dissolved Oxygen listings are stated in the **Assessment of Water Quality for the Clean Water Act Sections 303(d) and 305(b) Integrated Report**.

On page 30: Assessment Information and Specific Data Requirements - Dissolved Oxygen:
 "... The standards also allow a measurable decrease (0.2mg/l) in water below natural conditions due to human actions."

and on page 31: Category 5 Determination:
 "A waterbody will be placed in Category 5 using a single sample data when (1) a minimum of three excursions exist from all data considered, and (2) at least ten percent of single grab sample values in a given year do not meet the criterion."

Also, this remark from previous listings was used to evaluate the dissolved oxygen data: "During the assessment of data it was determined that WQ Policy 1-11(updated 9/03) was overly restrictive for the number of years of data excursions needed to list for D.O. impairments. Based on a review of monitoring studies for DO statewide, it was determined that multiple (3 or more) excursions for at least two years of monitoring should be used as an alternative indicator that a waterbody continues to be impaired. (Braley,ECY/WQP, 2003)

The criterion for all these waterbodies being discussed is 9.5 mg/L. These sites were screened three or more excursions for at least two years, and more than 10 percent of values below 9.5 mg/L each year. The following sites do not meet the Category 5 listing requirements for dissolved oxygen concentrations as discussed below.

1. **Listing ID 12680 (locator 0478).** In 2004 there was only one sample (9.3 mg/L), in 2005 one sample (9.0 mg/L), and 2007 only two samples (9.3 mg/L each) below the criterion. In 2006 there were four samples (9.2, 9.4, 9.4, and 9.4 mg/L) below the criterion. This does not meet the three or more excursions for two or more years requirements for listing.

2. **Listing ID 12681 (locator A432).** In 2004, 2005, 2006, and 2007 there was only one excursions in each year. This does not meet the three or more excursions for at least two years, and more than 10 percent of values below 9.5 mg/L each year requirements for listing.
3. **Listing ID 15795 (locator A499).** Only one sample in 2004 (7 percent of all samples) was <9.5 (sample measured 9.3 mg/L). Only one sample in 2007 (6 percent of all samples) was < 9.5 (sample measured 9.4 mg/L). No samples in 2005 or 2006 were below criterion. This does not meet the three or more excursions for at least two years, and more than 10 percent of values below 9.5 mg/L each year requirements for listing.
4. **Listing ID 12682 (locator A617).** One sample in 2004 (9.1 mg/L) was < 9.5 mg/L. Two samples in 2005 were <9.5 mg/L (9.3, 9.0 mg/L). No samples in 2006 were <9.5 mg/L. Only one sample in 2007 was < 9.5 mg/L (8.9 mg/L). This does not meet the three or more excursions for at least two years, and more than 10 percent of values below 9.5 mg/L each year requirements for listing.
5. **Listing ID 12708 (locator B319).** Only one sample in 2004 (9.4 mg/L), one sample in 2005 (9.4 mg/L), and one sample in 2007 (9.3 mg/L) were less than criterion. There were no excursions in 2006. This does not meet the three or more excursions for at least two years, and more than 10 percent of values below 9.5 mg/L each year requirements for listing.
6. **Listing ID 12686 and 47996 (locator C446).** One sample in 2004 (9.0 mg/L), no samples in 2005, one sample in 2006 (9.3 mg/L), and three samples in 2007 (9.4, 8.8, and 9.0 mg/L) were below the 9.5 mg/L criterion. This does not meet the three or more excursions for at least two years, and more than 10 percent of values below 9.5 mg/L each year requirements for listing.
7. **Listing 12687 (locator C484).** Two samples in 2004 (9.3 and 9.2 mg/L), four samples in 2005 (9.4, 9.4, 9.2, 8.9 mg/L), one sample in 2006 (9.3 mg/L), and four samples in 2007 (9.1, 9.2, 9.4, 8.9 mg/L) were < 9.5 mg/L. This does not meet the three or more excursions for at least two years criterion.
8. **Listing 12688 (locator N484).** Two samples in 2004 (9.4 and 9.1 mg/L), four samples in 2005 (9.1, 9.0, 8.9, and 9.4 mg/L), two samples in 2006 (9.2 and 9.3 mg/L), and one sample in 2007 (9.3 mg/L). This does not meet the three or more excursions for at least two years criterion.