

Discrete Water Quality Metadata- Laboratory Methods						
Current?	Code	Name	Description	Comparability Notes	Data From	Data To
Yes	EPA 350.1	Ammonia, Nitrogen (Dissolved)	The sample is buffered at a pH of 9.5 with a borate buffer in order to decrease hydrolysis of cyanates and organic nitrogen compounds, and is distilled into a solution of boric acid. Alkaline phenol and hypochlorite react with ammonia to form indophenol blue that is proportional to the ammonia concentration. The blue color formed is intensified with sodium nitroprusside and measured colorimetrically.	Data comparable to other standard methods in this category, within accuracy and precision limits.	1/16/1979	present
No	EPA 350.2	Ammonia by Distillation and Colorimetry	The sample is buffered at a pH of 9.5 with a borate buffer in order to decrease hydrolysis of cyanates and organic nitrogen compounds, and is then distilled into a solution of boric acid. The ammonia in the distillate can be determined colorimetrically by nesslerization, titrimetrically with standard sulfuric acid with the use of a mixed indicator, or potentiometrically by the ammonia electrode. The choice between the first two procedures depends on the concentration of the ammonia.	Data comparable to other standard methods in this category, within accuracy and precision limits.	1/7/1975	12/7/1978

No	EPA 160.1	Total Dissolved Solids	A well-mixed sample is filtered through a standard glass fiber filter. The filtrate is evaporated and dried to constant weight at 180°C. If Residue, Non-Filterable is being determined, the filtrate from that method may be used for Residue, Filterable.	Data comparable to other standard methods in this category, within accuracy and precision limits	1/7/1975	6/11/1996
Yes	EPA 160.2	Total Suspended Solids	A well-mixed sample is filtered through a glass fiber filter, and the residue retained on the filter is dried to constant weight at 103-105°C. The filtrate from this method may be used for Residue, Filterable.	Data comparable to other standard methods in this category, within accuracy and precision limits.	1/7/1975	present
Yes	EPA 160.4	Volatile Suspended Solids	The residue obtained from the determination of total, filterable or non-filterable residue is ignited at 550°C in a muffle furnace. The loss of weight on ignition is reported as mg/L volatile residue.	Data comparable to other standard methods in this category, within accuracy and precision limits.	1/7/1975	present
Yes	EPA 200.7 (D)	Dissolved Silica (SiO ₂)	Except for the determination of dissolved analytes, aqueous samples are acid preserved prior to sample	Data comparable to other standard	8/7/1997	present

			<p>processing. For the analysis of dissolved analytes, an acidified portion of the filtrate is analyzed directly. For the determination of total recoverable analytes in aqueous samples containing particulate material as well as solid wastes, samples are subjected to acid pretreatment with nitric and hydrochloric acids and gentle refluxing prior to analysis. The method involves multi-element determination using sequential or simultaneous instruments. The instruments measure characteristic atomic-line emission spectra by optical spectrometry. Sample solutions are nebulized and the resulting aerosol is transported to the plasma torch. Element specific emission spectra are produced by a radio-frequency inductively coupled plasma. The spectra are dispersed by a grating spectrometer and the</p>	<p>methods in this category, within accuracy and precision limits.</p>		
--	--	--	---	--	--	--

			<p>intensities of the lines are monitored at specific wavelengths by a photosensitive device. Photocurrents from the photosensitive device are processed and controlled by a computer system. A background correction technique is required to compensate for variable background contribution to the determination of the analytes. Background must be measured adjacent to analyte lines on samples during analysis. Various interferences are discussed and must be considered and addressed appropriately.</p>			
No	EPA 213.2 (D)	Cadmium by AA Furnace (Dissolved)	<p>The sample is treated by an appropriate digestion procedure to ensure cadmium is in a detectable form (see EPA Method 200.0 for suggested digestion procedures). The digestate is then introduced into the furnace system with an appropriate matrix modifier,</p>	<p>Data comparable to other standard methods in this category, within accuracy and precision limits.</p>	5/5/1988	9/10/1993

			and cadmium levels are determined while using required background correction.			
No	EPA 213.2 (T)	Cadmium by AA Furnace (Total)	The sample is treated by an appropriate digestion procedure to ensure cadmium is in a detectable form (see EPA Method 200.0 for suggested digestion procedures). The digestate is then introduced into the furnace system with an appropriate matrix modifier, and cadmium levels are determined while using required background correction.	Data comparable to other standard methods in this category, within accuracy and precision limits.	5/5/1988	9/10/1993
No	EPA 218.2 (D)	Chromium by AA Furnace (Dissolved)	A sample prepared according to EPA Method 200.0 is analyzed using a graphite furnace atomic absorption spectrometer. Specifications for instrument operation and preparation of standards are provided in the method.	Data comparable to other standard methods in this category, within accuracy and precision limits.	5/5/1988	9/10/1993
No	EPA 218.2 (T)	Chromium by AA Furnace (Total)	A sample prepared according to EPA Method 200.0 is analyzed using a graphite furnace atomic absorption spectrometer. Specifications for instrument operation and preparation of	Data comparable to other standard methods in this category, within accuracy and	5/4/1987	9/10/1993

			standards are provided in the method.	precision limits.		
No	EPA 220.2 (D)	Copper by AA Furnace (Dissolved)	A sample prepared according to EPA Method 200.0 is analyzed using a graphite furnace atomic absorption spectrometer. Specifications for instrument operation and preparation of standards are provided in the method.	Data comparable to other standard methods in this category, within accuracy and precision limits.	5/5/1988	9/10/1993
No	EPA 220.2 (T)	Copper by AA Furnace (Total)	A sample prepared according to EPA Method 200.0 is analyzed using a graphite furnace atomic absorption spectrometer. Specifications for instrument operation and preparation of standards are provided in the method.	Data comparable to other standard methods in this category, within accuracy and precision limits.	5/7/1987	9/10/1993
No	EPA 236.2 (D)	Iron by AA Furnace (Dissolved)	A sample prepared according to EPA Method 200.0 is analyzed using a graphite furnace atomic absorption spectrometer. Specifications for instrument operation and preparation of standards are provided in the method.	Data comparable to other standard methods in this category, within accuracy and precision limits.	5/4/1987	9/10/1993
No	EPA 236.2 (T)	Iron by AA Furnace (Total)	A sample prepared according to EPA Method 200.0 is analyzed using a graphite furnace atomic absorption spectrometer.	Data comparable to other standard methods in this	5/4/1987	9/10/1993

			Specifications for instrument operation and preparation of standards are provided in the method.	category, within accuracy and precision limits.		
No	EPA 239.2 (D)	Lead by AA Furnace (Dissolved)	A sample prepared according to EPA Method 200.0 is analyzed using a graphite furnace atomic absorption spectrometer. Specifications for instrument operation and preparation of standards are provided in the method.	Data comparable to other standard methods in this category, within accuracy and precision limits.	5/5/1988	9/10/1993
No	EPA 239.2 (T)	Lead by AA Furnace (Total)	A sample prepared according to EPA Method 200.0 is analyzed using a graphite furnace atomic absorption spectrometer. Specifications for instrument operation and preparation of standards are provided in the method.	Data comparable to other standard methods in this category, within accuracy and precision limits.	5/5/1988	9/10/1993
No	EPA 243.2 (D)	Manganese by AA Furnace (Dissolved)	A sample prepared according to EPA Method 200.0 is analyzed using a graphite furnace atomic absorption spectrometer. Specifications for instrument operation and preparation of standards are provided in the method.	Data comparable to other standard methods in this category, within accuracy and precision limits.	5/4/1987	9/10/1993
No	EPA 243.2 (T)	Manganese by AA Furnace (Total)	A sample prepared according to EPA Method 200.0 is analyzed	Data comparable to	5/4/1987	9/10/1993

			using a graphite furnace atomic absorption spectrometer. Specifications for instrument operation and preparation of standards are provided in the method.	other standard methods in this category, within accuracy and precision limits.		
No	EPA 245.1 (T)	Mercury by AA Cold Vapor (Total)	A known portion of a water sample is transferred to a BOD bottle, equivalent ground glass stoppered flask or other suitable closed container. It is digested in diluted potassium permanganate-potassium persulfate solutions and oxidized for two hours at 95°C. Mercury in the digested water sample is reduced with stannous chloride to elemental mercury and measured by the conventional cold vapor atomic absorption technique.	Data comparable to other standard methods in this category, within accuracy and precision limits.	1/8/1975	9/10/1993
No	EPA 289.2 (D)	Zinc by AA Furnace (Dissolved)	A sample prepared according to EPA Method 200.0 is analyzed using a graphite furnace atomic absorption spectrometer. Specifications for instrument operation and preparation of standards are provided in the method.	Data comparable to other standard methods in this category, within accuracy and precision limits.	5/6/1987	9/10/1993
No	EPA 289.2 (T)	Zinc by AA Furnace (Total)	A sample prepared according to EPA Method 200.0 is analyzed using a graphite furnace atomic	Data comparable to other standard	5/6/1987	9/10/1993

			absorption spectrometer. Specifications for instrument operation and preparation of standards are provided in the method.	methods in this category, within accuracy and precision limits.		
Yes	EPA 300.0	Dissolved Chloride	A small volume of sample, typically 50-100 uL, is introduced into an ion chromatograph. The anions of interest are separated and measured, using a system comprised of a guard column, separator column, suppressor device, and conductivity detector.	Data comparable to other standard methods in this category, within accuracy and precision limits.	11/1/2000	present
No	EPA 325.2	Chloride	Thiocyanate ion (SCN) is liberated from mercuric thiocyanate through sequestration of mercury by chloride ion to form un-ionized mercuric chloride. In the presence of ferric ion, the liberated SCN forms a highly colored ferric thiocyanate in concentration proportional to the original chloride concentration. Measurements of the colored complex are made using an automated spectrophotometer.	Data comparable to other standard methods in this category, within accuracy and precision limits.	4/7/1980	10/19/2000
Yes	EPA 351.2	Total Kjeldahl Nitrogen	The sample is heated in the	Data	5/1/1978	Present

			<p>presence of sulfuric acid, H₂SO₄ for two and one half hours. The residue is cooled, diluted to 25 mL and analyzed for ammonia. This digested sample may also be used for phosphorus determination. Total Kjeldahl nitrogen is the sum of free-ammonia and organic nitrogen compounds which are converted to ammonium sulfate (NH₄)₂SO₄, under the conditions of digestion described. Organic Kjeldahl nitrogen is the difference obtained by subtracting the free ammonia value from the total Kjeldahl nitrogen value. Reduced volume versions of this method that use the same reagents and molar ratios are acceptable provided they meet the quality control and performance requirements stated in the method.</p>	comparable to other standard methods in this category, within accuracy and precision limits.		
Yes	EPA 351.2 (Dissolved)	Dissolved Organic Nitrogen	<p>This is a semi-automated method. A sample is heated in the presence of sulfuric acid, potassium sulfate, and mercuric sulfate for two and one half hours. The digestion converts nitrogen components of biological origin (e.g., amino acids, proteins, and peptides) to</p>	Data comparable to other standard methods in this category, within accuracy and precision limits.	5/2/1978	Present

			ammonia, but may not convert some compounds in industrial wastes (e.g., certain amines and refractory tertiary amines, nitro compounds, hydrazones, oximes, semicarbazones). The resulting residue is cooled, diluted to 25 mL and placed on the AutoAnalyzer for ammonia determination by colorimetry. This digested sampled also may be used for phosphorus determination.			
No	EPA 351.3	Nitrogen, Colorimetric	The sample is heated in the presence of sulfuric acid, potassium sulfate, and mercuric sulfate, and evaporated until sulfite fumes are obtained and the solution becomes colorless or pale yellow. The residue is cooled, diluted, and is treated and made alkaline with a hydroxide-thiosulfate solution. The ammonia is distilled and determined after distillation by potentiometry or other procedure.	Data comparable to other standard methods in this category, within accuracy and precision limits.	1/7/1975	5/1/1978
No	EPA 353.3 (DWR Modified)	Nitrate, Cd Reduction (frozen to -10°C)	DWR Variation on EPA 353.3. Samples are frozen in the field to -10°C and holding time extended to 28 days. Nitrate and nitrite: A filtered sample is passed through a	Data comparable to other standard methods in this category, within accuracy and	2/15/1979	6/11/1996

			<p>column containing granulated copper-cadmium to reduce nitrate to nitrite. The nitrite (originally in the sample and reduced nitrate) is determined by diazotizing with sulfanilamide and coupling with N-(1-naphthyl)-ethylenediamine dihydrochloride to form a highly colored azo dye, which is measured with a spectrometer. Nitrite alone: The procedure is the same except that the cadmium column is bypassed.</p>	precision limits.		
No	EPA 353.3 (DWR Modified)	Nitrate, Cd Reduction unpreserved oxidized form	<p>DWR Variation on EPA 353.3. Samples are frozen in the field to -10°C and holding time extended to 28 days. Nitrate and nitrite: A filtered sample is passed through a column containing granulated copper-cadmium to reduce nitrate to nitrite. The nitrite (originally in the sample and reduced nitrate) is determined by diazotizing with sulfanilamide and coupling with N-(1-naphthyl)-ethylenediamine dihydrochloride to form a highly colored azo dye, which is measured with a spectrometer. Nitrite alone: The procedure is the same except that the</p>	Data comparable to other standard methods in this category, within accuracy and precision limits.	1/21/1975	1/24/1979

			cadmium column is bypassed.			
Yes	EPA 365.1 (DWR Modified)	DWR Ortho-Phosphate (Dissolved)	EPA Method 365.1 modified holding time of 28 days and preservation by freezing to -10 degrees Celsius. A sample is appropriately treated to convert all phosphorus of interest to reactive orthophosphate. Ammonium molybdate and antimony potassium tartrate are added to the treated sample reacting with orthophosphate in an acidic medium to form an antimony-phospho-molybdate complex. This complex is reduced to an intensely blue-colored complex by ascorbic acid. The concentration of the orthophosphate is measured by detecting the absorbance of the complex with a spectrophotometer.	Data comparable to other standard methods in this category, within accuracy and precision limits.	1/16/1979	Present
Yes	EPA 365.4	Phosphorus (Total)	The sample is heated in the presence of sulfuric acid, potassium sulfate, and mercuric sulfate for two and one half hours. The residue is cooled and diluted to 25 mL and placed in autoanalyzer for determination of phosphorus by colorimetry.	Data comparable to other standard methods in this category, within accuracy and precision limits.	5/2/1978	Present
No	EPA 405.1	BOD	The BOD test is an empirical bioassay-type test which	Data comparable to	1/7/1975	12/16/1977

			measures the dissolved oxygen consumed by microbial life while assimilating and oxidizing organic matter in a sample. A waste sample (or dilution) is incubated for five days 20oC in the dark. Dissolved oxygen is measured before and after incubation using a modified Winkler or oxygen probe method (e.g., EPA Method 360.2 and 360.1). The reduction in dissolved oxygen during the incubation period yields a measure of BOD.	other standard methods in this category, within accuracy and precision limits.		
No	EPA 608	Organochlorine Pesticides and PCBs	A 1L sample is extracted using a liquid/liquid phase extraction technique with methylene chloride as the extracting solvent. The extract is dried through sodium sulfate, exchanged to hexane, and then concentrated down to a volume of less than 10mL. The extract is then separated using gas chromatography with an ECD. Method 624 can be used for GC/MS confirmation of compound match or interference.	Data comparable to other standard methods in this category, within accuracy and precision limits.	1/21/1975	9/10/1993
Yes	Std Method 10200 H	Spectrophotometric Determination of Chlorophyll	Measured samples (500 to 1000 ml depending on the concentration of suspended solids) are filtered in the field	Data comparable to other standard methods in this	2/2/1998	Present

			and frozen. Pigments are extracted in aqueous acetone with tissue grinding, centrifugation and incubation at 4°C. Chlorophyll a and Pheophytin a concentrations are measured with a spectrophotometer scans made before and after acidification with hydrochloric acid.	category, within accuracy and precision limits.		
No	Std Method 10200 H (Modified)	Spectrophotometric Determination of Chlorophyll (Sonication)	Measured samples (400 ml) are filtered in the field and frozen. Pigments are extracted in aqueous acetone with warm water bath (58°C), sonication followed by incubation at room temperature. Chlorophyll a and Pheophytin a concentrations are measured with spectrophotometer scans made before and after acidification with a hydrochloric acid. The modification to the standard method resides in using a sonication unit (instead of a tissue grinder) for the disruption of cells and release of intracellular components.	A study was conducted in 2001-2002 and found good agreement between the modified and unmodified chlorophyll extraction methods. (See Triboli, K., Mueller-Solger, A. and Vayssières, M. 2003)	1/7/1975	1/9/1998
Yes	Std Method 2540-C	Total Dissolved Solids	Total Dissolved Solids, total filterable residue dried at 180 degrees Celsius.	Data comparable to other standard methods in this category, within accuracy and	7/19/1996	Present

				precision limits.		
No	Std Method 3111 B	Cations by Flame AA	Cations: Ca, Mg, Na, and K analyzed by Direct Air-Acetylene Flame AA.	Data comparable to other standard methods in this category, within accuracy and precision limits.	1/7/1975	9/11/1986
No	Std Method 3111 C	Metals AA Flame	Chelation, extraction followed by aspiration into air-acetylene flame.	Data comparable to other standard methods in this category, within accuracy and precision limits.	1/7/1975	9/11/1986
No	Std Method 3114 C	Arsenic	Continuous Hydride generation/Atomic absorption Spectrometric method	Data comparable to other standard methods in this category, within accuracy and precision limits.	9/9/1986	9/10/1993
No	Std Method 3500-As, C	Arsenic, Colorimetric		Data comparable to other standard methods in this category, within accuracy and precision limits.	1/13/1976	5/22/1986

No	Std Method 4500-Cl, B	Chloride, Tritimetric		Data comparable to other standard methods in this category, within accuracy and precision limits.	1/7/1975	3/13/1980
Yes	Std Method 4500-NO3-F Modified	Nitrite, Nitrate (DWR Modified)(Dissolved)	Similar to EPA Method 353.2 with modified holding time: 28 days, preservation: freeze sample.	Data comparable to other standard methods in this category, within accuracy and precision limits.	7/19/1996	Present
No	Std Method 4500-P, D	Ortho Phosphate, Colorimetric		Data comparable to other standard methods in this category, within accuracy and precision limits.	1/7/1975	12/7/1978
No	Std Method 4500-P, F	Ortho-Phosphate (Dissolved)		Data comparable to other standard methods in this category, within accuracy and precision limits.	7/19/1996	11/12/2002
No	Std Method 4500-Si-D	Silica (Dissolved) Molybdosilicate		Data comparable to	3/2/1994	7/15/1997

		Method		other standard methods in this category, within accuracy and precision limits.		
No	USGS I-1700-85	Silica (SiO ₂)		Data comparable to other standard methods in this category, within accuracy and precision limits.	1/7/1975	2/7/1994
Yes	EPA 415.1	Total Organic Carbon (Combustion or Oxidation)	Organic carbon in a sample is converted to carbon dioxide (CO ₂) by catalytic combustion or wet chemical oxidation. The CO ₂ formed can be measured directly by an infrared detector or converted to methane (CH ₄) and measured by a flame ionization detector. The amount of CO ₂ or CH ₄ is directly proportional to the concentration of carbonaceous material in the sample.	Data comparable to other standard methods in this category, within accuracy and precision limits.	1/1/2011	Present
Yes	EPA 415.1 (D)	Dissolved Organic Carbon	Organic carbon in a sample is converted to carbon dioxide by catalytic combustion or wet chemical oxidations. The carbon dioxide formed can be measured directly by an infrared detector or converted to		1/1/2011	Present

			methane and measured by a flame ionization detector. The amount of carbon dioxide or methane is directly proportional to the concentration of carbonaceous material in the sample.			
Yes	EPA 200.7 (D)	Dissolved Calcium	Except for the determination of dissolved analytes, aqueous samples are acid preserved prior to sample processing. For the analysis of dissolved analytes, an acidified portion of the filtrate is analyzed directly. For the determination of total recoverable analytes in aqueous samples containing particulate material as well as solid wastes, samples are subjected to acid pretreatment with nitric and hydrochloric acids and gentle refluxing prior to analysis. The method involves multi-element determination using sequential or simultaneous instruments. The instruments measure characteristic atomic-line emission spectra by optical spectrometry. Sample solutions are nebulized and the resulting aerosol is transported to the plasma torch. Element specific emission spectra are produced by a radio-frequency inductively		1/1/2011	Present

			<p>coupled plasma. The spectra are dispersed by a grating spectrometer and the intensities of the lines are monitored at specific wavelengths by a photosensitive device. Photocurrents from the photosensitive device are processed and controlled by a computer system. A background correction technique is required to compensate for variable background contribution to the determination of the analytes. Background must be measured adjacent to analyte lines on samples during analysis. Various interferences are discussed and must be considered and addressed appropriately.</p>			
No	Std Method 4500-Si-D	Dissolved Silica (SiO ₂)			3/2/1994	7/15/1997