

Last revised on Wednesday, September 29, 2004

| Metadata - Field methods | | | | | | | | | | |
|--------------------------|---------------------------------------|---|---|-------------|----------------|--|---|--|-----------|------------|
| Current? | Method | Name | Description | Instrument | Manufacturer | Model | Instrument Setup | Comparability notes | Data from | Data to |
| Yes | Chlorophyll fluorescence (blue lamp) | Chlorophyll a fluorescence (in vivo) using blue lamp and narrow filter kit. | In vivo chlorophyll a fluorescence is a good indicator of algal biomass levels, since all algae contain chlorophyll a. For accuracy of in vivo measurements, samples must be taken regularly for extraction to correlate with the in vivo readings. | Fluorometer | Turner Designs | Model 10-AU field fluorometer equipped with flow through implement and temperature compensation. | Setup to measure chlorophyll a in the presence of high blank, humic substances, or chlorophyll b (in vivo) (Optical Kit 10-096R). Including: 10-050R excitation filter, 034-0395R emission filter (680 nm interference filter), 10-032 1ND reference filter, an | In April 2003 this setup replaced the traditional white lamp setup after a comparative study showed it yielded better relationships with extracted values. | 3/13/2003 | 5/20/2004 |
| No | Chlorophyll fluorescence (white lamp) | Chlorophyll a fluorescence (in vivo) using white lamp and wide filter kit. | In vivo chlorophyll a fluorescence is a good indicator of algal biomass levels, since all algae contain | Fluorometer | Turner Designs | Model 10-AU field fluorometer equipped with flow through implement and temperature | Setup with traditional chlorophyll filters (Optical Kit 10-037R). Including the 10-050R excitation | This setup was replaced in April 2003 with the setup for the measurement of chlorophyll a in the presence | 1/25/1996 | 10/21/2003 |

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| | | | chlorophyll a. For accuracy of in vivo measurements, samples must be taken regularly for extraction to correlate with the in vivo readings. | | | compensation. | filter, the 10-051R emission filter, the 10-032 1ND reference filter, and the 10-045 Daylight White Lamp. | of high blank, humic substances, or chlorophyll b (in vivo) after comparative study showed it yielded better relationships with extracted values. | | |
| Yes | Depth of Water | Depth of Water Body | The depth of the water column at the point of sampling is measured to nearest foot (0.3 m) | Either 1) a weighted measuring tape for station accessed by road or 2) an electronic depth sounding instrument for stations accessed by boat. | Either 1) n/a for station accessed by road or 2) Ray Marine for stations accessed by boat. | Either 1) n/a for station accessed by road or 2) Sea Talk Syatem T50 200MHz for stations accessed by boat. | n/a | Data comparable to other standard methods in this category, within accuracy and precision limits. | 1/18/1996 | 5/20/2004 |
| Yes | EPA 120.1 (Field) | Specific Conductance (at 25 °C) | The specific conductance of a sample is measured by use of a self-contained conductivity | Electrical conductivity meter | Either 1) for station accessed by road = 1975 to March 2002: Beckman (RC-19) and then | Model RC-19 Beckman; model ...; model 85 YSI. | Instruments used have temperature compensation. | Data comparable to other standard methods in this category, within accuracy and precision | 1/7/1975 | 5/20/2004 |

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| | | | meter, Wheatstone bridge-type, or equivalent. Samples are preferable analyzed at 25°C. If not, temperature corrections are made and results reported at 25°C. | | from April 2002 and on: YSI (85); or 2) for stations accessed by boat = 1975 to Feb 2001: Beckman (RC-19) then from March 2001 and on: ... | | | limits. | | |
| No | EPA 150.1 (Field) | pH (Electrometric) | The pH of a sample is determined electrometrically using either a glass electrode in combination with a reference potential or a combination electrode. | pH Meter | 1975 to 1988: Leeds and Northrup (model 7410) 1989 to 1995: Beckman (pHI 12 or pHI 71) | Model 7410 Leeds and Northrup; model pHI12 or pHI 71 Beckman. | n/a | Data comparable to other standard methods in this category, within accuracy and precision limits. | 1/7/1975 | 12/19/1995 |
| Yes | EPA 170.1 (Field) | Temperature | Temperature measurements may be made with any good grade of mercury-filled or dial type centigrade | Thermometer or thermistor | Either mercury filled thermometer or YSI telethermometer | model unknown? | n/p | Data comparable to other standard methods in this category, within accuracy and precision limits. | 1/7/1975 | 5/20/2004 |

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| | | | thermometer, or a thermistor. | | | | | | | |
| Yes | EPA 180.1 (Field) | Turbidity (Nephelometric) | The method is based upon a comparison of the intensity of light scattered by the sample under defined conditions with the intensity of light scattered by a standard reference suspension. The higher the intensity of scattered light, the higher the turbidity | Turbidimeter | Either 1) for station accessed by road = 1975 to March 2002: Hach (2100A), then from April 2002 and on: Hach (2100P); or 2) for stations accessed by boat = 1975 to December 1998: Hach (2100A), then from January 1999 and on: Turner Designs (10AU) | Models 2100 A or 2100 P Hach; Model 10-AU Turner Designs. | Turner Design model 10-AU set up as turbidimeter | Turbidity using light side-scatter measurement. Comparable with other such methods. Not comparable with Jackson Candle methods. | 1/7/1975 | 5/20/2004 |
| Yes | EPA 360.2 (Field) | Oxygen, Dissolved (Modified Winkler, Full-bottle technique) | The sample is treated with manganous sulfate, potassium hydroxide, and potassium iodide (the latter two reagents combined in one solution) | Bench (pretitration chemicals in powder pillow form from Hach Chemical Co.) Shift from phenylarsine oxide (PAO) | n/a | n/a | n/a | Data comparable to other standard methods in this category, within accuracy and precision limits. | 1/7/1975 | 5/20/2004 |

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| | | | and finally sulfuric acid. The initial precipitate of manganous hydroxide, Mn(OH) combines with the dissolved oxygen | to sodium thiosulfate in 1989. | | | | | | |
| Yes | Field Notes | Notes taken in the field | Notes are taken in the field to document any particular event or condition regarding the sampling event | n/a | n/a | n/a | n/a | n/a | 1/18/1996 | 5/20/2004 |
| Yes | GPS Location | Determine geographic coordinates using the Global Positioning System. | GPS is funded by and controlled by the U. S. Department of Defense (DOD). While there are many thousands of civil users of GPS world-wide, the system was designed for and is operated | Global Positioning System | Various | Various | Read NAD83 datum coordinates | Data comparable to other standard methods in this category, within accuracy and precision limits. | 3/11/2004 | 5/20/2004 |

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| | | | by the U. S. military. GPS provides specially coded satellite signals | | | | | | | |
| No | Light extinction | Depth at which sunlight is extinguished to 1% of surface intensity. | As a light meter is lowered in the water, depth and light measurements are recorded to establish a curve of light extinction. The depth at which only 1% of the surface light intensity remains is read from the curve and recorded. | Light meter | Whitney | LMT-8A | n/p | Data consistent over time, however comparability to other measurements in this category is unknown. | 1/7/1975 | 12/11/1986 |
| Yes | Secchi Disk | Transparency / light penetration below water surface | The Secchi disk (a plastic disk 20 cm in diameter with alternate black and white quadrants) is lowered into the water where the surface is calm and shaded | Secchi Disk | n/a | n/a | n/a | Data comparability to other data mediocre, because of the method's dependance on operator and procedure characteristics. | 1/7/1975 | 5/20/2004 |

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| | | | since glare and surface movements interfere with the observer's vision. The depth at which the disk | | | | | | | |
| No | Serial identification | Serial number applied to field datasheet for identification | Each datasheet used in the field is identified by a serial number | n/a | n/a | n/a | n/a | n/a | 1/3/1983 | 12/8/1993 |
| Yes | Temperature | Temperature | Temperature measurements may be made with any good grade of mercury-filled or dial type centigrade thermometer, or a thermistor. | Thermometer or thermistor | Either mercury filled thermometer or YSI telethermometer | n/p | n/p | Data comparable to other standard methods in this category, within accuracy and precision limits. | 1/7/1975 | 12/19/1995 |
| No | Tide slack level | Tidal level of the targeted water slack | For data consistency and ease of operation, water sampling events are planned to occur within an hour of the predicted high | n/a | n/a | n/a | n/a | n/a | 1/3/1983 | 12/19/1995 |

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| | | | water slack time at each station. The tidal level (i.e. HH for "Higher High", LH for "Lower High") corresponding to this target tim | | | | | | | |
| Yes | Tide slack time | Predicted time of slack water (reference: Golden Gate) | For data consistency and ease of operation, water sampling events are planned to occur within an hour of the predicted high water slack time at each station. The predicted high water slack time at the Golden Gate (San Francisco Bay Entrance) is read from | n/a | n/a | n/a | n/a | Data based on tide prediction models, not on actual observations. | 1/18/1996 | 5/20/2004 |
| Yes | Weather Observations | Subjective weather observations | A qualitative statement on general weather conditions is | n/a | n/a | n/a | n/a | Comment only. Cannot be compared to other data | 1/18/1996 | 5/20/2004 |

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| | | | recorded on the field datasheet. | | | | | because the procedure is not precisely defined. | | |
| No | Wind Direction | Wind Direction | Wind direction is obtained with the wind vane associated with the anemometer and recorded on the field sheet. Readings are made in increments of 360/16 degrees (i.e. 22.5 degrees), with North at 0. | Wind Vane | Either 1) for stations accessed by road: a Dwyer hand-held wind speed indicator or 2) for stations accessed by boat: a Danforth electronic wind speed indicator. | n/p | n/p | Data comparable to other such measurements, however accuracy and precision are limited. | 1/23/1984 | 12/19/1995 |
| No | Wind Velocity | Wind Velocity | Wind speed is measured with the anemometer and recorded on the field sheet. | Anemometer | Either 1) for stations accessed by road: a Dwyer hand-held wind speed indicator or 2) for stations accessed by boat: a Danforth electronic wind speed indicator. | n/p | n/p | Data comparable to other standard methods in this category, within accuracy and precision limits. | 1/7/1975 | 12/19/1995 |