Action Agency Response to Comments by the National Marine Fisheries Service on the 2002 Water Management Plan

7.3 Water Quality Actions

7.3.2 Total Dissolved Gas Monitoring

Monitoring of the physical and biological effects of the Biological Opinion (BiOp) spill program has been and continues to be a necessary part of the water quality activities associated with the spill program. Additionally, physical monitoring of total dissolved gas (TDG) at the fixed monitoring stations throughout the Columbia and Snake rivers as well as biological monitoring of juvenile and adult salmonid migrants has been a requirement of the state water quality agencies as part of the annual waiver of water quality standards. A detailed description of the two monitoring programs needs to be provided.

In the past the monitoring planning was done in concert with the annual Water management Plan (WMP). When the WMP was distributed for review and comment at the Water Quality Team (WQT) on January 8, 2002, the absence of monitoring plan discussions was noted. The Corps representative explained that the monitoring plans would be addressed in subsequent planning documents. The discussion of the TDG monitoring in Section 7.3.2 is inadequate for this purpose and no mention is made in the WMP of plans for biological monitoring. We strongly recommend that the Corps include a full discussion of the two monitoring program plans either as a component of the final Water Management Plan or in companion planning documents.

RESPONSE: The following text has been added:

There are two purposes for the Corps to monitoring TDG and water temperature at 10 Columbia River Basin dams: 1) to monitor project performance in relation to water quality standards, and 2) to provide water quality data for anadromous fish passage at Columbia/Snake mainstem dams. The monitoring program is considered an integral part of the Corps' Reservoir Control Center water management activities.

TDG is the primary water quality parameter monitored. High saturation level TDG can cause physiological damage to fish. Water temperature is also measured because it affects TDG saturation levels, and because it influences the health of fish and other aquatic organisms. Both TDG and water temperature are closely linked to project water management operations (e.g., water released over the spillways, releases through the powerhouses and other facilities, and forebay and tailwater water surface elevations).

One component of the NMFS 2000 BiOp water quality strategy was for the Corps to take the actions necessary to implement the spill program at the dams called for in the BiOp, including obtaining variances from appropriate State water quality agencies. The Corps took the necessary actions to prepare for the 2002 spill season. The variance from the State of Oregon was issued on March 8, 2002.

The variance provides for a revision of the total dissolved gas standard from 110 percent to a revised standard of 115 percent in the forebays and 120 percent

in the tailwaters of McNary, John Day, The Dalles, and Bonneville dams, and the Camas location, from April 1, 2002, to August 31, 2002. The 115 percent and 120 percent caps are based on the 12 highest hourly measurements per calendar day. Also, a cap of total dissolved gas of 125 percent, based on the two highest hours, is in effect.

In 1999, the State of Washington had issued a modified TDG water quality standard, which is in effect through the 2002 water year. Additional actions with the State of Washington were not required for the 2002 water year.

The State of Idaho was not approached in 2002 concerning a variance to water quality standards. The State, in conjunction with the Tribes, provided a set of conditions in 2001 to be met as part of the variance process. Due to the conditions provided by the State and Tribes, the forecasted drought conditions and the foreseen use of Dworshak water releases, there was no further pursuit of a water quality variance by the Corps for the 2001 water year. The Corps did not pursue obtaining a variance from the State of Idaho for 2002.

The Reservoir Control Center is responsible for monitoring the TDG and water temperature conditions in the forebays and the tailwaters of the lower Columbia River/lower Snake River dams, and selected river sites. The operational water management guidelines in Oregon are to change spill levels and, subsequently, spill patterns at the dams (daily if necessary) so that the forebays are as close to, but do not exceed, daily (12 highest hours) average of 115 percent TDG, and the tailwater levels are close to, but do not exceed, daily (12 highest hours) average of 120 percent TDG. Also, a cap of total dissolved gas of 125 percent, based on the two highest hours, is in effect.

The Corps prepares a Total Dissolved Gas Management Plan each year. It is a supporting document for the Water Management Plan. The Plan summarizes the roles and responsibilities of the Corps as they relate to dissolved gas monitoring. The Plan stipulates what to measure, how, where, and when to take the measurements and how to analyze and interpret the resulting data. The Plan also provides for periodic review and alteration or redirection of efforts when monitoring results and/or new information from other sources justifies a change. The Plan identifies channels of communication with other cooperating agencies and interested parties.

The Corps will be monitoring similarly to what occurred in 2000 and 2001.

See: http://www.nwd-wc.usace.army.mil/TMT/

The 2001 Plan of Action can be found listed under the TDG category of the Reservoir Control Center Water Quality Team page on the following web site: http://www.nwd-wc.usace.army.mil/TMT/wqwebpage/mainpage.htm

RPA 131 and 132 also have biological monitoring components. However, tracking the biological monitoring is not part of RPAs 131 and 132. A complete discussion of juvenile fish passage monitoring is described in the BiOp, at 10.5.1.4, Monitoring Juvenile Fish Passage at Dams. BPA is responsible for funding the smolt monitoring program coordinated and implemented by the Fish Passage Center, and the Corps is responsible for funding sampling relative to the juvenile fish transportation program and facility operations. A report on gas bubble trauma is a condition of the Oregon TDG variance for 2002 and a condition of the modified Washington TDG standard of 115 percent in the forebays and 120 percent in the tailwaters for juvenile salmonid passage. The Corps relies on NMFS for two products that are submitted to the Oregon Department of Environmental Quality and the Washington Department of Ecology to meet their water quality conditions. The two products are a copy of the Fish Passage Center annual report and a concurrence letter from NMFS agreeing with the Fish Passage Center conclusions. The Corps forwards the two products, along with the other reports, to meet the conditions of the states of Washington and Oregon.

7.3.3 Total Dissolve Gas Monitoring Review

The third sentence should be changed to, "NMFS believes that some forebay locations, such as the Camas site, ~~have~~ may need to be changed. The BiOp clearly indicates that there may be a problem with representativeness of the sampling of fixed monitoring stations (FMS), particularly forebay stations, but the BiOp called for a careful technical evaluation of the conditions at the stations and a coordination with the WQT in making of final decisions. The WMP should reflect these points more accurately.

A subgroup of the WQT has been working on this issue for a number of months and is nearing the end of its efforts. The subgroup has developed a set of criteria for FMS performance, has applied these criteria to nearly half of the FMS locations and has concluded its discussions of the Camas site in particular. The WMP should reflect these efforts and findings. Also, the current draft makes reference to a due date of February 2001 for the development of a plan to review the FMS system. It is currently a year later. This reference in a planning document for calendar 2002 makes no sense.

RESPONSE: The following text has been added:

In an effort to address the issue of redundant monitoring the Corps has drafted Data Quality Criteria for the fixed monitoring stations at its projects. The Data Quality Criteria describe the accuracy, precision and completeness of the data needed at each station. The fixed monitoring stations will be assessed at the end of the monitoring season against these criteria and a performance report will be created. Adjustments will be made to the individual fixed monitoring stations that do not perform to the objectives described. The Data Quality Criteria approach is being recommended instead of the redundant and backup monitoring, and spot-

checking approach described in the BiOp since it will provide greater flexibility with equipment and has less impact on program cost escalation.

The Corps is proposing the following Data Quality Criteria as an alternative to the redundant stations in RPA 131 and as a regional standard for TDG monitoring stations.

7.3.2.1 PROPOSED DATA QUALITY CRITERIA

The proposed data quality criteria for fixed monitoring station cover laboratory calibration, field instrument post-calibration; field performance check; and general criteria. The items are described as following:

1. ***Laboratory calibration***
   There are four data quality criteria associated with laboratory calibration, including calibration of the following: the secondary TDG standard; the secondary barometric pressure standard; the field instrument TDG sensor; and secondary standard thermistor. Each is described as follows:

   1. ***<u>Calibration of Secondary TDG Standard (instrument calibrated with a primary standard)</u>***
      Calibrate the TDG sensor at two points using the primary National Institute of Standards and Technology certified (NIST) standard. The TDG pressure must be +/- 2 mmHg at both pressures; otherwise the secondary standard is recalibrated. Pressures at which the sensor is calibrated must bracket the expected range of field measurements.

   2. ***<u>Calibration of Secondary Barometric Pressure Standard</u>***
      Calibrate the secondary standard barometer at ambient barometric pressure to the NIST standard. The barometer must be +/- 1 mmHg of the primary standard (NIST certified instrument) otherwise the secondary standard is recalibrated.

   3. ***<u>Calibration of Field Instrument TDG sensor</u>***
      The two point TDG sensor calibration must agree within +/- 2 mmHg at both pressures, otherwise the sensor is recalibrated. Pressures at which the sensor is calibrated must bracket the expected range of field measurements.

   4. ***<u>Calibration of Secondary Standard Thermistor</u>***
      The instrument's thermistor must agree within +/- 0.2°C with the primary NIST standard. This variance will be monitored and if the probe performs outside this range, it will be returned to the manufacturer for maintenance. A check or verification still constitutes a calibration and should be documented in records.

2. ***Field instrument post-calibration***
   There are three data quality criteria associated with field instrument post-calibration: two fixed points; two point TDG sensor calibration and suspected parameters. Each is described as follows:

   1. ***<u>Two Fixed Points:</u> In order to reduce TDG calibration variability, two fixed points should be chosen and incorporated in the TDG calibration protocol. For example, calibrate the first point to ambient barometric pressure, and the second point to 200 mmHg over barometric pressure. The calibrated range for this example brackets 100-126 percent TDG saturation. This ensures the same calibration curve is established each time for every instrument.***

   2. ***<u>Two Point TDG Sensor Calibration:</u> Following a 2-week deployment, a two point TDG sensor calibration must agree within +/- 4 mmHg at both pressures. Pressures at which the sensor is calibrated must bracket the expected range of field measurements. If the pressure is not +/- 4 mmHg of the standard, the data will be reviewed and appropriately corrected. If, after data review, a correction cannot be applied, the data will be removed from the database. Sensor drift can be handled using a linearly prorated correction, but it is entirely possible for someone to enter incorrect calibration values, which would result in a shift affecting all readings equally.***

   3. ***<u>Suspected Parameters:</u> If any parameter is considered suspect following these calibration checks on return to the laboratory, the data collected for the previous time period will be reviewed and if applicable, corrections will be applied or the data will be removed from the database.***

3. ***Field Performance check***
   There are four data quality criteria associated with field performance check: TDG pressure compared to secondary standard; standby probes deployed; thermistor compared to secondary standard; and field barometer compared to secondary standard. Each is described as follows:

   1. ***<u>TDG Pressure Compared to Secondary Standard:</u> After the deployment period, prior to removal of the field instrument, the TDG pressure will be compared to the secondary standard. The actual decision point regarding adjusting the data would be in the lab following the two point TDG sensor calibration described in field instrument post calibration. The field comparison actually involves sampling precision and should not be used as a decision point for shifting data.***

   2. ***<u>Standby Probe Deployed</u>: During initial deployment of a new instrument, after sufficient time for equilibration (up to 1 hour), the TDG pressure must***

be +/- 10 mmHg of the secondary standard otherwise another (standby) probe is deployed.

3. ***<u>Thermistor Compared to Secondary Standard:</u> During initial deployment of the new instrument, the thermistor will be +/- 0.4°C of the secondary standard, corrected for calibration, or the instrument will be replaced with a standby.***

4. ***<u>Field Barometer Compared to Secondary Standard:</u> At each visit the field barometer reading should the same as the secondary standard or the field barometer will be calibrated.***

4. ***General Criteria:***

    1. ***<u>Depth of Sensor:</u> The sensor must be deployed to a depth greater than the compensation depth; otherwise the TDG measurements may be underestimated. If the site does not accommodate maintaining the probe at greater than the compensation depth for more than 95 percent of the measurements, investigations will begin to relocate the fixed monitoring station.***

    2. ***<u>Data Set Completeness:</u> As a goal, data collected at each site will be 95 percent of the data that could have been collected during the defined monitoring period. The calculation of data set completeness is based on temperature and percent TDG, encompassing barometric pressure and TDG pressure, not the completeness of each parameter measured.***

In 2002 we plan to establish data quality objectives, at existing stations, instead of establishing redundant stations.

The NMFS 2000 Biological Opinion RPA 198 stipulates "The Action Agencies, in coordination with NMFS, USFWS, and other Federal agencies, NWPPC, state, and Tribes, shall develop a common data management system for fish population, water quality, and habitat data." The Memorandum of Agreement (MOA) for Cooperative Information System Management for the Columbia Basin, signed on April 1, 2002, by the NWPPC and NMFS, encourages the development of regional data standards in support of a consistent and standardized database. The development of data quality criteria for TDG monitoring stations could be one of the regional standards towards the long-term goal of a consistent, standardized regional database. To foster comparability of their databases with the MOA, the Action Agencies participate at several levels in the cooperative information system development project being conducted by the NWPPC, NMFS and Science Applications International Corporation (SAIC). The other entities stipulated in RPA 198 will be part of this project.

7.3.4 Total Dissolved Gas Model

The draft WMP makes reference in this section to a due date of spring 2001 for the development of TDG models to be used as river management tools. This reference in a planning document for calendar 2002 makes no sense. Further, as the draft describes, the Corps and BPA conducted workshops on the SYSTDG model in February and March of 2001. At that time the model was described as being management capable at that time. The draft seems to contradict what the region was told at the workshops. This should be clarified.

RESPONSE: The following text was added:

Use of the SYSTDG model as a water management planning tool needs ongoing development. The original data set used to develop the model included 1994 to 1998 data. The model can be used as a management tool to simulate flow conditions experienced between 1994 to 1998. The Corps will work with the SYSTDG model developer in 2002 to scope an effort to expand the data set to include 1994 to 2001 data sets. This addition will increase the model's range of use as a planning tool.

7.3.5 Temperature Model and Temperature Monitoring Needs

The first sentence needs to be clarified. It states, "Water temperature alteration, elevation or depression caused by impoundment of pools behind dams can result in a change of water temperature regime of the river." The underlined words are suggestions that might help but the original intent of the statement is not clear to the reader.

RESPONSE: The sentence was changed as follows:

Water temperature changes related to the impoundment of pools behind dams can result in increases in the water temperature regime of the river, potentially causing injury and mortality of juvenile salmonids.

The second paragraph in this section states that the geographic scope of the model called for by Action 143 of the RPA is unclear. It then proceeds to state the specific geographic guidance provided in the BiOp. Clearly, the primary focus of this action item is the Snake River and Lower Granite Reservoir. Hells Canyon and Dworshak Dams are mentioned because these are the major structures offering control of water releases into the reach of concern. Bonneville Dam is mentioned because the thermal effects of changes in the Snake River are likely to have influence further downstream. In cases where technical future decisions or action item implementation guidance was anticipated by the BiOp the Water Quality Team was identified as a source to the region. If clarification of technical matters is required in the WMP or other actions related to the BiOp the Corps should consider bringing the issue to the WQT.

<u>RESPONSE</u>: The following text was added:

The geographic scope of the model described in BiOp RPA 143 (page 9-127) has been clarified based on discussion at the February 2002 Water Quality Team meeting. The discussion section of RPA 143 included a reference to Bonneville Dam, but the Water Quality Team clarified that the intent of RPA 143 was directed to only the Snake River.

For all the above paragraphs, text of the Water Management Plan was modified to incorporate information discussed in the comments.