California Regional Water Quality Control Board
Lahontan Region

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Arnold Schwarzenegger
Governor

MEMORANDUM

TO: Dr. Gerald Bowes
State Water Resources Control Board
Division of Water Quality
P.O. Box 100
Sacramento, CA 95812

FROM: Douglas F. Smith
Chief of the TMDL/Basin Planning Unit

DATE: November 12, 2008

SUBJECT: REQUEST TO INITIATE SCIENTIFIC PEER REVIEW PROCESS FOR LAKE TAHOE WATERSHED TOTAL MAXIMUM DAILY LOAD (TMDL) FOR SEDIMENT AND NUTRIENTS

Lahontan Water Board staff request that you begin the process for selection of scientific peer reviewers for the draft Basin Plan Amendment for the Lake Tahoe TMDL. The TMDL is a joint effort between Lahontan and the Nevada Division of Environmental Protection (NDEP). Lake Tahoe, located in both California and Nevada, sits between the crest of the Sierra Nevada Mountains on the west and the Carson range on the east. Sixty-three streams flow into Lake Tahoe, and the Lake's one outlet, the Truckee River, drains into Pyramid Lake located in Nevada.

Lake Tahoe is listed pursuant to the federal Clean Water Act, Section 303(d), for impairment due to an excess loading of nutrients and fine sediment particles. Lahontan Water Board staff expects the draft amendment will be circulated for public review in 2009, and brought to the Water Board for consideration in late 2009. At least four peer reviewers are requested to cover four specific disciplines: 1) limnology, with expertise in estimating load capacity and lake response to pollutant input, 2) watershed water quality/hydrology, with expertise in source load estimates, 3) water quality resources management, with expertise in non-point source assessment and best management practices, and 4) atmospheric science, with expertise in the transport and deposition of nutrients and fine sediment particles. In addition to the four disciplines listed above, peer reviewers with expertise in non-point source pollution and biogeochemistry, as related to limnology and water quality, would be appropriate additions.

Peer reviewers are asked to determine whether the scientific portion of the Lake Tahoe TMDL Staff Report and proposed Basin Plan Amendment is based upon sound scientific knowledge, methods, and practices. These documents should be available for

peer review by the week of February 2, 2009. Attachment 2 provides more information on the technical and scientific issues to be addressed by the peer reviewers. Supporting information used to develop the Lake Tahoe TMDL and Basin Plan Amendment will be provided for the peer reviewers' reference, including three specifically significant documents, the Lake Tahoe TMDL Technical Report (2008), the Pollutant Reduction Opportunity Report (March 2008), and the Integrated Water Quality Management Strategy Report (March 2008). These three documents are summarized in the Lake Tahoe TMDL Staff Report and will be sent to the peer reviewers as documents in PDF format on a disk.

I understand from the California Environmental Protection Agency's November 2006 guidance document that, after reviewing the attached summaries, you will contact the State Board's contractor to arrange for identification of potential peer reviewers. Once reviewers have been identified, communication with them will be Water Board staff's responsibility. Due to the timeline for public review and Board consideration, I request that the peer review process be completed within 30 days of receipt of the review materials.

Five Attachments are provided as part of this peer review request: (1) a summary of the Lake Tahoe TMDL, (2) a summary of the technical and scientific issues that may require peer review, (3) a list of scientists, engineers, and land-use planners external to the State or Water Board involved in previous studies related to the TMDL, (4) a list of peer reviewed publications relied on for the Lake Tahoe TMDL, and (5) a list of non-peer reviewed publications relied on for the Lake Tahoe TMDL.

Please contact me at our South Lake Tahoe office if you have any questions or need further information. You may reach me at (530) 542-5453; my email address is dfsmith@waterboards.ca.gov. Thank you.

cc: David Coupe, Office of Chief Counsel, SWRCB
Rik Rasmussen, Division of Water Quality, SWRCB
Joanne Cox, Division of Water Quality, SWRCB
Jason Kuchnicki, Nevada Division of Environmental Protection
Larry Benoit, Tahoe Regional Planning Agency

Attachments

Revised
June 4, 2009

Attachment 1

Background of the Lake Tahoe TMDL

The proposed amendment is a plan to control the fine sediment particle and nutrient inputs that are impacting Lake Tahoe's famed clarity. This plan, known as the Lake Tahoe Total Maximum Daily Load (TMDL), identifies the basin-wide budget of fine sediment particles less than 16 micrometers (µm) and nutrients (total nitrogen and total phosphorus) and estimates the total load reductions for these pollutants that are needed to restore clarity. The amendment will (1) describe the impacts of fine sediment particles and nutrients on relevant beneficial uses designated for the Lake, (2) propose numeric targets to interpret narrative sediment and nutrient-related water quality objectives, and (3) provide an estimate of pollutant source loads and load reductions needed to improve the transparency and clarity to meet the water quality objectives.

The maximum allowable pollutant loads, or TMDL, will be allocated to major source categories in the Lake Tahoe basin according to land use types and estimates of sediment/nutrient control efficiencies. For the urban source category the pollutant loads will be allocated to specific jurisdictions. The amendment will include a plan of implementation, describing the general nature of actions needed to control fine sediment particles and nutrients entering the lake, and an initial monitoring plan to determine the success of these measures.

To facilitate TMDL development, Water Board staff contracted with University of California-Davis and Tetra Tech, Inc., entities which in turn sub-contracted with various academic and consulting groups, to study sediment, nutrients (total nitrogen and total phosphorus) and turbidity conditions affecting the Lake Tahoe watershed. These studies helped develop a basin-wide budget of pollutant inputs associated with each significant source category (e.g., upland runoff, atmospheric deposition). Additionally, Water Board staff contracted with Tetra Tech, Inc. and Environmental Incentives Inc. to determine types of pollutant control measures that could be used to restore Lake Tahoe. The products from these studies will be provided to the peer reviewers for their reference.

The draft Lake Tahoe TMDL document prepared by Water Board and NDEP staff is based on our interpretation of data from these comprehensive research studies. Our interpretation is that Lake Tahoe is not capable of assimilating the current loads of fine sediment particle and nutrient inputs. This phenomenon is indicated by years of clarity measurements showing the Lake is not meeting the clarity and transparency standards developed by the Water Board. Additionally, 2007 Secchi disk measurements demonstrate the Lake has lost more than seven meters of annual average clarity depth since measurements began in 1968. TMDL research indicates that fine sediment particles (< 16 µm in diameter) are a leading cause impacting the Lake's clarity: However, the importance of nutrient reduction is also recognized.

Urban runoff, forest runoff, stream channel erosion, atmospheric deposition, and shoreline erosion are all contributing factors that deliver fine sediment particles to Lake Tahoe. The largest percent contribution of fine sediment particles is generated in urban areas from its associated commercial, residential, and roadway network.

The Lake Tahoe TMDL is a plan to restore Lake Tahoe's historic transparency and clarity.

Revised
June 4, 2009

Attachment 2

Description of the Scientific Basis of the TMDL and Issues to be Addressed

The statute mandate for external scientific peer review (Health and Safety Code Section 57004) states that the reviewer's responsibility is to determine whether the scientific portion of the proposed Basin Plan Amendment is based upon sound scientific knowledge, methods, and practices.

We request that you make this determination for each of the following issues that constitute the scientific basis of the proposed regulatory action. An explanatory statement is provided for each issue to focus the review.

1. **Determination of fine sediment particles (< 16 µm) as the primary cause of clarity impairment based on interpretation of scientific studies, available data, and the Lake Clarity Model.**

Although Lake Tahoe is on the Clean Water Act 303d list as impaired due to sediment and nutrient inputs, the primary indicator of these impairments is the loss in transparency as measured by Secchi disk depth. The Lake Clarity Model, developed, calibrated, and validated by UC Davis, indicates clarity loss is primarily due to the number of fine sediment particles suspended in the water column. Specifically, the number of particles with a diameter of less than 16 µm is responsible for the majority of the clarity condition. Increased primary productivity driven by elevated nitrogen and phosphorus inputs is a lesser, but still important, factor in Lake Tahoe's clarity loss. Based on the model's predictive capability, the Lake Tahoe TMDL implementation plan emphasizes fine sediment particles as the target pollutant. Nutrient load reductions are also important but to a lesser degree as compared to fine sediment particle load reductions. All three pollutant loads will be allocated and load reductions will be tracked.

Your review for this issue should focus on the summary information in Chapters 3 and 8 in the Draft TMDL, and for detailed information, you should focus on Chapters 3.4, 5, and 6 in the TMDL Technical Report.

2. **Identification of the six sources of pollution affecting lake clarity of which urban upland areas was found to be the primary source of fine sediment particles causing Lake Tahoe's clarity loss.**

Staff, contracted researchers, and consultants created a pollutant loading budget for three forms of sediment (total suspended sediment mass, < 63 µm mass, and < 16 µm particle number), phosphorus and nitrogen. The loading budget identified six pollutant sources: urban uplands, forest uplands, atmospheric deposition, groundwater, shoreline erosion, and stream channel erosion. Of these sources, urban uplands was found to contribute more than 70% of the total fine sediment particle load as measured by the number of particles less than 16 µm in diameter. The reliability of these

estimates was checked using a number of approaches including field monitoring, modeling and comparison to previously reported studies in the Tahoe basin.

Your review for this issue should focus on the summary information in Chapter 7 of the Draft TMDL and, for detailed information, you should focus on Chapter 4 of the TMDL Technical Report.

3. Determination that the Lake Tahoe Watershed Model was an appropriate model to estimate upland pollutant source loads.

The Lahontan Water Board contracted with the University of California, Davis and Tetra Tech, Inc. to determine the magnitude of fine sediment and nutrient loads from upland sources (undeveloped and developed). Building on the EPA-approved Load Simulation Program in C++ (LSPC) watershed model, Tetra Tech developed the watershed-specific Lake Tahoe Watershed Model capable of estimating average annual loads from a variety of different land use conditions, including rural and urban areas. The model results indicate approximately 9% and 72% of the average annual fine sediment particle load is generated in the undeveloped and urban uplands, respectively.

Your review for this issue should focus on the summary information in Chapter 7.5 of the Draft TMDL and, for detailed information, you should focus on Chapter 4.3 in the TMDL Technical Report. For additional detail regarding the selection and development of the Lake Tahoe Watershed Model, please see the *Watershed Hydrologic Modeling and Sediment and Nutrient Loading Estimate for the Lake Tahoe Total Maximum Daily Load* report, dated February 2007.

4. Determination that estimates of groundwater nutrient loading rates are reasonable and accurate.

The United States Army Corp of Engineers (USACE) completed an evaluation in 2003 to analyze available groundwater data and estimate groundwater nutrient inputs to Lake Tahoe and its tributary streams. By dividing the Lake Tahoe Basin into regional groundwater sub basins, the USACE 2003 evaluation refined previous groundwater loading estimates, evaluated ambient groundwater nutrient loading rates, and identified potential groundwater pollution sources. Based on this information, the Lake Tahoe TMDL program determined that groundwater contributes approximate 12% and 15% of the average annual nitrogen and phosphorus loads, respectively.

Your review for this issue should focus on the summary information in Chapter 7.2 of the Draft TMDL and, for detailed information, you should focus on Chapter 4.1 in the TMDL Technical Report.

5. **Pollutant loading rates from atmospheric deposition directly to the lake surface were quantified and in-basin sources were found to be the dominant source of both nitrogen and fine particulate matter. Direct deposition of dust accounts for approximately 15% of the average annual fine sediment particle load.**

Because the Lake's surface area (501 km^2) is large relative to its watershed drainage area (812 km^2), the Lake Tahoe TMDL team spent significant time and resources to quantify nutrient and particulate loading from direct atmospheric deposition. In cooperation with the California Air Resources Board (CARB), the TMDL team undertook a multi-year science program to quantify the contribution of dry atmospheric deposition. The 2006 *Lake Tahoe Atmospheric Deposition Study*, conducted by CARB, augmented long-term atmospheric data collected by the University of California, Davis. Based on these studies, the Lake Tahoe TMDL found that atmospheric deposition contributes 55% of the average annual nitrogen load directly to the lake.

Your review for this issue should focus on the summary information in Chapter 7.6 of the Draft TMDL and, for detailed information, you should focus on Chapter 4.5 of the TMDL Technical Report.

6. **Pollutant Reduction Opportunity (PRO) analysis identifies fine sediment particle and nutrient reduction options that can be quantified. The PRO findings offer basin-wide pollutant load reduction estimates and costs for a range of implementation alternatives for reduction loads from urban uplands, forest uplands, stream channel erosion, and atmospheric deposition sources.**

The Water Board contracted with Tetra Tech, Inc. to conduct a thorough evaluation of pollutant load reduction opportunities for the major pollutant sources. The project was organized around four Source Category Groups, led by local and regional experts in their respective fields. These groups screened potential treatment options on (1) the ability to treat the pollutants of concern and (2) the ability to quantify load reduction effectiveness. The analysis results provide the basis for the Lake Tahoe TMDL implementation strategy. The PRO analysis found the largest, most cost effective opportunities for fine sediment particle load reductions are from the urban upland source.

Your review for this issue should focus on the summary information in Chapter 9 of the Draft TMDL. Details of each Source Category Group analysis approach are described in Chapters 2-5 of the Lake Tahoe TMDL Pollutant Reduction Opportunity Report v2.0 (March 2008). Combined results summarizing the basin-wide estimated load reductions and associated costs can be found in Chapter 6 of that report. Chapter 2 of the Integrated Water Quality Management Strategy Project Report outlines the Recommended Strategy for TMDL implementation, while Chapter 3 of that document describes how the Pollutant Load Reduction Opportunity analysis was used to develop the Recommended Strategy.

7. Lake Clarity Model was the most appropriate for predicting the lake response to changes in pollutant loads.

Researchers at the University of California at Davis developed the Lake Clarity Model to predict how Lake Tahoe's Secchi depth may respond to changing pollutant input over time. The Lake Tahoe TMDL program used the Lake Clarity Model to predict how the lake's transparency is expected to change in response to the proposed implementation approach.

Your review for this issue should focus on the summary information in Chapter 8 of the Draft TMDL and, for detailed information, you should focus on Chapter 6 of the TMDL Technical Report.

8. Allocation of allowable fine sediment particle and nutrient loads is based on the relative magnitude of each pollutant source's contribution and the estimated ability to reduce fine sediment particle and nutrient loads

Fine sediment particle and nutrient loads were allocated based on the relative source loads and the ability to control fine sediment particles and nutrients from the primary contributing land uses. The efficacy of various pollutant control options was evaluated and provided the basis of the recommended implementation strategy. Because the urban landscape contributes the largest percentage of the fine sediment particle load and because urban stormwater controls represent the greatest control opportunity, urban stormwater dischargers bear the brunt of the reduction responsibility. Current programs to reduce fine sediment particle and nutrient loads from undeveloped forest areas and stream channel erosion are adequate and cost effective. Dust control measures offer further opportunities for fine particle reductions from atmospheric deposition and are included in the implementation approach.

Your review for this issue should focus on Chapter 10 of the Draft TMDL. Chapter 5 of the Integrated Water Quality Management Strategy Project Report describes the load allocation analysis methods for dividing allocations by responsible jurisdiction and summarizes the different load allocation approaches considered. Your attention should focus on Approach II, Load Source Weighted, as this was the chosen load allocation approach.

The Big Picture

Reviewers are not limited to addressing only the specific issues presented above, and are asked to consider the following questions:

(a) In reading the staff technical reports and proposed implementation language, are there any additional scientific issues that are part of the scientific basis of the proposed rule not described above?

(b) Taken as a whole, is the scientific portion of the proposed rule based upon sound scientific and technical knowledge, methods, and practices?

(c) Was the science program reasonably designed to fill in knowledge gaps: was historical data appropriately used.

Reviewers should also note that some proposed actions may rely significantly on professional judgment where available scientific data is not as extensive as desired to support the statute requirement for absolute scientific rigor. In these situations, the proposed course of action is favored over no action.

The preceding guidance will ensure that reviewers have an opportunity to comment on all aspects of the scientific basis of the proposed Board action. At the same time, reviewers also should recognize that the Board has a legal obligation to consider and respond to all feedback on the scientific portions of the proposed rule. Because of this obligation, reviewers are encouraged to focus feedback on the scientific issues that are relevant to the central regulatory elements being proposed.

Additional Materials Provided to the Peer Reviewers

The Lake Tahoe TMDL Technical Report references numerous projects that were funded as part of the Lake Tahoe TMDL. These numerous studies, which are listed below, are also provided for the peer reviewers since these studies were intended for direct use in the Lake Tahoe TMDL Technical Report. In some cases, the language from portions of those project reports was directly incorporated into the text of the Technical Report.

Groundwater

USACE (United States Army Corps of Engineers). 2003. *Lake Tahoe Basin Framework Study: Groundwater Evaluation*. U.S. Army Corps of Engineers, Sacramento District.

Stream Channel

Simon, A., E.J. Langendoen, R.L. Bingner, R. Wells, A. Heins, N. Jokay and I. Jaramillo. 2003. *Lake Tahoe Basin Framework Implementation Study: Sediment Loadings and Channel Erosion*. USDA-ARS National Sedimentation Laboratory Research Report. No. 39.

Simon, A. 2006. *Estimates of Fine-Sediment Loadings to Lake Tahoe from Channel and Watershed Sources*. USDA-Agricultural Research Service, National Sedimentation Laboratory. Oxford, MS.

Atmospheric

CARB (California Air Resources Board). 2006. *Lake Tahoe Atmospheric Deposition Study (LTADS)*. Final Report – August 2006. Atmospheric Processes Research Section, California EPA, Sacramento, CA.

Upland

Tetra Tech, Inc. 2007. *Watershed Hydrologic Modeling and Sediment and Nutrient Loading Estimation for the Lake Tahoe Total Maximum Daily Load.* Final modeling report. Prepared for the Lahontan Water Board and the University of California, Davis.

Shoreline Erosion

Adams, K.D. 2004. Shorezone erosion at Lake Tahoe: Historical aspects, processes, and stochastic modeling. Final report for the U.S. Bureau of Reclamation and the Tahoe Regional Planning Agency. Desert Research Institute, Reno, NV.

Adams, K.D. and T.B. Minor. 2001. *Historic Shoreline Change at Lake Tahoe from 1938 to 1998: Implications for Water Clarity.* Desert Research Institute, Reno, NV. Prepared for the Tahoe Regional Planning Agency.

Lake Clarity Modeling

Sahoo, G.B., S.G. Schladow and J.E. Reuter. 2007. *Linkage of Pollutant Loading to In-lake Effects.* University of California, Davis – Tahoe Environmental Research Center. Prepared for the Lahontan Water Board.

Water Quality Planning

Lake Tahoe TMDL Pollutant Reduction Opportunity Report. Environmental Incentives, LLC., prepared for the Lahontan Water Board and the Nevada Division of Environmental Protection. March 2008

Integrated Water Quality Management Strategy Project Report, Environmental Incentives LLC, prepared for the Lahontan Water Board and the Nevada Division of Environmental Protection. March 2008

Attachment 3

Scientists, Engineers, and Land Use Planners Involved in Studies Related to the Lake Tahoe Watershed Sediment and Nutrient TMDL

FEDERAL AGENCIES

1. ***U.S. Army Corps of Engineers***
   Meegan Nagy, Melissa Kieffer, Lewis Hunter, Timothy Crummett, Teresa Rodgers, John Baum, Elizabeth Caldwell, Scott Gregory, Suzettee Ramirez, Glenn Cox, Richard Meagher

2. ***U.S. Environmental Protection Agency***
   Jacques Landy, Jane Freeman

3. ***U.S. Geological Survey***
   Tim Rowe, Kip Allander

4. ***U.S. National Park Service***
   Lee Tarnay

5. ***U.S. Department of Agriculture (USDA), United States Forest Service – Lake Tahoe Basin Management Unit***
   Sue Norman, Denise Downey, German Whitley, Joey Keeley, Craig Oehrli

6. ***USDA – National Sedimentation Laboratory, Oxford, MS***
   Andrew Simon, Eddie Langendoen, Ron Bingner, Brian Bell, Loren Klimetz, Danny Klimetz, Mark Griffith, Charlie Dawson, Robert Wells, Amanda Heinz, Nick Jokay, Igor Jaramillo

STATE AGENCIES

1. ***California Air Resources Control Board***
   Earl Withycomb***,*** Eileen McCauley, Leon Dolislager, Tony VanCuren, Jim Pederson, Ash Lasgari, Bart Croes, Richard Corey, Dongmin Luo, William Vance, Clinton Taylor, Steve Mara, Deborah Popejoy, Michael Fitzgibbon, Jerry Freeman, Pat Vaca

2. ***California Department of Transportation (Caltrans)***
   Jody Jones, Amarjeet Benipal, Joe Caputo, John Rodrigues, Katrina Pierce, Steve Kirkpatrick, John Webb, Douglas Coleman, Leslie Case, Bill Davis, Tom Brannon, Jody Brown, Scott McGowen, Joyce Brenner, Karl Dreher, Keith Jones, Daniela Guthrie, Mitch Mysliwiec, John Johnston

3. ***California Tahoe Conservancy (CTC)***

Judy Clot, Kim Carr

4. ***Tahoe Regional Planning Agency (Bi-state agency, California and Nevada)***
   Larry Benoit, Sean Dougan, John Stanley, Charles Emmett, Karen Fink

5. ***Nevada Department of Transportation (NDOT)***
   Steve Cooke

6. ***Nevada Division of Environmental Protection***
   Jason Kuchnicki

7. ***Nevada State Lands***
   Charlie Donohue, Elizabeth Harrison

8. ***Nevada Tahoe Conservation District***
   Matt Vitale, Doug Martin, Scott Brown

9. ***Tahoe Resource Conservation District***
   David Roberts – formerly with the California Regional Water Quality Control Board - Lead author of Draft Lake Tahoe Maximum Daily Load Technical Report, September 2007

UTILITY DISTRICT

1. ***South Tahoe Public Utility District***
   Ivo Bergsohn

STATE UNIVERSITIES

1. ***University of California, Davis – Tahoe Environmental Research Center***
   John Reuter, Geoff Schladow, Goloka Sahoo, Scott Hackley, Tom Cahill, Steve Cliff, Ted Swift, Joaquim Perez-Losada, Alan Jassby, Bob Richards, Charles Goldman, Jenny Coker, Alex Rabidoux, Mark Grismer, Andrea Parra, Colin Strasenburgh, Raph Townsend, Lev Kavvas, Michael Anderson, Patty Arneson, Mark Palmer, Tina Hammell, George Malyj, David Jassby, Brant Allen, Debbie Hunter

2. ***University of Nevada, Reno***
   Jerry Qualls, Joseph Ferguson, Anna Panorska, Wally Miller

3. ***University of Nevada, Reno - Desert Research Institute***
   Alan Heyvaert, Jim Thomas, Ken Adams, Ken Taylor, Todd Mihevc, Gayle Dana, Rick Susfalk, Melissa Gunter, Alan Gertler, Tim Minor, Paul Verburg, Mary Cablk, Erez Weinroth

ENVIRONMENTAL SCIENCE AND ENGINEERING CONSULTANTS

1. ***2NDNATURE, LLC***
   Nicole Beck, Maggie Mathias, Nick Handler

2. ***Countess Environmental***
   Richard Countess

3. ***Environmental Incentives***
   Jeremy Sokulsky, Chad Praul

4. ***Entrix***
   Steve Peck, Mike Rudd

5. ***GeoSyntec***
   Eric Strecker, Jim Howell, Andi Thayumanavan, Marc Leisenring

6. ***Hydroikos***
   Bob Coats, Matt Luck

7. ***Integrated Environmental Restoration Services***
   Michael Hogan, Kevin Drake

8. ***Kieser & Associates***

9. ***Northwest Hydraulic Consultants (nhc)***
   Ed Wallace, Brent Wolfe

10. ***Tetra Tech, Inc.***
    John Riverson, Leslie Shoemaker, Clary Barreto, Andrew Parker, John Craig, Will Anderson

11. ***Valley and Mountain Consulting***
    Virginia Mahacek

Attachment 4
Peer Reviewed Publications Cited in the Lake Tahoe TMDL Report

* Publications followed by and asterisk have been subjected to a peer review process different than that for publications in scientific journals.

Adams, K.D., and T.B. Minor. 2002. Historic shoreline change at Lake Tahoe from1938 to 1998: implications for sediment and nutrient delivery. Journal of Coastal Research, 18(4), 637-651.

Arhonditsis, G.B., M.T. Brett. 2005. Eutrophication Model for Lake Washington (USA) Part I. Model description and sensitivity analysis. Ecological Modelling, 187, 140-178.

Bates, B.C., Z.W. Kundzewicz, S. Wu and J.P. Palutikof, Eds. 2008. Climate Change and Water. Technical Paper of the Intergovernmental Panel on Climate Change, IPCC Secretariat, Geneva, 210 pp.*

Beauchamp, D.A., B.C. Allen, R.C. Richards, W.A. Wurtsbaugh, and C.R.Goldman. 1992. Lake Trout Spawning in Lake Tahoe: Egg Incubation in Deepwater Macrophyte Beds. North American Journal of Fisheries Management, 12, 442-449.

Bicknell, B.R., J.C. Imhoff, J.L. Kittle, A.S, Donigian, Jr. and R.C. Johanson. 1997. Hydrological Simulation Program - FORTRAN, User's manual for version 11. Athens: USEPA, EPA/600/R-97/080.*

Bowie, G.L., W.B. Mills, D.B. Porcella, C.L. Campbell, J.R. Pagenkopf, G.L. Rupp, K.M. Johnson, P.W.H. Chan, S.A. Gherini and C.E. Chamberlain. 1985. Rates, constants, and kinetics formulations in surface water quality modeling, Tetra Tech, Incorporated. Second ed. Athens, U.S. Environmental Protection Agency, EPA 600/3-85/040, 455 p.*

Bradu, D. and Y. Mundlak. 1970. "Estimation in Lognormal Linear Models." Journal of the American Statistical Association, 65(329), 198-211.

CARB (California Air Resources Board). 2006. Lake Tahoe Atmospheric Deposition Study (LTADS). Final Report – August 2006. Atmospheric Processes Research Section, California EPA, Sacramento, CA.*

Casamitjana, X. and S.G. Schladow. 1993. Vertical distribution of particles in stratified lake. Journal of Environmental Engineering, 119(3), 443-461.

Chandra, S., M.J. Vander Zanden, A.C. Heyvaert, R.C. Richards, B.C. Allen and C.R. Goldman. 2005. The effects of cultural eutrophication on the coupling between pelagic primary producers and benthic consumers. Limnol. Oceanogr., 50(5), 1368-1376.

Chapra, S.C., 1997. Surface Water-Quality Modeling. McGraw-Hill, New York.*

Chen, C., R. Ji, D.J. Schwab, D. Beletsky, G.L. Fahnenstiel, M. Jiang, T.H. Johengen, H. Vanderploeg, B. Eadie, J.W. Budd, M.H. Bundy, W. Gardner, J. Cotner and P.J. Lavrentyev. 2002. A model study of the coupled biological and physical dynamics in Lake Michigan. Ecological Modelling, 152, 145-168.

Cliff, S.S. and T.A. Cahill. 2000. Air Quality. In: The Lake Tahoe Watershed Assessment (eds. D.D. Murphy and C.M. Knopp), USFS GTR (U.S. Forest Service Pacific Southwest Research Station), pp. 131-211.*

Coats, R.N. and C.R. Goldman. 2001. Patterns of nitrogen transport in streams of the Lake Tahoe Basin, California-Nevada. Water Resources Research, 37(2), 405-416.

Coats, R.N, J. Perez-Losada, S.G. Schladow, R. Richards and C.R. Goldman. 2006. The Warming of Lake Tahoe. Clim. Change, 76, 121-148.

Coats, R., M. Larsen, A. Heyvaert, J. Thomas, M. Luck and J. Reuter. 2008. Nutrient and sediment production, watershed characteristics, and land use in the Tahoe basin, California-Nevada. J. Am. Water Res. Assoc., 44(3), 754-770.

Cohn, T.A., L.L. DeLong, E.J. Gilroy, R.M. Hirsch and D.K. Wells. 1989. “Estimating Constituent Loads.” Water Resources Research, 25(5), 937-942.

Coon, T.G., M. Matilde Lopez, P.J. Richerson, T.M. Powell and C.R. Goldman. 1987. Summer dynamics of the deep chlorophyll maximum in Lake Tahoe. J. Plankton Res., 9(2), 327-344.

Davies-Colley, R. J., W.N. Vant and D.G. Smith. 1993. Colour and Clarity of Natural Waters: Science and Management of Optical Water Quality. Ellis Horwood. Westergate, England, 210 p.*

Dettinger, M.D. 2005. From climate-change spaghetti to climate-change distributions for 21st century California. San Francisco Estuary and Watershed Science, 3(1), Article 4.

Dillion, P.J. and R.A. Reid. 1981. Input of biologically available phosphorus by precipitation to Precambrian lakes. In: Atmospheric Pollutants in Natural Waters (ed: S.J. Eisenreich). Ann Arbor Science Publishers Inc.*

Downing, J.A. and F.H. Rigler. 1984. A manual on methods for the assessment of secondary productivity in fresh waters, second edition. Blackwell Scientific Publications, Oxford, UK.*

Dugan, G.L. and P.H. McGauhey. 1974. Enrichment of surface waters. J. Water Pollution Control Federation, 46, 2261-2280.

Efler, S.W., C.M. Brooks, M.G. Perkins, N. Ohrazda, D.A. Matthews, D.L. Johnson, M.T. Auer, J.S. Bloomfield and S. Quinn. 2000. The effects of terrigenous inputs on spatial patterns of water quality indicators in South Lake, Lake Champlain. J. Great Lakes Res., 26, 366-383.

Effler, S.W., R.K. Gelda, M.G. Perkins and D.M. O'Donnell. 2005. Modeling light attenuation, Secchi disk, and effects of tripton in Seneca River, New York, USA. J. American Water Res. Assoc., 41(4), 971-984.

Eppley, R.W., N.J. Rogers and J.J. McCarthy. 1969. Half-saturation constants for uptake of nitrate and ammonium by marine phytoplankton. Limnol. and Oceanogr., 14, 912-920.

Fasham, M.J.R. 1993. Modeling the marine biota. In: Heimann, M. (Ed.), The Global Carbon Cycle. Springer-Verlag, Berlin, pp 475-504.*

Finney, D.J. 1941. "On the Distribution of a Variate whose Logarithm is Normally Distributed." J. R. Stat. Soc. Suppl., 7(2), 155-161.

Froelich, P.N. 1988. Kinetic control of dissolved phosphate in natural rivers and estuaries: A primer on the phosphate buffer mechanism. Limnol. Oceanogr., 33, 649-668.

Gardner, J.V., L. A. Mayer, J.E. Hughs Clarke. 2000. Morphology and processes in Lake Tahoe (California-Nevada). Geological Society of America Bulletin, 112(5), 736-746.

Gertler, A.W., A. Bytnerowicz, T.A. Cahill, M. Arbaugh, S. Cliff, J. Kahyaoglu-Koracin, L. Tarnay, R. Alonso and W. Fraczek. 2006. Local air pollutants threaten Lake Tahoe's clarity. California Agriculture, 60(2), 53-58.

Goldman, C.R. 1988. Primary productivity, nutrients, and transparency during the early onset of eutrophication in ultra-oligotrophic Lake Tahoe, California-Nevada. Limnol. Oceanogr., 33(6), 1321-1333.

Goldman, C.R. 1994. Lake Tahoe: A microcosm for the study of the impact of urbanization on fragile ecosystems, pp. 93-105. In R.H. Platt et al. (eds.), The Ecological City. University of Massachusetts Press, Amherst.*

Goldman, C.R. 1998. Multiple environmental stresses on the fragile Lake Tahoe ecosystem, pp. 41-50. In J.J. Cech, Jr., et al. (eds.), Multiple Stresses in Ecosystems. Lewis Publishers, CRC Press, Boca Raton, FL.*

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