

Dr. Robert N. Brent

Department of Integrated Science and Technology
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Education

- **Ph.D.**, Environmental Sciences in Civil and Environmental Engineering, 1999. University of Illinois, Urbana, IL.
- **M.S.**, Environmental Sciences in Civil and Environmental Engineering, Aquatic Biology Track, 1997. University of Illinois, Urbana, IL.
- **B.S.**, Biology, 1994. Virginia Polytechnic Institute and State University, Blacksburg, VA
Minor: Chemistry

Personal

Birth date: January 19, 1972

Citizenship: United States

Marital Status: Married with three children

Research Interests

- Ecosystem responses to stressors
- Methods in aquatic toxicology
- Ecosystem effects of persistent bioaccumulative contaminants
- Stormwater impacts on aquatic ecosystems
- Biomonitoring methods
- Watershed management
- Total Maximum Daily Load development
- Environmental modeling
- Sustainable energy and development
- Renewable energy sources
- Global climate change
- Environmental markets for greenhouse gases

Employment / Research Experience

- **James Madison University, Department of Integrated Science and Technology, Assistant Professor, 2009 – present.** Teach courses and conduct research in the Environmental Sector of Integrated Science and Technology. Funded research projects include: 1) development of an *in situ* mesocosm test system for manipulative experiments in the South River.
- **Virginia Department of Environmental Quality, Regional TMDL Coordinator, 2003 – 2009.** Conduct and manage Total Maximum Daily Load (TMDL) studies in rivers and streams of Virginia's Valley Region. Managed more than 60 TMDL studies for pollutants such as bacteria, sediment, mercury, PAHs, lead, temperature, and phosphorus. Major duties and responsibilities have included: 1) monitoring and assessment of biological stream health and water quality; 2) design and management of benthic macroinvertebrate and water quality monitoring programs; 3) preparation and review of stressor identification analyses to determine causes of benthic macroinvertebrate impairments; 4) performance of source assessments to quantify pollutant sources within contaminated watersheds; 5) development and review of watershed and water quality models using HSPF, GWLF, EFDC, and LSPC; 6) preparation and review of TMDL reports and TMDL Implementation Plans; 7) education of the public on water quality issues.
- **Private Environmental Consulting, 1995-present.** Provide environmental consulting services for various clients including EPA Office of Water, EPA Office of Wastewater Management, EPA Great Lakes National Program Office, and Army Corp of Engineers. Projects have included: 1) biological/ecological assessments of streams and lakes; 2) development of physiological models of native mussel species to assess risk from barge navigation; 3) design of a long-term biomonitoring program to evaluate stormwater and combined sewer overflow effects; 4) technical and litigation support of EPA Whole Effluent Toxicity (WET) methods; 5) technical and scientific review of new biological methods submitted for EPA approval; 6) preparation of rulemaking packages for EPA actions regarding biological methods; 7) review of quality assurance project plans and data from sediment and water column toxicity studies.
- **DynCorp Information and Enterprise Technology, Principal Biologist, 1999 – 2003.** Provided EPA's Office of Water and Great Lakes National Program Office with consulting and technical support on biological monitoring programs and methods. Major duties and responsibilities included: 1) management of staff, budgets, and projects under EPA contract work assignments; 2) design, implementation, and management of a national interlaboratory study of toxicity methods for fish, macroinvertebrates, and algae; 3) analysis and interpretation of environmental data from EPA's Lake Michigan Mass Balance Study, including atrazine, mercury, PCBs, and *trans*-nonachlor concentrations in atmospheric wet and dry deposition, tributaries, Lake Michigan water column, sediment, plankton, and fish; 4) drafting of EPA Guidance Documents and method manuals for toxicity testing; 5) design of laboratory studies to validate biodegradation, bioaccumulation, and sediment toxicity methods for monitoring drilling fluids; and 6) regulatory support, including drafting environmental regulations.
- **University of Illinois, EPA STAR Fellow, 1995-1996, 1997-1998.** Conducted research on the role of exposure magnitude, duration, and frequency in determining effects on aquatic organisms, populations, and communities. Conducted laboratory and field experiments, developed and tested population models, and provided recommendations and guidance to

support the environmental management of stormwater and other episodic sources of pollution to aquatic systems. Designed, developed, and managed an aquatic toxicology laboratory for University of Illinois Department of Environmental Engineering. Responsible for development of research ideas, experimentation in aquatic toxicology and aquatic ecology, data analysis, and publication of papers and reports.

- **University of Illinois, Graduate Research Assistant**, 1996-1997. Conducted research on the vulnerability of fisheries resources to global climate change. Responsible for developing fish population models and linking fish population models to habitat resource modeling. Also responsible for biological assessments of fish populations and fish habitat under various flow regimes.
- **University of Illinois, Graduate Research Assistant**, 1994-1995. Conducted research on timescale toxicity in aquatic ecosystems. Conducted field experiments to quantify the relationship between contaminant exposure during wet weather discharges and toxic effects. Evaluated biological test systems for use in detecting acute and chronic effects of stormwater discharges. Responsible for development of research ideas, sampling and toxicological analysis of wet weather flows, and publication of papers and reports.
- **Virginia Tech, Undergraduate Research Assistant/Technician**, 1992-1994. Conducted research on uptake and partitioning of metals in wetland ecosystems exposed to acid mine drainage. Responsible for developing and implementing independent research project, analysis of wetland water chemistry, and analysis of metals content in plant, invertebrate, and vertebrate tissue.
- **Virginia Tech, Work-Study**, 1991-1992. Assisted in research on design and implementation of in situ methods for assessing effects of pollutants on stream biota. Responsible for biological measurements such as primary productivity, chlorophyll A, ATP.
- **Central Virginia Laboratories and Consultants, Laboratory Technician**, 1989-1993. Responsible for environmental sampling, hazardous waste disposal, wet chemistry analysis, metals analysis, and acute and chronic bioassays. Performed chemical and toxicological testing under NPDES and VPDES permits.
- **Louisiana State University, National Science Foundation Internship**, 1989. Conducted research on feeding rates of a marine gastropod when exposed to physical and chemical stressors. Responsible for assisting in design and implementation of field and laboratory experimentation.

Teaching Experience

- **Assistant Professor**, James Madison University, 2009-present. Courses taught include:
 - GISAT 112 – Environmental Issues in Science and Technology
 - ISAT 321 – Fundamentals of Environmental Science and Technology
- **Guest Lecturer**, 2003-2008. Lectured on TMDLs for watershed management courses at James Madison University (Integrated Science and Technology Department) and Virginia Tech (Biological Systems Engineering).
- **Instructor, Stream Ecology Course**, University of Illinois, 1997. Taught sections of this 3-credit hour, 300-level course. Responsible for preparation of lecture materials, lecturing, authoring and grading exam questions, authoring and grading homework assignments, and preparing labs.

- ***Instructor, Biomonitoring Course***, University of Illinois, 1998. Taught sections of this 3-credit hour, 300-level course. Responsible for preparation of lecture materials, lecturing, authoring and grading exam questions, authoring and grading homework assignments, and preparing labs.
- ***Independent Study Supervision***, University of Illinois, 1995-1999. Supervised and mentored a total of 21 undergraduates (up to 6 per semester) in independent study projects. Responsible for assisting with project formulation, reviewing project plans, and overseeing daily activities.
- ***Environment and Ecology Field Trips***, 1995-1998. Conducted ½-day, hands-on field trips to expose young students to the environmental field. Individual trips were appropriately targeted to kindergarten, junior high school, and college freshmen age groups. Introduced field methods of fish and macroinvertebrate sampling, and provided on-site identification, explanation, and commentary.
- ***Public Informational Meetings***, Virginia Department of Environmental Quality, 2003-present. Held over 40 public meetings to inform local citizens about water quality impairments and watershed management plans in their communities.
- ***Professional Workshops***, DynCorp I&ET, 2000-2003. Taught professional development workshops on whole effluent toxicity testing at regional, national, and international meetings including Society of Environmental Toxicology and Chemistry Annual Conference, Water Environment Federation Technical Conference, and EPA's Annual Conference on Analysis of Pollutants in the Environment. Responsible for organizing and conducting workshop, lecturing, preparing visual aids, preparing workshop resources and handouts, and participating in panel discussions and question/answer sessions.

Honors / Scholarships

- ***Virginia Department of Environmental Quality Extraordinary Contributor Award***, 2004, 2006, 2007, 2008.
- ***Virginia Department of Environmental Quality Employee Recognition Award***, 2008. Award for exemplary performance as Regional TMDL Coordinator.
- ***Virginia Department of Environmental Quality Employee Recognition Award***, 2005. Multimedia teamwork award for managing PCB contamination in state waters.
- ***Virginia Department of Environmental Quality Employee Recognition Award***, 2004. Award for exemplary performance as Regional TMDL Coordinator and interim Regional Water Quality Assessor.
- ***DynCorp Key Contributor Award***, 2001. Award for diligence and significant contribution in managing EPA contract work assignments.
- ***EPA Doctoral Fellowship***, 1997-1999. Awarded through EPA Science to Achieve Results (STAR) Program to encourage promising doctoral students to pursue careers in environmentally related fields. Award based on academic excellence and critical review of proposed research.
- ***EPA Masters Fellowship***, 1995-1996. Awarded through EPA Science to Achieve Results (STAR) Program to encourage promising Masters students to pursue careers in environmentally related fields. Award based on academic excellence and critical review of proposed research.

- *University of Illinois Fellowship in Civil Engineering*, 1994. Award based on academic excellence and potential for graduate study.
- *National Science Foundation Graduate Research Fellowship*, Honorable Mention, 1994.
- *Department of Biology Undergraduate Research Award*, 1994. Award given by Virginia Tech Biology faculty for best independent research project conducted by an undergraduate.
- *Daniel Stetler Memorial Scholarship*, 1993. Virginia Tech Biology Department award based on academic excellence.
- *Katelyn Gallier Memorial Scholarship*, 1990. Central Virginia Laboratories and Consultants employee award based on academic achievement and future potential.

Poster Presentations

- Murphy, E., K. Miller, J. Telech, R. Brent, M. Middlebrook Amos, J. Schofield, E. Benjamin, T. Holsen, P. Hopke, M. Milligan, and J. Pagano. 2010. *Great Lakes contaminant concentration assessment in lake trout and walleye*. International Association for Great Lakes Research Annual Conference, Toronto, Canada, May 2010.
- Brent, R.N. 2009. *Modeling hydrology and sediment transport in the Little Calfpasture River*. James Madison University, College of Integrated Science and Technology Faculty Research Day, Harrisonburg, VA, October 2009.
- Jones, B., R. Brent, M.B. Ross, J. Schofield, and K. Miller. 2008. *Concentration-response analysis in support of remedial investigation of the Buffalo River*. Society of Environmental Toxicology and Chemistry Annual Conference, Tampa, FL, Nov. 2008.
- Alvarez, D., W. Cranor, S. Perkins, V. Schroeder, S. Werner, E. Furlong, J. Holmes, D. Kain, and R. Brent. 2008. *Reconnaissance of persistent and emerging contaminants in the Shenandoah and James River Basins, Virginia, during the spring of 2007*. Society of Environmental Toxicology and Chemistry Annual Conference, Tampa, FL, Nov. 2008.
- Brent, R., J. Reemelin, and W. Telliard. 2001. *Accuracy of laboratory reporting in EPA's WET interlaboratory variability study*. Society of Environmental Toxicology and Chemistry Annual Conference, Baltimore, MD, Nov. 2001.
- Telliard, W., R. Brent, T. Norberg-King, F. Fulk, J. Fox, L. Phillips, M. Kelly, D. Denton, and M. Narvaez. 2001. *Resolving the WET variability debate: is that light at the end of the tunnel?* Society of Environmental Toxicology and Chemistry Annual Conference, Baltimore, MD, Nov. 2001.
- Brent, R.N., L. Burle, and E.E. Herricks. 1996. *The effects of brief toxic exposure on freshwater invertebrates*. Society of Environmental Toxicology and Chemistry Annual Conference, Washington, DC, Nov. 1996.

Platform Presentations

- Brent, R.N. Baby Steps on the Road to Restoring the Valley's Agricultural Streams. Virginia Lakes and Watersheds Association, Virginia Water Conference, Richmond, VA, March 2006.
- Brent, R.N. and C. Lunsford. Incremental Success in a Culturally Unique Watershed. Water Environment Federation's TMDL 2005 Conference, Philadelphia, PA, June 2005.
- Brent, R.N. Guide to Selecting Qualified WET Laboratories. Workshop W108, A Permittee's Guide to Whole Effluent Toxicity (WET): Methodology, Monitoring, Limits, and Remediation, WEFTEC 2002, Chicago, IL, Sept. 2002.
- Brent, R.N. Lessons from the WET Interlaboratory Variability Study. EPA's WET Laboratory Stakeholder Meeting, Chicago, IL, January 2002.
- Brent, R.N. EPA's Interlaboratory Variability Study of EPA Short-term Chronic and Acute Whole Effluent Toxicity Test Methods. Whole Effluent Toxicity Testing (WET) Workshop, Annual Conference on Analysis of Pollutants in the Environment, Portsmouth, VA, May 2001.
- Brent, R.N. EPA's Interlaboratory Variability Study of EPA Short-term Chronic and Acute Whole Effluent Toxicity Test Methods. WET Special Session, Society of Environmental Toxicology and Chemistry Annual Conference, Nashville, TN, Nov. 2000.
- Fox, J., R.N. Brent, and M. Kelly. EPA's WET Method Guidance Document. Workshop 134, Developments in Whole Effluent Toxicity (WET): New EPA Guidance and Interlaboratory Variability Study Results, WEFTEC 2000, Anaheim, CA, Oct. 2000.
- Brent, R.N. EPA's Interlaboratory Variability Study of EPA Short-term Chronic and Acute Whole Effluent Toxicity Test Methods. Workshop 134, Developments in Whole Effluent Toxicity (WET): New EPA Guidance and Interlaboratory Variability Study Results, WEFTEC 2000, Anaheim, CA, Oct. 2000.
- Brent, R.N. Participant Laboratory Tasks in EPA's Whole Effluent Toxicity (WET) Interlaboratory Variability Study. WET Interlaboratory Variability Study Participant Laboratory Meeting, Chicago, IL, Sept. 1999.
- Brent, R.N. The Toxicological Effects of Intermittent Pollutant Exposures. University of Illinois Environmental Engineering and Science Symposium, Champaign, IL, April 1998.
- Brent, R.N. and E.E. Herricks. Monitoring the Biological and Ecological Effects of Wet Weather Discharges. Illinois Water Environment Association 18th Annual Conference, Rockford, IL, March 1997.
- Johnson, I., E.E. Herricks, and I. Milne. Application of a Test Battery for Wet Weather Discharge Toxicity Analysis. WEFTEC '96, Dallas, TX, Oct. 1996.

- Brent, R.N. and E.E. Herricks. Time of Exposure Toxicity as an Element of Criteria for Wet Weather Discharge Events. WEFTEC '96, Dallas, TX, Oct. 1996.
- Brent, R.N. The Effects of Brief Toxic Exposure on Freshwater Invertebrates. University of Illinois Environmental Engineering and Science Symposium, Champaign, IL, April 1996.
- Brent, R.N., R.B. Atkinson, and J. Cairns, Jr. Metal Accumulation in Biota of Wetlands on Surface Mined Lands. International Land Reclamation and Mine Drainage Conference & Third International Conference on the Abatement of Acidic Drainage, Pittsburgh, PA, April 1994.
- Brent, R.N., R.B. Atkinson, and J. Cairns, Jr. Metal Uptake by Wetland Macrophytes in Surface Mined Areas of Southwestern Virginia. Virginia Academy of Science 71st Annual Meeting, Williamsburg, VA, May 1993.

Published Abstracts

- Brent, R.N. 2006. Baby Steps on the Road to Restoring the Valley's Agricultural Streams. In Proceedings of the 2006 Virginia Water Conference. Virginia Lakes and Watersheds Association, Richmond, VA, March 2006.
- Telliard, W., M. Kelly, and R. Brent. 2000. EPA's interlaboratory variability studies: results and conclusions. In Society of Environmental Toxicology and Chemistry Annual Conference Abstract Book, Nashville, TN, Nov. 2000.
- Brent, Robert N. 1998. The toxicological effects of intermittent pollutant exposures. In Proceedings of 1998 Science to Achieve Results (STAR) Graduate Fellowship Program Technical Conference, Arlington, VA, June 14-16, 1998.
- Brent, Robert N, and E.E Herricks. 1997. Monitoring the biological and ecological effects of wet weather discharges. In Proceedings of the Illinois Water Environment Association Eighteenth Annual Conference, Rockford, IL, March 18-20, 1997.
- Brent, R.N., R.B. Atkinson, and J. Cairns, Jr. 1993. Metal uptake by wetland macrophytes in surface mined areas of southwestern Virginia. *Virginia Journal of Science*, Vol. 44, No. 2, p. 146.

Published Book Chapters

- Brent, R.N. and G.J. Warren. 2005. Atrazine in the Lake Michigan ecosystem: monitoring results from the Lake Michigan Mass Balance Study. In: T. Edsall and M. Munawar (Eds.), *State of Lake Michigan: Ecology, Health, and Management*. Backhuys Publishers, The Netherlands.

Published Papers

- Brent, R.N. (In Preparation). Development of a Bioaccumulation Factor for Mercury in the South River, Waynesboro, Virginia.
- Brent, R.N. and R. El-Farhan. 2010(Accepted). *A hybrid modeling approach for sediment TMDLs*. In Proceedings of the American Society of Agricultural and Biological Engineers TMDL 2010 Conference, Baltimore, MD, November 2010.
- Yagow, G. and R.N. Brent. 2006. North River: Case Study of a Category 4 TMDL – “Impaired, but TMDL not Needed”. In Proceedings of the 2006 American Society of Agricultural and Biological Engineers Annual International Meeting, Portland, OR, July 2006.
- Brent, R.N. and C. Lunsford. 2005. Incremental Success in a Culturally Unique Watershed. In Proceedings of the Water Environment Federation’s TMDL 2005 Specialty Conference, Philadelphia, PA, June 2005.
- Telliard, W.A., M.Kelly, R.N. Brent, and H.B. McCarty. 2002. Quality control in whole effluent toxicity test methods: lessons from EPA’s Interlaboratory Variability Study. In Proceedings of EPA’s 21st Annual National Conference on Managing Environmental Quality Systems, Phoenix, Arizona, April 2002.
- Brent, R.N. and Herricks, E.E. 1999. A method for the toxicity assessment of wet weather events. *Water Research*. 33(10): 2255-2264.
- Brent, R.N. and E.E. Herricks. 1998. Post-exposure effects of brief cadmium, zinc, and phenol exposures on freshwater organisms. *Environmental Toxicology and Chemistry*. 17(10): 2091-2099.
- Brent, R.N. and E.E. Herricks. 1996. Time of exposure toxicity as an element of criteria for wet weather discharge events. In Proceedings of the Water Environment Federation, 69th Annual Conference and Exposition, Vol. 4, p. 359-366.
- Herricks, E.E., R. Brent, L. Burle, I. Johnson, and I. Milne. 1996. A time-scale perspective applied to toxicity assessments performed in watershed management programs and performance assessments. In Proceedings of Watershed ’96, Baltimore, MD.
- Herricks, E.E., R.N. Brent, I. Milne, and I. Johnson. 1996. Assessing the response of aquatic organisms to short-term exposures to urban runoff. In Proceedings of an Engineering Foundation Conference, Snowbird, Utah, August 1996.
- Brent, R.N., R.B. Atkinson, and J. Cairns, Jr. 1994. Metal accumulation in biota of wetlands on surface mined lands. In Proceedings of the International Land Reclamation and Mine Drainage Conference & Third International Conference on the Abatement of Acidic Drainage, Pittsburgh, PA, April 1994.

Atkinson, R.B., J. Cairns, Jr., D.H. Jones, G.B. Noe, and R.N. Brent. 1993. Ecological applications to enhance surface mine reclamation: some recommendations. In Proceedings of the Powell River Project Symposium and Progress Reports, p. 46-50.

Published Documents and Reports (selected)

Brent, R.N. 2009. *Total Maximum Daily Load Development to Address a Benthic Impairment in the Little Calfpasture River, Rockbridge County, Virginia*. Virginia Department of Environmental Quality, Richmond, Virginia.

Brent, R.N. 2009. *Total Maximum Daily Load Development to Address Bacteria and Benthic Impairments in the Spout Run Watershed, Clarke County, Virginia*. Virginia Department of Environmental Quality, Richmond, Virginia.

Brent, R.N. 2009. *Total Maximum Daily Load Development for Mercury in the South River, South Fork Shenandoah River, and Shenandoah River, Virginia*. Virginia Department of Environmental Quality, Richmond, Virginia.

Alvarez, D.A., W.L. Cranor, S.D. Perkins, V.L. Schroeder, S.L. Werner, E.T. Furlong, D. Kain, and R. Brent. 2008. Reconnaissance of persistent and emerging contaminants in the Shenandoah and James River Basins, Virginia, during Spring of 2007. U.S. Geological Survey Open-File Report 2008-1231, 19 p.

McCarty, H.B., J. Schofield, K. Miller, R.N. Brent, P. VanHoof, and B. Eadie. 2004. *Results of the Lake Michigan Mass Balance Study: Polychlorinated Biphenyls and Trans-nonachlor Data Report*. EPA/905/R-01/011. U.S. Environmental Protection Agency, Great Lakes National Program Office, Chicago, IL.

McCarty, H.B., K. Miller, R.N. Brent, J. Schofield, and R. Rossmann. 2004. *Results of the Lake Michigan Mass Balance Study: Mercury Data Report*. EPA/905/R-01/012. U.S. Environmental Protection Agency, Great Lakes National Program Office, Chicago, IL.

Brent, R.N., J. Schofield, and K. Miller. 2001. *Results of the Lake Michigan Mass Balance Study: Atrazine Data Report*. EPA/905/R-01/010. U.S. Environmental Protection Agency, Great Lakes National Program Office, Chicago, IL.

U.S. Environmental Protection Agency. 2001. *Final Report: Interlaboratory Variability Study of EPA Short-term Chronic and Acute Whole Effluent Toxicity Test Methods, Vols. 1 & 2*. EPA/821/B-01/004 & EPA/821/B-01/005. U.S. Environmental Protection Agency, Office of Water, Washington, D.C.

U.S. Environmental Protection Agency. 2001. *Proposed Changes to Whole Effluent Toxicity Method Manuals*. EPA/821/B-01/002. U.S. Environmental Protection Agency, Office of Water, Washington, D.C.

- Brent, R.N. 2001. *Whole Effluent Toxicity Test Analysis for the Uniform National Discharge Standards Program*. Technical Report, February 19, 2001. DynCorp Information & Enterprise Technology, Alexandria, VA.
- U.S. Environmental Protection Agency. 2000. *Preliminary Report: Interlaboratory Variability Study of EPA Short-term Chronic and Acute Whole Effluent Toxicity Test Methods, Vols. 1 & 2*. EPA/821/R-00/028A & EPA/821/R-00/028B. U.S. Environmental Protection Agency, Office of Water, Washington, D.C.
- U.S. Environmental Protection Agency. 2000. *Method Guidance and Recommendations for Whole Effluent Toxicity (WET) Testing (40 CFR Part 136)*. EPA/821/B-00/004. U.S. Environmental Protection Agency, Office of Water, Washington, D.C.
- Brent, R.N. 1999. *A Toxicological Analysis of Exposure Magnitude, Duration, and Frequency and the Significance for Monitoring and Management of Episodic Pollution Events*. Ph.D. Dissertation. University of Illinois, Urbana, IL.
- Schaeffer, D.J., Martin, J.A., Brent, R., Tompkins, M., and Hauser, T. 1998. *Effects of Increased Commercial Navigation Traffic on Freshwater Mussels in the Upper Mississippi River System*. Technical Report EL-98-xx, U.S. Army Corp of Engineers Waterways Experiment Station, Vicksburg, MS.
- Brent, R.N., 1997. *The Effects of Brief Toxic Exposure on Freshwater Organisms and the Significance for Episodic Pollution Event Analysis*. MS Thesis. University of Illinois, Urbana, IL.

Professional Memberships

- Society of Environmental Toxicology and Chemistry, 1996-present
- Water Environment Federation, 1996-present
- Virginia Water Environment Association, 2000-present
- Illinois Water Environment Association, 1996-1999

Professional Advisory Committees

- VADEQ Statewide Mercury Strategy Committee, 2006-2009
- Shenandoah River Fish Kill Taskforce, 2005-present
- South River Mercury Science Team, 2003-present
- VADEQ Multi-media PCB Taskforce, 2003-2009
- Shenandoah River Pure Water Forum, Board, 2003-present
- Illinois Water Environment Association, Nonpoint Source Committee, 1996-1999