

TEXAS STATE VITA

I. Academic/Professional Background

A. Name: Dr. Thom Hardy Title: Chief Science Officer, River Systems Institute

B. Educational Background

Degree	Year	University	Major	Thesis/Dissertation
Bachelors	1977	University of Nevada	Education	Emphasis on math, chemistry, physics, and biology.
Bachelors	1978	University of Nevada	Biology	Emphasis on ichthyology and ecology.
Masters	1982	University of Nevada	Aquatic Ecology	Emphasis on aquatic ecosystem dynamics and fisheries science.
Ph.D.	1988	Utah State University	Civil and Environmental Engineering	Emphasis on hydrology, uncertainty analysis and control theory applied to recursive real time estimation of river water quality.

C. University Experience

Position	University	Dates
<u>Professor; Department of Biology</u>	<u>Texas State University</u>	2009-present
<u>Chief Science Officer, River Systems Institute</u>	<u>Texas State University</u>	2009-present
<u>Professor; Department of Civil and Environmental Engineering</u>	<u>Utah State University</u>	1987-2009
<u>Associate Director, Utah Water Research Laboratory</u>	<u>Utah State University</u>	2002-2009
<u>Director, Institute for Natural Systems Engineering</u>	<u>Utah State University</u>	1987-2009
<u>Research Scientist, Aquatic Biology</u>	<u>University of Nevada at Las Vegas</u>	1979-1982
<u>Staff, Department of Biology</u>	<u>University of Nevada at Las Vegas</u>	1979-1982
<u>Aquatic Ecologist</u>	<u>University of Nevada at Las Vegas/EPA</u>	1979-1980
<u>Aquatic Ecologist</u>	<u>University of Nevada at Las Vegas</u>	1979

D. Relevant Professional Experience

Position	Entity	Dates
Principal	Watershed Systems Group, INC	1978-2009
Instructor, Computer Techniques	Utah Division of Wildlife Resources	1988
Principal	Environmental Mapping and Remote Sensing, Inc.	1994-1999
Research Engineer	BIO/WEST, Inc.	1984-1987
Research Diver	University of Nevada at Las Vegas Utah Water Research Laboratory	1979-1984 1984-1985
Civil Engineer	Twelve-Nine, Inc.	1984

Research Scientist	Utah Water Research Laboratory	1983-1984
Project Manager/Aquatic Ecologist	Environmental Consultants, Inc.	1979-1985
Surveyor	Clark County Engineering Department	1976

II. TEACHING

A. Teaching Honors and Awards:

B. Courses Taught:

Course	Entity	Dates
CEE 693 – Ecology and management of regulated rivers	Utah State University	1990
CEE 103 – Digital computer applications in engineering	Utah State University	1990,1991,1992
CEE 363 - Introduction to Environmental Engineering	Utah State University	1992,1993,1994,1995,1996
CEE 493/693 - Special problems in natural systems engineering	Utah State University	1998
CEE 796 (5720/6720) - Natural Systems Modeling	Utah State University	1992,1997,1998,1999,2000,2001,2003,2004,2005,2006
CEE 5690/6690 - Natural Systems Engineering	Utah State University	2002,2003,2004,2005,2006,2008
CEE 369 - Environmental Systems Engineering	Utah State University	1993,1994,1995,1996,1997,1998
CEE 5700/6700 - Field sampling techniques	Utah State University	1999,2000,2001
CEE 588 - Senior Design Seminar	Utah State University	1993,1994,1995,1996,1997,1998,1999,2002,2003,2004,2005,2006
CEE 596/696 - Management of Regulated Rivers	Utah State University	1994,1995
CEE 6930 - Special Problems	Utah State University	1999,2003,2004,2005,2006

C. Graduate Theses/Dissertations or Exit Committees (if supervisor, please indicate):

Student	MS	ME ¹	PhD	Supervisor or Committee Member
Mark Woodbury	X			Committee Member
Craig Addley	X			Supervisor
Shanda Fallau	X			Committee Member
Anga Rebane			X	Committee Member
Kiran Panja	X			Supervisor
Robert Black			X	Committee Member
Somkiat Prajamwong			X	Committee Member

Brent Bartz	X		Supervisor
Jeff Watkins	X		Supervisor
James Shoemaker	X		Supervisor
Thomas Redd	X		Supervisor
Jennifer Ludlow	X		Supervisor
Abdelmonaim Angallouch	X		Committee Member
Brent Crowther	X		Supervisor
Miaohsi Wang		X	Committee Member
Jacing Chou		X	Committee Member
Michael Chulick	X		Supervisor
Rajiv Prasad		X	Committee Member
Shyamal Bikash Chowdhury		X	Committee Member
Walter Wilson	X		Committee Member
Karl Tarbet	X		Supervisor
Steve Slasson	X		Supervisor
Nathan Bartz	X		Supervisor
Greg Guensch	X		Supervisor
Loni Johnson	X		Supervisor
Nathan Kennard	X		Supervisor
Jason Thompson	X		Supervisor
Hans Milliken	X		Supervisor
Craig Addley		X	Supervisor
Leon Basdekas		X	Supervisor
Anji Dodd		X	Supervisor
Ekaterina Saraeva		X	Supervisor
El-Hassan K. El-Hassan	X		Committee Member
Andrew Hood		X	Committee Member
Bruce Savage	X		Committee Member
Paul Badame	X		Committee Member
Jackie Blumberg		X	Committee Member
Mark Woodbury	X		Committee Member
Tong Yin		X	Committee Member
Rajan Phadnis	X		Committee Member
Mikhail Bhosle	X		Supervisor
Eric McKlesky	X		Supervisor
Britanie Ames	X		Supervisor
Alphonce Guzha		X	Supervisor
Kiran Chinnayakanahalli		X	Committee Member
Joon Hee Lee		X	Committee Member
Ahmed Mohamed		X	Committee Member
Bethany Neilson		X	Committee Member
Lizzette Oman	X		Committee Member
Cynthia Tyler	X		Committee Member
Karen Williams		X	Committee Member
Mark Schmelter		X	Committee Member
David Kikkert		X	Committee Member
Madeline Merck		X	Committee Member

Adrian Vogl			X	Committee Member
Clara Fobb	X			Committee Member
Issaak Vasquez			X	Committee Member
Hussein Batt			X	Committee Member
Sanyogita Andriyas			X	Committee Member
Brian Hines	X			Committee Member

¹ ME = Masters of Engineering

D. Courses Prepared and Curriculum Development:

IF310 – Using the computer based PHABSIM system
 CEE 103 – Digital computer applications in engineering
 CEE 363 – Introduction to Environmental Engineering
 CEE 369 – Environmental Systems Engineering
 CEE 493/693 Special problems in natural systems engineering
 CEE 5690/6690 – Natural Systems Engineering
 CEE 5700/6700 – Field sampling techniques
 CEE 5720/6720 – Natural Systems Modeling
 CEE 596/696 – Management of Regulated Rivers
 CEE 693 – Ecology and management of regulated rivers

Member of Curriculum Committee for transition of USU's Civil and Environmental Engineering program through conversion from quarters to semesters and subsequent ABET Accreditation.

E. Funded External Teaching Grants and Contracts: NA

F. Submitted, but not Funded, External Teaching Grants and Contracts: NA

G. Funded Internal Teaching Grants and Contracts: NA

H. Submitted, but not Funded, Internal Teaching Grants and Contracts: NA

I. Other: NA

III. SCHOLARLY/CREATIVE

A. Works in Print

1. Books (if not refereed, please indicate)

The Science of Instream Flows: A Review of the Texas Instream Flow Program (2005)
 NAS Report.

a. Scholarly Monographs: NA

b. Textbooks:

The Theory and Application of the Physical Habitat Simulation System (PHABSIM). Thomas B. Hardy Copyright 2006 all rights reserved.

Translated into Japanese (2009).

Translated into Korean (2006).

c. Edited Books: NA

d. Chapters in Books:

- Hardy, T.B., D.S. Bowles, and K. Bosworth. 1987. Recursive river water quality estimation using abstract evolution equations in functional Sobolev spaces. In: M. B. Beck (Ed.). Systems analysis in water quality management. Pergamon Press, London. 321-331 pp.
- Deacon, J.E. and T.B. Hardy. 1984. Streamflow requirements of woundfin (Plagopterus argentissimus): Cyprinidae in the Virgin River, Utah, Arizona, Nevada. In: Festschrift for Walter W. Dalquest in Honor of His Sixty-sixth Birthday (N.V. Horner, ed.). Department of Biology, Midwestern State University, 1984. 141-163 pp.
- Hardy, T.B., C.G. Prewitt and Kenneth A. Voos. 1982. Application of a physical habitat usability model to the fish community in a spring-fed desert stream. In: Analysis of Ecological Systems: State-of-the-Art in Ecological Modeling. (Lauenroth, Skogerboe and Flug Ed.). Developments in Environmental Modeling 5. Elsevier Scientific Publishing Company. 391-397 pp.

e. Creative Books:

Arielle's Answer (Science Fiction - Published 2003 – Copyright: Thomas B. Hardy)

2. Articles

a. Refereed Journal Articles:

- Hardy, T.B., et al. 2006. Validation of chinook fry behavior based escape cover modeling in the lower Klamath River. International Journal of River Basin Management. Vol 4, Issue 3.
- Hardy, T.B. and C. Addley. 2003. Instream Flow Assessment Modeling: Combining Physical and Behavioral-Based Approaches. Canadian Water Resources Journal. 28(2):1-10.
- Gregory, P.J., et. al. (including Hardy, T.). 2002. Environmental consequences of alternative practices for intensifying crop production. Agric. Ecosyst. Environ. 88, 279-290.
- Guensch, G.R., T.B. Hardy, and R.C. Addley. (2001) Validation of an Individual-Based, Mechanistic Habitat Selection Model for Drift-Feeding Salmonids. Canadian Journal of Fisheries and Aquatic Science. 58(3):446-457.
- Hardy, T.B & Addley, R.C. (2006). Vertical integration of spatial and hydraulic data for improved habitat modelling using geographic information systems. In Acreman, M.C. (ed) Hydro-ecology: Riverine Ecological Response to Changes in Hydrological Regime, Sediment Transport, and Nutrient Loading. IAHS Publication X.
- Goodwin, Peter and Thomas B. Hardy. 1999. Integrated Simulation of Physical, Chemical and Ecological Processes for River Management. Journal of Hydroinformatics. 01:1 33-58.
- Gilver, D.J., R. Bryant and T. Hardy. 1999. Remote sensing of channel morphology and

- in-stream fluvial processes. *Progress in Environmental Science*. 1(3): 257-284.
- Hardy, T.B. 1998. The Future of Habitat Modeling and Instream Flow Assessment Techniques. *Regulated Rivers: Research and Management* 14:405-420.
- Hardy, T.B. 1995. Assessing Environmental Effects of Severe Sustained Drought. *Water Resources Bulletin, American Water Resources Association*. 31(5):867-875.
- Kershner, J.L. and T.B. Hardy. 1992. The rules of the game for evaluation of FERC relicensing proposals. *Rivers*: 2:4 342-345 pp.
- Modde, T. and T. B. Hardy. 1992. Influence of Different Microhabitat Criteria on Salmonid Habitat Simulation. *Rivers*: 3:1 37-44 pp.
- Bishop, A. B. , T. B. Hardy and B. D. Glabou. 1990. Analyzing instream flow tradeoffs for small hydropower development. *RIVERS* 1(3):173-182.
- Valdez, R., P. Holden and T.B. Hardy. 1990. Habitat suitability index curves for humpback chub in the upper Colorado River Basin. *Rivers* 1(1):31-42.

b. Non-refereed Articles:

- Hardy, T.B. 2005. Klamath Basin Water Resources Issues: Perspectives from the center of the event horizon. *The Water Report*. 11:9-12, 16-17.

3. Abstracts:

4.a Reviewed Reports:

- Hardy, T. B., C. Addley, E. Saraeva. 2006. Evaluation of Instream Flow Needs in the Lower Klamath River. Phase II final report for the U.S. Department of the Interior.
- Hardy, T.B., J. Blumberg, M. Combes, L. Kent. 2006. The Rapid Assessment Tool – Methodology and Software User Manual. Final report for the Centre for Ecology and Hydrology, United Kingdom.
- Hardy, T.B., S. Clemens, M. Winkelaar, L. Kent, R.C. Addley. 2006. Riparian Community and Aquatic Habitat Classification for the Shasta River. Final Report for US Fish and Wildlife Service.
- Addley, R.C., M.Combes and T.B. Hardy. 2005.Woundfin temperature and growth investigation. Institute of Natural Systems Engineering, Utah State University, Utah Water Research Laboratory, Logan Utah.
- Addley, R.C., B. Neilson, L. Basdekas and T. Hardy. 2005. Virgin River temperature model validation, Project VI.03.03. Institute of Natuatural Systems Engineering, Utah State University, Utah Water Research Laboratory, Logan Utah.
- Addley, R.C., A. Rehm, R. Fridell, T.B. Hardy, S. Clemens and M. Winkelaar. 2005. Temperature and synoptic flow monitoring of the Virgin River watershed. Institute of Natural Systems Engineering, Utah State University, Utah Water Research Laboratory, Logan Utah.
- Addley, R.C., T.B. Hardy, B. Bradford, J. Ludlow, J. Thompson, and M. Combes. 2005. Santa Clara River Baseline Report. Final report for the Virgin River Resource Management and Recovery Program. Institute for Natural Systems Engineering, Utah Water Research Lab, Utah State University, Logan, Utah 84321.
- Booker, D.J., et al (Thomas Hardy). 2005. Rapid Assessment of the Physical Habitat Sensitivity to Abstraction. Interim Technical Report. Report to the Environment

- Agency and the Centre for Ecology and Hydrology. CEH Wallingford pp109.
- Gowing, I. and T.B. Hardy. 2004. Evaluation of Instream Flow Assessment Data at Selected Rapid Assessment Sites within the Nooksack River Watershed - WRIA 1 Final Project Report. Institute for Natural Systems Engineering, Utah Water Research Laboratory, Utah State University, Logan, UT 84322-8200.
- INSE, et al. 2004. Final Integration Report, Confluence Park Enhancement Alternatives: Design & Evaluation. Prepared for Virgin River Resource Management & Recovery Program by Grand Canyon Trust, Flagstaff, Arizona with technical assistance from Natural Channel Design, Inc., Bio-West, Inc. Applied Ecological Associates, Inc. and Institute for Natural Systems Engineering, Utah Water Research Laboratory, Utah State University, Logan, Utah.
- Shoemaker, J. and T.B. Hardy. 2004. Development and Application of an Instream Flow Assessment Framework for the Fountain Darter (*Etheostoma fonticola*) and Texas Wild-Rice (*Zizania texana*) in Spring Lake and the San Marcos River System. Institute for Natural Systems Engineering, Utah Water Research Laboratory, Utah State University, Logan, Utah 84322.
- Thompson, J. and T.B. Hardy. 2004. An Instream and Riparian Habitat Assessment of the Santa Clara River Watershed. Final report prepared for the Washington County Water Conservancy District. Institute for Natural Systems Engineering, Utah Water Research Laboratory, Utah State University, Logan, UT 84322-8200.
- Hardy, T.B., C. Addley, J. Deacon, C. Williams. 2003. An Assessment of Potential Limiting Factors of Native Fish Species in the Virgin River between Pah Tempe and the Washington Fields Diversion. Report prepared for Virgin River Resource Management and Recovery Program. Institute for Natural Systems Engineering, Utah Water Research Laboratory, Utah State University, Logan, UT 84322-8200.
- Addley, R.C., K. Clipperton, T.B. Hardy, and A. Locke. 2003. South Saskatchewan River Basin, Alberta, Canada - Fish Habitat Suitability Criteria (HSC) Curves. Prepared in cooperation with the Alberta FWD, Alberta Department of Sustainable Resource Development, Cochrane, Alberta. Institute for Natural Systems Engineering, Utah Water Research Laboratory, Utah State University, Logan, UT 84322-8200.
- Thompson, J. and T.B. Hardy. 2003. An Instream and Riparian Habitat Assessment of the Santa Clara River Watershed. Draft report prepared for the Washington County Water Conservancy District. Institute for Natural Systems Engineering, Utah Water Research Laboratory, Utah State University, Logan, UT 84322-8200.
- Basdekas, P., T.B. Hardy, and H. Milliken. 2003. Precision and Accuracy of One-Dimensional Hydraulic Modeling (R2-Cross) and Implications for Establishing Fisheries Base Flows. Prepared for US Department of Agriculture, US Forest Service. Institute for Natural Systems Engineering, Utah State University.
- Ames, D., and T.B. Hardy. 2002. Phase III Alpha Version Watershed Characterization Report, v.2. Prepared for The WRIA 1 Watershed Management Project. Institute for Natural Systems Engineering, Utah Water Research Lab, Utah State University, Logan, Utah 84322-8200.
- Ames, D., and T.B. Hardy. 2002. DSS Database Documentation. Prepared for WRIA 1 Watershed Management Project. Institute for Natural Systems Engineering, Utah Water Research Lab, Utah State University, Logan, Utah 84322-8200.
- Hardy, T.B. 2002. Instream Flow Selection Methodology Symposium - Summary Report. Prepared for The WRIA 1 Watershed Management Project. Institute for

- Natural Systems Engineering, Utah Water Research Laboratory, Utah State University, Logan, Utah 84322-8200.
- Hardy, T.B. 2002. Phase III Detailed Work Plan: Watershed Plan, EIS, and Socio-economic Coordination. Prepared for The WRIA 1 Watershed Management Project. Institute for Natural Systems Engineering, Utah Water Research Lab, Utah State University, Logan, Utah 84322-8200.
- Hardy, T.B. 2002. EDN 1: Hydraulic Model Calibration Files and Supporting Analysis Files. Prepared for The WRIA 1 Watershed Management Project. Institute for Natural Systems Engineering, Utah Water Research Lab, Utah State University, Logan, Utah 84322-8200.
- Hardy, T.B. 2002. Instream Flow Extrapolation Workshop Summary. Prepared for The WRIA 1 Watershed Management Project. Institute for Natural Systems Engineering, Utah Water Research Lab, Utah State University, Logan, Utah 84322-8200.
- Hardy, T.B. 2000. The Theory and Application of the Physical Habitat Simulation System (PHABSIM) for Windows (PHABWin-98) Lecture and Laboratory Manual. Institute for Natural Systems Engineering, Utah State University. 273pp.
- Bartsch, N., T.B. Hardy, J. Shoemaker and P. Connor. 1999. Development and Application of an In-Stream Flow Assessment Framework for the Fountain Darter (*Etheostoma fonticola*) and Wild Rice (*Zizania texana*) in Landa Lake and the Comal River System. Institute for Natural Systems Engineering Utah Water Research Laboratory, Utah State University, Logan, Utah 84322-4110 and U.S. Fish and Wildlife Service, Ecological Services Field Office Austin, Texas.
- Hardy, T.B. 1999. Evaluation of Interim Instream Flow Needs in the Klamath River: Phase I Final Report. Prepared for the Department of Interior. Institute for Natural Systems Engineering, Utah State University. 73pp +appendices.
- UWRL, WBWCD, BOR. 1999. Weber and Ogden River Basin Water Quality Management Study. Phase I/II Report. Cooperative Agreement No. 1425. Contract Control No. USDI/BOR 97-FC-20670.
- Hardy, T.B. 1999. A Conceptual Framework and Technical Approach for Assessing Instream Flow Needs in the Water Resource Inventory Area No. 1 (WRIA1) in Washington State. Institute for Natural Systems Engineering, Utah State University. 50pp.
- Hardy, T.B., S. Williamson, and T.J. Waddle. 1997. The theory and application of the Physical Habitat Simulation System (PHABSIM) Lecture and Laboratory Manual. 672pp.
- Hardy, T.B. and J.A. Shoemaker. 1995. Use of Multispectral Videography for Spatial Extrapolation of Fisheries Habitat Use in the Comal River. Proceedings of the 15th Workshop on Color Photography and Videography for Resource Assessment. Indiana State University, Indiana. May 2-3, 1995.
- Hardy, T.B. 1991. USDA Forest Service Region 1 and 4 fisheries habitat suitability indices for the Snake River Adjudication. Department of Civil and Environmental Engineering, Utah State University, Logan, Utah. 63 pp.
- Hardy, T.B., B.A. Bartz, W. Carter. 1991. Technical analysis reports for 987 fisheries quantification sites for the Snake River Adjudication. Department of Civil and Environmental Engineering. 18,723 pp.
- Hardy, T.B. 1991. Comparative analysis of R4-Cross and IFG4 hydraulic simulation of cross-sectional areas in channel maintenance flow computations. Department of Civil and Environmental Engineering. 11 pp.

Messer, J.J., T.B. Hardy and J.M. Ihnat. 1984. Sediment phosphorus relationships in Deer Creek Reservoir. Water Quality Series. UWRL/Q89/01. 45 pp.

4.b Non-reviewed Reports:

Combes, M. & T.B. Hardy. 2006. Morgan Creek Fish Habitat Assessment. Final Report; US Forest Service.

Addley, R.C., B. Bradford, M. Combes, S. Clemens, M. Winkelaar and T.B. Hardy. 2005. Two dimensional habitat modeling: Carmen-Smith hydroelectric Project (FERC No. 2242). Institute of Natural Systems Engineering, Utah State University, Utah Water Research Laboratory, Logan Utah.

Addley, R.C., T.B. Hardy, B. Bradford, J. Ludlow, J. Thompson, and M. Combes. 2004. Santa Clara River Baseline Report. Report for the Virgin River Resource Management and Recovery Program. Institute for Natural Systems Engineering, Utah Water Research Lab, Utah State University, Logan, Utah 84321.

Gardberg, J., R.C. Addley, S. Clemens, T.B. Hardy and M. Winkelaar. 2004. Temperature and Synoptic Flow Monitoring of the Virgin River Watershed. Institute for Natural Systems Engineering, Utah Water Research Lab, Utah State University, Logan, UT 84322-8200.

Hardy, T.B., et al. 2004. Benefits evaluation of channel reconstruction on lower LaVerkin Creek using two-dimensional hydrodynamics and biological habitat modeling. Final report prepared for the Washington County Water Conservancy District. Institute for Natural Systems Engineering, Utah Water Research Laboratory, Utah State University, Logan, UT 84322-8200.

Combes, M. and T. Hardy. 2003. Fish Community Structure and Habitat in the Lower and Middle Sevier River Basin 2003. Draft Report for the Consolidated Sevier Bridge Reservoir Company, Delta, UT and the Utah Division of Wildlife Resources. Institute for Natural Systems Engineering, Utah Water Research Laboratory, Utah State University, Logan, UT 84322-8200.

Combes, M. and T. Hardy. 2003. Fish Community Structure and Habitat in the Lower and Middle Sevier River Basin 2002. Final Report for the Consolidated Sevier Bridge Reservoir Company, Delta, UT and the Utah Division of Wildlife Resources. Institute for Natural Systems Engineering, Utah Water Research Laboratory, Utah State University, Logan, UT 84322-8200.

INSE, et al. 2003. Integration Report, Confluence Park Enhancement Alternatives: Design & Evaluation. Prepared for Virgin River Resource Management & Recovery Program by Grand Canyon Trust, Flagstaff, Arizona with technical assistance from Natural Channel Design, Inc., Bio-West, Inc. Applied Ecological Associates, Inc. and Institute for Natural Systems Engineering, Utah Water Research Laboratory, Utah State University, Logan, Utah.

Hardy, T.B. 2003. Seepage Run Study below the Quail Creek Diversion. Prepared for The Washington County Water Conservancy District. Institute for Natural Systems Engineering, Utah Water Research Laboratory, Utah State University, Logan, Utah 84322-8200.

Hardy, T.B., K. Hall, D. Jeon, J. Magrath, and M. Anderson. 2003. Quail Creek Pipeline Gravity Based Return Flow System Report: Feasibility Design to Achieve Summer Temperature Mitigation within the Main Stem Virgin River above Quail Creek for Native Fish. Prepared for The Virgin River Resource

- Management and Recovery Program. Institute for Natural Systems Engineering, Utah Water Research Laboratory, Utah State University, Logan, Utah 84322.
- Shoemaker, J., T.B. Hardy. 2003. Bathymetry of the River/Sevier Bridge Reservoir. Prepared for Bowen, Collins, & Associates. Institute for Natural Systems Engineering, Utah Water Research Laboratory, Utah State University, Logan, Utah 84322-8200.
- Tarboton, D.G., et al. (including Hardy, T.B.). 2003. Integrated water planning...at a University...in a State...in the Future. Report to the Utah State University Water Initiative Task Force, Logan, Utah.
- Hardy, T.B. 2002. Update of the San Marcos Hydraulic and Habitat Analysis System. Prepared for U.S. Fish and Wildlife Service. Department of Civil and Environmental Engineering, Utah State University, Logan, Utah 84322-4110.
- Combs, M. and T.B. Hardy. 2000. The Fish Community Structure and Habitat in the Lower and Upper Sevier River Basin with Emphasis upon the Leatherside Chub (*Gila copei*). Final Report for the Consolidated Sevier Bridge Reservoir Company, Delta Utah. Institute for Natural Systems Engineering, Utah State University. 91pp.
- Johnson, L., and T. B. Hardy. 1999. The Application Of Multi-Spectral Airborne Imagery For The Detection Of Temporal Changes In Stream Channel Characteristics. Final Report. Prepared for U.S. Department of Agriculture, Forest Service Payette National Forest Agreement No. 12-CRA-98-027. Institute for Natural Systems Engineering, Utah State University.
- Hardy, T.B. and R. Craig Addley. 1998. Maintenance of the Virgin River Fishes Data Base and Technical Coordination for the Virgin River Basin Integrated Resource Management and Recovery Program. Final Report to the Washington County Water Conservancy District. .
- Hardy, T.B. and R. Craig Addley. 1998. Winter Habitat Utilization by Native Species of the Virgin River. Final Report to the Washington County Water Conservancy District.
- Hardy, T.B. and R. Craig Addley. 1998. Population and Habitat Monitoring in the Virgin River and Automation of the VRBIRMRP Analysis System. Final Report to the Washington County Water Conservancy District.
- Stevens, D.K., T.B. Hardy, M. Miner, and K. Eggelston. 1997. Weber Basin water quality/watershed management study: Data Analysis - Final Project Report. Cooperative Agreement No. 4-FC-40-15250. Contract Control No. USDI/BOR 94-4061.
- Addley, R.C., and T.B. Hardy. 1997. Seasonal use of the Virgin River Gorge by native fish species. Arizona Heritage Grant Draft Final Report. Utah Water Research Laboratory.
- Hardy, T.B. 1996. A conceptual approach to assessing instream flows in large rivers of the Northern River Basin, Canada. In: Proceedings of the Northern River Basins Study Instream Flow Workshop. October 14-15, 1993 and January 6-7, 1994.
- Hardy, T.B., and R.C. Addley. 1996. Development of surface area and physical habitat suitability for VRBIRMRP Implementation. INSE, Utah State University.
- Addley, R.C., and T.B. Hardy. 1996. Temperature and conductivity modeling of the Virgin River for the Virgin River Basin Integrated Resource Management and Recovery Program.

- Addley, R.C. and T.B. Hardy. 1995. Woundfin, roundtail chub and desert sucker osmoregulation in natural saline waters of the Virgin River (draft). Utah State University. 32 pp.
- Hardy, T.B. and R.C. Addley. 1998. Maintenance of the Virgin River Fishes Data Base and Technical Coordination for the Virgin River Basin Integrated Resource Management and Recovery Program (Phase I); Winter Habitat Utilization by Native Species of the Virgin River (Phase II); Population and Habitat Monitoring in the Virgin River and Automation of the VRBIRMRP Analysis System (Phase III). Final Report. Prepared for The Washington County Water Conservancy District. Institute for Natural Systems Engineering, Utah Water Research Laboratory, Utah State University, Logan, Utah 84322-4110.
- Addley, R.C. and T.B. Hardy. 1998. Water Reuse of the St. George Regional Wastewater Treatment Plant. Prepared for The Washington County Water Conservancy District. Institute for Natural Systems Engineering, Utah Water Research Laboratory, Utah State University, Logan, Utah 84322-4110.
- Addley, R.C. and T.B. Hardy. 1998. Evaluation of Alternative Flow Scenarios for the Proposed Sand Hollow Reservoir Project. Prepared for The Washington County Water Conservancy District. Institute for Natural Systems Engineering, Utah Water Research Laboratory, Utah State University, Logan, Utah 84322-4110.
- Hardy, T.B., K. Tarbet, and K. Panja. 1995. Evaluating Alternative Flow Strategies in the Virgin River. Final Report to Washington County Water Conservancy District. Utah Water Research Laboratory, Utah State University, Logan, Utah.
- Addley, R.C. and T.B. Hardy. 1995. Virgin River Fishes Suitability Criteria. Final Report to Bureau of Land Management and Washington County Water Conservancy District. Utah Water Research Laboratory, Utah State University, Logan, Utah.
- Utah Water Research Laboratory. 1994. Weber Basin Water Quality/Watershed Management Study: Data Analysis. Phase I Report. Cooperative Agreement No. 4-FC-40-15250. U.S. Bureau of Reclamation and Weber Basin Water Conservancy District. 37 pp.
- Hardy, T.B., J.A. Shoemaker, K. Panja, and K. Tarbet. 1994. Availability of Fish Habitats within the Virgin River, Utah, Arizona, and Nevada. Final Report to Bureau of Land Management. September, 1994. Utah Water Research Laboratory, Utah State University, Logan, Utah. 29 pp.
- Hardy, T.B. 1994. Recovery Plan for the woundfin, **Plagopterus argentissimus** and Virgin River chub, **Gila robusta seminuda**. U.S. Fish and Wildlife Service. 96 pp.
- Addley, R.C. and T.B. Hardy. 1993. Aquatic Invertebrates in the Virgin River. Final Report to Bureau of Land Management, Utah Water Research Laboratory, Utah State University, Logan, Utah.
- Hardy, T.B. 1991. Population Status, Recruitment and Verification of Assessment Methodologies for the Fishes within the Virgin River. Department of Civil and Environmental Engineering, Utah State University, Logan, Utah. 39 pp.=
- Deacon, J.E., A. Rebane, T.B. Hardy. 1991. A habitat preference analysis of the Virgin Spinedace in Zion National Park, Utah. University of Nevada at Las Vegas. 80 pp.
- Hardy, T.B. 1990. Status report on the fishes of the Virgin River. 38 pp. Utah State University.
- Hardy, T.B. 1990. USDA Forest Service Region 1 and 4 fisheries habitat suitability indices. Department of Civil and Environmental Engineering, Utah State University, Logan, Utah. 91 pp.

- Hardy, T. B. 1989. Development and utilization of IFIM model results in the negotiation of instream flows. Department of Civil and Environmental Engineering, Utah State University, Logan, Utah. 24 pp.
- Hardy, T.B., B. Bartz and W. Carter. 1989. Population dynamics of the fishes in the Virgin River from 1984 through 1987 and impact analyses of the Quail Creek and North Creek reservoir Systems. Utah State University. 564 pp.
- Hardy, T.B. 1989. A comparison of the GAWS and Instream Flow models. Prepared for the U.S. Forest Service. Utah State University. 9 pp.
- Hardy, T.B. 1987. The Instream Flow Incremental Methodology applied to the Cypress Bayou Basin ichthyofauna. Prepared for the Army Corp of Engineers, Waterways Experiment Station. Utah State University. 31 pp.
- Hardy, T.B. 1988. Impact assessment of the proposed North Creek Reservoir on the ichthyofauna of the main stem Virgin River, Washington County, Utah. Utah State University. 119 pp.
- Hardy, T.B. 1988. Development of suitability of use curves for the Virgin River Spine dace (Lepidomeda mollispinis mollispinis). Utah State University. 27 pp.
- Hardy, T.B. 1988. Statistical analysis of the fisheries and flow data in the Virgin River, Washington County, Utah. Utah State University. 271 pp.
- Hardy, T.B. and C.C. Caupp. 1988. Development of a steady-state physical habitat model for the fishes of the Virgin River. Executive Summary. Prepared for the Washington County Water Conservancy District. Utah State University. 84 pp.
- Hardy, T.B. 1987. A comparative analysis of the effects of alternative stage-discharge computational methods on WUA predictions in IFIM modeling. Prepared for the Department of Fisheries and Oceans, Alberta Environment, Canadian Government. Utah State University. 44 pp.
- Hardy, T.B. and C.C. Caupp. 1986. Development of a steady-state physical habitat model for the fishes of the Virgin River. Prepared for the Washington County Water Conservancy District. Utah State University. 230 pp.
- Hardy, T.B. 1985. Development of a physical habitat model for use in determining instream flow requirements of the ichthyofauna in the Virgin River. Prepared for the Washington County Water Conservancy District. Utah State University. 63 pp.
- Hardy, T.B. and J.E. Deacon. 1982. Distribution and status of the ichthyofauna for localities with known collections of exotic or introduced species: Arizona, California, Colorado, Nevada, New Mexico, Texas and Utah. Department of Biological Sciences, University of Nevada at Las Vegas, Las Vegas, Nevada. 480 pp.
- Hardy, T.B. 1982. Ecological interactions of the introduced and native fishes in the outflow of Ash Springs, Lincoln County, Nevada. Department of Biological Sciences, University of Nevada at Las Vegas. 110 pp.

5. Book Reviews:

6. Other:

- Hardy, T.B., P. Panja, and D. Mathias. 2002. WinXSPRO: A Channel Cross-Section Analyzer User's Manual, v. 3.2. Modified from Earlier versions prepared by Grant et al., 1992 and WEST, Inc. 1998. Produced by USDA Forest Service, Rocky Mountain Research Station, Stream Systems Technology Center, Fort

- Collins, CO 80526. Institute for Natural Systems Engineering, Utah Water Research Lab, Utah State University, Logan, UT 84322-8200.
- Mathias, J.D., T.B. Hardy, K.J. Killgore, and J. Jorden. (1995). The aquatic habitat appraisal guide. U.S. Army Corps of Engineers Waterways Experiment Station.
- Hardy, T.B. 1989. Computer manual for the PCSIM hydraulic simulation software system. Prepared for the Department of Fisheries and Oceans, Alberta Environment, Canadian Government. Hardy and Associates. 187 pp.
- Hardy, T.B. and J.D. Mathias. 1989. Interactive curve development library for use in Suitability Index curve analyses. Prepared for the National Ecology Research Center. Utah State University. 18 pp.

B. Works not in Print

1. Papers Presented at Professional Meetings:

- Hardy, T.B. 2008. Conceptual validation of flow recommendations for salmon in the Klamath Basin using independent models. Invited paper for annual American Fisheries Society annual meeting in San Francisco, September 2007.
- Hardy, T.B. 2005. Modeling impact assessments in fluvial systems – A virtual river view. Presented as a keynote address at the Institut National Recherche Scientifique - Eau, Terre et Environnement/ Universite Laval sponsored Geosalar Conference, Geomatics and Fish Habitat Modeling in Rivers and Estuaries held in Quebec City, Quebec November 17-18, 2005. (invited)
- Hardy, T.B. 2005. The Science of instream flows – Evidence of an adaptive process and the dichotomy of perceived information needs. Presented at Flows for the Future, 2005 Environmental Flows Conferences sponsored by River Systems Institute, October 31 & November 1, 2005, Texas State University - San Marcos, TX. October 31-November1, 2005. (invited).
- Basdekas, L., T.B. Hardy, R.C. Addley, W. Bradford, J. Hammond. 2004. Benefits Evaluation of Channel Reconstruction on Lower LaVerkin Creek Using Two-Dimensional Hydrodynamics and Biological Habitat Modeling. Presented at the 5th International Symposium on Ecohydraulics in Madrid, Spain. September 12-17, 2004.
- Bhosle, M., T.B. Hardy. Estimating Uncertainty in Fish Habitat Modeling Using Two-Dimensional Hydraulics. Presented at the 5th International Symposium on Ecohydraulics in Madrid, Spain. September 12-17, 2004.
- Combes, M., I. Gowing, T.B. Hardy. 2004. Comparative Evaluation of a Rapid Assessment Methodology for Instream Flow Assessments with Intensive Physical Habitat Simulation (PHABSIM) Approaches. Presented at the 5th International Symposium on Ecohydraulics in Madrid, Spain. September 12-17, 2004.
- Hardy, T.B., and R.C. Addley. 2004. Incorporation of Fish Behavior in Physical Habitat Models. Presented as the keynote address at the 5th International Symposium on Ecohydraulics in Madrid, Spain. September 12-17, 2004.
- Saraeva, E., and T.B. Hardy. 2004. Development and Application of GIS Based Instream Flow Extrapolation Procedure for Watershed Planning in the Nooksack

- River Basin. Presented at the 5th International Symposium on Ecohydraulics in Madrid, Spain. September 12-17, 2004.
- Thompson, J., T.B. Hardy. 2004. Development and Application of a GIS Base River Basin Assessment Tool for Prioritization of Aquatic Habitat Restoration at the Watershed Level. Presented at the 5th International Symposium on Ecohydraulics in Madrid, Spain. September 12-17, 2004.
- Basdekas, L., L. Bastidas, A. Caplan, T.B. Hardy, M. McKee, and D. Stevens. 2004. Balancing Water Use, Water Rights, Endangered Species, and Economics; A Multi-Objective, System Operations Optimization Approach. Presented at the UCOWR/NIWA Conference in Portland, OR. July 20-22, 2004.
- Hardy, T.B. 2004. Field Validation of Habitat Modeling in the Lower Klamath River. Presented at the Lower Klamath Basin Science Conference in Redding, CA. June 7-9, 2004. – Invited.
- Hardy, T.B. 2004. Field Validation of Habitat Modeling of Chinook Spawning and Fry Life Stages in the Lower Klamath River. Presented at the American Fisheries Society meeting in Redding, CA. April 22-23, 2004.
- Dodd, A.M., E.M. Cashman and T.B. Hardy. 2003. Presentation at American Geophysical Union Fall Meeting, December 12, 2003. San Francisco, CA.
- Hardy, T.B. 2003. Technical Assessment of Instream Flows in the Lower Klamath River. (Invited) Western Division of the American Fisheries Society Annual Meeting, San Diego, California. April 15, 2003.
- Hardy, T.B. 2002. EDN 1: Hydraulic Model Calibration Files and Supporting Analysis Files. Prepared for The WRIA 1 Watershed Management Project. Institute for Natural Systems Engineering, Utah Water Research Lab, Utah State University, Logan, Utah 84322-8200.
- Addley, R.C., and T.B. Hardy. 1999. Three Dimensional Physical and Bioenergetics Habitat in Large River Systems Using State-of-the-Art Hydroacoustics, GPS, GIS, Photogrammetry, and Computational Fluid Dynamics. In: Proceedings of the 3rd International Symposium on Ecohydraulics – Strategies for Sampling, Characterization and Modeling of Aquatic Ecosystems in Applied Multi-disciplinary Assessment Frameworks.
- Shoemaker, J., J. Ludlow, and T. Hardy. 1999. A System for Collection of High Precision Bathymetry. In: Proceedings of the 3rd International Symposium on Ecohydraulics – Strategies for Sampling, Characterization and Modeling of Aquatic Ecosystems in Applied Multi-disciplinary Assessment Frameworks.
- Guensch, G. and T.B. Hardy. 1999. Validation of a Mechanistic Habitat Selection Model for Drift Feeding Salmonids. In: Proceedings of the 3rd International Symposium on Ecohydraulics – Strategies for Sampling, Characterization and Modeling of Aquatic Ecosystems in Applied Multi-disciplinary Assessment Frameworks.
- Hardy, T.B. and R.C. Addley. 1999. Vertical integration of spatial and hydraulic data for improved habitat modeling in GIS. Annual Meeting of the Bonneville Chapter American Fisheries Society. March 15-18, 1999.
- Hardy, T.B. 1998. Linkages between spatial sampling strategies, habitat heterogeneity and hydraulic modeling with implications to applied instream flow assessments. Invited Paper and Abstract at INTECOL 1998. International Symposium for Ecology, Florence, Italy.

- Addley, R.C., and T.B. Hardy. 1997. Bioenergetics: a biological response base approach to instream flow assessments. American Fisheries Society Annual Meeting, Monterey, California.
- Hardy, T.B. 1996. Formation of the International Aquatic Modeling Group. In: The 2nd International Symposium on Habitat Hydraulics, Quebec, Canada. pp A845-850.
- Bartsch, N., C.P. Gubala, and T.B. Hardy. 1996. Determining habitat criteria for the endangered fountain darter through aquatic mapping and hydrologic modeling. In: The 2nd International Symposium on Habitat Hydraulics, Quebec, Canada. pp B251-B262.
- Tarbet, K., and T.B. Hardy. 1996. Evaluation of one-dimensional and two-dimensional hydraulic modeling in a natural river and implications in instream flow assessment methods. In: The 2nd International Symposium on Habitat Hydraulics, Quebec, Canada. pp B395-B406.
- Hardy, T.B. 1996. The future of habitat modeling. In: The 2nd International Symposium on Habitat Hydraulics, Quebec, Canada. pp B448-B463.
- Ludlow, J.A., and T.B. Hardy. 1996. Comparative evaluation of suitability curve based habitat modeling and a mechanistic based bioenergetic model using 2-dimensional hydraulic simulations in a natural river system. In: The 2nd International Symposium on Habitat Hydraulics, Quebec, Canada. pp B519-B530.
- Hardy, T.B. 2004. An Applied Decision Support System Using Multidisciplinary Assessment Methods for Instream Flows – Nooksack River Basin. Presented at the American Fisheries Society Conference in Austin, TX. February 9-11, 2004.
- Hardy, T.B. 1995. Water Resource System Operations and Endangered Species in the Virgin River Basin: Past, Present and Future. Proceedings of the Annual Spring Symposium of the American Water Resources Association, *Water in the 21st Century: Conservation, Demand, and Supply*. April 23-26, 1995, Salt Lake City, Utah.
- Crowther, B.E., T.B. Hardy, and C.M.U. Neale. 1995. Application of Multispectral Video for the Classification of Fisheries Habitat Components in Salmon River, Idaho. Proceedings of the 15th Workshop on Color Photography and Videography for Resource Assessment. Indiana State University, Indiana. May 2-3, 1995.
- Panja, K., and T.B. Hardy. 1995. Comparison of Multispectral Videography based Classification of Mesoscale Habitats and Ground Based Mapping under Turbid Riverine Conditions. Proceedings of the 15th Workshop on Color Photography and Videography for Resource Assessment. Indiana State University, Indiana. May 2-3, 1995.
- Addley, R. Craig and T.B. Hardy. 1994. Distribution and abundance of Virgin Spinedace (*Lepidomeda mollispinis mollispinis*) in the Virgin River Basin. Abstract and Presentation at the American Fisheries Society Bonneville Chapter and Wildlife Society Utah Chapter Joint Winter Technical Session, February 24-26, 1993, St. George, Utah.
- Neale, C.M.U., T.B. Hardy, and J.A. Shoemaker. 1994. Evaluation of Coastal Wetland States using Spatial and Spectral Metrics derived from Multispectral Videographic Imagery. Final Report to Environmental Protection Agency, Corvallis, Oregon. Department of Civil and Environmental Engineering, Utah State University.
- Hardy, T.B., P.C. Anderson, C.M.U. Neale, D.K. Stevens. 1994. Application of Multispectral Videography for the Delineation of Riverine Depths and Mesoscale Hydraulic Features. Paper and Presentation at the American Water Resources

- Association, Effects on Human-Induced Changes on Hydrologic Systems. June 26-29, 1994. Jackson Hole, Wyoming.
- Hardy, T.B. 1994. Issues on Endangered Species. Abstract and Presentation at the Utah Water Users Group Annual Meetings. April 17, 1994. St. George, Utah.
- Hardy, T.B. 1994. Use of GIS in Multidisciplinary Studies for Instream Flow Assessments of Endangered Species in the Comal River Ecosystem. Paper and Presentation at the American Water Resources Association, Effects on Human-Induced Changes on Hydrologic Systems. June 26-29, 1994. Jackson Hole, WY.
- Redd, T.H., C.M.U. Neale, and T.B. Hardy. 1993. Classification and delineation of riparian vegetation on two western river systems using airborne multispectral video imagery. In: Proceedings of the 14th Biennial Workshop on Color Photography and Videography for Resource Monitoring. Utah State University, Logan, Utah, May 25-28, 1993, Editor C.M.U. Neale.
- Panja, K.V., T.B. Hardy, and C.M.U. Neale. 1993. Comparison of meso-scale hydraulic features at different discharges in a turbid river system using multispectral videography. In: Proceedings of the 14th Biennial Workshop on Color Photography and Videography for Resource Monitoring. Utah State University, Logan, Utah, May 25-28, 1993, Editor C.M.U. Neale.
- Hardy, T.B. 1993. Application of multi-spectral videography for resource management in the Virgin River Basin. Paper and Presentation at the 1993 American Fisheries Society Winter Technical Meeting, Bonneville Chapter. November 14, 1993. Wendover, Nevada.
- Hardy et al. 1985. A survey of graduate education in Environmental Engineering. In: Proceedings of the third annual conference on education in engineering. ASCE Fall Meeting, Columbus, Ohio. 6 pp.

2. Invited Talks, Lectures, Presentations:

Invited:

- Hardy, T.B. 2006. Incorporating ecological risk in assessing instream flows. Presented at LCRA/SAWS Science Symposium - Austin, TX. March 2006.
- Hardy, T.B. 2005. Managing Water for Endangered Fishes. Presentation at Water in the West: Use-Abuse-and Scarcity, An NR Week Symposium of the College of Natural Resources and the USU Water Initiative, Utah State University, Logan, Utah 84321, October 2005.
- Hardy, T.B. 2005. Use of GIS to integrate spatial data in instream flow assessments. Guest lecture in the GIS in Water Resources course taught concurrently at University of Texas at Austin and USU (CEE 6440) November 15, 2005 (invited)
- Hardy, T.B. 2003. Presentation/panelist at Inland Northwest Research Alliance 2003 Subsurface Science Symposium (invited). Role of Stakeholders in Determining Environmental Policy". October 6, 2003 Salt Lake City, UT.
- Bishop, B., T. Hardy, and M. McKee. 2003. Presentation at Northern Utah Conference on Evidence (invited). October 10, 2003. Eccles Conference Center, USU, Logan, UT.
- Hardy, T.B. and C. Addley. 2003. Instream Flow Assessment Modeling: Combining Physical and Behavioral-Based Approaches. (invited) American Fisheries Society 133rd Annual Meeting, Quebec City, Quebec. August 12, 2003.
- Hardy, T.B. 2002. The State-of-the-Art in Habitat Modeling. (Invited) 14th Annual

- International HydroVision Conference. Seattle, Washington. August 1, 2002.
- Hardy, T.B. 2002. A Decade of 2-dimensional Instream Flow Modeling Experience Benefits and Pitfalls of 2-dimensional Habitat Modeling. (Invited) Fourth International Ecohydraulics Conference, Cape Town, South Africa. March 2002.
- Hardy, T.B. and R.C. Addley. 1999. Vertical integration of spatial and hydraulic data for improved habitat modeling in GIS. (Invited). Hydro-ecology Session at IAHS Annual Meeting, Birmingham, England, July 1999.
- Hardy, T.B. and G. Guensch. 1999. Field validation of a mechanistic based bioenergetic model for drift feeding salmonids. (Invited). Hydro-ecology Session at IAHS Annual Meeting, Birmingham, England, July 1999.
- Hardy, T.B., N. Bartsch, and P Connor. 1998. Habitat and Flow Requirements – Instream Flow Methodology, Monitoring, and the Best Guess. (Invited). Watershed Management to Protect Declining Species and Symposium on Water Resources and World Wide Web. American Water Resources Association Annual Water Resources Conference. December 6-9 1996, Seattle Washington.
- Hardy, T.B., P. Waite, and G. Geuntsch. 1998. Evaluation of a Mechanistically Based Salmonid Model for Stream Position Choice. Invited Paper and Abstract at INTECOL 1998. International Symposium for Ecology, Florence, Italy.
- Hardy, T.B. and R.C. Addley. 1998. Physical Data Necessary to Describe Trout Populations at the Stream Reach and Larger Scale. Invited Presentation at Trout Population Dynamics at Stream Reach and Stream Network Scales: Quantifying Physical and Biological Processes. April, 1998, Fort Collins, Colorado.
- Hardy, T.B. 1997. Understanding the Biology of Your Watershed. Fourth Annual Water Summit, Utah Water Users Association. Invited Paper, November, 1997, Salt Lake City.
- Hardy, T.B. 1997. Moving Toward Trophic-Level-Based, Ecologically-Based Instream Flow Regimes. Invited Paper and Abstract. Instream and Environmental Flows Symposium Technology and Policy Issues. 17th International Symposium of the North American Lake Management Society. December 2, 1997, Houston, Texas.
- Gubala, C.P., T.B. Hardy and J. Eilers. (1995). SONAR-GPS Mapping of Aquatic Ecosystems and GPS Assisted Survey of Small Rivers, Streams and Creeks. Trimble Surveying and Mapping Users Conference and Exposition, August 9-11, 1995. Invited paper and presentation.
- Hardy, T.B. 1993. Environmental Engineering and the real world. Invited paper, Environmental Studies Program Professional Seminar Series, University of Nevada at Las Vegas.
- Hardy, T.B. 1993. Environmental Impacts of severe sustained drought: Case Studies. Abstract and Presentation at the 29th Annual Conference and Symposium "Effluent Use Management" American Water Resources Association, August 29-September 2, 1993. Tucson, Arizona. Invited.
- Hardy, T.B., D.S. Bowles, and B.A. Finney. 1986. A case for real time water quality management in the United States. Paper presented at the American Geophysical Union Fall Annual Meeting, San Francisco, California.

Reviewed Presentations:

- Hardy, T.B., R.C. Addley. 2007. Physical habitat and bioenergetic assessments of anadromous fish flow needs. An integrated application of the natural flow

paradigm to recommending instream flows. Presented at the 6th International Symposium on Ecohydraulics, Christchurch, New Zealand.

Hardy, T.B. 2004. An Applied Decision Support System Using Multidisciplinary Assessment Methods for Instream Flows – Nooksack River Basin. Presented at the American Fisheries Society Conference in Austin, TX. February 9-11, 2004.

Presentations:

Hardy, T.B. 2008. Modeling Game and Non-game Species – Assessing Flow Dependent Needs. Presented at 2008 Texas Chapter of the American Fisheries Society meeting at Texas Tech University-Junction on January 17-19, 2008.

Hardy, T.B. 2008. The use of aerial drone technology to collect remote sensing data for GIS applications. Presented at the Texas Geographic Information Council Quarterly Meeting, Austin, TX. January 30, 2008.

Acreman, M.C., D.J. Booker, M.J. Dunbar, T. Goodwin, A.R. Young, I.M. Gowing, M. Rivas-Casado, I. Maddock, G. Hill, T.B. Hardy, S. Allan. 2006. A risk-based approach to rapid assessment of physical habitat sensitivity to abstraction. Presented at TISOR International Conference on “Riverine Hydroecology: advances in research and applications” Stirling University England.

Stevens, D.K. and T.B. Hardy, 2005. Linking operational hydrology and water quality modeling in the Weber basin: A decision support system. Presented at GSA Annual Meeting and Exposition in Salt Lake City, UT. October 16, 2005 (invited)

Hardy, T.B. 2004. The Use of Hydrologic Modeling in the Development of Flow Recommendations. Presented at the Lower Klamath Basin Science Conference in Redding, CA. June 7-9, 2004. – Invited.

Shoemaker, J., P. Dey, T.B. Hardy, and K. Panja. 1996. Application of multispectral videography for natural resource classifications. Annual ERDAS Users Group Meeting.

Hardy, T.B. 1996. Integration of Low Cost GPS with GIS for Fisheries Resource Management. Presentation at the Winter Meeting of the Bonneville Chapter of the American Fisheries Society, February 29 1996, Logan Utah.

Hardy, T.B., K.V. Panja, and P.C. Anderson. 1993. Application of multispectral videography for resource management in the Virgin River Basin. Abstract and Presentation at the American Fisheries Society Bonneville Chapter and Wildlife Society Utah Chapter Joint Winter Technical Session, February 24-26, 1993, St. George, Utah.

Shoemaker, J., C.M.U. Neale, J.P. Dobrowolski, and T.B. Hardy. 1993. Use of multispectral videography for jurisdictional delineation of wetland areas. In: Proceedings of the 14th Biennial Workshop on Color Photography and Videography for Resource Monitoring. Utah State University, Logan, Utah, May 25-28, 1993, Editor C.M.U. Neale.

Anderson, P.C., T.B. Hardy, and C.M.U. Neale. 1993. Application of Multispectral videography for the delineation of riverine depths and mesoscale hydraulic features. In: Proceedings of the 14th Biennial Workshop on Color Photography and Videography for Resource Monitoring. Utah State University, Logan, Utah, May 25-28, 1993, Editor C.M.U. Neale.

Dupont, R.R. and T.B. Hardy. 1988. Estimating the uncertainty of hazardous air emissions from land treatment systems using the Thibodeaux-Hwang Air Emission

Model. 88.116-6 Presented to the 81st Annual Conference of the Air Pollution Control Federation, Dallas, Texas. June 20-24. 1988. 18 pp.

3. Consultancies:

Lead expert witness for federal fish related water claims on Forest Service lands in the Snake River Basin Adjudication. – Department of Justice

Technical review of Forest Service claims for fisheries in the Upper Klamath River Basin, Oregon. – Department of Justice

Mono Basin Hearings before the California Water Development Board – City of Los Angeles.

Expert witness in behalf of her Majesty the Queen of England in the Axford Inquiry. – The Crown of England.

Technical facilitator for Alberta Environment with first nations and oil sands development companies for water withdraw from the Athabasca River. Provincial Government of Alberta, Canada.

Hardy, T.B. 2005. CEMA Instream Flow Needs HSC Development Workshop Final Report– Athabasca River Fish Habitat Suitability Criteria (HSC) Curves.

Prepared in cooperation with the Watershed Systems Group, Inc., Logan, UT

Hardy, T. B. 1998. Experts Report - Multiple Use Sustained Yield Act - Fisheries Claims Quantification. Snake River Basin Adjudication, Department of Justice. 157pp +appendices.

Addley, R.C., and T.B. Hardy. 1998. Integrated Ecological Based Instream Flows for Diamond Fork, Utah. Prepared for Woodward-Clyde and the Central Utah Water District. Watershed Systems Group, Inc. 54pp + appendices.

Addley, R.C. and T.B. Hardy. 1995. Sonoita Creek Instream Flow Study, Hardy Addley & Assoc., Technical Report 01-95 Sonoita Creek. 35 pp.

Addley, R.C. and T.B. Hardy. 1995. Upper Salmon Falls North Channel instream flow study. Hardy Addley & Assoc., Technical Report #IPC 02-95. 35 pp.

Addley, C.R. and T.B. Hardy. 1995. Lower Salmon Falls Instream Flow Study. Final Report to Idaho Power Company. Hardy, Addley and Associates, Inc., Logan, UT.

Hardy, T.B., R.C. Addley. 1993. Evaluation of Ramping Rates Below the Lower Milner Powerhouse for Water Based Recreation and Rainbow Trout Fisheries. Final Report to Idaho Power Company. Hardy, Addley and Associates, Inc.

Addley, R.C. and T.B. Hardy. 1993. The current distribution and status of spinedace in the Virgin River Basin. Final report to Washington County Water Conservancy District. Hardy, Addley and Associates, INC.

Hardy, T.B, B. Bartz, and R.C. Addley. 1992. Fisheries Impact assessment of the proposed Blanchett Park Dam and Reservoir. Hardy & Associates, Technical Report #BIO-02.

Addley, R.C. and T.B. Hardy. 1992. Blanchett Park Reservoir conservation pool determination. Hardy & Associates, Technical Report #BIO-01. 34 pp.

Hardy, T.B. 1991. Review of instream flow recommendations for Mad River. Prepared for Snowridge, Inc. Hardy and Associates. 89 pp.

Hardy, T.B., B. Bartz and W. Carter. 1990. Instream flow recommendations for the fishes of Aravaipa Creek, Arizona. Prepared for The Nature Conservancy. Hardy and Associates. 241 pp.

- Hardy, T.B., B. Bartz, and W. Carter. 1990. Instream flow (PHABSIM) analysis of Lower Platte River fish species for the Interior Least Tern Forage. Prepared for Fisheries Division, State of Nebraska Game and Parks Commission. Hardy and Associates. 136 pp.
- Hardy, T.B. 1990. Review of instream flow recommendations for the Mad River. Prepared for Snowridge, Incorporated. Hardy and Associates. 20 pp.
- Hardy, T.B. 1990. Review of instream flow recommendations for Okemo Mountain. Prepared for Okemo Mountain, Inc. Hardy and Associates. 15 pp.
- Hardy, T. B. 1990. Assessment of instream flows for the Uinta River. Prepared for Moon Lake Electric. Hardy and Associates. 46 pp.
- Hardy, T.B. 1990. Fisheries impact analysis of the Yellowstone River Hydropower Plant. Prepared for Moon Lake Electric. Hardy and Associates. 76 pp.
- Hardy, T.B. 1990. Impact analysis and instream flow recommendations for the Unita River hydro-electric project. Prepared for the Moon Lake Electric Company. Hardy and Associates. 88 pp.
- Hardy, T.B. 1990. Impacts associated with the Beaver Dam Golf course construction project on the aquatic ecosystem of Beaver Dam Wash, Arizona. Prepared for Beaver Dam Golf, Inc. Hardy and Associates. 63 pp.
- Hardy, T.B. and T. Hickman. 1989. Supplemental report on the Wailuku River Instream Flow Impact Analysis. Hardy and Associates. 19 pp.
- Hardy, T.B. 1989. Impact analysis of the proposed Marble Creek hydroelectric project. Hardy and Associates. 28 pp.
- Hardy, T.B. 1988. Fisheries inventory of the Fremont River, Capitol Reef National Park. Hardy and Associates. 33 pp.
- Hardy, T.B. 1988. Fisheries impact analyses of the proposed Fremont River Water Development Project. Hardy and Associates. 134 pp.
- Hardy, T. B. 1988. Impacts associated with the proposed expansion of the Loon Mountain Ski Resort on the fishes of the Pemigewasset River. Hardy and Associates. 45 pp.
- Hardy, T.B. 1988. Instream flow analysis of minimum flow requirements in the Weber River, Utah. TR-146-1. BIO/WEST Inc. 42 pp.
- Grah, O.J. and T.B. Hardy. 1988. Erosion prediction technical report for the proposed Lake Catamount Ski Area Project. TR-145-2. BIO/WEST Inc. 43 pp.
- BIO/WEST Incorporated. 1987. Mojave-Kern River-EI Dorado natural Gas Pipeline Final Environmental Impact Statement/Report. Volume 1. 788 pp.
- Valdez, R.A., P.B. Holden, T.B. Hardy, and R.J. Ryel. 1987. Habitat suitability index curves for endangered fishes of the upper Colorado River Basin. BIO/WEST Inc./U.S. Fish and Wildlife Service. 173 pp.
- Holden, P.B., T.B. Hardy, and L.W. Crist. 1987. Instream flow studies on the Snake, Blackfoot and Portneuf Rivers, adjacent to the Fort Hall Indian Reservation. Tr-111-1. BIO/WEST Inc. 54 pp.
- Williams, C., J.E. Deacon and T.B. Hardy. 1982. Status of the Tecopa pupfish within Tecopa Bore. Environmental Consultants, Inc., Las Vegas, Nevada. 45 pp.
- Hardy, T.B., and J.E. Deacon. 1982. Impact analysis of the proposed Quail Creek Reservoir on Plagopterus argentissimus (woundfin) in the Virgin River. Environmental Consultants Inc. Las Vegas, Nevada. 96 pp.
- Hardy, T.B. and J.E. Deacon. 1981. Evaluation of water withdrawal on the Darwin Canyon Ecosystem. Environmental Consultants Inc., Las Vegas, Nevada. 89 pp.

Hardy, T.B. 1981. Status of the Pahrnagat Valley roundtail chub in the outflow of Ash Springs, Nye County, Nevada. Environmental Consultants Inc., Las Vegas, Nevada. 63 pp.

Hardy, T.B. et al. 1981. Impact analysis of the MX missile system on the aquatic habitats within the Pahrnagat and Moapa Valley River Systems. Environmental Consultants, Inc., Las Vegas, Nevada. 489 pp.

Hardy, T.B. et al. 1980. Impact analysis of the MX missile system on selected aquatic habitats in Central Nevada. Environmental Consultants Inc., Las Vegas, Nevada. 576 pp.

Hardy, T.B. 1908. Environmental assessment of proposed geothermal explorations on Relictus solitarius. Bio-Consultants of Nevada, Las Vegas, Nevada. 135 pp.

Deacon, J.E. and T.B. Hardy. 1978. Analysis of flow requirements of the woundfin in the Virgin River. Environmental Consultants, Inc., Las Vegas, Nevada. 27 pp.

4. Workshops:

Workshop	Entity	Dates
Development of instream flows for fisheries	Utah Division of Water Resources Professional Development Series	1989
Development of instream flows for fisheries	U.S. Forest Service Technical Training	1990,1991
IFIM Field techniques for habitat simulation	U.S. Forest Service Technical Training	1989,1991
Instream negotiation strategies	Utah State University	1991
IF310 Using the computer based PHABSIM system	National Ecology Research Center, U.S. Fish and Wildlife Service	1989,1991,1992,1993,1994, 1995,1996,1997,1998,1999, 2000,2001,2002,2003,2004, 2005,2006,2007,2008
Central Asian Republic Interactive Site Workshops on Water Management	USAID	1994
Instream Flow Techniques	Bureau of Land Management	1994
Research Methods	Utah Water Research Laboratory	1994,1995
Wildlife habitat and plant management	Utah State University, Department of Fisheries and Wildlife	1994,1995,1996,1997,1998
Northern Rivers Basin Instream Flow Technical Workshop	Alberta Fish and Wildlife Service, Canada	1994
Threatened and Endangered Species Consultation and Management Short Course	Bureau of Land Management	1994
Advanced instream flow techniques	International workshop – Vienna, Austria	1995,1996
Advanced instream flow techniques	International workshop – Institute of Hydrology, Center of Hydrology	1997

	and Ecology, Wallingford England	
Advanced instream flow techniques in ephemeral rivers	International workshop – Lisbon Portugal	1996
Applications of advanced instream flow techniques for protection of aquatic resources	National Rivers Authority, United Kingdom	1995
Applications of advanced instream flow techniques for protection of aquatic resources	University of Portugal, Eva	1996
Advanced instream flow techniques for quantification of impacts in rivers	Mexico Institute of Freshwater Ecology, Chutepeck, Mexico	1997
Application of habitat based assessment of project impacts on fisheries	Alberta Environment, Alberta, Canada	1998
Application of habitat based assessment of project impacts on fisheries	U.S. Forest Service	1999,2000,2001
Instream Flows 101	Texas State University	2008
Instream Flows – Integration and Interpretation of Study Results	Texas State University	2008
Two-dimensional hydraulic and habitat modeling	Southwest Florida Water Management District	2008
Application of physical habitat modeling for salmonid restoration	Buckley Valley Resource Center, Smithers, Canada	2009

5. Other:

C. Grants and Contracts

1. Funded External Grants and Contracts:

2. Submitted, but not Funded, External Grants and Contracts:

3. Funded Internal Grants and Contracts:

4. Submitted, but not Funded, Internal Grants and Contracts:

D. Fellowships, Awards, Honors:

NATO Advanced Study Institute for the use of Expert Systems in Civil Engineering through a grant awarded by the National Science Foundation in Edinburgh, Scotland. 1989.

IV. SERVICE

A. University:

Committee	Location	Dates
ASCE Student Chapter Faculty Advisor	Utah State University	1990-1996
Central Promotion and Tenure Review	Utah State University	2009
College of Engineering - Promotion and Tenure Review Committee		

B. Departmental:

Committee	Location	Dates
ASCE Student Chapter Faculty Advisor	Utah State University	1989,1990
CEE Computer Committee	Utah State University	1990
EE/CEE Microcomputer Laboratory Steering Committee	Utah State University	1990

C. Community:

D. Professional:

Committee	Location	Dates
Virgin River Fishes Recovery Team	USFWS	1982-present
Ecohydraulics Committee – IAHR	International	1988-present
Technical Reviewer for the Norwegian Science Board of Strategic Research Proposals	International	1990-present

E. Organizations

Committee	Location	Dates
International Association for Hydraulic Research – Ecohydraulics Committee (Founding Member)	International	1988 to present
IAHR-EC - Secretary	International	2003 to present
IAHR-EC - Chair	International	2009 - present

1. Honorary:

2. Professional:

- American Society of Civil Engineers
- American Water Resources Association
- American Society of Photogrammetry and Remote Sensing
- American Fisheries Society
 Certified Fisheries Scientist
- International Association for Hydraulic Research
- President, International Aquatic Modeling Group

F. Service Honors and Awards:

1st ever named Fellow of the Utah Water Research Laboratory (2009)