

CURRICULUM VITA

Name: Steven T. Summerfelt
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EDUCATION

B.S. Iowa State University, 1986, Chemical Engineering
M.S. Michigan State University, 1988, Chemical Engineering
Ph.D. Iowa State University, 1993, Civil and Const. Engin. (Environmental Engin. Emphasis)

POSITIONS

1992 - 2001 Research Engineer. TCFFI.
2002-Present Director of Aquaculture Systems Research, TCFFI.

SCIENTIFIC AND PROFESSIONAL ORGANIZATIONS

Aquaculture Engineering Society (AES):

1996-2000	<i>Secretary</i>
1996-2003, 2006-Present	<i>AES Newsletter Co-Editor</i>
2000	<i>2nd Vice President</i>
2001	<i>1st Vice President</i>
2002	<i>President</i>
2003	<i>Past President</i>
2009	<i>Member & Director</i>

American Institute of Chemical Engineers, *Member*

Water Environment Federation, *Member*

Sigma Xi, the Scientific Research Society, *Elected Member*

Alliance for Sustainable Aquaculture, *Founding Member*

Adjunct Professor, Hood College (Frederick, MD), appointment in 2005

Review panel member for the National Academy of Sciences, Research Support Program for the Middle East Regional Cooperation Program of the USAID, Washington, DC, October 25, 2005.

Review panel Chairman for the National Academy of Sciences, Research Support Program for the Middle East Regional Cooperation Program of the USAID, Washington, DC, March 21, 2008.

PROFESSIONAL LICENSURE

Licensed as a Professional Engineering in Virginia (No. 039601)

AWARDS

Aquacultural Engineering Society (AES) Meritorious Service Award to Steven Summerfelt
Presented at Aquaculture America 2008 in Orlando Florida, February 12, 2008.

2010 Aquacultural Engineering Society Best Paper Award:

Davidson, J., Helwig, N., Summerfelt, S.T. (2008). Fluidized sand biofilters used to remove ammonia, biochemical oxygen demand, total coliform bacteria, and suspended solids from an intensive aquaculture effluent. *Aquacultural Engineering* 39, 6-15.

2009 Aquacultural Engineering Society Best Paper Award:

Sharrer, M.J., Tal, Y., Ferrier, D., Hankins, J.A., Summerfelt, S.T. (2007). Membrane biological reactor treatment of a saline backwash flow from a recirculating aquaculture system. *Aquacultural Engineering* 35, 159–176.

2006 Aquacultural Engineering Society Honorable Mention Paper Awards:

Summerfelt, S.T., Davidson, J., Waldrop, T., Tsukuda, S., Bebak-Williams, J. (2004). A Partial-Reuse System for Coldwater Aquaculture. *Aquacultural Engineering* 31, 157-181.

Watten, B. J., Boyd, C. E., Schwartz, M. F., Summerfelt, S. T., Brazil, B. L. (2004). Feasibility of measuring dissolved carbon dioxide based on headspace partial pressures. *Aquacultural Engineering*, 30, 83-101.

2002 Aquacultural Engineering Society Best Paper Award:

Summerfelt, S.T., Vinci, B.J., Piedrahita, R.H. 2000. Oxygenation and carbon dioxide control in water reuse systems. *Aquacultural Engineering* 22, 87-108.

SELECTED PUBLICATIONS

Books and book chapters:

Brazil, B.L., Vinci, B.J., Summerfelt, S.T. (2004). Fish culture system design for the future. Pages 635-644 in M. J. Nickum, and D. D. MacKinlay, editors. Propagated fish in resource management. American Fisheries Society, Symposium 44, American Fisheries Society, Bethesda, Maryland.

Chen, S., Summerfelt, S.T., Losordo, T., Malone, R. (2002). Recirculating Systems, Effluents, and Treatments. In: J. R. Tomasso (Ed.), *Aquaculture and the Environment in the United States* (pp. 119-140). Baton Rouge, LA: U.S. Aquaculture Society, a Chapter of the World Aquaculture Society.

Summerfelt, S.T. (1996). Engineering design of a water reuse system. In: R. C. Summerfelt (Ed.), *Walleye Culture Manual* (pp. 277-309). Ames, IA: Central Regional Aquaculture Center Publication Center, Iowa State University.

Summerfelt, S.T. (1999). Chapter 13. Waste handling systems. In: E.H. Bartali & F.W. Wheaton (Eds.), *CIGR Handbook of Agricultural Engineering, Volume II: Animal Production and Aquacultural Engineering* (pp. 309-350). St. Joseph, MI: American Society of Agricultural Engineers.

Summerfelt, S.T. (2000). Carbon Dioxide. In: R. R. Stickney (Ed.), *Encyclopedia of Aquaculture* (pp. 141-147). New York: John Wiley and Sons, Inc.

Summerfelt, S.T., Bebak-Williams, J., Tsukuda, S. (2001). Controlled Systems: Water Reuse and Recirculation. In: G. Wedermeyer (Ed.), *Second Edition of Fish Hatchery Management* (pp. 285-395). Bethesda, MD: American Fisheries Society.

- Summerfelt, S.T., Summerfelt, R.C. (1996). Aquaculture of walleye as a food fish. In: *Walleye Culture Manual* (pp. 215-230). Ames, IA: North Central Regional Aquaculture Publication Center, Iowa State University.
- Summerfelt, S.T. and B.J. Vinci. (2008). Better management practices for recirculating systems. Pages 389-426 in C.S. Tucker and J.A. Hargreaves (editors), *Environmental Best Management Practices for Aquaculture*. Blackwell Publishing: Ames, Iowa
- Summerfelt, S.T., Timmons, M.B., Watten, B.J. (2000). Tank and Raceway Culture. In: R. R. Stickney (Ed.), *Encyclopedia of Aquaculture* (pp. 921-928). New York: John Wiley and Sons, Inc.
- Timmons, M.B., Ebeling, J.M., Wheaton, W.F., Summerfelt, S.T., Vinci, B.J. (2002). *Recirculating Aquaculture Systems*. (2nd ed.): Cayuga Aquaculture Ventures, LLC. Ithaca, NY.
- Timmons, M.B., Ebeling, J.M., Wheaton, F.W., Summerfelt, S.T., Vinci, B.J. (2001). *Recirculating Aquaculture Systems*. (1st ed.). North Dartmouth, MA: Northeast Regional Aquaculture Center.

Peer-reviewed journals:

In Review

- Davidson, J., Good, C., Welsh, C., Summerfelt, S.T. (Submitted-In Review). Unusual swimming and increased deformities in rainbow trout *Oncorhynchus mykiss* raised in low exchange water recirculation aquaculture systems. *Aquacultural Engineering*.
- Schiro, D., Pfeiffer, T., Summerfelt, S.T. (Submitted-In Review). Sidewall-box airlift pump provides large flows for aeration, CO₂ stripping, and water rotation in large dual-drain circular tanks. *Aquacultural Engineering*.
- Summerfelt, S.T., Clements, S., Gearheart, M. (Submitted-In Review). Ozone application and brominated by-products: Monitoring, formation, and destruction in water recirculating systems for fish culture. *Aquacultural Engineering*.

2011

- Davidson, J., Good, C., Welsh, C., Summerfelt, S.T. (2011). The effects of ozone and water exchange rates on water quality and rainbow trout *Oncorhynchus mykiss* performance in replicated water reuse systems. *Aquacultural Engineering* 44, 80-96.
- Good, C., Davidson, J., Welsh, C., Snekvik, K., Summerfelt, S. (2011). The effects of ozonation on performance, health, and welfare of rainbow trout *Oncorhynchus mykiss* in low-exchange water recirculation aquaculture systems. *Aquacultural Engineering* 44, 97-102.
- Good, C., Vinci, B., Summerfelt, S., Snekvik, K., Adams, I., Dilly, S. (2011). Assessing the suitability of a partial water reuse system for rearing juvenile Chinook salmon *Oncorhynchus tshawytscha* for stocking in Washington State. *Journal of Aquatic Animal Health*. 23, 55-61.
- Pfeiffer, T., Summerfelt, S.T., Watten, B.J. (2011). Comparative performance of CO₂ measuring methods: Marine aquaculture recirculation system application. *Aquacultural Engineering* 44, 1-9.

2010

- Good, C., Davidson, J., Welsh, C., Snekvik, K., Summerfelt, S.T. (2010). The effects of carbon dioxide on performance and histopathology of rainbow trout *Oncorhynchus mykiss* in water recirculation aquaculture systems. *Aquacultural Engineering* 42, 51-56.
- Houle, S., Schrader, K.K., Le Francois, N.R., Comeau, Y., Kharoune, M., Summerfelt, S.T., Savoie, A., Vandenberg, G.W. 2010. Geosmin causes off-flavour in Arctic charr in recirculating aquaculture systems. *Aquaculture Research* 41(10), 1-6.
- Schrader, K.K., Summerfelt, S.T. (2010). Isolation and Distribution of Geosmin-producing *Nocardia* spp. and *Streptomyces* spp. in a Series of Recirculating Aquaculture Systems. *North American Journal of Aquaculture*. 72, 1-10.
- Schrader, K.K., Davidson, J., Summerfelt, S.T. (2010). Evaluation of ozonation on levels of the off-flavor compounds geosmin and 2-methylisoborneol in water and rainbow trout *Oncorhynchus mykiss* from water recirculation aquaculture systems. *Aquacultural Engineering*. 43, 46-50.
- Sharrer, M.J., Rishel, K., Summerfelt, S.T. (2010). Evaluation of a membrane biological reactor for reclaiming water, alkalinity, salts, phosphorus, and protein contained in a high-strength aquacultural wastewater. *Bioresource Technologies* 101, 4322-4330.
- Sharrer, M.J., Rishel, K., Taylor, A., Vinci, B.J., Summerfelt, S.T. (2010). The cost and effectiveness of solids thickening technologies for treating backwash and recovering nutrients from intensive aquaculture systems. *Bioresource Technologies* 101, 6630-6641.

2009

- Davidson, J., Good, C., Welsh, C., Brazil, B., Snekvik, K., Summerfelt, S.T. (2009). Heavy metal and waste metabolite accumulation and their affect on rainbow trout performance in a replicated water reuse system operated at low or high system flushing rates. *Aquacultural Engineering* 41, 136-145.
- Good, C., Davidson, J., Welsh, C., Brazil, B., Snekvik, K., Summerfelt, S.T. (2009). The impact of water exchange rate on the health and performance of rainbow trout *Oncorhynchus mykiss* in water recirculation aquaculture systems. *Aquaculture* 294, 80-85.
- Sharrer, M.J., Rishel, K., Summerfelt, S.T. (2009). Evaluation of geotextile filtration applying coagulant and flocculant amendments for aquaculture biosolids dewatering and phosphorus removal. *Aquacultural Engineering* 40, 1-10.
- Summerfelt, S.T., Sharrer, M., Gearheart, M., Gillette, K., Vinci, B.J. (2009). Evaluation of partial water reuse systems used for Atlantic salmon smolt production at the White River National Fish Hatchery. *Aquacultural Engineering* 41, 78-84.
- Summerfelt, S.T., Davidson, J., Wilson, G., Waldrop, T. (2009). Advances in fish harvest technologies for circular tanks. *Aquacultural Engineering* 40, 62-71.
- Summerfelt, S.T., Sharrer, M.J., Tsukuda, S.M., Gearheart, M. (2009). Process requirements for achieving full-flow disinfection of recirculating water using ozonation and UV irradiation. *Aquacultural Engineering* 40, 17-27.
- Wolters, W., Masters, A., Vinci, B., Summerfelt, S.T. (2009). Design, loading, and water quality in recirculating systems for Atlantic salmon (*Salmo salar*) at the USDA ARS National Cold Water Marine Aquaculture Center (Franklin, ME). *Aquacultural Engineering* 41, 60-70.

2008

- Barbash, P., J. Fletcher, A. Carta, S. Summerfelt, D. Creaser. (2008). Reductions in bacterial micro-organisms by filtration and ozonation of the surface water supply at the USFWS Northeast Fishery Center. Pages 87-96 in S.V. Amaral, D. Mathur, E.P. Taft, III, editors. *Advances in Fisheries Bioengineering*. American Fisheries Society, Symposium 61, Bethesda, MD.
- Colt, J., Rust, M., Summerfelt, S., Pfeiffer, T., Fivelstad, S. (2008). Energy and resource consumption of land-based Atlantic salmon smolt hatcheries in the Pacific Northwest (USA). *Aquaculture* 280, 94–108.
- Davidson, J., Helwig, N., Summerfelt, S.T. (2008). Fluidized sand biofilters used to remove ammonia, biochemical oxygen demand, total coliform bacteria, and suspended solids from an intensive aquaculture effluent. *Aquacultural Engineering* 39, 6-15.
- Masters, A.L., Vinci, B.J. Brazil, B. Creaser, D.A., Summerfelt, S.T. (2008). Performance Characterization of Influent and Effluent Treatment Systems: A Case Study at Craig Brook National Fish Hatchery. *Aquacultural Engineering* 38, 66-76.
- Summerfelt, S.T., Bebak-Williams, J., Fletcher, J., Carta, A., Creaser, D. (2008). Description of the surface water filtration and ozone treatment system at the Northeast Fishery Center. Pages 97-121 in S.V. Amaral, D. Mathur, E.P. Taft, III, editors. *Advances in Fisheries Bioengineering*. American Fisheries Society, Symposium 61, Bethesda, MD.

2007

- Clingerman, J., Bebak, J., Mazik, P.M., Summerfelt, S.T. (2007). Use of avoidance response by rainbow trout to carbon dioxide for fish self-transfer between tanks. *Aquacultural Engineering* 37, 234-251.
- Davidson, J., Frankel, A., Ellison, W., Summerfelt, S.T., Popper, A.N., Mazik, P., Bebak, J. (2007). Minimizing noise in fiberglass aquaculture tanks: Noise reduction potential of various retrofits. *Aquacultural Engineering* 37, 125-131.
- Sharrer, M.J., Tal, Y., Ferrier, D., Hankins, J.A., Summerfelt, S.T. (2007). Membrane biological reactor treatment of a saline backwash flow from a recirculating aquaculture system. *Aquacultural Engineering* 35, 159–176.
- Sharrer, M.J., Summerfelt, S.T. (2007). Ozonation followed by ultraviolet irradiation provides effective bacteria inactivation in a freshwater recirculating system. *Aquacultural Engineering* 37, 180-191.

2006

- Brazil, B.L., S.T. Summerfelt. (2006). Aerobic treatment of gravity thickening tank supernatant. *Aquacultural Engineering*, 34, 92-102.
- Summerfelt, S.T., (2006). Design and management of conventional fluidized-sand biofilters. *Aquacultural Engineering*, 34, 275-302.

2005

- Davidson, J., Summerfelt, S.T., (2005). Solids removal from a coldwater recirculating system – comparison of a swirl separator and a radial-flow settler. *Aquacultural Engineering* 33, 47-61.
- Sharrer, M.J., Summerfelt, S.T., Bullock, G.L., Gleason, L.E., Taeuber, J., (2005). Inactivation of bacteria using ultraviolet irradiation in a recirculating salmonid culture system. *Aquacultural Engineering*, 33, 135-149.

2004

- Davidson, J. and S.T. Summerfelt. (2004). Solids flushing, mixing, and water velocity profiles within large (10 m³ and 150 m³) circular 'Cornell-type' dual-drain tanks used for salmonid culture. *Aquacultural Engineering* 32, 245-271.
- Summerfelt, S.T. and M.J. Sharrer. (2004). Design implication of biofilter carbon dioxide production within recirculating salmonid culture systems. *Aquacultural Engineering* 32, 171-182.
- Summerfelt, S.T., Sharrer, M.J., Hollis, J., Gleason, L.E., Summerfelt, S. R. (2004). Dissolved ozone destruction using ultraviolet irradiation in a recirculating salmonid culture system. *Aquacultural Engineering* 32, 209-224.
- Summerfelt, S. T., Wilton, G., Roberts, D., Savage, T. M., Fonkalsrud, K. (2004). Developments in recirculating systems for Arctic char culture in North America. *Aquacultural Engineering*, 30, 31-71.
- Summerfelt, S.T., J. Davidson, T. Waldrop, S. Tsukuda, and J. Bebak-Williams. (2004). A Partial-Reuse System for Coldwater Aquaculture. *Aquacultural Engineering* 31, 157-181.
- Vinci, B.J., Summerfelt, S.T., Creaser, D.A., Gillette, K. (2004). Design of partial water reuse systems at White River National Fish Hatchery for the production of Atlantic salmon smolt for restoration stocking. *Aquacultural Engineering* 32, 225-244.
- Watten, B. J., Boyd, C. E., Schwartz, M. F., Summerfelt, S. T., Brazil, B. L. (2004). Feasibility of measuring dissolved carbon dioxide based on headspace partial pressures. *Aquacultural Engineering*, 30, 83-101.

2003

- Adler, P. R., Summerfelt, S. T., Glenn, D. M., Takeda, F. (2003). Mechanistic approach to phytoremediation of water. *Ecological Engineering*, 20, 251-264.
- Ebeling, J. M., Sibrell, P. L., Ogden, S., Summerfelt, S. T. (2003). Evaluation of chemical coagulation-flocculation aids for the removal of phosphorus from recirculating aquaculture effluent. *Aquacultural Engineering*, 29, 23-42.
- Summerfelt, S. T. (2003). Ozonation and UV irradiation - An introduction and examples of current applications. *Aquacultural Engineering*, 28, 21-36.
- Summerfelt, S. T., Davidson, J. T., Waldrop, T., Vinci, B. J. (2003). Evaluation of full-scale carbon dioxide stripping columns in a coldwater recirculating system. *Aquacultural Engineering*, 28, 155-169.
- Tsukuda, S., J. Davidson, A. Adkins, and S. Summerfelt. (2003). Evaluation of dissolved chitosan for suspended solids removal. *International Journal of Recirculating Aquaculture*. 4, 33-46.

2000

- Adler, P. R., Harper, J. K., Takeda, F., Wade, E. M., Summerfelt, S. T. (2000). Economic evaluation of hydroponics and other treatment options for phosphorus removal in aquaculture effluent. *HortScience*, 35(6), 993-999.
- Adler, P. R., Harper, J. K., Wade, E. W., Takeda, F., Summerfelt, S. T. (2000). Economic analysis of an aquaponic system for the integrated production of rainbow trout and plants. *International Journal of Recirculating Aquaculture*, 1(1), 15-34.
- Bebak, J., Hankins, J. A., Summerfelt, S. T. (2000). The effect of water temperature on survival of eyed eggs and alevins of Arctic char (*Salvelinus alpinus*). *North American Journal of Aquaculture*, 62, 139-143.

- Bullock, G., V. Blazer, S. Tsukuda and S. Summerfelt. 2000. Toxicity of acidified chitosan for cultured rainbow trout (*Oncorhynchus mykiss*). *Aquaculture* 185:273-280.
- Schwartz, M. F., Bullock, G., Hankins, J. A., Summerfelt, S. T., Mathias, J. (2000). Effects of selected chemotherapeutants on nitrification in fluidized-sand biofilters for cold water fish production. *International Journal of Recirculating Aquaculture*, 1(1), 61-81.
- Summerfelt, S. T., Vinci, B. J., Piedrahita, R. H. (2000). Oxygenation and carbon dioxide control in water reuse systems. *Aquacultural Engineering*, 22, 87-108.

1999

- Summerfelt, S. T., Adler, P. R., Glenn, D. M., Kretschmann, R. (1999). Aquaculture sludge removal and stabilization within created wetlands. *Aquacultural Engineering*, 19(2), 81-92.

1998

- Timmons, M. B., Summerfelt, S. T., Vinci, B. J. (1998). Review of circular tank technology and management. *Aquacultural Engineering* 18, 51-69.

1997

- Bullock, G. L., Summerfelt, S. T., Noble, A., Weber, A. W., Durant, M. D., Hankins, J. A. (1997). Ozonation of a recirculating rainbow trout culture system: I. Effects on bacterial gill disease and heterotrophic bacteria. *Aquaculture*, 158, 43-55.
- Summerfelt, S. T., Hankins, J. A., Weber, A. W., Durant, M. D. (1997). Ozonation of a recirculating rainbow trout culture system: II. Effects on microscreen filtration and water quality. *Aquaculture*, 158, 57-67.
- Summerfelt, S. T., Hochheimer, J. N. (1997). Review of ozone processes and applications as an oxidizing agent in aquaculture. *The Progressive Fish-Culturist*, 59, 94-105.

1996

- Adler, P. R., Summerfelt, S. T., Glenn, M. D., Takeda, F. (1996). Evaluation of a model wetland system designed and operated to meet stringent phosphorus discharge requirements. *Water Environment Research*, 68(5), 836-840.
- Adler, P. R., Summerfelt, S. T., Glenn, M. D., Takeda, F. (1996). Evaluation of the effect of a conveyor production strategy on lettuce and basil productivity and phosphorus removal from aquaculture wastewater. *Environmental Research Forum*. Vols. 5-6:131-136.
- Adler, P. R., Takeda, F., Glenn, D. M., Wade, E. M., Summerfelt, S. T., Harper, J. K. (1996). Phytoremediation of wastewater using lettuce and basil. *Proceedings of the American Society of Plasticulturists*, 26, 253-258.
- Noble, A. C., Summerfelt, S. T. (1996). Diseases encountered in rainbow trout cultured in recirculating systems. *Annual Review of Fish Diseases*, 6, 65-92.
- Summerfelt, S. T., Cleasby, J. L. (1996). A review of hydraulics in fluidized-bed biological filters. *Transactions of American Society of Agricultural Engineers*, 39(3), 1161-1173.

1995

- Summerfelt, S. T., Holland, K. H., Hankins, J. A., Durant, M. D. (1995). A hydroacoustic waste-feed controller for tank systems. *Water Science and Technology*, 31(10), 123-129.

Trade Press

- Adler, P. R., Takeda, F., Glenn, M. D., Summerfelt, S.T. (1996). Utilizing byproducts to enhance aquaculture sustainability. *World Aquaculture* 27(2), 24-26.
- Adler, P. R., Summerfelt, S. T., Glenn, D. M., Takeda, F. (1995). Creation of wetlands capable of generating oligotrophic water. *The 21st Century Gardener* 8(2), 38-41.

- Adler, P. R., Takeda, F., Glenn, D. M., Wade, E. M., Summerfelt, S. T., Harper, J. K. (1996). Nutrient removal: ecological process sows a cost-saving idea for enhancing water quality. *Water Environment & Technology* 8(8), 23-24.
- Clingerman, J., Bebak-Williams, J., Summerfelt, S.T. (2006). Trout's carbon dioxide avoidance behavior used to improve transfer, harvest process. *Global Aquaculture Advocate* 9(3), 44-45.
- Colt, J., Summerfelt, S.T., Pfeiffer, T., Fivelstad, S., Rust, M. 2009. Addressing sustainability - energy consumption of two atlantic salmon smolt hatcheries. *Hatchery International* 10(5), 34-36.
- Davidson, J., Masters, A., Vinci, B., & Summerfelt, S. (2004). Testing dual tank drains for improved waste removal at Craig Brook NFH. *Hatchery International* 5(3), 22-23, 34.
- Davidson, J.T., Waldrop, T., Summerfelt, S.T., Bebak-Williams, J. (2004). Arctic char performance at 13-14°C using recirculating technologies. *World Aquaculture* 35(1), 48-51.
- Davidson, J.T., Summerfelt, S.T., (2005). Settler evaluation: Radial flow vs. tangential flow. *Global Aquaculture Advocate* 8(3), 56-57.
- Davidson, J., Summerfelt, S.T. (2008). U.S. researchers study effectiveness of fluidized sand biofilters. *Hatchery International* 9(2), 37.
- Gearheart, M., Summerfelt, S.T. (2007). Ozone safety in aquaculture systems. *Hatchery International* 8(4), 41-42.
- Jenkins, M. R., Summerfelt, S. T. (1998). Freshwater Institute builds natural gas-powered small-scale aquaponic demonstration project. *Recirc Today* July 1998, 14-16.
- Jenkins, M. R., Summerfelt, S. T. (1999). Demonstrating Aquaponics. *Practical Hydroponics & Greenhouses* Jan/Feb(#44), 48-51.
- Jenkins, M. R., Summerfelt, S. T. (2000). A natural gas-powered small-scale aquaponic demonstration project. *Small Farm Today, July 2000*, 45-46.
- Scarratt, D. (2006). Can Recirc Compete? *Hatchery International* 7(5), 36.
- Sharrer, M.J., Hankins, J.A., Summerfelt, S.T. 2008. Membrane biological reactor technology supports wastewater reclamation reuse. *Global Aquaculture Advocate* 11(4), 42-45.
- Sharrer, M.J., Rishel, K., Summerfelt, S.T. 2010. Membrane biological reactors provide wastewater treatment, resource reclamation. *Global Aquaculture Advocate* 13(4), 68-69.
- Simmons, J. A., Summerfelt, S. T., Lawrance, M. I. (2001). Mine Water Aquaculture: A West Virginia, USA Success Story. *Global Aquaculture Advocate*, 4(3), 57-59.
- Summerfelt, S.T., Adler, P.R., Glenn, D.M., Kretschmann, R., (1996). Aquaculture sludge removal and stabilization within created wetlands. *Vetiver Newsletter* 16, 61-66.
- Summerfelt, S.T., Hankins, J.A., Durant, M.D., Goldman, J.N., (1996). Removing obstructions: Modified pipe-lateral flow distribution mechanism reduces backflow in fluidized-sand biofilters. *Water Environment & Technology* 8(11), 39-49.
- Summerfelt, S.T., Vinci, B.J., Timmons, M.B., Watten, B.J., (1999). Stripping columns remove carbon dioxide from recirc systems. *Recirc Today* 1(4), 24-26.
- Summerfelt, S.T., Wade, E.M., (1998). Fluidized-sand biofilters installed at two farms. *Recirc Today* July 1998, 18-21.
- Summerfelt, S.T., (2002). Understanding and treating carbon dioxide problems. *Aquaculture Magazine* 28, 30-33.
- Summerfelt, S.T., Bebak-Williams, J. (2008). Unit process engineering for water quality control and biosecurity in marine water recirculating systems. *Fisheries and Fish Breeding in Israel* 39, 1251-1258.

- Summerfelt, S.T., Vinci, B.J., (2003). Dissolved gas conditioning for mine water utilization. *Global Aquaculture Advocate* 6(3), 38-39.
- Summerfelt, S.T., Vinci, B.J., (2004). Avoiding water quality failures: Part 1 – carrying capacity and water flow in intensive aquaculture systems. *World Aquaculture* 35(4), 6-8 & 70.
- Summerfelt, S. T., Vinci, B.J., (2004). Avoiding water quality failures: Part 2 – recirculating systems. *World Aquaculture* 35(4), 9-11 & 71.
- Summerfelt, S.T., (2005). Fluidized-sand biofilters. *Aquaculture Magazine* 31(4), 56-59.
- Summerfelt, S.T., Sharrer, M. (2010). MBR Aquaculture System Yields Clean Water, Recovers Valuable Resources. *Industrial WaterWorld*. 10 (7)
- Summerfelt, S.T., Davidson, J. T., Waldrop, T., Tsukuda, S., Bebak-Williams, J. (2005). Partial-reuse systems: Offer benefits for coldwater, seawater aquaculture. *Global Aquaculture Advocate* 8(1): 68-69.
- Summerfelt, S.T., Bebak-Williams, J., Waldrop, T., Goodrick, B. (2005). Prototype stunner tested on rainbow trout. *Global Aquaculture Advocate* 8(6), 26-27.
- Summerfelt, S.T. (2006). Building a better system. *Fish Farming International*, 33(10), 18-19.
- Summerfelt, S.T. (2007). Industrial-scale recirculating aquaculture systems – Part I. *Hatchery International*. 8(2), 36.
- Summerfelt, S.T. (2007). Industrial-scale recirculating aquaculture systems – Part II. *Hatchery International* 8(3), 40-42.
- Summerfelt, S.T., Davidson, J. T., Waldrop, T., Good, C. (2010). Rainbow trout attain good growth, health in tank-based recirculating systems. *Global Aquaculture Advocate* 13(2), 36-38.
- Wolters, W.R., Summerfelt, S.T. (2007). USDA Marine Aquaculture Center breeds Atlantic salmon. *Global Aquaculture Advocate* 10(2), 56-57.

Proceedings and Conference Abstracts and Presentations:

2011

- Davidson, J., Good, C., Barrows, F., Welsh, C., Kenney, B., Summerfelt, S.T. 2011. Effects of grain versus fishmeal-based diets on salmonid performance and welfare, as well as water quality in closed-containment systems. In: Special Session “Science Matters – Research to Implement Land-Based Closed Containment Systems for Salmonid Food Fish Production”, Second International Marine Conservation Congress, May 15, Victoria, British Columbia, Canada.
- Good, C., Davidson, J., Snekvik, K., Welsh, C., Summerfelt, S.T. 2011. Biosecurity considerations for raising salmonids in closed-containment systems. In: Special Session “Science Matters – Research to Implement Land-Based Closed Containment Systems for Salmonid Food Fish Production”, Second International Marine Conservation Congress, May 15, Victoria, British Columbia, Canada.
- Good, C., Davidson, J., Snekvik, K., Waldrop, T., Welsh, C., Summerfelt, S.T. 2011. Identifying criteria to optimize the performance, health, and consumer value of Atlantic salmon grown to food-size in closed-containment systems. In: Special Session “Science Matters – Research to Implement Land-Based Closed Containment Systems for Salmonid Food Fish Production”, Second International Marine Conservation Congress, May 15, Victoria, British Columbia, Canada.

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- Summerfelt, S. T., Hankins, J. A., Heinen, J., Weber, A. W., Morton, J. D. (1994, January). Evaluation of the TRIANGEL microsieve filter in a water-reuse system. *World Aquaculture Society 1994 Annual Meeting*, New Orleans, LA. World Aquaculture Society, Baton Rouge, LA.
- Summerfelt, S. T., Holland, K. H., Hankins, J. A. (1994, January). Hydroacoustic waste-feed controller. *World Aquaculture Society 1994 Annual Meeting*, New Orleans, LA. World Aquaculture Society, Baton Rouge, LA.
- Summerfelt, S. T., Holland, K. H., Hankins, J. A., Durant, M. D. (1994, April). A hydroacoustic waste-feed controller for tank systems. *Second International Symposium on Nutritional Strategies and Management of Aquaculture Waste*, Aalborg, Denmark.

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- Summerfelt, S. T., Cleasby, J. L. (1993). Hydraulics in fluidized-bed biological reactors. pp. 439-457. *Techniques for Modern Aquaculture*, St. Joseph, MI. J. K. Wang (Ed.). American Society of Agricultural Engineers.
- Summerfelt, S. T., Hankins, J. A., Summerfelt, S. R., Heinen, J. M. (1993). Modeling continuous culture with periodic stocking and selective harvesting to measure the effect on productivity and biomass capacity of fish culture systems. pp. 581-593. *Techniques for Modern Aquaculture*, St. Joseph, MI. J. K. Wang (Ed.). American Society of Agricultural Engineers.

Invited lectures

- Summerfelt, S. T. (1994, June). Solids removal options for aquaculture systems. *Mid-Atlantic Aquaculture Conference*, Fredericksburg, VA.
- Summerfelt, S. T. (1995). Ozonation within a recirculating trout-culture system. *The American Fisheries Society's Chemistry in Aquaculture Symposium*, Western Carolina University, Cullowhee, NC.
- Summerfelt, S. T. (1996). Practical solids removal in aquaculture effluents. *43rd Annual US Trout Farmer Association Meeting*, Tannersville, PA.
- Summerfelt, S. T. (1997, January). Selecting and evaluating solids capture units. Aquacultural Engineering Society workshop on Fundamentals of Design and Operation of Recirculating Aquaculture Systems, Fish Farming Expo VII, New Orleans, LA. Aquacultural Engineering Society, Shepherdstown, WV.
- Bebak, J., Hankins, J. A., Summerfelt, S. T. (1998, November 18-19). Effects of water temperature on survival of the eggs and fry of two strains of Arctic charr (*Salvelinus alpinus*). *Northeast Aquaculture Conference & Expo*, Maine Aquaculture and Innovation Center, Rockport, ME.

- Summerfelt, S. T. (1998, October 1-2). ABC's of Hatchery Recirculation. *Aquaculture Pacific Exchange Conference and Exposition*, Campbell River, British Columbia, Canada.
- Summerfelt, S. T. (1998, June 24). Nitrification review; Ozonation review; Fluidized-sand biofilter design. *Cornell Water Reuse Short Course*, Cornell University, Ithaca, NY.
- Summerfelt, S. T. (1998, July 30). Production intensification and water reuse. *Management Principles for Coldwater Fish Production*, Freshwater Institute, Shepherdstown, WV.
- Summerfelt, S. T., Timmons, M. B., Watten, B. J. (1999, January 27-29). Recirculating rearing techniques and issues. *Aquaculture America '99, Proceedings of the Aquacultural Engineering Society Workshop on Advances and Research in Aquacultural Engineering/Recirculating Systems*, Tampa, FL. Aquacultural Engineering Society, Shepherdstown, WV.
- Summerfelt, S. T. (1999, May 12). Trout waste characteristics; Waste capture; Dewatering methods. *Trout Farm Waste Management Conference*, North Carolina State University, Mountain Horticultural Crops Research and Extension Center, Asheville, NC.
- Summerfelt, S. T. (1999, June 22-26). Systems overview; Ozonation; Nitrification; Biofilter design. *5th Annual Aquaculture Water Reuse Systems Short Course*, Cornell University, Ithaca, NY.
- Summerfelt, S. T. (1999, February 10-12). Ozonation and disinfection. *Recirculation in Northern Climates Workshop, Canadian Aquaculture Institute and Recirc Today*, Moncton, New Brunswick, Canada.
- Vinci, B. J., Piedrahita, R. H., Summerfelt, S. T. (1999, January 27-29). Carbon dioxide stripping options and design. *Aquacultural Engineering Society Training Workshop, Aquaculture America '99*, Tampa, FL. Aquacultural Engineering Society, Shepherdstown, WV.
- Summerfelt, S. T., Piedrahita, R. H., Vinci, B. J. (1999, February 10-12). Dissolved gas management. *Recirculation in Northern Climates Workshop, Canadian Aquaculture Institute and Recirc Today*, Moncton, New Brunswick, Canada.
- Summerfelt, S. T. (2000, July 11-14). Solids control, fluidized-sand biofilter design, culture tank design, stocking and harvesting, ozonation and UV filtration, and coldwater system designs. *6th Annual Aquaculture Water Reuse Systems Short Course*, Cornell University, Ithaca, NY.
- Summerfelt, S. T. (2001, August 21). Recirculating Systems and Waste Management. *Pennsylvania Fish and Boat Commission's Annual Fish Hatchery Managers Meeting*, Lockhaven, PA.
- Summerfelt, S. T. (2001, July 17-20). Fluidized-sand biofilter design, culture tank design, stocking and harvesting, ozonation and UV filtration, system overview, and coldwater system designs. *7th Annual Cornell-Freshwater Institute Aquaculture Water Reuse Systems Short Course*, Shepherdstown, WV.
- Summerfelt, S. T., Vinci, B. J. (2001, July 22-24). Best waste management practices for recirculating systems. *Aquacultural Waste Management Symposium*, Roanoke, VA. Virginia Tech COTA, Blacksburg, VA.
- Summerfelt, S. T. (2002, July 22-26). Fluidized-sand biofilter design, culture tank design, water quality and treatment efficiency in recirculating systems, solids control, and ozonation and UV filtration. *8th Annual Cornell-Freshwater Institute Aquaculture Water Reuse Systems Short Course*, Shepherdstown, WV.
- Brazil, B. L., Vinci, B. J., Summerfelt, S. T. (2003, June 16-18). Fish culture system design for the future. *Propagated Fish in Resource Management*, Boise, ID. The American Fisheries Society, Bethesda, MD.

- Summerfelt, S.T. (2003, October 16-18). Utilizing intensive recirculating system technology in trout production. *US Trout Farmers Association Annual Meeting*, Shepherdstown, WV.
- Summerfelt, S. T. (2003, May 20). Improving Production Technologies in Large Systems. *USDA ARS Cooperators Meeting*, Leetown, WV.
- Summerfelt, S. T. (2003, July 14-18). Water quality and treatment efficiency in recirculating systems; Culture tank design; Biofiltration for ammonia control; Fluidized-sand biofilters; Coldwater biofilter design overview; Ozonation and UV disinfection; Trout and char growout system designs. *9th Annual Cornell-Freshwater Institute Recirculating Aquaculture Systems Short Course*, Nanaimo, British Columbia.
- Summerfelt, S.T. (2004, July 26-30). Water quality and treatment efficiency in recirculating systems; Culture tank design; Biofiltration for ammonia control; Fluidized-sand biofilters; Coldwater biofilter design overview; Ozonation and UV disinfection; Trout and char growout system designs. Presented at the *10th Annual Cornell-Freshwater Institute Recirculating Aquaculture Systems Short Course*. Shepherdstown, West Virginia.
- Summerfelt, S.T. (2005, June 21). Water recirculating systems for salmonid production. Fisheries Committee Meeting, Pennsylvania Fish & Boat Commission, Harrisburg, PA.
- Summerfelt, S.T., (2006). Improving technologies in controlled, intensive aquaculture systems. In: 2005-2006 Seminar Program, March 29, Center of Marine Biotechnology, University of Maryland, Baltimore.
- Summerfelt, S.T., (2006). Improving technologies in controlled, intensive aquaculture systems. In: CRIS Project Seminar for BARD/MARD Delegation. April 13, USDA ARS National Center of Cool and Cold Water Aquaculture, Leetown, WV.
- Summerfelt, S.T. 2006. Keynote Presentation – Achieving economies of scale in controlled intensive aquaculture systems. In: 6th International Recirculating Aquaculture Conference, July 20-23, Roanoke, Virginia.
- Good, C.M., Bebak, J., Vinci, B.J., Summerfelt, S.T. 2007. Engineering for Biosecurity. Invited Seminar, October 9, Danish Institute of Fisheries Research, Hirtshals, Denmark.
- Summerfelt, S.T. 2007. Recirculating systems and effluent treatment processes for the Atlantic salmon broodstock development program at the new USDA National Cold Water Marine Aquaculture Center. Invited Seminar, October 8, Danish Institute of Fisheries Research, Hirtshals, Denmark.
- Summerfelt, S.T., Sharrer, M.J., Tsukuda, S., Gearheart, M. 2007. Process requirements for achieving full-flow disinfection using ozonation and UV irradiation. Invited Seminar, October 9, Danish Institute of Fisheries Research, Hirtshals, Denmark.
- Summerfelt, S.T. 2007. Design, management, and applications of fluidized-sand biofilters. Invited Seminar, October 9, Danish Institute of Fisheries Research, Hirtshals, Denmark.
- Summerfelt, S.T., Vinci, B.J. 2008. Better management practices for recirculating systems. Page 385 In: *Aquaculture America 2008 Conference and Exposition*. February 9-12, Lake Buena Vista, Florida.
- Summerfelt, S.T., Waldrop, T., Wilson, G. 2008. Airlift fish pumps used to harvest circular tanks. Page 386 In: *Aquaculture America 2008 Conference and Exposition*. February 9-12, Lake Buena Vista, Florida.
- Summerfelt, S.T., 2008. Recycle system designs used in North America for Atlantic salmon smolt production. Invited Presentation In: *Recirculation of Water in Aquaculture*. Hosted by NOFIMA, February 27-28, Sunndalsora, Norway.

- Vinci, B. J., Summerfelt, S. T. (2000, May 2-6). End of pipe treatment. *AQUA 2000: Responsible Aquaculture in the New Millennium*, Nice, France. European Aquaculture Society, Oostende, Belgium.
- Vinci, B.J., Summerfelt, S.T., and Creaser, D. 2003. Influent water treatment options for aquaculture facilities. *U.S. Trout Farmers Association Annual Meeting*. Shepherdstown, West Virginia, October 16-18, 2003.
- Wade, E. M., Summerfelt, S. T., Hankins, J. A. (1996). Scales of economy in recycle systems. *43rd Annual US Trout Farmer Association Meeting*, Tannersville, PA.

Reports

- Freshwater Institute. (2000). *Mingo County Redevelopment Authority's Mine Water Demonstration Project Final Report. Final Report and Hatchery Operators Manual [CD-ROM]*. 30 pp. Shepherdstown, WV: The Conservation Fund's Freshwater Institute.
- Harper, J. K., Adler, P. R., Takeda, F., Wade, E. M., Summerfelt, S. T. (1998). *Economic evaluation of treatment options for phosphorus in fishery effluent*. 23 pp.(No. Staff Paper #318). State College, PA: Penn State University, College of Agriculture Sciences.
- Jenkins, M. R., Summerfelt, S. T. (1997). *The Freshwater Institute Natural Gas Powered Aquaponic System - Design Manual*. 36 pp. Shepherdstown, WV: Prepared by the Conservation Fund's Freshwater Institute, Shepherdstown, WV and supported with grants from The Consolidated Natural Gas Foundation and The Claude Worthington Benedum Foundation.
- Putz, R. E., et al. (1993). *Aquaculture Linked to Plant Culture, Final Project Report*. 274 pp.(No. USDA/ARS Grant No. 59-1931-8-111). Shepherdstown, WV: The Conservation Fund's Freshwater Institute.
- Summerfelt, S. T. (2002). *Final Project Report for USDA/ARS Grant No. 59-1930-8-038, Technologies, Procedures, and Economics of Cold-Water Fish Production and Effluent Treatment in Intensive Recycling Systems*. 140 pp. Shepherdstown, WV: The Conservation Fund's Freshwater Institute.
- Summerfelt, S. T., al., e. (1998). *Water Quality Control in Intensive Recycle/Reuse Aquaculture Production Systems. Final Project Report for USDA/ARS Grant No. 59-1931-3-012*. 188 pp. Shepherdstown, WV: The Conservation Fund's Freshwater Institute.
- Summerfelt, S. T., L., D. M. (2002). *Effects of the Dolphin Hytronic Series 1,000 on the Survival and Physiological Responses of Rainbow Trout *Onchorhynchus mykiss* Kamloop*. 12 pp. Shepherdstown, WV: The Conservation Fund's Freshwater Institute.
- Timmons, M. B., Summerfelt, S. T. (2000). *Optimizing removal of settleable solids using a non-proprietary double-drain for circular tanks*. 44 pp.(Final Report for Northeastern Regional Aquaculture Center No. Contract No. 97-6). Shepherdstown, WV: The Conservation Fund's Freshwater Institute.
- Tucker, C., Belle, S., Boyd, C., Fornshell, G., Hargreaves, J., LaPatra, S., Summerfelt, S., Zajicek, P. 2003. *Best Management Practices for Flow-Through, Net-Pen, Recirculating, and Pond Aquaculture Systems*. A report prepared for the United States Environmental Protection Agency under an Interagency Agreement with the United States Department of Agriculture Cooperative State Research. 92 pp.