

GEORGE ROBERT PESS
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EDUCATION

- 2004-2009 UNIVERSITY OF WASHINGTON, SCHOOL OF AQUATIC AND FISHERY SCIENCES Seattle, WA. PhD Thesis title - Patterns and Process of salmon colonization.
- 1990-1992 YALE SCHOOL OF FORESTRY & ENVIRONMENTAL STUDIES. New Haven, CT.
M.F.S. Masters of Forest Science with a concentration in Forest Hydrology and Watershed Management.
- 1983-87 BOWDOIN COLLEGE. Brunswick, ME.
A.B. Economics & Environmental Studies.

PROFESSIONAL EXPERIENCE

- 2010-present AFFILIATE ASSOCIATE PROFESSOR – University of Washington, School of Aquatic and Fishery Sciences
Courses taught – Stream and Watershed Restoration, Alaska Salmon Program
- 1998-present NORTHWEST FISHERIES SCIENCE CENTER, NOAA FISHERIES Seattle, WA. PROGRAM MANAGER
Conduct and manage research relating stream and watershed restoration strategies and actions to the biological and physical response of salmonid populations in the Pacific Northwest. Research focuses on how salmonid populations respond to a variety of restoration actions including in-stream structure placement, reconnection of isolated habitats, and dam removal. Expertise in salmonid behavior, fluvial geomorphology, fisheries biology, stream and salmon ecology, and forest hydrology.
- 1993-98 THE TULALIP TRIBES Marysville, WA STREAM ECOLOGIST
Design, coordinate, and implement efforts to analyze the direct and cumulative effects of forest practices on salmon habitat in the Stillaguamish and Snohomish Rivers

Selected peer-reviewed publications

I have contributed to over 215 peer-reviewed articles since 1994. Example journals include Canadian Journal of Fisheries and Aquatic Sciences, Transactions of the American Fisheries Society, Bioscience, Water Resources Research, PLOS One, Fisheries, Bioscience, and Nature: Scientific Reports.

Morley, S.A., Foley, M.M., Duda, J.J., Beirne, M.M., Paradis, R.L., Johnson, R.C., McHenry, M.L., Eloffson, M., Sampson, E.M., McCoy, R.E. and Stapleton, J., 2020. Shifting food web structure during dam removal—Disturbance and recovery during a major restoration action. PloS one, 15(9), p.e0239198.

- Pitman, K.J., Moore, J.W., Sloat, M.R., Beaudreau, A.H., Bidlack, A.L., Brenner, R.E., Hood, E.W., Pess, G.R., Mantua, N.J., Milner, A.M. and Radić, V., 2020. Glacier Retreat and Pacific Salmon. *BioScience*, 70(3), pp.220-236.
- Bellmore, J.R., Pess, G.R., Duda, J.J., O'connor, J.E., East, A.E., Foley, M.M., Wilcox, A.C., Major, J.J., Shafroth, P.B., Morley, S.A. and Magirl, C.S., 2019. Conceptualizing ecological responses to dam removal: If you remove it, what's to come? *BioScience*, 69(1), pp.26-39.
- Hall, J.E., Greene, C.M., Stefankiv, O., Anderson, J.H., Timpane-Padgham, B., Beechie, T.J. and Pess, G.R., 2018. Large river habitat complexity and productivity of Puget Sound Chinook salmon. *PloS one*, 13(11), p.e0205127.
- Ritchie, A.C., Warrick, J.A., East, A.E., Magirl, C.S., Stevens, A.W., Bountry, J.A., Randle, T.J., Curran, C.A., Hilldale, R.C., Duda, J.J. and Gelfenbaum, G.R., 2018. Morphodynamic evolution following sediment release from the world's largest dam removal. *Scientific reports*, 8.
- Beechie, T. J., G. R. Pess, H. Imaki, A. Martin, J. Alvarez, D. Goodman. 2015. Comparison of potential increases in juvenile salmonid rearing habitat capacity among alternative restoration scenarios, Trinity River, California. *Restoration Ecology*, 23(1):75-84. <http://dx.doi.org/10.1111/rec.12131>
- Pess, G. R., T. P. Quinn, S. R. Gephard, R. Saunders. 2014. Re-colonization of Atlantic and Pacific rivers by anadromous fishes: linkages between life history and the benefits of barrier removal. *Reviews in Fish Biology and Fisheries*, 24:88. 10.1007/s11160-013-9339-1
- Beechie, T., H. Imaki, J. Greene, A. Wade, H. Wu, G. Pess, P. Roni, J. Kimball, J. Stanford, P. Kiffney, and N. Mantua. 2012. Restoring salmon habitat for a changing climate. *River Research and Applications*. DOI: 10.1002/rra.2590.

Awards and service

- NOAA Employee of the year - 2019
- NOAA Restoration Center Excellence in Restoration Award – 2014
- American Fisheries Society Certificate of Achievement Award – WA/BC chapter 2013
- NOAA Employee of the year, honorable mention – 2012
- NOAA Bronze Medal – 2010
- Selected to NOAA's Puget Sound steelhead Technical Recovery Team to define populations and population viability for listed Puget Sound steelhead - 2010
- Selected to NOAA's Oregon Coast coho salmon Biological Review Team to re-determine status of listed Oregon Coast coho salmon - 2009
- University of Washington, School of Aquatic and Fishery Sciences, Faculty Merit Award, spring 2009
- American Fisheries Society Western Division – 2006 Eugene Maughan graduate student scholarship
- NOAA Employee of the year, honorable mention – 2005
- Puget Sound Steelhead Biological Review Team – NOAA 2005
- American Geophysical Union (AGU) – 2005 Annual meeting. Best student paper award
- NOAA's Advanced Studies program – 2004 and 2005
- NOAA Employee of the year, honorable mention – 2001

Full peer reviewed publications

- Quinn, T.P., Pess, G.R., Sutherland, B.J., Brenkman, S.J., Withler, R.E., Flynn, K. and Beacham, T.D., 2021. Resumption of Anadromy or Straying? Origins of Sockeye Salmon in the Elwha River. *Transactions of the American Fisheries Society*.
- Fraik, A.K., McMillan, J.R., Liermann, M., Bennett, T., McHenry, M.L., McKinney, G.J., Wells, A.H., Winans, G., Kelley, J.L., Pess, G.R. and Nichols, K.M., 2021. The Impacts of Dam Construction and Removal on the Genetics of Recovering Steelhead (*Oncorhynchus mykiss*) Populations across the Elwha River Watershed. *Genes*, 12(1), p.89.
- Munsch, S.H., Andrews, K.S., Crozier, L.G., Fonner, R., Gosselin, J.L., Greene, C.M., Harvey, C.J., Lundin, J.I., Pess, G.R., Samhuri, J.F. and Satterthwaite, W.H., 2020. Potential for ecological nonlinearities and thresholds to inform Pacific salmon management. *Ecosphere*, 11(12), p.e03302.
- Duda, J.J., Hoy, M.S., Chase, D.M., Pess, G.R., Brenkman, S.J., McHenry, M.M. and Ostberg, C.O., 2021. Environmental DNA is an effective tool to track recolonizing migratory fish following large-scale dam removal. *Environmental DNA*, 3(1), pp.121-141.
- Morley, S.A., Foley, M.M., Duda, J.J., Beirne, M.M., Paradis, R.L., Johnson, R.C., McHenry, M.L., Elofson, M., Sampson, E.M., McCoy, R.E. and Stapleton, J., 2020. Shifting food web structure during dam removal—Disturbance and recovery during a major restoration action. *PloS one*, 15(9), p.e0239198.
- Pitman, K.J., Moore, J.W., Sloat, M.R., Beaudreau, A.H., Bidlack, A.L., Brenner, R.E., Hood, E.W., Pess, G.R., Mantua, N.J., Milner, A.M. and Radić, V., 2020. Glacier retreat and Pacific salmon. *BioScience*, 70(3), pp.220-236.
- Clark, C., Roni, P., Keeton, J. and Pess, G., 2020. Evaluation of the removal of impassable barriers on anadromous salmon and steelhead in the Columbia River Basin. *Fisheries Management and Ecology*, 27(1), pp.102-110.
- Duda, J., Anderson, J.H., Beirne, M.M., Brenkman, S.J., Crain, P., Mahan, J., McHenry, M., Pess, G., Peters, R. and Winter, B., 2019. Complexities, context, and new information about the Elwha River. *Frontiers in Ecology and the Environment*, 17(1), pp.10-11.
- Stefankiv, O., Beechie, T.J., Hall, J.E., Pess, G.R. and Timpane-Padgham, B., 2019. Influences of valley form and land use on large river and floodplain habitats in Puget Sound. *River Research and Applications*, 35(2), pp.133-145.
- Bellmore, J.R., Pess, G.R., Duda, J.J., O'Connor, J.E., East, A.E., Foley, M.M., Wilcox, A.C., Major, J.J., Shafroth, P.B., Morley, S.A. and Magirl, C.S., 2019. Conceptualizing ecological responses to dam removal: If you remove it, what's to come?. *BioScience*, 69(1), pp.26-39.

- Ohlberger, J., Brenkman, S.J., Crain, P., Pess, G.R., Duda, J.J., Buehrens, T.W., Quinn, T.P. and Hilborn, R., 2019. A Bayesian life-cycle model to estimate escapement at maximum sustained yield in salmon based on limited information. *Canadian Journal of Fisheries and Aquatic Sciences*, 76(2), pp.299-307.
- Hall, J.E., Greene, C.M., Stefankiv, O., Anderson, J.H., Timpane-Padgham, B., Beechie, T.J. and Pess, G.R., 2018. Large river habitat complexity and productivity of Puget Sound Chinook salmon. *Plos one*, 13(11), p.e0205127.
- Ritchie, A.C., Warrick, J.A., East, A.E., Magirl, C.S., Stevens, A.W., Bountry, J.A., Randle, T.J., Curran, C.A., Hilldale, R.C., Duda, J.J. and Gelfenbaum, G.R., 2018. Morphodynamic evolution following sediment release from the world's largest dam removal. *Scientific reports*, 8(1), pp.1-13.
- Hines, D., Liermann, M., Seder, T., Cluer, B., Pess, G. and Schoenebeck, C., 2017. Diel shifts in microhabitat selection of steelhead and Coho salmon fry. *North American Journal of Fisheries Management*, 37(5), pp.989-998.
- Liermann, M., Pess, G., McHenry, M., McMillan, J., Elofson, M., Bennett, T. and Moses, R., 2017. Relocation and recolonization of coho salmon in two tributaries to the Elwha River: Implications for management and monitoring. *Transactions of the American Fisheries Society*, 146(5), pp.955-966.
- Peters, R.J., Liermann, M., McHenry, M.L., Bakke, P. and Pess, G.R., 2017. Changes in streambed composition in salmonid spawning habitat of the Elwha River during dam removal. *JAWRA Journal of the American Water Resources Association*, 53(4), pp.871-885.
- Foley, M.M., Bellmore, J.R., O'Connor, J.E., Duda, J.J., East, A.E., Grant, G.E., Anderson, C.W., Bountry, J.A., Collins, M.J., Connolly, P.J. and Craig, L.S., 2017. Dam removal: Listening in. *Water Resources Research*, 53(7), pp.5229-5246.
- Cram, J.M., Torgersen, C.E., Klett, R.S., Pess, G.R., May, D., Pearsons, T.N. and Dittman, A.H., 2017. Spatial variability of Chinook salmon spawning distribution and habitat preferences. *Transactions of the American Fisheries Society*, 146(2), pp.206-221.
- Hall, J. E., P. Roni, T. R. Bennett, J. R. McMillan, K. Hanson, G. R. Pess, R. E. Moses, M. McHenry, W. Ehinger. 2016. Life history diversity of steelhead in two coastal Washington watersheds. *Transactions of the American Fisheries Society*. 45 (5), 990-1005. <http://dx.doi.org/10.1080/00028487.2016.1194893>
- Bennett, S., G. R. Pess, N. Bouwes, P. Roni, R. E. Bilby, S. Gallagher, J. Ruzycki, T. W. Buehrens, W. Ehinger, J. H. Anderson, C. E. Jordan, B. Bowersox, C. M. Greene. 2016. Progress and challenges of testing the effectiveness of stream restoration in the Pacific Northwest using intensively monitored watersheds. *Fisheries*, 41(2):93-103. <http://dx.doi.org/10.1080/03632415.2015.1127805>

- Gayeski, N., G. R. Pess, T. J. Beechie. 2016. A Life-Table Model Estimation of the Parr Capacity of a Late-Nineteenth Century Puget Sound Steelhead Population. *FACETS*, 1:83-104. doi:10.1139/facets-2015-0010.
- Roni, P., C. Johnson, T. De Boer, G. Pess, A. Dittman, and D. Sear. 2015. Interannual variability in the effect of physical habitat and parentage on Chinook salmon egg-to-fry survival. *Canadian Journal of Fisheries Sciences*. 73(7): 1047-1059, 10.1139/cjfas-2015-0372
- Bartz, K. K., M. J. Ford, T. J. Beechie, K. L. Fresh, G. R. Pess, M. Rowse, M. B. Sheer, R. Kennedy. 2015. Trends in developed cover adjacent to habitat for threatened salmon in Puget Sound, Washington, U.S.A. *PLoS ONE*. 10(4) <http://dx.doi.org/10.1371/journal.pone.0124415>
- Beechie, T. J., G. R. Pess, H. Imaki, A. Martin, J. Alvarez, D. Goodman. 2015. Comparison of potential increases in juvenile salmonid rearing habitat capacity among alternative restoration scenarios, Trinity River, California. *Restoration Ecology*, 23(1):75-84. <http://dx.doi.org/10.1111/rec.12131>
- East, A., G. R. Pess, J. Bountry, C. Magirl, A. Ritchie, J. Logan, T. Randle, M. Mastin, J. J. Duda, M. Liermann, M. McHenry, T. J. Beechie. 2015. Large-scale dam removal on the Elwha River, Washington, USA: river channel and floodplain geomorphic change. *Geomorphology*, 228:765-786. <http://dx.doi.org/10.1016/j.geomorph.2014.08.028>
- Warrick, J.A., Bountry, J.A., East, A.E., Magirl, C.S., Randle, T.J., Gelfenbaum, G.R., Ritchie, A.C., Pess, G.R., Leung, V., Duda, J.J., 2015. Large-scale dam removal on the Elwha River, Washington, USA: source-to-sink sediment budget and synthesis. *Geomorphology* 246: 729-750. doi:10.1016/j.geomorph.2015.01.010.
- McMillan, J. R., G. R. Pess, M. Liermann, S. A. Morley, M. McHenry, L. A. Campbell, T. P. Quinn. 2015. Using redd attributes, fry density, and otolith microchemistry to distinguish the presence of steelhead and rainbow trout in the Elwha River Dam removal project. *North American Journal of Fisheries Management*, 35(5):1019-1033. <http://dx.doi.org/10.1080/02755947.2015.1074965>
- Roni, P., T. J. Beechie, C. E. Jordan, G. R. Pess. 2015. Basin scale monitoring of river restoration: recommendations from case studies in the Pacific Northwest USA. In *Fish habitat management. AFS Symposium 78*. 73-98. American Fisheries Society. Bethesda, Maryland.
- Kendall, N., J. R. McMillan, M. R. Sloat, T. W. Buehrens, T. P. Quinn, G. R. Pess, K. V. Kuzischchin, M. M. McClure, R. W. Zabel. 2015. Anadromy and residency in steelhead and rainbow trout *Oncorhynchus mykiss*: a review of the processes and patterns. *Canadian Journal of Fisheries and Aquatic Sciences*, 72(3):319-342. doi:10.1139/cjfas-2014-0192

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- Liermann, M. C., Rawding, D., Pess, G. R., & Glaser, B. 2015. The spatial distribution of salmon and steelhead redds and optimal sampling design. *Canadian Journal of Fisheries and Aquatic Sciences*, 72(3), 434-446. doi:10.1139/cjfas-2014-0181.
- Roni, P., T. J. Beechie, G. R. Pess, and K. Hanson. 2014. Fact and fiction regarding wood placement in streams. *Canadian Journal of Fisheries and Aquatic Sciences*. 72(3) 466-478. doi:10.1139/cjfas-2014-0344.
- Buehrens, T. W., P. M. Kiffney, G. R. Pess, T. R. Bennett, S. M. Naman, G. T. Brooks, T. Quinn. 2014. Increasing juvenile coho salmon densities during early recolonization have not affected resident coastal cutthroat trout growth, movement, or survival. *North American Journal of Fisheries Management*, 34(5):892-907.
- Kiffney, P. M., Buhle, E. R., Naman, S. M., Pess, G. R., & Klett, R. S. 2014. Linking resource availability and habitat structure to stream organisms: an experimental and observational assessment. *Ecosphere* 5 (4): 39. 10.1890/ES13-00269.1
- McMillan, J. R., R. Pess, G., McHenry, M. L., Moses, R., & Quinn, T. P. 2014. Documentation of Unusual, Fall Spawning by Coastal Cutthroat Trout in the Elwha River System, Washington. *Transactions of the American Fisheries Society*, 143(6), 1605-1611. <http://dx.doi.org/10.1080/00028487.2014.963255>
- Naman, S. M., Kiffney, P. M., Pess, G. R., Buehrens, T. W., & Bennett, T. R. 2014. Abundance and body condition of sculpin (*Cottus* spp.) in a small forest stream following recolonization by juvenile Coho Salmon *Oncorhynchus kisutch*. *River Research and Applications*, 30(3), 360-371. 10.1002/rra.2643
- Anderson, J. H., G. R. Pess, R. W. Carmichael, M. J. Ford, T. Cooney, C. Baldwin, M. M. McClure. 2014. The next link will exit from NWFSC web site Planning Pacific salmon and steelhead reintroductions aimed at long-term viability and recovery. *North American Journal of Fisheries Management*, 34(1):72-93. <http://dx.doi.org/10.1080/02755947.2013.847875>
- Pess, G. R., T. P. Quinn, S. R. Gephard, R. Saunders. 2014. Re-colonization of Atlantic and Pacific rivers by anadromous fishes: linkages between life history and the benefits of barrier removal. *Reviews in Fish Biology and Fisheries*, 24:88. 10.1007/s11160-013-9339-1
- Peters, R.J., J.J Duda, G.R. Pess, M. Zimmerman, P. Crain, Z. Hughes, A. Wilson, M.C. Liermann, S.A. Morley, J.R. McMillan, K. Denton, D. Morrill, and K. Warheit. 2014. Guidelines for Monitoring and Adaptively Managing Restoration of Chinook Salmon (*Oncorhynchus tshawytscha*) and Steelhead (*O. mykiss*) on the Elwha River. U.S. Fish and Wildlife Service, Olympia.

- Pess, G. R., Quinn, T. P., Schindler, D. E. and Liermann, M. C. 2013. Freshwater habitat associations between pink (*Oncorhynchus gorbuscha*), chum (*O. keta*) and Chinook salmon (*O. tshawytscha*) in a watershed dominated by sockeye salmon (*O. nerka*) abundance. *Ecology of Freshwater Fish*. doi: 10.1111/eff.12088.
- Beechie, T., G. Pess, S. Morley, L. Butler, P. Downs, A. Maltby, P. Skidmore, S. Clayton, C. Muhlfeld, and K. Hanson. 2013. Watershed assessments and identification of restoration needs. Pages 50-113. In *Stream and Watershed Restoration: A guide to restoring riverine processes and habitats*. Edited by P. Roni and T. Beechie. John Wiley and Sons, Ltd. U.K.
- Roni, P., G. Pess, K. Hanson, and M. Pearsons. 2013. Selecting appropriate stream and watershed restoration techniques. Pages 144-188. In *Stream and Watershed Restoration: A guide to restoring riverine processes and habitats*. Edited by P. Roni and T. Beechie. John Wiley and Sons, Ltd. U.K.
- Skidmore, P., T. Beechie, G. Pess, J. Castro, B. Cluer, C. Thorne, C. Shea, and R. Chen. 2013. Developing, designing, and implementing restoration projects. 2103, Pages 215-253. In *Stream and Watershed Restoration: A guide to restoring riverine processes and habitats*. Edited by P. Roni and T. Beechie. John Wiley and Sons, Ltd. U.K.
- Beechie, T., P. Roni, and G. Pess. 2013. Synthesis: Developing comprehensive restoration programs. Pages 280-289. In *Stream and Watershed Restoration: A guide to restoring riverine processes and habitats*. Edited by P. Roni and T. Beechie. John Wiley and Sons, Ltd. U.K.
- Lisi, P. J., Schindler, D. E., Bentley, K. T., & Pess, G. R. 2012. Association between geomorphic attributes of watersheds, water temperature, and salmon spawn timing in Alaskan streams. *Geomorphology*. <http://dx.doi.org/10.1016/j.geomorph.2012.12.013>.
- Anderson, J. H., G. R. Pess, P. M. Kiffney, T. R. Bennett, P. Faulds, T. P. Quinn. 2013. Dispersal of colonizing juvenile coho salmon (*Oncorhynchus kisutch*): tributary immigration and the influence of emergence date and kin association. *Ecology of Freshwater Fish*, 22:30-42. doi:0.1111/j.1600-0633.2012.00589.x
- Ward, E., G. R. Pess, K. Anlauf-Dunn, C. E. Jordan. 2012. Applying time series models with spatial correlation to identify the scale of variation in habitat metrics related to threatened coho salmon (*Oncorhynchus kisutch*) in the Pacific Northwest. *Canadian Journal of Fisheries and Aquatic Sciences*. 69(11): 1773-1782, 10.1139/f2012-096
- Beechie, T., H. Imaki, J. Greene, A. Wade, H. Wu, G. Pess, P. Roni, J. Kimball, J. Stanford, P. Kiffney, and N. Mantua. 2012. Restoring salmon habitat for a changing climate. *River Research and Applications*. DOI: 10.1002/rra.2590.

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- Kiffney, P., T. Buehrens, G. Pess, S. Naman, and T. Bennett. 2011. Recolonization of anadromous fish in the Cedar River above Landsburg Diversion Dam: a ten-year evaluation. Report of the National Marine Fisheries Service to the Seattle Public Utilities. Seattle, Washington.
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- Roni, P, G.R. Pess, and S.A. Morley. 2010. Monitoring salmon stream restoration: guidelines based on experience in the American Pacific Northwest. Pages 119-147 in P. Kemp, editor. *Salmonid fisheries: freshwater habitat management*. Wiley-Blackwell, Oxford, UK. (Published July 2010).
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- Pess, G.R., S. Brenkman, G. Winans, M. McHenry, J. Duda, and T. Beechie 2010. The Elwha river dam removal: A major opportunity for salmon and steelhead recolonization. *The Osprey* 65: 4-8
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http://www.fish.washington.edu/research/publications/ms_phd/Pess_G_PhD_Sp09.pdf
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- Greene, C.M., and G.R. Pess. 2009. Multispecies modeling for salmon: alternatives, challenges, and opportunities. Pages 429-454. In E. Knudsen, H. Michael, and C. Steward, eds. *Pacific Salmon Environment and Life History Models: Advancing Science for Sustainable Salmon in the Future*. American Fisheries Society Symposium 71.
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