Joseph **Thorley**

Senior Computational Biologist

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Background

Dr Joseph Thorley RPBio is a Senior Computational Biologist with Poisson Consulting who specializes in Bayesian analysis, software development and fish population ecology. In addition to teaching courses on Understanding Statistics and Decision Making for Natural Resource Managers he maintains over 30 R packages.

Education

2000	PhD in Theoretical Phylogenetics	*Bristol University*
1994	BA in Biological Sciences	*Oxford University*

Career

2017	Senior Computational Biologist	*Poisson Consulting*
2007	Fish Population Biologist	*Poisson Consulting*
2005	Fisheries Biologist	*Independent*
2002	Fisheries Biologist	*Scottish Exec.*

Example Projects

Harmer and Grave Creek Westslope Cutthroat Trout (2020 - ongoing)

Bayesian network and integrated population models to evaluate influence of environmental variables on population dynamics of an isolated population of Westslope Cutthroat Trout.

Barren-Ground Caribou (2018 - ongoing)

Analysis of fecundity, breeding cow abundance, cow collar and calf cow ratio data complete with standard errors using an integrated stage-based state-space population model to estimate migration, survival and population growth rate.

Lower Columbia River Rainbow Trout Spawning (2009 - ongoing)

Study design, data analysis and report writing to understand the influence of dam operations on Rainbow Trout trout spawning and egg survival.

Lower Columbia River Fish Indexing (2008 - ongoing)

Study design and data analysis for a program to estimate abundance, growth, survival and body condition of Whitefish, Rainbow Trout, and Walleye.

Lardeau and Lower Duncan River Juvenile Rainbow Trout Stock Recruitment (2008 - ongoing)

Study design, field work and data analysis for a program to estimate Gerrard Rainbow Trout stock-recruitment.

Key Software

- chk - R package for developers to check user-supplied function arguments.
- RadCon - C++ MacOS program for manipulating and analyzing phylogenetic trees.
- ssdtools - R package to derive water quality guidelines which is used internationally.
- ypr - R package that implements equilibrium-based yield per recruit methods.

Key Publications

1. Irvine, R. L., & Thorley, J. L. (2024). Relative efficiency of hunting methods during an incomplete Sitka black-tailed deer eradication on Haida Gwaii, Canada. *Ecological Solutions and Evidence*, *5*(1). https://doi.org/10.1002/2688-8319.12312
2. Warnock, W. G., Thorley, J. L., Arndt, S. K., Weir, T. J., Neufeld, M. D., Burrows, J. A., & Andrusak, G. F. (2021). Kootenay Lake kokanee (Oncorhynchus nerka) collapse into a predator pit. *Canadian Journal of Fisheries and Aquatic Sciences*, cjfas-2020-0410. https://doi.org/10.1139/cjfas-2020-0410
3. Fox, D. R., Dam, R. A., Fisher, R., Batley, G. E., Tillmanns, A. R., Thorley, J., Schwarz, C. J., Spry, D. J., & McTavish, K. (2020). Recent developments in SSD Modeling. *Environmental Toxicology and Chemistry*, etc.4925. https://doi.org/10.1002/etc.4925
4. Thorley, J., & Schwarz, C. (2018). ssdtools: An R package to fit Species Sensitivity Distributions. *Journal of Open Source Software*, *3*(31), 1082. https://doi.org/10.21105/joss.01082
5. Lee, L. C., Thorley, J., Watson, J., Reid, M., & Salomon, A. K. (2018). Diverse knowledge systems reveal social-ecological dynamics that inform species conservation status. *Conservation Letters*, *12*(2), e12613. https://doi.org/10.1111/conl.12613
6. Ramey, R. R., Thorley, J. L., & Ivey, A. S. (2018). Local and population-level responses of Greater sage-grouse to oil and gas development and climatic variation in Wyoming. *PeerJ*, *6*, e5417. https://doi.org/10.7717/peerj.5417
7. Thorley, J. L., & Andrusak, G. F. (2017). The fishing and natural mortality of large, piscivorous Bull Trout and Rainbow Trout in Kootenay Lake, British Columbia (2008–2013). *PeerJ*, *5*, e2874. https://doi.org/10.7717/peerj.2874
8. Thorne, A., MacDonald, A. I., & Thorley, J. L. (2016). The abundance of large, piscivorous Ferox Trout (Salmo trutta) in Loch Rannoch, Scotland. *PeerJ*, *4*, e2646. https://doi.org/10.7717/peerj.2646
9. Irvine, R. L., Thorley, J. L., Westcott, R., Schmidt, D., & DeRosa, D. (2015). Why Do Fish Strand? An Analysis of Ten Year of Flow Reduction Data from the Columbia and Kootenay Rivers, Canada. *River Research and Applications*, *31*(10), 1242–1250. https://doi.org/10.1002/rra.2823
10. Youngson, A. F., Piertney, S. B., Thorley, J. L., Malcolm, I. A., & Soulsby, C. (2011). Spatial association of nest construction by brown trout Salmo trutta. *Journal of Fish Biology*, *78*(3), 713–725. https://doi.org/10.1111/j.1095-8649.2010.02883.x
11. Thorley, J. L., Youngson, A. F., & Laughton, R. (2007). Seasonal variation in rod recapture rates indicates differential exploitation of Atlantic salmon, Salmo salar, stock components. *Fisheries Management and Ecology*, *14*(3), 191–198. https://doi.org/https://doi.org/10.1111/j.1365-2400.2007.00540.x
12. Thorley, J. L., Eatherley, D., Stephen, A., Simpson, I., Maclean, J., & Youngson, A. (2005). Congruence between automatic fish counter data and rod catches of Atlantic salmon (Salmo salar) in Scottish rivers. *ICES Journal of Marine Science*, *62*(4), 809–817. https://doi.org/10.1016/j.icesjms.2005.01.016
13. Wilkinson, M., Cotton, J., Creevey, C., Eulenstein, O., Harris, S., Lapointe, F.-J., Levasseur, C., Mcinerney, J., Pisani, D., & Thorley, J. (2005). The Shape of Supertrees to Come: Tree Shape Related Properties of Fourteen Supertree Methods. *Systematic Biology*, *54*(3), 419–431. https://doi.org/10.1080/10635150590949832
14. Youngson, A. F., Malcolm, I. A., Thorley, J. L., Bacon, P. J., & Soulsby, C. (2004). Long-residence groundwater effects on incubating salmonid eggs: Low hyporheic oxygen impairs embryo development. *Canadian Journal of Fisheries and Aquatic Sciences*, *61*(12), 2278–2287. https://doi.org/10.1139/f04-217
15. Stefanni, S., & Thorley, J. L. (2003). Mitochondrial DNA phylogeography reveals the existence of an Evolutionarily Significant Unit of the sand goby Pomatoschistus minutus in the Adriatic (Eastern Mediterranean). *Molecular Phylogenetics and Evolution*, *28*(3), 601–609. https://doi.org/10.1016/S1055-7903(03)00054-X
16. Thorley, J. L., & Page, R. D. M. (2000). RadCon: Phylogenetic tree comparison and consensus. *Bioinformatics*, *16*(5), 486–487. https://doi.org/10.1093/bioinformatics/16.5.486