Biostatistics Consulting

Population viability analysis,
Research, monitoring, and evaluation

Power analysis tools

Multi-population population viability analysis

Monitoring design

Hinrichsen Environmental

Richard A. Hinrichsen, Ph.D.
9034 45th AVE NE
Seattle, WA 98115
Phone: 206-715-2859
rich@hinrichsenenvironmental.com
www.hinrichsenenvironmental.com
www.onefishtwofish.net

Hinrichsen Environmental

Biostatistics Consulting

Richard A. Hinrichsen, Ph.D.

Population viability analysis; Research, monitoring, and evaluation

Tel: 206-715-2859

Biostatistics Consulting

Over the past 25 years Hinrichsen has developed juvenile salmon passage models, life-cycle models, population viability models, and conducted detailed analyses of spawner-recruit models to estimate passage mortality and latent mortality. He has conducted *a priori* power analyses for evaluating experimental management and experiments aimed at estimating relative reproductive success of hatchery-born spawners in the wild.

Selected publications:

Hinrichsen, R.A., R. Sharma, and T.R. Fisher. 2012. Precision and accuracy of estimators of the proportion of hatchery-origin spawners. Transactions of the American Fisheries Society **141**:437-454.

Paulsen, C.M., and Hinrichsen, R.A. 2002. Experimental management for Snake River spring summer chinook *(Oncorhynchus tshawytscha*): trade-offs between conservation and learning for a threatened species. Can. J. Fish. Aquat. Sci. **59**: 717 725.

Hinrichsen, R.A. 2001. High variability in spawner-recruit data hampers learning. Can. J. Fish. Aquat. Sci. **58**: 769-776.

Population Viability Analysis

Population growth rate, variance, autocorrelation, and population abundance are used to estimate extinction risks of endangered salmon populations. Population viability analysis is performed on several populations simultaneously to increase statistical accuracy and model synchrony in related populations. Effects of measurement error are considered in a state-space modeling approach.

Hinrichsen, R.A. 2009. Population viability analysis for several populations using multivariate state-space models. Ecological Modelling **220**: 1197-1202.

Hinrichsen, R. A. and E. E. Holmes. 2009. Using multivariate state-space models to study spatial structure and dynamics. In Spatial Ecology (editors Robert Stephen Cantrell, Chris Cosner, Shigui Ruan). CRC/Chapman Hall.

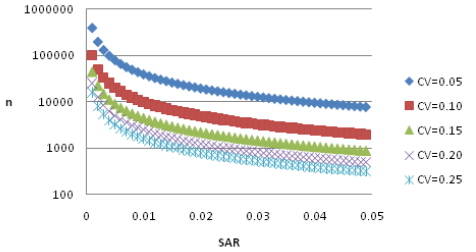
Research, Monitoring, and Evaluation

Designs of experiments for estimating effects of habitat action are evaluated. Tagging programs are designed for monitoring adult escapement, survival, migration timing, and distribution.

Power analysis tools are developed to determine appropriate tagging numbers for measuring smolt-to-adult ratios, downstream survival, adult escapement, survival, timing and distribution.

Alternative statistical methods for estimating escapement are evaluated.

Hinrichsen, R.A. 2003. The power of experiments for estimating relative reproductive success of hatchery-born spawners. Can. J. Fish. Aquat. Sci. **60**:864-872.



Tagging number (n) needed to deliver the desired accuracy of a smolt-to-adult ratio (SAR).

Hinrichsen Environmental

Richard A. Hinrichsen, Ph.D.

9034 45th AVE NE

Phone: 206-715-2859

rich@hinrichsenenvironmental.com

www.hinrichsenenvironmental.com

www.onefishtwofish.net