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## EDUCATION

**Doctor of Philosophy** in Quantitative Ecology & Resource Management from the University of Washington, Seattle, WA. 2009.  
**Master of Science** in Quantitative Ecology & Resource Management from the University of Washington. Seattle, WA. 1998.  
Certification in Environmental Management from UW Business School. Seattle, WA. 1998.  
**Bachelor of Science** in Mathematics, minor in Economics and Computer Science from Mt. St. Mary's College. Emmitsburg, MD. 1995.  
**Indian School Certificate** (1991): Don Bosco School, Park Circus, Calcutta, India.  
**Indian Certificate for Secondary Education** (1989): Don Bosco School, Park Circus, Calcutta, India.

## EXPERIENCE

### Independent Consultant

Portland,OR (8/2004-present)

Provide independent guidance on power analysis, experimental design, statistical and mathematical models relating to natural resource issues.

- Design Population Viability tools for Department of Fisheries and Oceans Canada.
- Provide experimental design services to different consultants and natural resource agencies in the Pacific Northwest.
- Design statistical software for different First Nations and tribal entities in the Pacific Northwest.
- Develop habitat, hatchery and harvest models for salmon in the Pacific Northwest Region.

### Columbia River Intertribal Fisheries Commission

Biometrician

Portland,OR (6/2000-present)

Involved in various aspects of research and planning for Columbia river salmon stocks as far as in river and ocean management are concerned. A few of the tasks are as follows:

- Co-chair of the Pacific Salmon Commission Chinook technical Committee.
- Serve as a technical analyst for the United States on the Pacific Salmon Committees technical workgroups, namely the Chinook Technical Committee and the Selective Fisheries Evaluation Committee.
- Extensive analysis of Columbia River stocks in ocean fisheries using the Exploitation Rate analysis and Chinook Management models.
- Perform in river updates and technical analysis incorporating harvest regimes and runsizes for Columbia River stocks.
- Review biological assessments and perform extinction risk analysis for Columbia river stocks.
- Involved in study designs, and statistical methodology for various tribal entities designing experiments in the Columbia River basin.
- Use of spatial statistics techniques in analyzing Geographic Information Systems data on the Columbia.

### University of Washington

Research Assistant (Ph. D.)

Seattle, WA (9/2004-6/2009)

Ph. D. in University of Washington dealing with climate variability and its effect on Pacific Northwest (PNW) Chinook Salmon.

- Used Multivariate and time-series statistical techniques to investigate the effect of atmospheric and ocean regimes and its effect on survival and maturation rates on PNW Chinook.
- Used non-linear modeling approaches to fit age structured data on Chinook salmon on a stock by stock basis as well as incorporating this directly into a new assessment model for PNW Chinook of relevance to the Pacific Salmon Commission.
- Manuscript (in review): Developing Statistical Catch at Age models for Chinook salmon using Non-linear optimization techniques: An alternative modeling tool for Chinook salmon stock assessment.
- Manuscript (in review): Spring and Fall Chinook Distributions: Empirically based differences of Ocean migration pathways.
- Manuscript (in review): Cluster and Time series analysis of Survival, maturation and Distribution of Pacific Northwest Chinook Salmon: Affect of climate and ocean cycles on Pacific Northwest Chinook.

### Quinault Indian Nation

Harvest Management Analyst

Taholah, WA (4/98-4/2000)

Worked as a quantitative analyst on evaluating the performance of their fisheries resources.

- Use Bayesian simulation algorithms to forecast a fish population size before the season begins.
- Prepare management reports on how to allocate the catch between different user groups.
- Perform updates to the Pacific Fisheries Management Council on the fish resources.

### University of Washington

Research Assistant

Seattle, WA (9/95-4/98)

Worked with Dr. Ray Hilborn, Dr. Tom Quinn, Dr. Tom Leschine and Dr. Dan Huppert as a research associate in their labs. I designed various mathematical and statistical models to evaluate the interactions between different aspects of resource management in the Puget Sound region in Washington, and Alaska. Looked at the economic trade-offs between different management options.

- Worked with the Washington Department of Fish and Wildlife, North West Indian Fisheries Commission and the National Marine Fisheries Service to design and collate a database of habitat variables which can be quantified in comparison to the fish runs.
- Designed a model in Visual basic which incorporates the principal of Carrying Capacity and the effect habitat depletion may have on it. The model involves complex interactions with the ocean, harvest and hatcheries and is for Washington State.
- Quantified the effect of habitat on productivity of coho salmon using likelihood ratio profiles (MS thesis). This was used in decision analysis to decide which management option on habitat enhancement would result in the most likely outcome.
- Used Splus (statistical package) to do cluster analysis for fish population data in the Bering sea. Developed algorithms for spatial point processes using the fisheries data.
- Involved in the design and analysis of minor oil spills in the Puget Sound region of Washington, USA. The end product involved the trade-off between different management techniques, and the preservation of certain areas from oil pollution using risk and decision analysis.
- Performed factor analysis on surveys addressing issues of contaminants in Puget Sound.

## Computer Skills.

*Operating Systems:* DOS, Windows, UNIX, and Primos.

*Languages:* C++, Java, Visual Basic, S, R, SPSS, WinBugs, Wave, Stella, Pascal, COBOL, and Basic,.

*Networks & Applications:* Novell LANs, TCP/IP, Internet browsers, MS Office, and Editors.

## Papers

### Peer review Literature

- Publication (2009 *in press* Fisheries Management and Ecology). Supplementing Spawner-Recruit data with watershed size to improve estimation of  $S_{MSY}$ : A Bayesian hierarchical modeling approach (Liermann, Sharma & Parken).
- Publication (2009 North American Journal of Fisheries Management 29: 423-433): "The Use of Generalized Additive Models for Forecasting the Abundance of Queets River Coho Salmon". (Wang, Morishima, Sharma and Gilbertson).
- Publication (2007. Fish Sc. Vol 73:808-816): "Bayesian Decision Analysis for status of Snake River spring-summer Chinook Salmon *Oncorhynchus tshawytscha* populations at extinction risk" (Hyun and Sharma).
- Publication (2007. Canadian Science Advisory Secretariat). "Recovery potential analysis for Chinook salmon Okanagan population, *Oncorhynchus tshawytscha*" (David, Wright, Brown, Phillips, Sharma, Parkin).
- Publication (2006. Vol 63:423-43 in Canadian Journal of Fisheries and Aquatic Sciences): "Evaluation of the Clearwater River Supplementation Plan in Western Washington" (Sharma, Morishima, Wang, Talbot and Gilbertson).
- Publication (2005 (Vol 183 231-250) in Ecological Modeling): "A Quantitative framework for the analysis of habitat, harvest, hatchery practices and ocean conditions for Pacific salmon" (Sharma, Cooper and Hilborn).
- Publication (2005 Vol 25:446-463 in North American Journal of Fish Management): "Using simulation techniques to assess management parameters in Snake River steelhead: Declines in productivity make rebuilding difficult" (Yuen and Sharma).
- Publication (2003 in the Hawaii International Conference on Business 2003): "An examination of ethical attitudes among Indian Management students, Business executives and Civil Service Probationers" (Bhatnagar and Sharma).
- Publication (2003 Vol 31:1-24 in Coastal Zone Management Journal): "Beliefs, Values and technical Assessment in Environmental Management: Contaminated sediments in Puget Sound" (Leschine, Lind and Sharma).
- Publication (2001 Vol 58:1453-1463 in Canadian Journal of Fisheries and Aquatic Sciences): "Empirical Relationship between watershed characteristics and smolt abundance in coho salmon in 14 western Washington streams" (Sharma and Hilborn).
- Manuscript (in review in Ecological Modelling): Estimating Critical Thresholds in Populations: A Simulation Based Approach. (Raborn and Sharma).
- Manuscript (in review North American Journal of Fisheries Management): Analyses of Potential Mitigation Efforts and Harvest Effects on the Snake River White Sturgeon Population using Extinction Risk and Biomass Dynamic Models (Sharma, Kappenman, Webb and Everett).
- Manuscript (in review Canadian Journal of Fisheries and Aquatic Sciences ): Developing Statistical Catch at Age models for Chinook salmon using Non-linear optimization techniques: An alternative modeling tool for Chinook salmon stock assessment (Sharma, Yuen and Hilborn).
- Manuscript (in review Conservation Biology): Spring and Fall Chinook Distributions: Empirically based differences of Ocean migration pathways (Sharma and Quinn).
- Manuscript (in review Fisheries Oceanography): Cluster and Time series analysis of Survival, maturation and Distribution of Pacific Northwest Chinook Salmon: Affect of climate and ocean cycles on Pacific Northwest Chinook (Sharma, Mantua and Francis).

### Conference Proceedings

Presented papers in Joint Statistical Meetings (Seattle 2006), American Fisheries Society Annual Meetings (Bozeman 2006, and New York 2006, Anchorage 2005, & San Diego, 2002) Conservation Biology (Kent, UK 2002), Resource Management Association, Seattle WA, 1997 and Pacific Ecology Conference (Victoria, BC, 1998).

### Grey Literature

- Special Report of Chinook Technical Committee HRI Workgroup on the Evaluation of Harvest rate indices for use in Monitoring Harvest Rate Changes in Chinook AABM Fisheries. 2009. Pacific Salmon Commission, Vancouver, BC.
- Technical Committee Reports for the Chinook Technical Committee since 2001 (12 reports 2000-2009). Pacific Salmon Commission, Vancouver, BC.
- Technical Committee Reports for the Selective Fisheries Evaluation Committee since 2001 (12 reports 2000-2009). Pacific Salmon Commission, Vancouver, BC.
- Technical Report on West Coast of Vancouver Island: Report of the Joint Chinook Technical Committee Workgroup on the October 19, 2005 Assignment Given to the Chinook Technical Committee by the Pacific Salmon Commission Regarding the Conduct of Canadian AABM Fisheries. Pacific Salmon Commission, Vancouver, BC.