ECONorthwest
ECONOMICS • FINANCE • PLANNING

Education

B.A. Linfield University: Environmental Studies, Economics Minor

M.S. Oregon State University, Agricultural and Natural Resource Economics

Years in Industry: 16

Areas of Expertise

Recreation Economics

Ecosystem Service Analysis

Socioeconomic Impact Analysis

Agricultural Economics

Natural Resource Damage Assessment

Water Resource Economics

NEPA / EIS

Terry Wirkkala, Senior Project Manager

Terry is a senior project manager at ECONorthwest with a background in agricultural and natural resource economics. With over 15 years of experience in environmental consulting, Terry specializes in recreation economics, ecosystem service analysis, socioeconomic impact analysis, agricultural economics, natural resource damage assessment, business and agricultural feasibility analysis, water resource economics, and Indian water rights. Terry's interests are broad ranging from estimating the economic value of recreation to socioeconomic impact analysis for utility scale renewable energy projects to estimating the value of groundwater recharge and storage. Terry's work has been published in peer reviewed journals including the Review of Law and Economics.

REPRESENTATIVE PROJECTS

Terry has served as Senior Project Manager on the following projects, unless otherwise noted:

- **EMSWCD conservation easement analysis—Portland, OR (Ongoing).** Creating an alternative conservation easement methodology appropriate for the specific context of EMSWCD's work, including a spreadsheet-based tool. Work includes summarizing the design of existing and theoretical agricultural conservation easements and other conservation mechanisms/tools.
- **Darden Clean Energy Socioeconomics Analysis—Fresno, CA (Ongoing).** Conducting a socioeconomic impact analysis for the proposed Darden Clean Energy solar and hydrogen energy project by Intersect Power in Fresno County, California for CEC compliance. If permitted, this will be the largest solar project in the nation. The analysis focused on fiscal, social service, employment, income, and output throughout construction and operation of the project under multiple scenarios.
- **NM Calf Canyon-Hermits Peak wildfire—Statewide, NM (Ongoing).** Providing support and analysis to estimate damages of the 2022 Calf Canyon/Hermits Peak wildfire on various clients including utilities and school districts.
- **NUID Deschutes Water Supply—Bend, OR (Ongoing).** Conducting a series of economic analyses on water supply, demand, and value in

the Deschutes River Basin, focusing on NUID to inform specific water conservation programs and projects.

- **Bear River Economic Contribution Study—Bear River, UT/WY/ID (Ongoing).** Estimating the economic benefits of the Bear River water to agricultural and municipal users to inform future decision-making about the Bear River.
- **WSDA Climate Resiliency Plan—Olympia, WA (Ongoing).** Creating a climate resiliency plan for Washington State agriculture. Work includes inventorying risks, best practices, and programs to integrate the plan into existing programs.

PRE-ECONORTHWEST REPRESENTATIVE PROJECTS

Agricultural Economics

- **Agricultural Production for Various Tribes—New Mexico.** A benefit-cost analysis was performed evaluating agricultural production on the Jamez, Zia and Santa Ana Pueblo.
- **US DOJ: New Mexico—New Mexico.** Analyzed the feasibility of agricultural production on a New Mexico Indian Reservation as part of an expert whiteness testimony. A market analysis estimated potential demand for selected crops.
- **Dairy Enterprise Feasibility—Sanoma County, CA.** Analyzed the feasibility of dairy enterprises in Sonoma County including the creation of custom enterprise budgets for various sizes of sheep and cattle dairy enterprise.
- **Agricultural Production Feasibility—New Mexico.** Estimated the market for select agricultural crops. Created custom crop budgets for selected agricultural crops including specialty crops.
- **Feasibility Analysis for a Community Supported Agricultural Business—Washington.** A feasibility analysis was conducted for a proposed community supported agricultural business on the Yakama Indian Reservation. The market for selected agricultural crops was analyzed with the intent of farmers market and CSA sales to alleviate regional food shortages associated with a Food Desert designation. The analysis involved creation of custom crop budgets including projected costs and returns associated with the proposed CSA.
- **US DOJ—Montana.** Analyzed the feasibility of agricultural production on a Montana Indian Reservation as part of an expert whiteness testimony in a water rights litigation. As part of this work, future production and market demand of selected crops was estimated.
- **Feasibility Analysis for Agricultural Production—Washington.** A feasibility analysis for the specialty crop of hemp was analyzed. The work included a social feasibility analysis with the creation and implementation of a survey to gauge tribal support for a hemp venture.

Recreation Economics / Tourism

- **Feasibility Study for a Proposed Native American Cultural Center—Washington.** A feasibility study for the proposed Quinault Cultural Center included estimating the visitor market for the potential cultural center. Work included interviews with similarly sited Native

American cultural centers as well as an analysis to determine the potential visitation, fees, and gross revenue to the proposed Quinault Cultural Center.

- **Feasibility Study for Port Gamble Forest Heritage Park—Washington.** The feasibility study for the Port Gamble Forest Heritage Park included estimating the visitor market for the potential cultural center. Work included a market analysis of existing tourism and local visitation in Kitsap County with qualitative and quantitative analysis to understand the visitors using the park, County and region.
- **Feasibility of Recreation Facility—California.** Analyzed existing demand and supply of OHV recreation in Riverside County, CA as part of a feasibility analysis for siting an additional recreational facility.

Water Economics & Water Rights Valuation

- **Economic Valuation of Pueblo of Laguna Water Rights—New Mexico.** Estimated the economic value of water rights for the Laguna Pueblo in the Rio San Jose Basin as part of a damage estimation. Work included identifying Basin water users, quantity and timeframe of potential damages, and estimation of the value of Tribal water rights through the comparable sales, land price differential, and income capitalization methods as part of a water rights settlement with the Federal Government.
- **Economic Valuation of Water Rights in the LCR Basin / Hopi and Navajo Nation—Arizona.** Estimated the economic value of water rights in the Lower Colorado Basin for the proposed senior water right holders in the Basin, the Hopi and Navajo Nation. Work included estimation of the value of water rights through the comparable sales, land price differential, and replacement cost (conservation) methods as part of a water rights settlement with the Federal Government.
- **Economic Valuation of Water Rights in the Jemez River/ Jemez, Zia and Santa Ana Pueblos—New Mexico.** Estimated the value of water rights in the Jemez River Basin from the perspective of the Jemez, Zia and Santa Ana Pueblos. Work included estimation of the value of Tribal water rights through the comparable sales, land price differential, and replacement cost (conservation, storage, and recovery) methods as part of a water rights settlement with the Federal Government.
- **Economic Valuation of Ohkay Owingeh Water Rights in the Espanola Basin—New Mexico.** Estimated the value of water right damages for the Ohkay Owingeh Pueblo. Work included estimation of the value of Tribal water rights through the comparable sales, land price differential, replacement cost (conservation and reuse values) and income capitalization methods as part of an ongoing water rights litigation case.
- **Economic Valuation of Tule River Water Rights—California.** Estimated the value of Tule River water rights as part of a proposed water rights settlement in the basin. Work included estimation of the value of Tribal water rights through a comparable sales analysis, land price differential analysis, and a replacement cost approach (conservation and reuse values) as part of a water rights settlement case.

- **Economic Valuation of Environmental Water Rights —Nevada.** Estimated the value of water rights in a water basin basin as part of a proposed water rights settlement in the basin. as part of a water rights settlement case.
- **Economic Valuation of Utah/Navajo Water Valuation—Utah.** Estimated the value of Tule River water rights as part of a proposed water rights settlement in the basin. Work included estimation of the value of Tribal water rights through a comparable sales analysis, land price differential analysis, and a replacement cost approach (conservation and reuse values) as part of a water rights settlement case.
- **Kern Zone of Benefits—California.** Economist, Conducted an analysis of the economic impact of groundwater recharge on agricultural production and groundwater pumping levels. This analysis was conducted annually to track benefits through time.
- **Fort Belknap Water Rights—Montana.** Economist, as part of a multi-disciplinary team, conducted an estimation of non-market benefits associated with reservoir recreation and waterfowl habitat enhancement and determination of overall feasibility for a study of water rights.
- **Economic Value of Water Transfers—California.** Analyzed the potential type and magnitude of economic values associated with water transfers including impacts to area recreation and agricultural industries.

Natural Resource Damage Assessment

- **Human Use Impacts Resulting from Natural Resource Damages—Louisiana.** Economist, following natural resource damage, as part of an inter-agency team, implemented a recreational use survey and analyzed survey data and secondary data sources to quantify decreased recreational use following the damage.
- **Human Health Risk Assessment of Recreators—Washington.** Economist, as part of an interagency team, conducted primary data collection through implementation of survey of recreators to assess human health risks associated with Lake Roosevelt.

Socioeconomic Impact Analysis & Economic Analysis

- **Impact Analysis for South Columbia Basin Irrigation Project—Washington.** Conducted a socioeconomic and demographic baseline analysis for the South Columbia Basin Irrigation Project area covering a four-county area in Southeast Washington including Benton, Grant, Franklin, and Adams Counties. Work included gathering and analyzing demographic, employment, and income characteristics of the region. This study included state and national level analysis intending to provide insight into the local population and economy, as well as the demographic and economic context of the project area relative to the State and Nation.
- **Environmental Impact Statement for BLM North Steens Transmission Line—Oregon.** Conducted a socioeconomic baseline assessment analysis for the proposed North Steens Transmission Line wind energy project by Columbia Energy Project in Harney County, Oregon. The analysis examined the current economic and fiscal conditions of the project area including income, unemployment, the employment base, property and income tax revenues,

and home values. The tourism baseline assessment paid special attention to local recreation due to the location of Malheur National Wildlife Reserve including visitation and economic impacts of recreators in the County. These measures were analyzed at the project area, County, State, and National level to provide the socioeconomic context of the project area.

- **Environmental Impact Statement for the Soboba Band of Luiseno Indians—California.** Conducted a socioeconomic baseline assessment analysis for the proposed constructing of a hotel and casino complex including the relocation of existing casino operations to the subject property. The analysis examined the current economic and fiscal conditions of the project area including income, unemployment, the employment base, property and income tax revenues, and home values. These measures were analyzed at the project area, County, and State, to provide the socioeconomic context of the project area where necessary.
- **Skokomish Tribe, Socioeconomic Analysis for five Environmental Assessments—Washington.** Conducted a socioeconomic analysis for five Environmental Assessments (EA) including 18 properties being proposed for fee-to-trust by the Skokomish Indian Tribe. Each EA is unique to the subject properties, where a wide range of land uses are proposed varying from commercial to housing to habitat conservation. The analysis first focused on quantifying the baseline socioeconomic conditions including unemployment, education, housing, and employment base information. The potential effects of the proposed action were analyzed in the second phase of the analysis.
- **Environmental Impact Statement for Williams Gas Pipeline Replacement Project —Idaho.** Conducted a socioeconomic analysis of the Williams Gas Pipeline Replacement Project near Caldwell, Idaho in compliance with the Environmental Impact Statement for the project. Worked closely with GIS to spatially analyze property and transportation impacts to the local population. Traffic disruptions to a major highway and local access roads were analyzed to determine the effect of construction on local residents. Pipeline replacement required construction on private property, so land access restrictions and adverse land value effects were analyzed in conjunction with regional, state, and national levels to determine any environmental justice issues with the proposed project.
- **Pre-Feasibility Analysis of the Valsetz Reservoir—Oregon.** Analyzed the feasibility and potential environmental consequences of a proposed new dam and reservoir in Polk County, Oregon. Work included estimating the feasibility and benefits of creating enhanced in-stream flow for indigenous fish species on the river as a potential benefit of recreational opportunities made possible through the proposed dam and reservoir.
- **Economic Value of Fish Hatcheries—Oregon and Washington.** Estimated the economic value of fish hatcheries in Oregon and Washington. Work includes the estimation of economic benefits associated with recreational fishing in the states utilizing existing data on fishing effort and catch rates as well as relevant net economic benefits to anglers in the region.

Publications

Wu, JunJie and Wirkkala, Teresa M. (2009) "Firms' Motivations for Environmental Overcompliance," Review of Law & Economics: Vol. 5: Issue 1, Article 17.

Ervin, Wu, Khanna, Jones and Wirkkala (2013) "*Motivations and Barriers to Corporate Environmental Management*," Business Strategy and the Environment: Vol 22: Issue 6, pages 390-409.