

# Gretchen Greene, PhD

## CHIEF EXECUTIVE OFFICER/PRINCIPAL ECONOMIST



Dr. Gretchen Greene has 20 years of diverse economics experience in natural resource, energy, agricultural, and community economics. Dr. Greene has expertise in water demand and management, ecosystem service valuation, natural resource damage assessment, agriculture, and public infrastructure investment. She also brings expertise in endangered species economics; land conservation and sustainable economic development; cost-benefit analysis; demographics, socioeconomics, and environmental justice; decision analysis with uncertainty; and survey design and data analysis. Recent interests have focused on water supply and demand in the face of a changing climate. Dr. Greene also has significant experience with flood damage assessments and currently works as a reviewer for the U.S. Army Corps of Engineers. An experienced facilitator, Dr. Greene has developed focus groups and surveys covering a number of environmental topics. She has worked in dozens of different cultural environments, from southern Africa to Mongolia to Native American communities. She has worked with numerous federal, state, tribal, and municipal agencies as well as private industrial clients and law firms. Dr. Greene has considerable litigation support experience, including serving as expert witness in forecasting water demand and other topics.

### Qualifications

- PhD, Food and Resource Economics: University of Florida, Gainesville, 1995-1998
- MS, Food and Resource Economics: University of Florida, Gainesville, 1991-1995
- BA, Religion Studies: Wellesley College, 1977-1982

### Expertise

- American Water Research Association (AWRA)
- Water Environment Federation (WEF)
- Population Association of America (PAA)
- Western International Economic Association (WIEA)
- American Agricultural Economic Association (AAEA)

### Language skills

- English
- Spanish
- Setswana

## Relevant Projects

### Benefit Cost/Regulatory Analyses

#### Economic Analysis of Proposed Stream Protection Rule, National Mining Association – United States

Dr. Greene estimated the economic impacts of the Office of Surface Mining's proposed stream protection rule, which would have affected the entire U.S. coal industry. The project evaluated the language of the draft rule and assessed the impact of implementation against current industry statistics and trends. Compliance with the rule was evaluated on 75 current surface and underground mining operations in all regions of the country to determine the impact on access to demonstrated coal reserves. The percent decrease in access to recoverable reserves was determined for both surface and underground mining, and for each of the three regions in the country. For each sector experiencing losses, Dr. Greene's team estimated employment impacts, including direct mining jobs placed at risk as well as total jobs at risk. .

#### Analysis of Benefits and Costs of Proposed Regulatory Changes in Offshore Oil and Gas Exploration in the Arctic, Oil and Gas Industry

Dr. Greene analyzed the benefits and costs of offshore oil and gas exploration in the U.S. Arctic. Analysis included all benefits and costs covering royalties, income, fiscal impacts, regional economic impacts, and environmental benefits and costs. Detailed financial data were developed from public sources and from the client (under a nondisclosure agreement). Analysis was conducted prior to rulemaking on oil and gas operations in the arctic and covered risks of oil spills, safety, and



health impacts. Results were presented to the White House Office of Management and Budget. Analysis was also presented in testimony to the U.S. Senate Energy Committee. .

## **Economic Impact of Potential Carbon Reduction Rules in Oregon, Confidential Client – Portland, Oregon**

Dr. Greene reviewed the impact of potential State of Oregon carbon reduction rules (Cap and Trade, Carbon Tax) for a client with significant operations and fuel use in the state. The Ramboll team performed a literature review on existing carbon reduction programs in other regions and used data from the client to calculate the cost impacts on each sector of the client's operations for a range of potential policy choices. The work included creation of a calculator tool that allowed the client to easily compare the cost outcomes of different policy options on each of their business operations.

## **Cap and Trade Allowance Determination, Confidential Client – San Bernardino County, California**

Dr. Greene assisted a client in providing the California Air Resources Board with information so that the confidential client could be included in the California Cap and Trade regulations. Since the client represented a new industrial sector not included in the original regulatory process, CARB requested that the client provide information about the appropriate level of free allowances to be allocated to the firm for the Cap and Trade program. Specifically, the Ramboll economists assisted the client in determining the appropriate leakage class and benchmark factor.

## **Review of Regulatory Impact Assessment for Proposed Air Quality Regulation, American Petroleum Institute – Washington DC**

When a new regulation is proposed at the federal level, a Regulatory Impact Assessment (RIA) is prepared by the sponsoring agency. Dr. Greene reviewed the preliminary RIA for proposed changes in air quality regulations for offshore oil and natural gas production in the Gulf of Mexico. Dr. Greene reviewed existing emissions trading markets in the gulf, surveyed oil and gas producers on their costs, developed cost calculations for various elements of the proposed rule, and evaluated the benefits of the proposed regulation, including the cost of carbon emissions and reductions in the incidence of air-quality-related health impacts. .

## **Effect of Policy Tools for Encouraging Electric Vehicle Adoption, Newhall Ranch – Santa Clarita, California**

Dr. Greene led a research team conducting a review of articles pertaining to policies encouraging the adoption of electric vehicles. Based on the literature review, Ramboll created a forecasting model for the impact of different policy tools on electric vehicle adoption in a new residential community in California.

## **Review of Savannah Harbor Expansion Project, Battelle and U.S. Army Corps of Engineers – Georgia**

Dr. Greene reviewed the Savannah Harbor Expansion Project Economic Evaluation, General Reevaluation Report, and Transportation Cost and Savings Model as part of the external panel review. Comments are reviewed and addressed by the COE before publication. The review team also reviewed a Tier II environmental impact statement, including environmental mitigation and enhancement plans.

## **Panel Review of Fargo Moorhead Metropolitan Flood Risk Management Area Draft Feasibility Report and Environmental Impact Statement, Battelle and U.S. Army Corps of Engineers – North Dakota**

Dr. Greene was an economics panel member for an external panel review. She reviewed the flood damage assessment model and environmental mitigation for proposed flood protection alternatives for the Fargo Moorhead Metropolitan Area. Comments were reviewed and addressed by the COE prior to publication. .

## **Dredged Material Management Study: Risk-Based Analysis of the Lewiston Levee, HDR and U.S. Army Corps of Engineers - Idaho**

Dr. Greene led this study, which was part of a dredged material management environmental impact statement for the Snake River system including McNary and Lower Snake River Reservoirs. Dr. Greene estimated flood damage reduction benefits provided by the Lewiston Levee system. Environmental benefits and costs were evaluated separately. Dr. Greene also conducted a socio-institutional analysis and a regional economic analysis. The results of all study components were included in a benefit-cost economic analysis of various dredge plans, levee alterations, and dredged material disposal options for the COE's Walla Walla District. Dr. Greene oversaw the development of a socioeconomic analysis of the region, including projections and a regional economic impact analysis. Flood damage reduction benefits were developed using the COE Hydrologic Engineering Center's Flood Damage Analysis model. The model and results were operated and presented, respectively, consistent with COE Engineering Manual 1110-2-1619, Risk Based Analysis for Flood Damage Reduction Studies. Dr. Greene reviewed methodology for freight benefit estimation, grain production, and shipment forecasts, and prepared a technical memorandum of findings.

## **Oil Transfer Rule, Small Business Economic Impact Statement, and Cost-Benefit and Least Burdensome Analysis, Washington State Department of Ecology – Olympia, Washington**

Ecology's Spill Prevention, Preparedness, and Response Program revised rules that govern the transfer of oil within Washington State waters. As part of the rulemaking process, several economic analyses were needed in advance of Ecology's proposal of the rule change. Dr. Greene led the effort to complete these analyses, which focused on the costs and benefits associated with changes in oil transfer safety procedures. Included were a cost-benefit analysis and an analysis of the impacts to small businesses. As part of the analysis, Dr. Greene participated in public meetings and gathered information through interviews with a variety of representatives from affected industrial sectors. The new rules affect vessels as well as four different types of facilities that transfer oil on or over state waters. Available at: .

## **Analysis of the Economic Impacts of Complying with Regulations Implementing Laws on Endangered Species, EDAW and California Department of Fish and Game – Sacramento, California**

Dr. Greene analyzed the impacts of regulations implementing California laws relating to threatened or endangered species. The laws modify conditions under which incidental or accidental take of species is penalized, as well as changing reporting requirements for individuals and other state agencies. Dr. Greene was responsible for analyzing the economic impacts of the new regulation on the development community as well as the natural environment.

## **Technical Review of Economic Benefits Analysis of South Pasture Phosphate Mine, CF Industries – Levy County, Florida**

Dr. Greene provided technical review of an economic benefit analysis completed for this proposed phosphate mine. The analysis estimated regional economic impacts in terms of the number of jobs provided through time, as well as the direct, indirect, and induced effects on the local economy.

## **Sustainable Economic Development**

### **Economic Value of Environmental and Community Benefits from Stewardship Development Strategy, Fourth Quarter Properties – Venice, Florida**

Dr. Greene led a research team identifying and quantifying environmental and community benefits associated with an environmentally friendly development design plan. The study identified benefits of the proposed project over and above those that would be realized using a conventional development strategy. The proposed project involved adherence to building and design standards and practices such as those of the Florida Green Building Coalition, Smart-growth, Low Impact Design, Florida Yards and Neighborhoods, and Leadership in Energy and Environmental Design. Quantified benefits included improved water and ecological functioning, better habitat for wildlife, reduced transportation and associated reductions in costs and pollution, improved energy conservation, and healthier lifestyles for citizens.

## **West Hayden Island Economic Foundation Study, City of Portland Bureau of Planning and Sustainability – Portland, Oregon**

This study was paired with an environmental study conducted for the City of Portland to evaluate potential gains and losses associated with development of a marine terminal on West Hayden Island. Dr. Greene co-led the research, which included assessments of the economic role of Portland Harbor, marine industrial trends, and marine site suitability; and a land absorption and needs forecast. The land demand analysis also informed the Economic, Social, Environmental, and Energy (ISEE) analysis completed as part of the city land use plan.

## **Environmental and Social Impact Analysis, Oyu Tolgoi Mine – Mongolia**

Dr. Greene evaluated the effects of the southern Gobi Desert ecosystem on livestock herders and populations of small towns (soums). Ecosystem effects were evaluated through data collection and through focus groups and on-site interviews with representatives from various demographic groups. Topics covered include pasture quality, water availability, use of plants and wildlife, and other traditional uses of the natural landscape.

## **Conservation Tools: An Evaluation and Comparison of the Use of Certain Land Preservation Mechanisms, Washington State Recreation and Conservation Office – Washington**

Dr. Greene developed a spreadsheet-based tool for analyzing how different land conservation and preservation mechanisms affect the achievement of stated goals of the Recreation and Conservation Office. The report was part of a required element of State House Bill 1957 that required the office to explore the effect of different land preservation mechanisms on cost and the ability to respond to future ecological and economic changes and shocks. .

## **Economic Analysis of Phase 3 BLM LV Land Disposal Boundary Environmental Impact Statement, (City of North Las Vegas) – Las Vegas, Nevada**

The cities of Las Vegas and North Las Vegas were considering the set-aside of additional lands for conservation known as the Conservation Transfer Area. It is expected that, if the boundaries of the CTA are expanded, residential development currently planned on that land will take place in satellite communities instead. Dr. Greene completed an economic analysis of environmental effects of setting aside the additional land by estimating the dollar values of the expected resulting environmental losses, including additional transportation to accommodate workers living farther from the urban core and impacts from lower-density development.

## **Analysis of Regional Economic Impacts of Wind Power Development, Palouse Economic Development Council – Southeastern Washington**

Dr. Greene assisted in the analysis of the economic impact of three existing wind power projects in Columbia County. Sources of project impacts being evaluated include wind turbine operation and maintenance jobs, lease payments to landowners, increased visitation to the region, increased tax revenue, and potential effects on property values and recreation.

## **Assistance with Comprehensive Economic Development Strategy, White Mountain Apache Tribe – White River, Arizona**

Dr. Greene provided support to the White Mountain Apache Tribe's update of their Comprehensive Economic Development Strategy. The U.S. Economic Development Agency requires that applicants provide a CEDS when pursuing grants for economic development. Dr. Greene supported the effort through data collection, economic development project evaluations, and oversight of the document preparations.

## **Landscape Analysis for the Spring Mountains Recreation Area, U.S. Forest Service - Las Vegas, Nevada**

Dr. Greene worked with the USFS interdisciplinary team to develop a landscape analysis that will guide the USFS in managing the recreation area in a way that supports human recreation without sacrificing habitat protection. She worked closely with biologic and ecologic scientists, USFS staff, and various partners in the project to develop an adaptive management strategy for the future.

## **Tool for Selection of Sustainable Remediation Strategies for the Great Lakes Region– Northeast United States**

Dr. Greene developed a decision-making tool for selection of alternative remediation strategies based on principles of green remediation consistent with U.S. Environmental Protection Agency and U.S. Navy guidance documents. Metrics used in the decision framework include water quality, water quantity, sediment quality and quantity, air quality, recreation and other human uses, and ecological or habitat services.

## **Water Resource Management**

### **Economic Analysis of Water Infrastructure Investment, Washington State Legislature – Washington**

Dr. Greene led a team of ecologists, hydrologists, and economists evaluating 20 years of water infrastructure investment in Washington State and the economic consequences of that investment. The analysis involved gathering information from a wide variety of sources, including stakeholder workshops, key interviews, and general literature review, to develop a forecast for investment needs based on eight basins located across the state. Investments in water supply, stormwater management, flood prevention, and fisheries habitat were included in the analysis. Available at:

### **Assessment of Water Supply Security, Recreation Industry– United States**

Dr. Greene assessed water supply security for 34 different recreational facilities in 16 different states across the U.S. Tasks involved evaluating the legal conditions surrounding water allocation in each state and assessing the specific agreement surrounding water in each of the facilities. A score of 1 to 5 was assigned to each property, depending on the certainty of policy going forward as well as on the availability of data.

### **Water Rights Review, Confidential Data-Processing Client – Oklahoma**

Dr. Greene analyzed the year-round, long-term security of water for a large data-processing center in the Midwestern U.S. The tasks involved evaluating the alternative sources of water for the facility and comparing the different sources under drought conditions, during dry years, and under potentially shifting policy regimes. Since the data center is located near three different states, analyses of three different state policies, interstate agreements, and responses to drought were involved.

### **Oversight of Analysis of Water Supply for Future Demand – Polk County, Oregon**

Dr. Greene oversaw the analysis conducted to identify options for meeting future demand for water in Polk County, Oregon. The effort included collection of water use data through interviews with water providers, reservoir operators, and other stakeholder organizations in the relevant watersheds, and development of a comprehensive database of water use in the region. The information included source capacity, average daily demand, maximum daily demand, and deficit, where applicable. An analysis of alternative measures for increasing water supply in the county included the options of building a reservoir, using cooperative and water-sharing agreements, trading water rights, upgrading systems, restricting use, and other conservation measures.

### **Expert Panel Reviewing the Benefits of the “Grey to Green” Stormwater Best Management Practice Program Benefits to Community, and Energy Reduction, City of Portland Bureau of Environmental Services – Portland, Oregon**

Dr. Greene coordinated with the BES to convene an expert panel to review proposed metrics and benchmarks for measuring community benefits of existing Grey to Green stormwater management programs. Experts from academia, local planning, water management, energy use, and community health were among panel members who reviewed eight different BMP programs. Dr. Greene assisted in designing and facilitating panel workshops and subgroup meetings, as well as by filling gaps in available data and metrics and developing the final report.

## **Oversight and Technical Review of Water Right Valuation, Grays Harbor Public Utility – Washington**

Dr. Greene provided oversight and technical review to the team conducting a water right valuation exercise for the Grays Harbor Public Utility. The utility sought support in determining appropriate lease values for the water, as well as other contracting specifications. A review of Washington State water rights transactions in the area was used in conjunction with estimates of future demands to develop a user-friendly spreadsheet that offered the client a way to review and compare alternative contracting structures and total revenue through time.

## **Determination of Future Requirements for Domestic, Commercial, Municipal, and Industrial Water, Flathead Indian Nation – Montana**

Dr. Greene worked in cooperation with Tribal consultants to determine the present water use and future water requirements for domestic, commercial, municipal, and industrial purposes on the Flathead Indian Reservation in Montana. The work included an economic assessment of future projects and development opportunities. The results will be included in an operational water model of the reservation. Results will also assist in negotiations for a water rights settlement among the Tribe, the State of Montana, and the federal government.

## **Economic Analysis of Water Allocation Alternatives, Indian Community – Arizona**

Dr. Greene led a team developing an economic analysis of water allocation alternatives. The team examined the benefits, costs, and markets associated with banking surface water supplies in off-reservation Arizona Water Bank projects; developed a database of market water leases in Arizona; conducted a literature review on the costs and benefits of water exchange agreements and water leases; updated irrigated-crop budgets; and analyzed the market opportunities and limits for irrigated crops and the current and future market value of off-reservation water leases. The results provided input to the water resource decision support system that will assist the community in formulating a water-management strategy that meets short-, intermediate-, and long-term community goals and objectives.

## **Expert Witness on Present Water Use and Future Water Needs for Domestic, Commercial, and Municipal Purposes and Present and Future Comprehensive Groundwater Need, Lummi Indian Nation – Washington**

Dr. Greene served as expert witness on the domestic, commercial, and municipal water needs of the Lummi Nation. The work included conducting a population projection and estimating the future water requirements of the Tribe on a per capita basis. Water demand forecasts were used in this study covering the comprehensive groundwater needs of the Lummi Nation. Dr. Greene contributed a socioeconomic analysis of the reservation.

## **Quarry Valuation Based on Water Storage Potential, Confidential Client – Indiana**

Dr. Greene's appraisal of a quarry in Indiana focused on three different capacities: water storage potential, any remaining mineral resources, and any other uses (e.g., as a landfill).

## **Expert Witness on Conservation and Urban Water Demand – New York City, New York**

Dr. Greene provided expert witness support on the effects of conservation on urban water demand. Literature was reviewed and water demand forecasts were evaluated and reproduced.

## **Water Supply Reallocation Report, City of Thomson – Georgia**

Dr. Greene provided an initial analysis for a water supply reallocation report to the city. The initial review of the proposed reallocation included the cost effectiveness of the proposed action, as well as impacts on other water users and the environment. Based on the initial review findings, the city determined that the proposed increase in their water storage contract would not be necessary.

## **Water Supply Reallocation Report, City of Lincolnton – Georgia**

Dr. Greene provided a water supply reallocation report regarding the city's proposed increase to their J. Strom Thurmond Reservoir water storage contract. This included analyzing alternative water supply sources and the cost effectiveness of the proposed reallocation. Impacts to the environment and other water users, including

hydropower providers [facilities?], were analyzed in accordance with U.S. Army Corps of Engineers guidance documents.

## **Expert Testimony on Future Water Requirements for Domestic, Commercial, Municipal, and Industrial Purposes – Seattle, Washington**

Dr. Greene provided expert testimony in deposition regarding the future water needs of the Lummi Indian Nation in a matter regarding control of the groundwater on the Lummi Reservation. She prepared an expert report before the case came to settlement.

## **Adjudication Expert Regarding Reserved Water Rights, Hopi and Navajo Indian Reservations – Arizona**

Dr. Greene was named as an expert in the matter of the general adjudication of the waters of the Little Colorado River Basin. She conducted a water rights litigation support study concerning the economic feasibility of an irrigation plan. Dr. Greene's updated population projections, which are based on Census data, will be used to forecast future domestic, commercial, municipal, and industrial water requirements.

## **Water Use and Population Forecasts for the Navajo Nation in the San Juan River Basin, U.S. Department of Justice – Denver, Colorado**

Dr. Greene provided an expert report and affidavit on the future water use and future population of the Navajo Nation on the lands held in trust on behalf of the Navajo Nation in the San Juan River Basin, New Mexico. The expert report captured work presented in the U.S. Hydrographic Survey and the U.S. Statement of Claims.

## **Litigation Support for Water Resource Development – New Mexico**

Dr. Greene supported testimony by Dr. Robert McKusick on the economic theory of evaluating water resource development for irrigation purposes on the Nambe Indian Reservation, including the use of benefit-cost analysis, the homeland concept, and appropriate discount rates. The report served as a trial exhibit and basis for testimony in the 1998 water rights case, *New Mexico v. Aamodt*.

## **Team Member Investigating Reserved Water Rights for the Crow Indian Reservation, U.S. Department of Justice – Denver, Colorado**

Dr. Greene was part of a multidisciplinary study team that has been investigating the Crow Indian Reservation's water rights since 1995. The team is analyzing the economic feasibility of a comprehensive water right claim plan, including a detailed analysis of farm enterprises. Dr. Greene is also responsible for identification, field check, and Geographic Information Systems mapping of domestic wells and stock ponds and for overall management of the GIS database for the study team. Dr. Greene developed population projections for the reservation, which will be used to forecast future domestic, commercial, municipal, and industrial water needs on the reservation.

## **Forecast of Future Population and Associated Reserved Water Rights for the Nez Perce Indian Reservation, U.S. Bureau of Indian Affairs – Portland, Oregon**

Dr. Greene forecasted the future Indian population of the Nez Perce Indian Reservation by river basin and by water supply source. The results were combined with water-use estimates to determine future water needs for domestic, commercial, and municipal purposes.

## **Summary Report on the Proposed San Manuel Bottled Water Facility, Indian Nation – Highland, California**

Dr. Greene conducted a reconnaissance study for the proposed bottling and sale of reservation spring water. The study included a descriptive analysis of the national and regional bottled water industry; analysis of market structures, competition, and demand for bottled water; and production and marketing plans, as well as estimated revenues, costs, and profits of the enterprise.

## **Water Management Plan for a Solar Photovoltaic Project – Choluteca, Honduras**

In partial fulfillment of lender environmental and social impact analysis performance standards, Dr. Greene worked to develop a water management plan for a solar project in southern Honduras. The project involved an assessment and review of alternative cleaning methods, including the use of dry brush cleaning; and an assessment of the water required for operations and its effects on competing uses. The plan developed recommendations for coordinating a sustainable water use with other developers, agricultural and livestock producers, and other relevant nearby users.

## **Fisheries/Marine Economics**

### **Social and Economic Impacts of Sailfin Armored Catfish in Florida, Commission for Economic Cooperation – Ontario, Canada**

Dr. Greene interviewed a wide variety of agency staff members, local fishermen, and fisheries experts to determine the economic impacts of the invasive suckermouth armored catfish in Florida. Two case studies focused on (a) impacts to Lake Okeechobee, and (b) impacts to the Tilapia fishery in Lake and Polk counties. Benefits were also discussed, in terms of the beneficial aquaculture industry associated with production of plecos, or armored catfish, for sale in the ornamental fish trade, and the collection of egg masses from the wild stocks. Negative impacts included potential losses in the bait industry in Lake Okeechobee and lost profits to Tilapia fishermen in central Florida.

### **Socioeconomic Impact Analysis of State Aquatic Lands Habitat Conservation Plan, Department of Natural Resources – Washington**

Dr. Greene contributed analyses of the socioeconomic impacts associated with Washington State's Aquatic Lands Habitat Conservation Plan. The analysis was conducted as part of the environmental impact statement to be released later. Impacts to shellfish growers, coastal businesses, recreation, and houseboat owners, among others, were evaluated.

### **Market Analysis of Alaska Groundfish Fisheries, North Pacific Fishery Management Council and National Marine Fisheries Service – Alaska**

Dr. Greene conducted research and analysis of the market structure and conditions for Alaska pollock, Pacific cod, and Atka mackerel. She developed preliminary econometric models of the supply and demand for Alaska pollock products. She analyzed the impacts of protective measures for the endangered Steller sea lion on the markets for products of the three fish species. The report was included in a supplemental environmental impact statement.

### **Regulatory Impact Review Related to Salmon Species, National Marine Fisheries Service – Portland, Oregon**

Dr. Greene worked on the economic assessments of proposed Endangered Species Act 4(d) rulings as they related to 15 to 20 salmon species in California, Idaho, Oregon, and Washington. The individual analyses followed RegFlex guidelines for determining whether a regulation has a significant impact on a substantial number of small businesses in an affected area. Impacts were measured using IMPLAN data for estimates of production costs for representative small firms in a series of potentially affected economic sectors.

### **Review of Draft Environmental Impact Statement for Special Use Permit, Drakes Bay Oyster Company – Inverness, California**

Dr. Greene was the lead editor and lead economist for comments and a review of the DEIS developed by the National Park Service. Her team found consistent omissions and errors that exaggerated potential negative impacts and understated the potential positive impacts and benefits of removing the oyster-processing facility. National Environmental Policy Act protocol requires the author to apply a net impact analysis—an assessment of both positive and negative impacts. Without this net approach, results could point toward a “least negative” alternative that might in fact be worse for the environment than other options. A National Academy of Sciences panel convened subsequent to the team's review fundamentally agreed with its conclusions. Subsequent

testimony was developed by each expert, including experts in fisheries and ecology, cultural resources, socioeconomics, flooding, and environmental justice. Dr. Greene coordinated and compiled all testimony.

## **Fish-Consumption and Recreation Survey, Upper Columbia River Remedial Investigation/Feasibility Study and Human Health Risk Assessment, Teck Cominco – Spokane, Washington**

Dr. Greene worked with the U.S. Environmental Protection Agency and the National Park Service in the RI/FS process of assessing risk to human health. She oversaw and reviewed the Upper Columbia River recreation and fish-consumption surveys. She reviewed and developed the data quality objectives, survey sample design, survey instrument, enumeration, and data analysis steps of the process.

## **Evaluation of the Economic Impact of Designating Critical Habitat for the Cook Inlet Beluga Whale, National Marine Fisheries Service – Anchorage, Alaska**

Dr. Greene evaluated the economic impacts of designating critical habitat for the Cook Inlet beluga whale. She analyzed the potential benefits of critical habitat designation and the designation's potential impacts to subsistence and commercial fishing. The work was part of the Regulatory Impact Review Section 4(b)(2) Analysis/Initial Regulatory Flexibility Act Analysis for the designation.

## **Environmental Impact Assessment of Eradication of Northern Pike, U.S. Forest Service – Lake Davis, California**

Dr. Greene conducted the environmental justice analysis associated with the eradication of the northern pike from Lake Davis. Potential impacts included temporary losses of income and jobs in a small rural area. U.S. Census data were analyzed, using Geographic Information Systems software, to identify low-income and minority groups that might be differentially affected by the project. The study satisfied federal guidelines for social, economic, and environmental justice impact assessment.

## **Analysis of Utah Lake Carp Disposal Options, Utah Department of Natural Resources, Utah Lake Commission, and June Sucker Recovery Implementation Program – Utah**

Dr. Greene led an analysis of options for removing and disposing of common carp from Utah Lake. The study was part of the joint efforts of the Utah Lake Commission and the JSRIP to coordinate the removal of carp from the lake. The study looked at financial and ecological feasibilities of two options: removal and disposal of carp at local landfill(s)/composting facility(ies) and removal and conversion of carp into marketable fish meal through the development of a fish meal processing plant at the lake. The team conducted a traditional financial feasibility analysis of the two options. This was followed by a deeper analysis of the ecosystem service values associated with each option and development of a more complete assessment of benefits and costs by incorporating environmental gains and losses into the economic decision making.

## **Demographics/Socioeconomics/Environmental Justice**

### **Population Projections for Red River Valley Counties and Municipalities, 2000 through 2050, Bureau of Reclamation, Dakotas Area Office – North Dakota**

Dr. Greene developed 50-year population projections for each of 20 counties and 40 municipalities in the Red River Valley of North Dakota and Minnesota. She led the effort, developing assumptions about births, deaths, and net in- and out-migration for the region, based on data from the U.S. Census Bureau, the National Center for Health Statistics, and other state and local data sources.

### **Social and Economic Assessment Report, Confederated Tribes of the Grand Ronde – Oregon**

Dr. Greene conducted a social and economic assessment of several communities in which the CTGR operate. She developed, administered, and analyzed results of a 14-page mail survey of over 1,300 Tribal members living in the immediate Grand Ronde area and throughout the nation, as well as non-Tribal members living in the local community. Survey topics included housing, health care, education, natural resources, governance, public safety, economic development, and cultural resources. The survey questions were developed based on

interviews with dozens of Tribal staff members. Dr. Greene also held a series of workshops with representatives from the Tribe to set up and use a shared information network to house the most recent community data and reports.

## **Survey of Tribal Housing and Income in the Pacific Northwest, Nisqually Tribe – Pierce County, Washington**

The Alesek Institute conducted a survey of Native Americans in Washington State during 2004 and 2005. Dr. Greene analyzed the results of the survey, including the different types of household structures found among Native Americans. For example, multigenerational households with children, parents, siblings, and grandparents represented one household structure, while several unrelated adults living together represented another, and households with single parents and young children still another. The analysis compared how household incomes varied by household structure, and also how Indians from Washington State tribes compared with other Indians living in the region.

## **Demographic Profile of the Soboba Indian Reservation, Soboba Band of Luiseno Indians – California**

Dr. Greene developed a demographic profile of the reservation, including a detailed analysis of migration to and from the reservation between 1990 and 2000. This information was integrated into projections of the Indian population of the reservation to the year 2050. The population forecast was used to derive future housing needs for the reservation.

## **Population Projections for Portland and Six Parks and Recreation Subareas, 2000 through 2020, Portland Parks and Recreation – Portland, Oregon**

Dr. Greene developed population projections to the year 2020 for six subareas of Portland in order to facilitate parks and recreation planning. Projections considered changes to total population, as well as differentiation by age, race, and ethnicity. Both a summary report, oriented to a general audience, and a technical report, describing the methodology, were prepared and submitted to the city.

## **Socioeconomic Impacts on Port Angeles 8th Street Bridge Replacement, Exeltech Consulting - Port Angeles, Washington**

Using U.S. Census block-level data in coordination with Geographic Information Systems software, Dr. Greene evaluated the differential social impacts of a project to replace a bridge in Port Angeles, Washington. Impacts included potential increased traffic once the new bridge was in place, and noise, dust, and traffic interruptions during construction. To analyze environmental justice concerns, Census block data were used to evaluate impacts by race, ethnicity, and household income. The study complied with U.S. Department of Transportation guidelines for social, economic, and environmental justice impact assessment for transportation projects.

## **Preliminary Impact Report for North of Delta Off-site Storage Project, U.S. Bureau of Reclamation and California Department of Water Resources – Sacramento Valley, California**

Working in conjunction with the U.S. Bureau of Reclamation and the California DWR, Dr. Greene analyzed U.S. Census data, using Geographic Information Systems software, to conduct the environmental justice analysis for the NODOS project, which consisted of a water reservoir and associated pipelines. The analysis identified low-income and minority groups that might be differentially affected by the project in Colusa, Tehama, Glenn, Yolo, and Shasta counties.

## **Sustainable Agriculture**

### **Opportunities for and Threats to Soybean Growers Related to Sustainability Requirements, GEEC Law, United Soybean Board – Clayton, Missouri**

Dr. Greene conducted an overview of key economic considerations related to contractual and regulatory sustainability requirements in agriculture and the potential opportunities for and threats to agricultural producers that may come with these developments. The resulting memorandum focused on impacts to soybean

growers, but other agricultural industries were also included. Links in the value chain to other agricultural producers mean that similar sustainability pressures on other agricultural markets (both opportunities and threats) may affect the soybean industry through shifts in demand for soybeans and soybean products. The information collected followed along the themes of the policy environment; market responses to policies as well as to the changing consumer preferences in the marketplace; and the potential for the carbon offset market to change agricultural cost and revenue streams.

## **Ganado Family Farm Agricultural Marketing Study, Western States Sustainable Agricultural Research and Education (WSARE) Farmer and Rancher Grant Program - Ganado, Arizona**

Dr. Greene provided technical support to Ganado Family Farms in designing, administering, and analyzing a survey of residents of the Navajo Reservation about preferences for traditional foods. As a result of this WSARE grant, systems were developed, and information disseminated to small farmers about how to pursue the processing and marketing of traditional Navajo corn products such as neeshjizhi and kneel down bread. Dr. Greene oversaw the surveying of the Navajo population and others to estimate market demand. This estimate was used to measure the size of the production effort that may be supported by the market. Also, the Ganado Farm Board was considering applying for funding in the near future for a local community kitchen including commercial facilities that could be shared by food processors (vendors). Under this grant, a workshop was held to discuss the development of a community kitchen in Ganado.

## **Evaluation of Economic Feasibility of Miscanthus Production as a Biomass Energy Feedstock, Aloterra Energy, LLC – Ohio**

Dr. Greene evaluated the economic and environmental feasibility of biomass production and conversion for the U.S. Department of Agriculture Biomass Crop Assistance Program. The analysis included an economic feasibility determination, including an assessment of location, labor, and infrastructure; a financial feasibility determination based on financial projections and assumptions and cash flows; a sensitivity analysis based on feedstock and energy prices; and an analysis stating that feedstock is the highest and best use of the land and product. Regional economic impacts were also estimated as part of the application.

## **White Paper on Coexistence of Genetically Engineered (GE) Agricultural Products and Traditional and Organic Products, Confidential Client - Missouri**

Dr. Greene is conducting an evaluation to identify and detail the various potential economic impacts associated with coexistence of GE and traditional crops. These potential impacts include the economic effect of segregation programs and the impact on organic production under full deregulation of GE crops. The paper also addresses the best stewardship crops and provides sufficient detail to support a National Environmental Policy Act assessment.

## **Evaluation of Economic Feasibility of Camelina Production for Jet Fuel Biomass Feedstock, Altair, LLC - Seattle, Washington**

Dr. Greene evaluated the economic and environmental feasibility of camelina production in the western U.S. for purposes of jet fuel feedstock. The proposed project was submitted to the U.S. Department of Agriculture's Biomass Crop Assistance Program. The analysis included an economic feasibility determination, including an assessment of location, labor, and infrastructure; a financial feasibility determination based on financial projections and assumptions and cash flows; a sensitivity analysis based on feedstock and energy prices; and an analysis stating that feedstock is the highest and best use of the land and product.

## **Ecosystem Services Analysis for Pesticide Reregistration, Dow Chemical – London, England**

Dr. Greene is currently working with Dow Chemical to explore the ecosystem service levels associated with a potential reregistration of the chemical chlorpyrifos, or dursban. The pesticide is used in Spain to control red scale in citrus production. Spain is the largest citrus exporter in the world, and the economic analysis explores the economic impacts in terms of jobs, regional impacts, and aesthetic value under a scenario in which chlorpyrifos is banned. The environmental effects considered in the assessment include impacts on water,

greenhouse-gas levels, and habitat for over 25 species. Preliminary results suggest that, although environmental impacts may be minimal, economic impacts would be considerable.

## **Transitions in the Mexican Sugar Industry, the Wedgeworth Foundation – Florida**

As the first Wedgeworth Fellow, Dr. Greene conducted research on the sugar industry in Mexico. She interviewed government agencies, nongovernmental organizations, firms, finance institutions, industrial representatives, mill managers, mill owners, workers, and growers in Veracruz, Mexico, for dissertation research. She analyzed industry productivity enhancement using time-series and cross-sectional data, and developed a theoretical trade model for the North American sweetener market.

## **Global Resource Availability Scan, Driscoll's Berries – Wilsonville, California**

Dr. Greene led a team conducting an environmental scan for Driscoll's Berries, evaluating the risks associated with global access to fuel, water, land, and labor over the next 15 to 20 years. The team reviewed global forecasts for availability of these resources and analyzed how changing access might influence decisions to invest in areas throughout the world. Climate change impacts to agricultural production were analyzed in a Geographic Information Systems environment and overlaid with land, labor, and fuel availability.

## **Natural Resource Damage Assessments and Other Litigation**

### **Economic Value of Tropical Rainforest Land in Latin America, Confidential Oil and Gas Client – Ecuador**

Dr. Greene led a team providing litigation support to a confidential client on potential damage to tropical rainforest land in Latin America. The project involved literature reviews on the total economic value of the land, including direct use values, indirect or ecological use values, and passive or nonuse values.

### **Human Use Impacts Resulting from Petroleum Corporation Oil Spill, CITGO – Louisiana**

Dr. Greene assessed the human use impacts resulting from a CITGO oil spill in the Calcasieu River Estuary in Louisiana. A series of site visits and helicopter overflights was conducted to investigate the recreational sites and types of activities potentially affected by the spill and the level of recreational activity in the spill impact zone. Dr. Greene designed and implemented a recreational use survey and analyzed survey data and other information to estimate the economic value of lost and diminished recreational use.

### **Settlement Support, Tribal Natural Resource Damage Case, Arcadis Consulting – New York**

Dr. Greene provided background information about different approaches to valuing the cultural component of natural resource damages in a case between an Indian tribe and a confidential client of Arcadis Consulting. Relevant previous settlements were reviewed and a strategy for negotiations was developed.

### **Traditional Ecological Knowledge Study, First Nation and Ministry of Transportation, Ontario, Canada**

Dr. Greene worked with a First Nation and the Ministry of Transportation of Ontario to provide estimates of damages to lands occupied by the highway traversing reserve lands. Estimates for foregone market losses such as timber stumpage fees, as well as non-market value estimates for subsistence and traditional and community values, are being developed.

### **Settlement Support for Soboba Tunnel Damages Natural Resource Damages Case, Soboba Band of Luiseno Indians – Hemet, California**

Dr. Greene supported Luebben, Johnson, and Barnhouse in estimating the value of foregone water to the Soboba Tribe over a period of 70 years. The foregone water resulted from damages related to the leakage into a tunnel built by the federal government. Damages were estimated for a variety of different legal strategies. The settlement involved three water districts and federal, local, and state entities.

## **Damages Related to Mining Lease Dispute, Wilson Elser Moskowitz Edelman & Dicker – Dallas, Texas**

Dr. Greene provided expert testimony in deposition regarding alleged damages related to a mineral lease and water permitting procedures. The case was heard in the District Court of Tulsa County, State of Oklahoma.

## **Assistance with Development of Baseline Information System Related to Gulf Oil Spill, Arnold and Porter – Washington DC**

Dr. Greene assisted in developing a Web-based information management system that compiles, evaluates, and facilitates access to publicly available data, reports, articles, and geospatial information related to baseline ecological and human-use services provided within a large water body.

## **Recreation Economics**

### **Expert Testimony on Economic Value of Hunting and Fishing in Missouri**

Dr. Greene provided expert testimony in court and in deposition for a case involving a ban on imports and exports of deer in the state of Missouri. Testimony covered the economic stimulus provided by, and the economic value of, deer hunting, and was based on a study completed for the Missouri Department of Conservation by Ramboll Environ on the economic value of hunting and fishing in Missouri.

### **Recreational Benefits of Proposed Water-Storage Facility, Fort Apache Indian Reservation - Arizona**

Dr. Greene estimated the economic benefits of a proposed water-storage facility on future tourism visitation and related tourist expenditures to the Fort Apache Indian Reservation. Benefits were measured in terms of increased value of improved fish habitat, increased value of recreation for Tribal members and tourists, benefits to the Tribal fish hatchery program. The study also included a discussion of cultural values. A regional economic impact analysis was also completed, quantifying profits to local and Tribal businesses and income and employment increases. Visitors from within Arizona and from other states were estimated separately. The results of this analysis were used in negotiations related to Salt River Project basin-wide water rights adjudications and Gila River basin adjudications.

### **Planning Strategies for Revenue Enhancement on the Valles Caldera National Preserve, Valles Caldera Trust - New Mexico**

Dr. Greene managed a project which developed a business plan for the Valles Caldera National Preserve in New Mexico. A variety of recreational ventures were analyzed, including mid-level lodge with restaurant; high-end lodge; campground; cabin rentals; visitor center with gift shop and café; green burial cemetery; and expansion of the recreational program and visitor tours. Dr. Greene developed an interactive financial model to be used for planning purposes. The interactive model allows board members and preserve staff to adjust model assumptions to view their impact on future cost and return projections.

### **Economic Benefits of Improved Instream Flow in the Upper Yakima Basin, Bureau of Reclamation - Yakima, Washington**

Dr. Greene conducted an evaluation of the recreational benefits associated with the acquisition of water rights to enhance stream flows in the Taneum Creek basin. The study included a direct survey of recreational anglers to determine their willingness to pay for increased stream flows to benefit fish. Recreation participation rates and demand, as well as the benefits of various levels of improved fishing quality, were estimated using a random utility model. Regional economic impacts were also developed to describe the impact from recreational anglers' expenditures on the economies of the Yakima Basin.

## **Social and Economic Impact Analysis for the Timber Mountain/John's Peak Off-Highway Vehicle Management Plan and Environmental Impact Statement, Bureau of Land Management - Medford, Oregon**

Dr. Greene drafted an EIS that evaluated management alternatives for an OHV recreation area. Her work focused on the social and economic impacts of the management alternatives, including issues concerning property values, noise, and law enforcement near the recreation area. Future demand for OHV recreation in the management area was also estimated.

## **Recreational Needs Assessment, Enloe Dam Hydroelectric License Application Process - Okanogan County, Washington**

Dr. Greene conducted a recreational needs assessment for the Enloe Dam relicensing process. The work involved projecting recreational needs for the next 30 years and evaluating the capacity of the project to mitigate recreational demand. Trends in recreational participation, based on national, state, and county research, were developed for the County. Local stakeholders were interviewed to validate the results.

## **Climate Change/Uncertainty/Decision Making with Ecosystem Services**

### **Economic Analysis of Nature-Based Adaptation to Climate Change, Nonprofit Organization – Ventura County, California**

Dr. Greene worked with Coastal Resilience Ventura to evaluate alternative climate change adaptation strategies. The goal of the project was to analyze all economic costs and benefits of nature-based and engineering-based adaptation alternatives for Ventura County. The approach used changes in the ecosystem service levels for both alternatives, including habitat, recreation, and erosion prevention. The built environment was evaluated for flood and hazard damages, including damages to public infrastructure. The team is working closely with stakeholders representing city governments, state agencies, emergency managers, and the U.S. Navy. .

### **Analytic Techniques for Incorporating Economics into Coastal Climate Change Adaptation, The Nature Conservancy - Nationwide**

The Nature Conservancy asked Dr. Greene to analyze economic tools that had been developed to assist in adaptation planning for sea level rise. As no single economic tool addresses all of the economic impacts of sea level rise, it is necessary to understand the capabilities and limitations of all [a number of? a range of?] available tools. Dr. Greene analyzed the economic metrics, technical expertise required, analytical flexibility, scale of analysis, software requirements, and budget considerations for multiple tools addressing flood damages, regional economic impacts, ecosystem services, and social and community impacts. .

### **Prairie Credit Pricing Assessment Methodology, Prairie Habitat Assessment Methodology – Thurston County, Washington**

Dr. Greene provided a peer review of a proposed cost method for providing mitigation credits for Thurston County via an in-lieu fee program. Permittees causing unavoidable impacts to prairies will pay the proposed in-lieu fees to a central fund that is used to purchase prairie credits. That fund will be administered by a nongovernmental entity (e.g., county, Washington Department of Fish and Wildlife). Such in-lieu fee programs are most effective where there are clear priorities for mitigation siting, as well as a central administration of mitigation funds that is guided by a conservation strategy. Weaknesses in in-lieu programs were identified to evaluate the range of costs associated with acquiring, restoring, and maintaining the county's prairie habitat credit in perpetuity.

### **Floodplain Ecosystem Services Valuation for Carson River Valley, Carson River Water Subconservancy District – Carson, Nevada**

Dr. Greene estimated the value of floodplain ecosystem services provided by farmlands that flood in winter. Facing population and development pressures, the water management district was interested in exploring appropriate monetary values to pay farmers for ecosystem services provided by the undeveloped land. Based on actual flood flow data, a model was designed to simulate, first, the actual event, and then the same event,

but with a developed floodplain. Results demonstrated changes in peak flow speed, volume, and warning time under the two scenarios. .

## **Preliminary Feasibility and Net Environmental Benefit Analysis of Kishon River, Confidential Client – Haifa, Israel**

Dr. Greene completed an analysis of the net environmental benefits associated with alternative remediation of contaminated river sediments. The analysis quantified habitat benefits, recreation, and risks associated with dredging and disposal options.

## **Economic Considerations for Land Preservation as a Strategy for Watershed Protection in the Cahaba River Basin, EDAW – Atlanta, Georgia**

Dr. Greene prepared a report which provided an overview of the economic benefits and costs of preserving and conserving land in the rapidly developing Cahaba Watershed and included an evaluation of different preservation mechanisms. A summary of the strengths and weaknesses of preservation mechanisms included a review of land leases, donations, transferable development rights, product contracts, conservation easements, and fee purchases. Benefits of watershed protection that were evaluated included values for protecting water quality and water supply; enhancing recreation; preserving habitat; reducing erosion; and enhancing property values and tax revenues. Costs included payments for land purchase, management, and enforcement; foregone tax revenues; and the opportunity cost of development.

## **Economics of Recycling and Reuse**

### **Recycling Economic Impact Assessment – State of Colorado**

While employed by Ramboll ENVIRON, Dr. Greene oversaw a project that identified the economic impacts of waste diversion on Colorado. The project included data collection through directed research, interviews, and surveys, as well as the economic impact assessment using IMPLAN, an input-output software. The direct, indirect, and induced economic impacts resulting from the recycling, composting, remanufacturing, and reuse industries were reported in terms of the number of jobs created (broken down by geographic area, industry sector; and material type), the overall economic stimulus, and the effects on local and state taxes. In addition, Ramboll ENVIRON developed recommendations, based on increased diversion, about the potential for job creation and increased revenues.

### **Examining the Feasibility of Increasing Compost Use on Food Crops, Portland Metro – Oregon**

Dr. Greene, while at Ramboll ENVIRON, conducted a study of the potential for increasing compost use on food crops in the Portland Metro area. The analysis considered ways to increase compost use among food growers by identifying barriers to market penetration, education, and knowledge, and pinpointing specific requirements in nutrient value and quality that might not have been met at the time.

### **Analysis of Utah Lake Carp Disposal Options - State of Utah**

Dr. Greene led an analysis of options for removing and disposing of common carp from Utah Lake. The study looked at financial and ecological feasibilities of two options: removal and disposal of carp at local landfill(s)/composting facility(ies) and removal and conversion of carp into marketable fish meal through the development of a fish meal processing plant at the lake.

### **Regulatory Analysis of Used-Oil Processing and Re-refining in California, Industry - California**

Dr. Greene, while at Ramboll ENVIRON, analyzed the used-oil markets in California and the impact California Senate Bill 546 (SB 546) would have on the market structure. The study assessed which elements of SB 546 would be most likely to improve waste diversion, collection, and ultimate end use of used oil. In addition, the study examined the environmental impact of used oil and the role that re-refining plays in reducing that impact on air quality and energy consumption.

## **Availability of Paper with Recycled Content for Magazine Use, National Geographic Society**

The Ramboll ENVIRON team, led by Dr. Greene, analyzed the potential for use of high-quality recycled paper in magazine printing, including the current and projected worldwide supply and demand for high-grade recycled paper, and identified supply constraints for the paper.

## **Recycling Feasibility Assessment, Municipality – City of Vancouver, Washington**

Dr. Greene developed and facilitated focus groups with citizens to determine strengths and weaknesses of the existing curbside recycling system and propose a pilot program. Dr. Greene then designed a telephone survey and analyzed the results to evaluate the effectiveness of the pilot program and design the final curbside recycling program.

## **Public Involvement/Facilitation/Program Review**

### **North Santiam Watershed Protection Network Summit – City of Salem, Oregon**

Dr. Greene facilitated two emergency-planning workshops and analyzed survey data pertaining to emergency planning for the North Santiam watershed. The summit involved federal, state, and local stakeholders who collaborated in planning for the event of an emergency such as a toxic spill in the watershed.

### **Forest Legacy Program (FLP): Performance Assessment, U.S. Department of Agriculture Forest Service, State and Private Forestry, Cooperative Forestry - Washington DC**

Dr. Greene evaluated the effectiveness of the Forest Legacy Program managed by the U.S. Forest Service for the purpose of protecting environmentally important forest areas threatened by conversion to non-forest uses. Lands and easements for the program are obtained through donations or purchases from willing sellers. Dr. Greene reviewed implementation of the FLP and assessed its effectiveness. She evaluated management activities and recommended specific improvements.

### **Women Working Together for Personal, Economic, and Community Development – Kalahari Desert**

Dr. Greene developed, facilitated, and conducted four two-week-long workshops with Remote Area Dweller women in the Kalahari Desert facing resettlement. The workshops focused on small-business development, including accounting, marketing, and doing feasibility studies, as well as issues related to fuelwood and other natural resources, nutrition, community health, and women's rights.

### **Ethnographic Overview of Three National Forests and the Santa Rosa and San Jacinto Mountains National Monument in Southern California, U.S. Department of Agriculture Forest Service – Southern California**

Dr. Greene provided an ethnographic overview of the San Bernardino, Los Padres, and Angeles national forests, and the Santa Rosa and San Jacinto Mountains National Monument in southern California. She prepared reports for each of the forests and the monument, including descriptions of past inhabitants and their use of forest resources; current Native American descendants of these past inhabitants, including present legal status; contemporary uses of forests and places of importance; and issues and concerns. Dr. Greene conducted interviews with representatives from over 25 Indian tribes in California to collect information on the values placed on traditional forest cultural resources and detailed information on current uses of the forests. The reports are being used to update forestland management plans, as well as to protect culturally sensitive areas.

### **Trainer, International Training and Development, University of Florida – Gainesville, Florida**

Dr. Greene developed and delivered training sessions and workshops in community-based agriculture and natural resource management. Topics included Participatory Rural Appraisal, stakeholder analysis, community-based resource management, training of trainers, gender analysis, and techniques in nonmarket valuation.

### **Assessment of Small Farms Programming, Washington State University – Pullman, Washington**

Dr. Greene provided support to WSU in the assessment of its Small Farms Program. The work involved quickly gathering the necessary information through telephone interviews with core SFP staff and conducting surveys

of other people who have worked or were working with the SFP (approximately 300), using Survey Monkey, an online survey tool. Survey questions were developed in consultation with the Small Farms Team. The report provided recommendations for strengthening the program.

## Health Economics

### **Economic Analysis of Modified-Risk Tobacco Products, Tobacco Industry – Nationwide**

Dr. Greene created an estimate of the benefits in terms of health care cost savings that would be attained by the adoption of reduced-harm tobacco products by smokers who would otherwise continue to smoke. The estimation process involves processing data from numerous public health sources to estimate health care cost savings by state for Medicaid recipients.

### **Health Risk Perception Expert, Hughes Hubbard and Reed Law Firm – New York**

Dr. Greene worked for a legal firm studying the history of health risk perception as it relates to tobacco use in the U.S. through the 20th century and to the present day. The work involved becoming familiar with the history of public information on health impacts of smoking, and evaluating the extent to which information on health risks translates to changes in behavior.

### **Analysis of Employer-Based Health Benefit Costs, Mercer Benefit Consultants – New York City, New York**

Dr. Greene has developed an econometric analysis of employer-based health care costs and analyzed annual survey data on health benefit costs for the past 18 years. The data are based on a stratified random sample of over 3,000 employers throughout the U.S. that have completed a survey on health care costs. Dr. Greene analyzes which features of firm-based health benefit programs increase costs and which decrease costs, all other things being equal. One recent effort has examined whether health and wellness programs have an effect on costs. Results are incorporated into a user-friendly interface that allows firms to compare their own health care program costs with those based on the survey results.

### **Primary Care Service Area Database Technical Notes, Oregon Health Sciences University, Office of Rural Health – Portland, Oregon**

The purpose of this work was to develop a Microsoft® Access® database of socioeconomic, demographic, and health care statistics at the zip code level for all rural primary care services areas in Oregon. The database structure was designed to be updated annually by OHSU staff. Dr. Greene provided complete documentation for the database, as well as user-friendly instructions for developing basic research queries and reports from the database.

## Published Papers and Presentations

Remediation and water resource protection under changing climatic conditions. With D. Rowe, S. Warner, and K. Gimre. *Environmental Technology & Innovation* 8:291-298, 2017.

Panel Discussion: Integrated Planning for Coastal Restoration: A Net Ecosystem Services Approach. CNREP 2016, New Orleans, Louisiana, March 22, 2016.

Office of Surface Mining's Stream Protection Rule, Keeping Coal in the Ground. American Coal Council Spring Coal Forum, Clearwater Beach, Florida, March 9, 2016.

Making Decisions about Climate Change Adaptation. San Diego Climate Action Plan Panel Discussion. Lambda Alpha International, San Diego, California, January 5, 2016.

Economic Analysis of Climate Change Adaptation in Ventura County, CA. With G. Reub, F. Kristanovich, R. Battalio, D. Revell, S. Newkirk, L. Verdone, and E. Vandebroek. CERF Annual Meeting, Coastal Inundation and Its Impacts in a Changing Climate, Session SCI 188B, Portland, Oregon, November 12, 2015.

Climate Change and Water Management: Fear of Uncertainty. Session 3: Economic Considerations. 2015 AWRA Washington State Conference—Water Management Strategies in the Face of Climate Change, Seattle, Washington, October 22, 2015.

Net Ecosystem Services Analysis as a Floodplain Restoration and Management Tool. With G. Reub and S. Mathies. Fish Passage 2015, Groningen, The Netherlands, June 22–24, 2015.

Economic Analysis of Nature Based Adaptation to Climate Change, a Dashboard Approach. AWRA 2015 Summer Specialty Conference, Climate Change Adaptation, New Orleans, Louisiana, June 15, 2015.

Considering the Influence of Climatic Uncertainty in Designing Measures to Protect and Restore Critical Water Resources. With S. D. Warner and D. Rowe. Aquaconsoil, Copenhagen, Denmark, June 9–12, 2015.

Absentee Participant Stories: Al Josephy and Peter Brand, How's That Working? Ecosystem Services from the Perspective of State Regulators. ACES Conference, Washington DC, December 10, 2014.

Mitigating the Risks: How Ports Can Proactively Address Climate Change Vulnerabilities in Planning Processes. Session 1, Track E: Climate Change Impacts and Adaptation. With D. Daugherty, G. Reub, and D. Moore. PIANC World Congress, San Francisco, California, June 2, 2014.

Economic Approaches to Using Ecosystem Services in Floodplain Management Decisions. With S. Burr. American Water Resources Association Annual Meeting, Portland, Oregon, November 7, 2013.

Measuring the Social and Economic Outputs from Ecosystem Services Provided by Shellfish Used in Restoration and Aquaculture. With G. Reub, J. Fisher, and W. Dewey. EcoSummit 2012, Columbus, Ohio, October 4, 2012.

An Ecosystem Services Framework in Practice: An Assessment of Fruit Production in Southern Europe. With G. Reub, S. Deacon, J. Nicolette, and S. Norman. 6th SETAC World Congress/SETAC Europe 22nd Annual Meeting, Berlin, Germany, May 20–24, 2012.

Optimal Ecosystem Services Provided through Shellfish Aquaculture: The Role of Property Rights. With J. Fisher, G. Reub, and W. Dewey. Coastal and Estuarine Research Federation 21st Biennial Conference, Societies, Estuaries, and Coasts: Adapting to Change, Daytona Beach, Florida, November 6–10, 2011.

Cultural Differences in Economic Values for Ecosystem Service Restoration. Society for Ecological Restoration 4th World Conference, Merida, Mexico, August 21–25, 2011.

Overview of Social and Economic Service Quantification, Evolution and Valuation of Ecosystem Services Workshop. ACES Conference, Phoenix, Arizona, December 6, 2010.

Understanding and Evaluating Watershed Assets as Part of a Water Stewardship Program. American Business Conferences Sustainable Agricultural Partnerships 2010, San Francisco, California, August 10, 2010.

Conservation Tools: An Evaluation and Comparison of Certain Land Preservation Mechanisms. With D. Greene, T. C. Richmond, and T. Greenwalt. Washington State Office of Recreation and Conservation, Dec. 23, 2009, available at: <http://www.rco.wa.gov/documents/rco/ConservationTools.pdf>

Socioeconomic Conditions in an Oil-Producing Region of Ecuador. With B. Wyse, S. Onisko, and S. Jenniges. 2009 ESRI International User Conference Map Gallery Exhibition, San Diego, California, July 2009.

Chapter 4 – Social and Economic Impacts of the Loricariid Catfish in Florida. With D. Lee. Trinational Risk Assessment Guidelines for Aquatic Alien Invasive Species, Commission for Environmental Cooperation, 2009.

Nonmarket Valuation on a Budget: Comparing Approaches. With B. Wyse and H. Seely. Western Economic Association International, 81st Annual Conference, San Diego, California, June 29–July 3, 2006.

The Importance of Detailed Small Area Population Projections in Local Planning Efforts. With J. Sawyer and S. Christensen. Pacific Northwest Regional Economic Conference, Tacoma, Washington, May 18-20, 2004.

Estimating AIAN Migration on Indian Reservations in the Western United States. With J. Sawyer. Population Association of America Annual Meeting, Boston, Massachusetts, April 1-3, 2004.

Projecting Indian Populations for the Purpose of Determining Water Requirements: Methodological Issues. With M. Taylor and J. Sawyer. Population Association of America Annual Meeting, Minneapolis, Minnesota, May 1-3, 2003.

Transitions in the Mexican Sugar Industry: An Analysis of the Production and Marketing Systems. G. Chavez, L. Ramiro, T. Spreen, D. Sano, and C. O. Andrew, Florida Science Source, 2004.

Employer Health Care Costs and Female Participation in the Workforce: What are the Relationships, and Are They Changing? With B. Umland. Western Economic Association Annual Meetings, Vancouver, British Columbia, Canada, June 30-July 2, 2000.

Economic Impacts of Endangered Species Listings: Better Measurement versus Better Regulation. With A. Fox. American Water Resources Association Annual Water Resources Conference, Seattle, Washington, December 5-9, 1999.

Structural Reform and Implications for Mexico's Sweetener Market. With G. Chavez, L. Ramiro, and T. Spreen. Sweetener Markets in the 21st Century, Miami, Florida, November 14-16, 1999.

The Role of Mexican Sugar Production in the North American Sweetener Market. With C. B. Moss and T. H. Spreen. Southern Agricultural Economics Association Annual Meetings, Memphis Tennessee, February 1999 (Abstract: Journal of Agricultural and Applied Economics, 31:2(1999):396).

Price-Sensitivity of Mexican Sugar Supply. With C. B. Moss and T. H. Spreen. Southern Agricultural Economics Association Annual Meetings, Little Rock, Arkansas, February 1998 (Abstract: Journal of Agricultural and Applied Economics, 30:1(1998):229).

La Sensibilidad a los Precios del Abastacimiento de Azucar. Seminar on the Sugar Agroindustry, University of Florida, Universidad Veracruzana and CYTCANA, Cordoba, Veracruz, Mexico, October 1997.

The Demand for Recreational Fishing in Tampa Bay, Florida: A Random Utility Approach. With C. B. Moss and T. H. Spreen. American Agricultural Economics Association Annual Meetings, San Antonio, Texas, July 1996 (Abstract: American Journal of Agricultural Economics, 78:5(1996):1414).

Estimation of Recreation Anglers' Value of Reef Fish in the Gulf of Mexico. With C. B. Moss and E. Thunberg. Southern Agricultural Economics Association Annual Meetings, North Carolina, February 1996 (Abstract: Journal of Agricultural and Applied Economics, 28:1(1996):216).

Transitions in the Mexican Sugar Industry. Ph.D. dissertation, University of Florida, Food and Resource Economics, August 1998.

The Demand for Recreational Fishing in Tampa Bay, Florida: A Random Utility Approach. With C. B. Moss and T. H. Spreen. Marine Resource Economics, 12:293-305, 1997.

Graduate Education in Agricultural Economics: Bridge to the Future or Road to Nowhere? With C. Brewster. Free Session, American Agricultural Economics Association Annual Meetings, Toronto, Ontario, August 1997.

Angling in Tampa Bay: A Nested Random Utility Model of Non-Market Demand for Marine Recreational Fishing. Master's thesis, University of Florida, Food and Resource Economics, August 1995.