

Western Economics Forum

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Dear Fellow WAEA Members:

This is our third issue of the WEF. We want to thank you those of you that have submitted and reviewed articles for your hard work. We are meeting our goal of including authors from across the West, across disciplines and representing research, outreach and public perspectives. The first three issues of the WEF contain articles from authors from 10 states and Canada. We are also meeting our goal of publishing articles in our five target areas: Farm/ranch management and production, Marketing and agribusiness, Natural resources and the environment, Institutions and policy, and Regional and community development. In this issue, we expand our horizons to include articles from the Western Rural Development Center and the Animal Plant Health Inspection Service.

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Call For Submissions

Please read the following page about the WEF and consider whether you should submit your own work. We prefer it if you submit an abstract or outline first for initial feedback on its appropriateness for the audience, but feel free to submit a full paper if you wish.

The Western Economics Forum

A new peer-reviewed publication from the Western Agricultural Economics Association

Purpose

One of the consequences of regional associations nationalizing their journals is that professional agricultural economists in each region have lost one of their best forums for exchanging ideas unique to their area of the country. The purpose of this publication is to provide a forum for western issues.

Audience

The target audience is professional agricultural economists with a Masters degree, Ph.D. or equivalent understanding of the field that are working on agricultural and resource economic, business or policy issues in the West.

Subject

This publication is specifically targeted at informing professionals in the West about issues, methods, data, or other content addressing the following objectives:

- Summarize knowledge about issues of interest to Western professionals
- To convey ideas and analysis techniques to non-academic, professional economists working on agricultural or resource issues
- To demonstrate methods and applications that can be adapted across fields in economics (e.g. adapting conjoint analysis from marketing to environmental economics)
- To facilitate open debate on Western issues

Structure and Distribution

This will be a peer-reviewed publication. It will contain approximately 3 or 4 articles per issue, with approximately 2,000 words each (maximum 2,500), and as much diversity as possible across the following areas:

- Farm/ranch management and production
- Marketing and agribusiness
- Natural resources and the environment
- Institutions and policy
- Regional and community development

There will be two issues per year, which will be mailed out with the WAEA newsletter in the spring and fall.

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THE TRANSACTION COSTS TRADEOFFS OF PRIVATE AND PUBLIC WILDLIFE MANAGEMENT

Dominic P. Parker¹

Introduction

In the U.S., public agencies and some private landowners conduct wildlife management (Messmer et. al. 1998). Old and new challenges complicate their task. First, unfettered wildlife territories do not often coincide with land ownership. Fences that force wildlife to respect property boundaries are costly to erect and reduce how much humans value their existence. Second, recreational and environmental groups, less interested in specific game species, have emerged as important wildlife users. Fulfilling their demands is difficult because the users are dispersed and hard to identify and because the scale of managing a community of species is much larger (see Szaro et. al. 1998).

This article frames these challenges as transaction costs. It extends the analysis of Lueck (1989; 1991) who views the wildlife department as an institution that mitigates the transaction costs of managing transient wildlife. While Lueck focuses on the contracting costs facing landowners wishing to profit from fee-hunting, his hypothesis is relevant in the case of nongame management. Wildlife agencies, however, are not immune to the transaction costs of satisfying nongame demands, especially because bureaucratic incentives and constraints conducive to managing game are unlikely to be conducive for nongame management. This article describes variation in the organization of wildlife agencies and variation in landowner contracting costs and their effects on agency effort and emphasis on nongame management.

The Wildlife Management Problem

The economic problem of managing wildlife is one of meeting the demands of those willing to pay, while taking into account the costs of wildlife management effort, the value of alternative resource use, and damages related to abundant wildlife stocks.

Wildlife species are no longer valued primarily for the meat and fur their carcass provides. Today, recreational demand from hunters and nongame users dominates (USFWS 2001). Hunters are a small group of relatively high value users generally interested in big game species such as elk, deer, and antelope. Nongame users are a larger group of relatively low value users. They enjoy watching and photographing wildlife as a primary or complementary activity to a related outdoor experience. Nongame users may enjoy a single high profile species such as wolves or grizzly bears, or they may enjoy a community of low profile species such as songbirds and amphibians. A few indicators show that nongame demand is growing in prevalence. Participation in bird-watching and membership in groups such as Defenders of Wildlife and Audubon Society have grown tremendously since the mid 1980's, but the total number of individual hunting license holders peaked in 1982 (USFWS 2001; Richie 1999; Parker 2001).

Managers can maintain abundant, sustained populations of wildlife in order to fulfill user demands. To do so, they need to mitigate resource use that competes with wildlife such as shopping malls and certain types of agriculture. Managers may also need to conduct research, manipulate habitat, and establish and enforce poaching laws. Maintaining wildlife populations, then, generates opportunity costs and management effort costs. Wildlife populations also impose direct costs on other

¹ Research Associate, PERC: Bozeman, Montana (www.perc.org). This article is part of a larger research project, conducted with Dean Lueck, on the evolution of state wildlife management. I am grateful to Dean Lueck and Terry Anderson for comments and helpful discussions. Thanks to PERC for research support.

resources. Deer damage crops and suburban gardens and cause traffic accidents. Wolves kill sheep and cattle. Coyotes and foxes raid chicken coops. Bats transmit diseases. Other species can be a general nuisance to property, people, and pets.

One can imagine a first-best level of resources devoted to wildlife. A tract of land, for example, would be used to sustain a wolf pack if the willingness-to-pay of wolf advocates outweighed the costs of less development and livestock losses. In order for this first-best outcome to occur, however, wildlife managers would need a costless mechanism that enabled them to capture all use and existence values attributed to wolves and to perfectly compensate those who suffer losses.

Management Institutions and Transaction Costs

Such a mechanism would exist only in a world of zero transaction costs (Coase 1960). Ownership of wildlife would be perfectly defined. Rights would be enforced at zero costs. Those who value wildlife would be excluded from consumption unless they paid market prices. These conditions do not hold, of course, and the transient nature of wildlife means that the transaction costs needed to sustain wildlife populations are potentially high. Private landowners and wildlife agencies must overcome a unique set of transaction costs in order to increase the net value of wildlife.

Landowner Contracting Costs

Landowners have incentives to accommodate wildlife if they are residual claimants to its value. Because wildlife species typically require larger tracts of land for habitat than a single landowner can accommodate, however, landowners must contract with each other in order to capture their value. Consider Western landowners wishing to profit from elk hunting. Neighbors with small landholdings would need to form a cooperative of sorts, agreeing to limit livestock grazing, regulate hunting, and perhaps manipulate habitat. Once cooperative terms were established, however, each landowner would have incentives to cheat, perhaps by allowing more hunting than agreed upon or by shirking on livestock grazing restrictions. Because of these incentives created by divided ownership, landowners would expend resources to monitor and enforce the terms of the contract (see Barzel 1997; Lueck 1989).

These contracting costs are not necessarily prohibitive. Anderson (1998) lists examples of how they have been privately mitigated by innovative contracts, property right technologies, and consolidated ownership of land. Yet the costs will be higher, *ceteris paribus*, when land use is heterogeneous, single landholdings are small, and when public land is interspersed among private landholdings. When land use is heterogeneous, it will be costly for the separate landowners to measure the relative contribution of their land to successful wildlife propagation. Knowing this, neighbors will have incentives to shirk on contractual arrangements. When private landholdings are small, landowners must contract with several parties in order to secure a tract large enough to encompass a stock of wildlife. The expected costs of monitoring and enforcing contracts will rise with the number of parties involved. Finally, in the unlikely event that politicians overseeing public land agencies agree to contract with private landowners, the attendant transaction costs could be prohibitive. Contracts with public agencies are likely to be inflexible devices that require the approval of numerous interested parties.

Nineteenth century America provides a good example of high landowner transaction costs. Land ownership, at that time, consisted primarily of small privately held parcels amidst large tracts of un-owned or public land. The territorial requirements of many species were simply larger than most single landholdings could accommodate. Many species of migratory birds annually migrated across the continent, fish populations inhabited rivers that flowed for hundreds of miles, and big game species required thousands of acres to roam. In such an environment contracting between several parties (private and governmental) was prohibitively costly. Lueck (1989) argues that the game department emerged as an institution that lowered the cost of establishing and enforcing property rights to wildlife.

Under such a regime, rights to wildlife may be enforced at a lower cost because explicit agreement among all landowners is not required for the agency to act.

Public Agency Constraints

Wildlife agencies, however, are an imperfect solution to the landowner contracting problem. Their ability to maximize the net value of wildlife is limited by three categories of constraints. First, politicians that oversee agencies have incentives to cater to powerful interest groups (Peltzman 1976; Becker 1983). Resident hunting groups, for example, pressure politicians (and therefore agencies) into keeping resident license fees low. Second, agencies are generally not motivated to maximize the difference between wildlife benefits and costs. Instead they are more likely to seek some combination of larger budgets (Niskanen 1971), autonomy (Wilson 1989), and tasks that allow them to increase their human capital (Wilson 1989; Dewatripont et. al. 1999). Third, even if bureaucrats are (temporarily) rewarded for wealth-maximizing behavior, long-standing procedural rules constrain their ability to respond quickly and effectively to changes in demand and costs.

These constraints portray the wildlife department as a political beast beleaguered by self-interested behavior and "red-tape." Yet wildlife departments are probably more market oriented than most modern bureaucracies. Hunting, fishing, and other user fees still account for the majority of agency revenues in most states (WCFA 2001). In addition, most wildlife departments have well-defined missions and are designed to serve a narrow, well-defined constituency. Because of these factors, the principle-agent link between wildlife users and managers is probably clearer than that of other natural resource agencies such as the U.S. Forest Service and state environmental protection departments.

In recent years, however, the link between wildlife user and manager may be eroding. The percentage of agency revenues derived from license sales has been declining for over twenty years. Many wildlife agencies now receive a substantial proportion of their revenue from state general tax dollars (funds derived from sources unrelated to wildlife use) (WCFA 2001). In addition, many wildlife departments have been subordinated beneath larger natural resource or environmental protection agencies on state governmental hierarchies (Lueck and Parker 2003). These wildlife agencies are governed by a much broader mission and a broader range of constituents are involved in decision-making.

Institutional Tradeoffs

The efficacy of private and public wildlife management institutions will depend on the severity of landowner contracting costs relative to bureaucratic management constraints and vice versa. The efficacy of each institution may also depend on whether hunting or nongame wildlife demand dominates.

If allowed to profit from wildlife, we should expect private management effort to increase when landholdings are large, homogeneous, and held by private parties. These propositions are obviously relevant in determining whether landowners will capture the consumptive value of wildlife – for example, by choosing to grant hunters access for a fee (see Lueck 1991). Although less intuitive, they are also relevant in determining whether landowners will act to capture nongame values. In order to make a profit, however, landowners would need to collect revenues from a largely dispersed group of low value users and somehow limit visual access from those who have not paid. The contracting costs of achieving this arrangement are likely to be higher than those associated with fee hunting.

When landowner contracting costs are high, wildlife agencies have a comparative advantage in establishing and enforcing hunting restrictions (Lueck 1989). This advantage is diminished, however, to the extent that a wildlife agency is not designed to primarily service hunting constituencies. Relative to private landowners, the power of taxation gives public agencies a comparative advantage in controlling

those who free-ride on nongame production.² This advantage is amplified to the extent that a wildlife agency is designed to manage communities of species and service nongame constituencies.

Some Empirical Evidence

To examine some of these tradeoffs empirically, one might regress landowner contracting costs and agency organization against private and public game and nongame management effort. While proxies for private management effort are unavailable, wildlife agency revenue and nongame spending data for each state are available for certain years in the 1980s and 1990s. For years corresponding with the dependent variables, separate cross data sets were assembled. For each state, the data include information about the average farm size and the percent of land in federal and state ownership. These variables proxy landowner contracting costs. Bureaucratic organization variables indicate the proportion of revenues that came from state general funds and whether the wildlife department was subordinate to a larger natural resource agency. Additional variables control for game and nongame demand and other economic and political factors.³ Preliminary findings are summarized in Table 1.

Agency Revenue

Wildlife agency revenue comes from various sources including hunting, fishing, and trapping license sales, wildlife license plate fees, wildlife-related merchandise sales, taxes on sporting equipment, private donations, and state general funds. For each year, regression analysis shows that the relationship between total agency revenue and average farm size was negative. Regression results also show that the relationship between agency revenue and the percent of public land was positive. Considered together, the above results imply that demand for agency management is greater when landowner contracting costs are high and when more habitat is in public ownership.

For each year, regression analysis shows a negative relationship between revenue and subordinate placement. Because general funds are endogenous to agency revenues, I could not infer the effect of general funds on agency demand by regressing general fund dollars against total revenues. Separate empirical tests, however, indicate a fairly robust negative relationship between the amount of general funds received by an agency and revenues from license sales. Taken together, the above results imply that agencies more constrained by procedural rules and subjected to a wider range of constituent pressures will have trouble generating revenue - especially from user fee related sources.

Table 1: Summary of Preliminary Regression Results

	Effect on total agency revenue	Effect on percentage of revenue spent on nongame
Increase in average farm size	-	+
Increase in percentage of public land	+	0
Agency is subordinate	-	+
Increase in reliance on general funds	na	+

Spending on Nongame Species

Most wildlife agencies established a program funded specifically for nongame (species not taken for food, fur, or sport) in the 1970's. All states had such a program by 1989 (Edelson and Curelean 1994). Nongame programs generally began to research a single, high-profile species (Vickerman 1989), but now appear to be more focused on the goal of preventing the decline of all

² With case study examples, Anderson (1998) shows that private organizations can also effectively control free riders.

³ For more details, see Lueck and Parker (2003).

indigenous nongame wildlife (Richie and Holmes 2000). While the percentage of agency revenue spent on nongame programs has increased in most states since 1986, current figures vary significantly across states (Richie and Holmes 2000; WCFA 2001).

Regression analysis shows a positive relationship between average farm size and the percentage of agency revenue spent on nongame. The findings imply that decreases in the landowner costs of managing game species will increase the relative demand for agency management of nongame wildlife. Regression analysis also shows that there is no relationship between the percent of public land in a state and the percentage of revenues spent on nongame. This finding suggests that more public land gives wildlife agencies a comparative advantage in both game and nongame management.

Regression analysis shows a positive relationship between agency reliance on general funds and the percentage of revenue spent on nongame. The analysis also shows a positive relationship between subordinate placement and the percentage of revenue spent on nongame. Considered together, these findings imply that agencies exposed to a broader range of constituent interests expended more of their resources on nongame.

Conclusions

Private landowners with relatively large, contiguous, and homogenous parcels can overcome the contracting costs of managing transient wildlife, thereby reducing the comparative advantage of a wildlife agency. In light of this, state policymakers might think of ways to shift management responsibility (and residual claimancy) to landowners where appropriate. Efforts to do so are underway in many Western States. For example, Leal and Grewell (1999) chronicle state-landowner partnerships that allow landowners to receive market hunting prices for accommodating wildlife.

The problem of efficiently managing wildlife is more complex in the case of nongame species. Values are dispersed among a greater number of not easily identified users. The power of taxation and consolidated ownership of a community of interacting species may give state agencies a comparative advantage in capturing values. Bureaucratic features more conducive to managing nongame, however, may come at the expense of more procedural constraints and vague objectives. Early evidence suggests that these constraints hinder a wildlife agency's ability to generate revenue. Future research should critique this evidence by more explicitly evaluating the transaction costs involved with managing nongame and ecosystems compared with those associated with the traditional management of single game species. Extensions in this direction would necessarily consider agency interaction with the federal government. The updated model will best address the current issues facing private and public wildlife managers.

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ADVERSE IMPACTS OF DROUGHT ON CROPS AND CROP PRODUCERS IN THE WEST

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Introduction

Drought often creates economic and financial difficulties for agricultural producers. Drought that persists for several years can create substantial and devastating agronomic difficulties and genuine economic hardship for agricultural producers and agriculturally-based businesses in rural communities. Agricultural producers experience crop production losses and concomitant losses in revenues from crop sales. Upstream and downstream, agribusinesses experience reductions in the demand for agricultural inputs such as fertilizer and machinery and reductions in throughput in grain and other crop handling facilities. Other rural businesses also face declines in the need for their products.

Several areas of Montana have experienced extensive and persistent drought during the four-year period 1998 through 2001 that adversely affected farm revenues and economic activity in rural communities. Estimating the size and scope of these adverse economic effects is a real challenge to economists. It requires data that is sometimes difficult to obtain. In addition, accurately assessing the net effects of drought on farm incomes also requires the economist to take account of the consequences of permanent government programs such as crop insurance and counter-cyclical payments that are designed to offset yield and/or revenue shortfalls and ad hoc programs that compensate for crop yield losses due to natural disaster.

We use publicly-available National Agricultural Statistics Service (NASS) data to qualitatively evaluate the impacts of drought on crop producer decisions and crop production. Then we briefly describe several public programs available to ameliorate to some degree the adverse financial impacts of drought on crop producers. Finally, we discuss the economic benefits that accrue to producers from these programs and the impacts of drought on certain program provisions.

Assessing Drought Impacts Using NASS Data

Through state offices NASS provides estimates of acres planted and harvested, crop yields per acre, and total production for many crops. These data are usually available for major annually-planted crops at state, crop reporting district and county levels. Sometimes the data are further stratified by cropping practice (for example, following fallow versus planting on stubble).

To provide context for the usefulness of NASS data in assessing drought impacts, we examine wheat production in Montana's North Central crop reporting district. This district is a major wheat producing area the shape of an isosceles triangle, referred to as the "Golden Triangle", with its apex at Great Falls and other corners at Cut Bank and Chinook along the U.S.-Canadian border.

In Montana's Golden Triangle the acres planted to all wheat declined by about seven percent between 1999 and 2000. Decisions to reduce planted acres were certainly affected by agronomic considerations such as soil moisture but were also linked to producer expectations about the prices of crops and major variable inputs. Wheat prices were low relative to historical norms during the 1998

through 2001 period. Careful econometric analysis would be needed to determine the extent to which decreases in planted acreage were influenced by changes in relative prices and other economic considerations.

Where several classes of wheat can often be produced profitably under “average” weather/climatic conditions, the timing of precipitation events may influence the acres planted to each wheat class. In the Golden Triangle acres planted to winter wheat were 35 percent lower in the fall of 1998 than acres planted in the fall of 1997 (Table 1). Producer planting decisions in these semi-arid areas depend in large part on soil moisture conditions at the time of planting and expectations of growing season precipitation. In the fall of 1998 soil moisture conditions were extremely poor in the Golden Triangle. The decline in acres planted resulted in less potential income from sales for producers and declines in sales for agribusiness suppliers.

In contrast to winter wheat, in 1999 the acres planted to spring wheat by Golden Triangle producers were greater than those in 1998 (Table 2). Soil moisture conditions had improved over the winter months and producers generally expected average growing season precipitation. The decline in acres of winter wheat- planted was partially offset by the increase in acres planted to spring wheat. Nevertheless, the total acres of all wheat planted declined.

Total production is determined by total acres planted, acres planted but not harvested, and yields on acres harvested. The proportion of all wheat acres planted that were harvested in 2001 was much lower than in preceding years. Only about 67 percent of winter and spring wheat acres planted on land fallowed in 2000 were harvested in 2001 and only about 50 percent of winter and spring wheat acres planted back into stubble (recrop) were harvested in 2001 (Tables 1 and 2). Growing season precipitation was well below average. In the three previous growing seasons 96 percent of spring wheat planted on fallow and 91 percent of spring wheat planted into stubble was harvested (Table 2). Acres of wheat planted but not harvested represent abandoned acres and a total loss in grain production. Producers gross revenues from sales are reduced and agribusinesses and firms such as grain merchandisers likely suffer gross income reductions because of lower volumes handled.

Total production losses are also affected by poor yields on the acres that are harvested. Crop year 2001 winter and spring wheat yields in the Golden Triangle were relatively low compared to immediately previous years, especially for wheat produced on land previously fallowed. Sales revenues of wheat producers and agribusinesses that handle grain were adversely impacted.

These data are somewhat useful *ex post* in tracing the aggregate of producer choices relative to planting and harvesting decisions and crop production.

Percentage shifts at the state-level in acres planted and harvested and percentage changes in yields due to drought are generally lower than at the crop reporting district level. This indicates, among other things, that drought is often not state-wide but concentrated in certain crop reporting districts or counties. Most disaster-related declarations are made at the county level and the NASS county data appear useful in administering these disaster programs. Variation in acres planted and harvested, and in crop yields, is usually greater at the county level than for the pertinent crop reporting district.

Programs that Ameliorate Adverse Economic Impacts of Drought

Three programs that explicitly ameliorate the adverse impacts of drought are available to many crop producers: (1) crop insurance; (2) the Emergency Loan Program; and (3), the Crop Disaster Program.

Producers seeking to shift some of their production risk can often obtain crop insurance underwritten by the Federal Crop Insurance Corporation (FCIC). Multiple peril crop insurance is available in most counties for major annual and perennial crops and for minor land use crops in many

counties from actuarial tables or from written agreements that provide individualized policies. Federally-subsidized crop revenue insurance products are available for some crops in some counties. The Farm Service Agency's Noninsured Disaster Assistance Program provides some financial assistance for producers of crops in counties where federally-subsidized crop insurance actuarial coverage does not exist.

The preponderance of federally-subsidized crop insurance coverage has been through individual farm yield policies offered to crop producers at reduced premium rates. Premium rates are relatively inexpensive to producers. Producers can usually elect a yield coverage of 50 to 75 percent of their actual proven history. Indemnifications occurs when actual yields fall below elected yield coverage levels.

The Farm Service Agency provides emergency loans at relatively low interest rates to help producers in declared disaster areas recover from production and physical losses due to drought and other natural disasters. To be eligible for the Emergency Loan Program a farm must have suffered at least a 30 percent loss in crop production and the producer must also have an acceptable credit history, be able to provide full collateral to secure the loan, and be able to demonstrate repayment ability.

Prior to the 2003 Agricultural Assistance Act, the most recent ad hoc disaster program was for the 2000 crop year. The Crop Disaster Program funded in the 2003 Act will provide payment to producers for qualifying losses to agricultural commodities due to damaging weather or related conditions. Losses in excess of 35 percent of a normal crop will be compensated. Producers may elect to receive payment for crop year 2001 or 2002, but will not be compensated for losses in both years.

The programs described above are designed to explicitly assist crop producers in event of drought. The commodity title of the Farm Security and Rural Investment Act of 2002 includes programs that not only augment farm income, but address some of the production and marketing risks of covered commodities. These are the marketing assistance loan, direct payment, and counter-cyclical payment programs.

Benefits from Public Programs for Drought-Impacted Producers

In the Great Plains and West regions crop insurance payments are seldom made when a dryland producer is unable to plant due to drought. In large part this is because 60 to 80 percent of the annual precipitation occurs during the growing season in many production areas. Thus many producers plant even when soil moisture is limited at planting time.

Producers with individual farm yield multiple peril crop insurance receive indemnities when drought-impacted crop yields are less than their guaranteed yields. But crop insurance indemnifications do not fully replace total expected gross sales revenue under normal production conditions. These indemnities may cover operating costs incurred prior to the yield loss and make some contribution to the costs of fixed factors. However, under continuous drought a producer's actual production history is likely to erode and result in a reduction in the income protection provided by crop insurance.

The erosion of a producer's actual production history can be limited to some extent by the use of what FCIC labels "plug" yields. During years within the consecutive 10 years of yield history when a producer's yield is less than 60 percent of the FCIC-specified transition yield, producers can request the use of the plug yields equal to 60 percent of the transition or "T" yields. In many counties the T yield is similar to a NASS county yield. But T yields tend to be quite stationary; consequently, recent drought in a county often does not immediately impact T yields or diminish a producer's plug yields.

In many years producers receive Crop Disaster Program payments in addition to crop insurance indemnities on yield losses due to drought. Under the current Crop Disaster Program a producer's joint compensation from the sale of a partial crop, crop insurance indemnities, and disaster assistance will be limited to 95 percent of the revenues from sales under normal yield conditions. The concern producers most often express is that disaster programs are ad hoc and depend on special legislation. But the only cost of disaster assistance to producers is the increase in their tax liabilities.

Crop insurance and disaster payments provide cash to a producer and increase the likelihood that input suppliers will be paid. But as one regional manager of a malting barley firm recently told us—"It is hard to make malt out of insurance and disaster payments". As a group, product merchandisers, handlers and processors settle for less income and individual firms try to expand their service areas just as they did in response to implementation of the Conservation Reserve Program. Some agribusinesses will be permanently displaced. One long-term consequence of this process may be higher input prices and lower product prices for producers due to increased transportation costs.

The Farm Service Agency's Emergency Loan Program provides relatively low interest rate loans to qualified borrowers impacted by drought. In the mid and late 1980s some producers used these loans subsequent to droughts and they never recovered. (Nominal interest rates during this era were several times current interest rates). Farmers did not recover from "terming" loans for operating costs and cash for family living expenses over a five to seven year amortization period. Problems with repayment of emergency loans are only exacerbated with successive droughts, shortfalls in income, and additional loans.

Drought impacts the marketing assistance loan program. If there is no production, there is no loan collateral. Furthermore, there is no opportunity to participate in this program's income enhancement provisions during periods when cash prices are low relative to county loan rates by taking out a loan deficiency payment in lieu of a loan or settling a loan with a marketing loan gain.

There are no drought-related production risks for participants in an ongoing direct payment program. Direct payments in an ongoing program are totally decoupled from current production. Producers with the appropriate production history will receive direct payments with certainty if they sign up each year.

Drought during the 1998 through 2001 crop years may have impacted land owners who recently made crop acreage base decisions for covered commodities under the Farm Security and Rural Investment Act of 2002. Under these provisions producers were allowed to adjust acres bases for direct and counter-cyclical payments. Larger bases for the appropriate commodities could provide larger income transfers to those who share in the production and marketing risks for these commodities.

If drought reduced the number of acres planted to covered commodities in the 1998 through 2001 crop years relative to the existing base established under the prior statute, then a land owner might not have been able to improve the farm's base acres for crops such as wheat, barley and corn or add base for soybeans and other oilseeds.

Producers were allowed to establish program yields for oilseeds for both the direct and counter-cyclical programs and improve yields for traditional program crops under the counter-cyclical program if they established new bases. Some producers used old yields for traditional program crops and drought-impacted oilseed yields for oilseeds.

Conclusions

Persistent drought can be devastating financially for agricultural producers and have substantial adverse economic impacts on agribusinesses.

NASS data permit *ex post* tracing of the aggregate of producer planting and harvesting decisions and yield performance. Higher levels of geographic aggregation can mask the adverse impacts of drought. Finally, publicly available data useful for tracing the adverse impacts of drought on agribusinesses are sparse.

Crop insurance provides indemnification for yield losses due to drought. Prevented planting on dryland due to drought is usually not compensated. In some years the ad hoc Crop Disaster program provides producers compensation in addition to crop insurance indemnities.

Crop insurance indemnifications and other forms of disaster assistance provided for yield loss due to drought usually only cover a portion of a farm's operating costs. So, producers must rely on other sources of cash to meet outflow requirements for some operating costs, fixed operating costs such as property taxes, principal payments on debt, and family living expenses. In certain instances the Emergency Loan Program provides this cash. Several successive years of such cash infusion often leads to business failure.

Table 1: Winter Wheat Planted and Harvested in Montana's Golden Triangle, 1998-2001

Year	Planted Acres			Harvested Acres			Acres Harvested ÷ Acres Planted, %		
	Following Fallow	Recrop	Total	Following Fallow	Recrop	Total	Following Fallow	Recrop	Total
2001	554,000	72,500	626,500	363,400	32,900	396,300	65.6	45.4	63.3
2000	644,200	91,000	735,200	619,300	61,500	680,800	96.1	67.6	92.6
1999	361,400	21,000	382,400	320,200	18,400	338,600	88.6	87.6	88.5
1998	562,600	49,000	611,600	496,600	40,300	536,900	88.3	82.2	87.8

Table 2: Spring Wheat Planted and Harvested in Montana's Golden Triangle, 1998-2001

Year	Planted Acres			Harvested Acres			Acres Harvested ÷ Acres Planted, %		
	Following Fallow	Recrop	Total	Following Fallow	Recrop	Total	Following Fallow	Recrop	Total
2001	1,245,000	246,000	1,491,000	858,300	138,000	996,300	68.9	56.1	66.8
2000	1,051,700	270,000	1,321,700	1,003,600	233,000	1,236,600	95.4	86.2	93.6
1999	1,522,300	325,500	1,847,300	1,489,000	310,200	1,799,200	97.2	95.3	96.9
1998	1,398,000	270,000	1,668,000	1,335,500	245,000	1,580,500	95.5	90.7	94.7

SAY HAY AND HAY WEST: CHARITY, GOVERNMENT AND FARMER RESPONSES TO THE 2002 DROUGHT IN WESTERN CANADA

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The drought that hit western Canada in the summer of 2002 was one of the most devastating ever recorded on the Canadian prairies. Though 1961 stands out as the worst drought year in Saskatchewan, the 2002 drought affected a vast area of the northern and central part of the grain belt in Saskatchewan and Alberta, an area that normally has adequate precipitation and is immune to the worst effects of droughts. Grasshopper populations soared as a result of the persistent dryness and many producers abandoned hopes of harvesting a crop by early July. Although some moisture was received in late July and August, it was considered too late for most drought-stricken areas in central and northern Alberta and Saskatchewan, where many crops were already written off and used for grazing or harvested for livestock feed.

Droughts are not uncommon in the arid and semi-arid parts of the prairies and, while the impacts of drought in those regions also can be devastating, farmers there have adopted management techniques (such as trying to keep at least one year of stored feed on hand) that somewhat mitigate the impacts of a drought. However, farmers in the northern and central regions have not adopted such cautious habits. Many sold excess feed they harvested the previous year when the southern region was experiencing its third consecutive year of drought and sold hay at premium prices. These actions left the northern and central producers with few choices when the drought struck in their region so suddenly (and with such a vengeance) in the spring of 2002.

Impacts of the Drought

Early reports of a developing drought were widespread and caused major anxiety in both rural and urban areas. Despite using immature cereal crops for grazing, many cattle producers encountered severe shortages of feed for their livestock and were forced to either buy additional feed or remove some of their breeding livestock. Reports of beef cattle producers disposing of breeding stock after spending decades on genetic improvements were heart wrenching. Cattle were moved to leased pastures in the southern parts of the prairie. By July, sales volumes at livestock auction sales were three to four times normal in drought areas (Duckworth 2002a).

Tame hay yields and production in the drought-affected regions of Saskatchewan and Alberta were far below average. To compensate for low tame hay production, producers harvested an unusually high area of annual crops as green-feed or silage. Total 2002 production of major grains and oilseeds in Alberta was about 45% of the previous 5-year average, according to the November 2002 estimate by Statistics Canada (Government of Alberta). Poor yields and a reduced area harvested led to low production. Total area of field crops planted in Alberta 2002 was about 24.2 million acres, relatively unchanged from 2001 and the 5-year average. However, total harvested area in 2002 was estimated at only 15.1 million acres, 69% of the 5-year average acreage (Government of Alberta).

The poor growing conditions and the shortage of forage supplies contributed to a large area that was harvested for forage, grazed by livestock, or abandoned outright. An estimated 4.5 million acres or 25% of 2002 grain/oilseed crops in Alberta were harvested as forages, three times the 5-year average of 1.5 million acres (Government of Alberta).

Total production of wheat in Alberta was estimated at 3.5 million tonnes, 49% below the 5-year average and the lowest production since 1977. Barley production in Alberta was 56% below the 5-year average and the lowest since 1964. Oats production was 63% below the 5-year average and 52%

lower than the previous year. Canola production was 65% below the 5-year average. Tame hay production was estimated at 41% below the 5-year average (Government of Alberta).

The low crop production in 2002 led to a severe shortage and high prices of feed grains and forages in the drought affected region. To secure winter supplies, many producers purchased feed grains and/or forages from Manitoba, southern Saskatchewan, Ontario, British Columbia and the United States (Government of Alberta). Corn imports from the United States increased substantially and may reach a record high in the crop year of 2002/03.

Responses By Governments

The federal government has a number of farm programs that support agriculture during difficult economic times. These programs (summarized in Table 1) include the Net Income Stabilization Account (NISA), Crop Insurance and the Canadian Farm Income Program (CFIP).

The main response to the 2002 drought by the federal government was the establishment of the Drought Watch program. Its goals were to provide timely information on the impacts of climatic variability on water supply and agriculture on the prairies and to promote practices that reduce drought vulnerability. To realize the program's goals, the federal government posted a web page (http://www.agr.gc.ca/pfra/drought/index_e.htm) that contains updated information on precipitation, climate profiles, farm stress telephone lines, and links to other federal resources such as the advanced payments program¹, the rural water development program² and the tax deferral program³.

Since provincial governments in Canada share responsibility for agriculture with the federal government, a lot of political pressure was placed on the governments of Alberta and Saskatchewan to provide assistance to drought stricken farmers. The Alberta government announced a special drought assistance program whereby farmers and ranchers were eligible to receive acreage payments for crop and forage land as well as some financial assistance for farm-water development and fighting the grasshopper outbreak. The Saskatchewan government provided per head payments for breeding livestock with the level of payment dependent on the severity of the drought condition.

Charity for Western Farmers

Stories in the media of drought distress generated a large response from urban dwellers and farmers in eastern Canada. One of the most generous and well-meaning responses was the "Hay West" initiative, launched by farmers from Navan, Ontario to help prairie farmers keep their livestock during the drought.

By September 23rd, almost 1800 individuals from Ontario, Québec, New Brunswick, Nova Scotia and Prince Edward Island had donated nearly 100,000 large square and round bales and 5,000 small square bales. Although farmers donated this hay, someone else had to pay for loading, fumigating, rail or truck transportation, and distribution of the hay. Seeing a public-relations opportunity, the two transcontinental railways donated the costs of transporting hay on 187 rail cars. The federal government agreed to pay transportation costs on 377 rail cars of hay, and private donors covered the cost of shipping 72 rail cars of hay. In total, Hay West loaded 736 rail cars and 150 large trucks with large hay bales (Duckworth 2002b).

¹ The Advance Payments Program (APP) allows farmers to receive cash advances of up to \$250,000 for crops in storage.

² This program is designed to contribute to the stability and development of prairie rural areas by improving the security of good quality water in agricultural areas in Manitoba, Saskatchewan, Alberta and the Peace River region of British Columbia.

³ Under the program, owners of breeding livestock in designated areas who are forced to sell all or part of their breeding herd due to drought conditions are eligible for a one-year tax deferral on income from those sales.

While this operation began as a heartfelt symbol of the best in Canadian spirit, it provided an excellent example of unintended economic consequences of government interference in agricultural markets. The undertaking was costly. Shipping costs alone were about \$1000 per rail car from Ottawa, Ontario to Wainwright, Alberta (a distance of more than 2000 miles) – two to three times the value of the hay. The federal government paid \$3.8 million to cover the transportation and fumigation costs of the donated hay, and the costs of an administrative office and staff. Remaining costs were covered by private donations of individuals, provincial governments and corporations. The federal government also donated 1,100 large bales of hay grown at the Canadian Food Inspection Agency's research institute.

Lost in all the hay and money traveling around the country was the fact that the severe drought conditions occurred only in the Saskatoon-Edmonton corridor (an area roughly 500 miles long and 150 miles wide) and that hay yields generally were good south of there. Local hay prices adjusted in response to the increased demand in drought areas and abundant supply in the south. However, farmers in drought areas who were willing to sell hay for C\$120/ton in a normal year seemed unwilling to pay that price plus transportation costs for hay in 2002. Prominent politicians leveled charges of price gouging and these allegations provided ready fodder for the easily excitable press.

Rather than pay a higher price for hay, many farmers liquidated their herds or relied on a lottery for donated hay. By October 25th, 525 farmers in Alberta and 300 farmers in Saskatchewan had won 35-40 large bales each in the lotteries. Though the gesture was commendable and received much admiration, it did not make a significant difference to the hay shortage on the prairies. A prominent farm newspaper recently listed 275 advertisements of hay for sale (eight columns in the classified advertisements section), indicating that the “hay shortage” was more fiction than reality.

In addition, other charities held fund raising events, including: a fundraising Canadian Football League game between the Calgary Stampeders and the Ottawa Renegades, a Hay West Stomp Dance and Fundraiser in Pembroke, Ontario, and Say Hay Benefit Concerts in Edmonton and Calgary. Proceeds from donations and fundraising activities totaled nearly \$2 million (Duckworth, 2002c). More than 1,600 farmers applied for the money raised in the charity events. A ten-member committee, selected by the 4-H Foundation of Alberta, devised a ten point system to distribute donated money to feed-short farmers. Criteria used to distribute *Say Hay* funds included the number of breeding animals with current year offspring, land base, herd size, previous feed history feed on hand, other secured sources of feed and sources of off-farm income. About half the applicants for the charity were selected to receive a grant to purchase feed but many who did not receive the grant cried foul.

Overall Impacts of the 2002 Drought

The 2002 drought ravaged crop and pasture production in a wide area of Saskatchewan and Alberta. Table 2 reveals that, in spite of the drought, overall farm cash receipts were only modestly reduced from the previous year and were, in fact, substantially higher than the previous five-year average. When increased program payments were taken into account, farm cash receipts were only one percent lower than the previous year in Alberta and only 4.3 percent lower in Saskatchewan.

Despite widespread concern in the media over the possible multiplier effects of reductions in crop and hay yields, they are likely to be modest. This should come as little surprise since it is well known that Canadian farmers now receive more than three-quarters of their family incomes from non-farm sources (Culver et al., 2001). In fact, the smallest farmers (the ones who most likely suffered the most from low farm yields), on average, get virtually all of their family incomes from non-farm sources. Of course, there were many heartbreaking stories of individuals who were forced out of their chosen way of life or had to make painful adjustments of selling breeding herds. However, these were anecdotes and do not reflect the overall economic and financial consequences of the 2002 drought on the Canadian prairies. Even in the most sparsely populated agricultural region of western Canada, it takes much more than a bad year or two in agriculture to seriously affect the overall economy.

Concluding Remarks

Two outcomes from the 2002 drought warrant a final comment. First, safety net programs like NISA, Crop Insurance and CFIP are designed to assist farmers in disaster years. In response to political pressure and despite the availability of the safety net programs, the Alberta and Saskatchewan governments provided additional assistance in the form of ad hoc transfer programs tied to acreage or production. As a result, large landowners and large producers received most of the assistance. While the Saskatchewan government transferred less money to farmers than did Alberta, it did so in a more rational fashion. Transfers in Saskatchewan were based on drought severity in local districts. In contrast, all producers in Alberta were eligible for ad hoc assistance whether they were in a drought area or not.

Second, recipients of donated hay from the Hay West campaign were picked by lottery. Government assistance to fumigate, transport and distribute the charity hay benefited only a handful of lucky individuals in Western Canada while most received no assistance at all. It is highly unusual (and there is no justification) for distributing public funds by lottery.

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Table 1: Federal Safety Net Programs

Title	Description
Net Income Stabilization Account	NISA is a national program available in all provinces. Its purpose is to encourage producers to save a portion of their income for use during periods of reduced income. The calculation of the amount that a producer may contribute is based on gross sales of qualifying commodities less the purchases of qualifying commodities. Most agricultural products (except the supply-managed commodities of milk, chicken, eggs, and turkey) are included in the program. Producers deposit up to three percent of eligible net sales into their NISA accounts. The federal government then matches two-thirds and the provincial government matches one-third of the farmer contribution. In addition, the federal and provincial governments pay bonus interest of three percent above the interest paid by the financial institution where the account is held.
Crop Insurance	The crop insurance program is designed and delivered provincially. It provides insurance protection against production and quality losses caused by natural disasters. Insurance is provided under a two-tier system, where governments pay 80% of the premiums for the first 50% coverage plus all administrative costs and producers pay the remaining 20%. Producers may then choose to purchase additional coverage up to the 80% level (90% for low-risk crops); premiums for the higher coverage are shared 50% by producers, 25% by the federal government and 25% by the provincial governments.
Canadian Farm Income Protection	The Canadian Farm Income Protection (CFIP) program provides producers with ongoing protection against dramatic drops in farm income. The program is designed to cover all agricultural production by providing income stabilization at 70% of an historic average. The claim-year margin is based on income tax figures. Eligible expenditures include farming expenses incurred and reported for a claim year. The historic reference period margin is based on combined historic NISA and income tax data. Using such a reference period as the basis for payment increases CFIP's ability to provide funding to those who need it most and ensures that all producers are treated equitably, regardless of the commodities they produce. CFIP complements the NISA and crop insurance programs. Although those eligible for CFIP are not required to participate in NISA, a number of linkages exist between NISA and CFIP to avoid duplicate support payments. Farmers had until February 28, 2003 to apply for assistance for the 2002 CFIP program and the extent of the claims was not known at the time this article was written.

Source: Culver, et al. 2001.

Table 2: Farm Cash Receipts by Province

	Avg 97-01 \$ million	2001 \$ million	2002 \$ million	02 vs. 01 % change	02 vs. Avg % change
British Columbia	1,968	2,236	2,200	-1.6%	11.7%
Alberta	7,043	8,307	8,227	-1.0%	16.8%
Saskatchewan	5,871	6,550	6,270	-4.3%	6.8%
Manitoba	3,165	3,648	3,755	2.9%	18.7%
Ontario	7,517	8,534	8,471	-0.7%	12.7%
Quebec	5,196	5,729	5,485	-4.3%	5.6%
All other provinces	1,157	1,250	1,289	3.1%	11.4%
CANADA	31,916	36,254	35,697	-1.5%	11.8%

Source: Agriculture and Agri-food Canada.

NEWS AND VIEWS FROM THE WESTERN RURAL DEVELOPMENT CENTER

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I am pleased to have this opportunity to make additional connections with the region's economists and provide information about the growth and progress at the Western Rural Development Center (WRDC) since I became Director. As the title implies, my comments are divided into two distinct sections. The first section consists of an overview of WRDC programs, and provides some information on my background and ways that you might link your work with ours. The second section focuses on two specific research issues: some thoughts about the "Whitelaw/Power" hypothesis and applying a game theory/experimental orientation to public lands policy and environmental regulation.

The Western Rural Development Center

Some WEF readers may know more about the history of the WRDC than I do, since the WRDC has a long tradition of partnering with the region's agricultural economists. But by the same token, as I travel around the region I find that knowledge of the Center's mission, structure, and programming varies considerably.

The WRDC is one of four Regional Rural Development Centers (RRDCs) that date back to the Rural Development Act of 1972. The other three Centers are hosted by state universities in Iowa (www.ncrcrd.iastate.edu), Mississippi (www.srdc.msstate.edu), and Pennsylvania (www.cas.nercd.psu.edu). Each Center works on behalf of the Extension and Agriculture Experiment Station directors in its region. The western region covers 11 contiguous states (roughly everything west of the Dakotas, Nebraska, Kansas, and Texas), Alaska, Hawaii, and the land grant institutions in the Pacific Islands. As per federal regulations, each Center is governed by a board of directors, comprised of Extension and AES directors, faculty, and non-university partners.

The WRDC was at Oregon State University from its formation in 1974 until 1999. When Russ Youmans, the long time director, announced his retirement plans, the region's experiment station and extension directors used that as an opportunity to consider relocating the Center. A competitive bidding process was organized, and almost half of the states in the region wrote proposals. The Utah State University proposal was selected, and the WRDC began operation in Logan in the latter half of 1999.

The WRDC has a Steering Committee that is roughly comprised of 1/3 administrators, 1/3 faculty, and 1/3 non-university partners. A major purpose of the Steering Committee is to determine the strategic priorities of the Center, and there are currently two: 1) civic capacity in the rural West and 2) natural resource management.

Personal introduction

It is not in my nature to do a lot of self-disclosure; I am by nature a moderately private person. I tend to assume that other people are probably not interested in the details of my background and that self-disclosure readily becomes self-indulgent. But my role as the director of the WRDC is a much more public position than the typical research or extension specialist position, and therefore I think it is useful for WEF readers to have a sense of my orientation on the world. My academic training consists of an undergraduate degree in economics, a Master's in forestry, and a Ph.D. in economics. Aside from my graduate school years in North Carolina, I have lived in the West my entire life. It is a bit odd to frame it this way, but I have lived in Alaska (a summer), Idaho (twice), Montana (twice), Oregon, Washington (twice), and Utah (three times). The biggest single portion of my professional career was at Oregon State University, where for almost 12 years I was on the faculty in forest economics and policy (with emphasis on the latter because of departmental staffing needs at the time). My orientation is much more a natural resources perspective than an agricultural one.

WRDC communication vehicles

Since 1999, the Center has implemented several new strategies to promote regional communication around rural development issues. Our goals have been to 1) spread the word about western opportunities and activities of interest, and 2) encourage a two-way conversation that allows us to learn about pressing issues and respond appropriately.

Our most visible communication tools are the *Circuit Rider*, a full-color quarterly newsletter published electronically; *Items and Opportunities*, a monthly e-newsletter with a distribution of more than 500 western county extension agents, Extension and AES directors, and others; and the WRDC website (<http://extension.usu.edu/wrdc>), which features a searchable Expert Roster. As director, I get a fair number of inquiries from people trying to connect with others in particular areas of specialty, and I typically turn to the Expert Roster. I encourage you to visit the WRDC website to see what is available, and perhaps join the Expert Roster. If you do not already receive our publications and would like to be added to the distribution list, please contact the WRDC at wrdc@ext.usu.edu.

Ways to partner with the WRDC

I am not hesitant to say that the huge sweep of acres and issues in the west greatly exceeds the WRDC's resources. The Center's base funding from CSREES is only about \$350,000, even less than the current USDA estimate of the \$500,000 needed to fund the operations of a single "bench" scientist for a year. So the WRDC cannot be seen as a deep pocket for funding large projects. But what we can do is 1) fund the efforts of proposal writing teams, 2) offer funds to add components to research projects that make the effort more regionally applicable and hopefully more attractive to funders, 3) provide editorial, publication, and distribution support to re-interpret research findings for more popular audiences, 4) partial funding for thematic conferences, particularly when the goal is to link research results and analytical methods to rural decision makers and 5) support the participation of scholars from 1994 land grant schools (Native American serving) in projects and meetings. This list does not bound the ways in which we might work together; rather it illustrates the kinds of roles the WRDC has productively played in the past. And while our default set of partners is the land grant schools, I do not feel at all constrained to limit the Center's partnerships to them.

Research Issues

Let me acknowledge that I am certainly not up-to-speed on the full sweep of economic research that has been underway in region for the past several years. So it may very well be that the research topics discussed below have already been examined, either in part or in whole. If that is the case,

please grant me a measure of goodwill. Rather than discount me as a poorly-read dilettante, kindly drop me a note with a citation, reprint, or working paper.

Now that I have the caveat out of the way, allow me to discuss two issues that I have continue to ponder. The first of these relates to a hypothesis about the role of primary industry in economic future of the west, and the second relates to the use of economic theory to re-align the incentives imbedded in natural resource policies. It is interesting for me to acknowledge that neither of these flow directly out of the maximization/efficiency/equilibration-at-the-margin paradigm that was the cornerstone of my academic training. A comment in a meeting several years ago stopped me in my tracks: "efficiency has no constituency." Natural resources, economic structure, and the rural west are interwoven issues that are hugely political, and politics is often a dance among competing constituents. The implicit presumption of my Ph.D. training was that the body politic would find efficiency to be as compelling a criterion as do economists. The first 20 years of my career has not shown that to be the case. I suspect that if we surveyed both the region's perennial combatants and the public at large, we would find that economic efficiency lies very far down their list of factors that should drive policy processes.

The Whitelaw/Powers hypothesis

I am invoking the term "Whitelaw/Power hypothesis" to refer to an intellectual argument that primary industry has little or no place in the economy of the New West. In fact, the contention is that such industries may impede economic prosperity when they detract from the amenity values of the West, which are seen to be the true basis of our comparative advantage. I recognize that there are other people who have written about these issues, but because of personal connections, I most often associate them with Ed Whitelaw and Tom Power. Ed is a long-time faculty member at the University of Oregon and a principal in a consulting firm. When I was on the faculty at Oregon State University during the spotted owl controversy, Ed's "second paycheck" metaphor received considerable attention. The image he was evoking was that in-migrants get a quality of life/amenity second paycheck when they move to Oregon, so employers can pay them lower actual wages. The implication was that protecting the attributes that generated the second paycheck was central to protecting Oregon's competitiveness. Tom has been on the faculty at the University of Montana since I met him in the late 1970s and has written books in recent years contending that primary/extractive industries created a "failed economy." The third to the last sentence of his 1996 book, *Lost Landscapes and Failed Economies*, is a concise summary:

In many cases, if we opt for extractive industries to keep the local economy afloat, we will be sacrificing what is scarce and unique for what is common and cheap.

I think this hypothesis warrants concerted scholarly examination. I confess that I am deeply conflicted by this line of thinking; I freely admit that I choose to live in the Rocky Mountain region because of the amenity values but I simultaneously recognize that I could not live here without the ability to make a satisfactory income. As I think about the Whitelaw/Power hypothesis, I have a gnawing feeling that there are one or more intellectual fallacies at play.

In recalling the philosophy of science lectures I have variously enjoyed and/or endured, the notions of Galtung's fallacy of the wrong level and Robinson's ecological fallacy come to mind. Both of these argue against making cross-level inferences in social science. They make me hesitant to conclude that because personal income rose 8.5% per year in Dubois, Wyoming, after the lumber mill closed, in aggregate we would be better off mills if the were gone (an example used in *Lost Landscapes*). This analogy is easily extended to agriculture. Each level of a vertical production process depends on the existence of the other levels. If we choose to eliminate the levels of production we dislike, even for very legitimate reasons, it seems we have an intellectual burden to examine systemic implications of that choice. Moreover, in those situations where a particular industry provides only a modest number of direct jobs, is it insignificant or somehow politically expendable?

Perhaps the data were carefully selected to substantiate a belief rather than test an idea through falsification. Perhaps I am being too much a purist in terms of scientific method. Perhaps what

is true for Dubois, Driggs, and Bigfork is less true for Jordan, Gillette, and Pahrump. I have too many “perhaps-es” floating around to be convinced, not the least of which is that perhaps this hypothesis is correct.

A reviewer of this article thoughtfully raised two points that bear repeating, and will confess to have not having solved them yet, although I think the reviewer is onto something. First, there may be a variant of the classic “diamond and water” paradox in play here. Arguably environmental quality is essential to life, and amenities are essential to quality of life. But just as with water, the marginal value may be paradoxically low. Secondly, a fruitful way to disentangle this issue may be to apply the concepts of natural, built, and human capital, and the linkages among them. Natural and human capital are perhaps the most fundamental sources of economic activity and growth, and the creation of other forms of wealth is predicated on our ability to steward them.

I also want to acknowledge that I do not believe that academic adherents to the Whitelaw/Power hypothesis are necessarily prone to overstating their case. But by the same token, I have seen these ideas thrown into public debates around a number of natural resource policy issues. In these settings rhetorical exaggeration is par for the course. I have seen the Whitelaw/Power hypothesis—and other academic images such as Bill Freudenberg’s “addictive economies”—used to argue that the West would be better off if we were “rid of the lot of them,” with the “them” variously being ranchers, irrigators, commercial fishermen, woods workers, etc. That is when I realize that the ideas we generate as academic economists have very real impacts on very real lives. We therefore have the obligation to critically examine those ideas that begin to resonate in the policy arena.

By the same token, I think we have a collective responsibility to think carefully about the larger implications of our research efforts. There is a tendency, both as authors and reviewers, to compartmentalize our thinking and divorce ourselves from the ways in which our research might be interpreted or used by others. I think we do so at a substantial peril. Some of the risk is to others, some is to the profession, but some is to us as individual researchers. One of my favorite political scientists refers to scientific findings as cannonballs being shot across the political battlefield. All sides are looking around for any cannonballs that they think can overcome the defenses of their opponents, and really cares little what happens to the cannonballs when they hit. The only catch is that the researcher is chained forever to the cannonball and goes flying across as well, destined to smash into the other groups’ intellectual buttresses. In the political sphere, research findings are a means to an end, and are as expendable as any other instrumental input. Every time I forget this fundamental truth (invariably because I am flattered that someone is interested in my work) I have come to regret it eventually.

Applying the game theory/experimental orientation to public lands policy and environmental regulation

Over the past decade I have become a fan of game theoretic/experimental economic research. Admittedly, my support has been passive because my time has been allocated to other areas. Nevertheless, I think that this research orientation offers some intriguing avenues for developing ways to both critically examine and potentially reformulate the incentive structures created by a myriad of public lands/environmental regulations. The Western Economic Forum readership knows better than I the arguments about the various incentives created by water policies, the 1862 Hardrock Mining Act, the Endangered Species, and others. I firmly believe that we can use game theoretic approaches to create innovative institutional frameworks that address perverse incentive issues, and apply experimental economics to provide a measure of empirical evidence as to their likely efficacy. The case of marketable discharge permits comes to mind as a perfect example of policy innovation that aligned incentives for individual firms with a socially defined goal. Even though it initially struck many as odd, my arms-length knowledge is that it proven itself to be both effective and accepted. My point is not so much that we need to get the prices right in a Coasian sense, but that we need to untangle the rules/incentives/behavior Gordian knot in a Nash/Vernon Smith sense.

I spent much of the summer of 1992 at the Center for the Advanced Study in the Behavioral Sciences at Stanford, working with both experimental psychologists and economists on negotiation and

conflict theory. On my way home from that session, I met with the then-Deputy Regional Forester for the USDA-Forest Service in California. I tried to explain how the appeals procedure used by the agency functioned as a form of conventional arbitration, which had been proven to generate more positional behavior and extreme initial offers than approaches such as final offer arbitration. I argued, unsuccessfully, that the Forest Service needed to experiment with alternative appeals procedures with incentive structures less likely to promote extreme rhetoric. But that employee is now the Chief of the Forest Service, who complains bitterly about policy gridlock. Perhaps it is time to revisit these issues with him. Perhaps some of you who are more articulate and persuasive might join the WRDC in such a project.

In summary, whether your interests are in game theoretic approaches to natural resource policy, the Whitelaw/Power hypothesis, or an entirely different arena, I hope you regard the Western Rural Development Center as a source of information, a possible outlet for your policy-relevant research, and a potential partner on projects. I have spent my initial energies as the Center's director building bridges to other disciplines (rural sociology more than economics) and other university colleagues (extension more than research). I hope the region's economists continue to regard the WRDC as a constructive part of the land grant system. Feel free to contact me at sdaniels@ext.usu.edu.