A Technical Review of :

Niemi, Ernie. August 2013. Economic Value of Goods and Services Produced by the O&C Lands. For Pacific Rivers Council

By Forest Econ Inc. (FEI), Moscow, Idaho

Charles McKetta Ph.D. Natural Resources Economist
Dan Green Ph.D. Regional Economist
October 1, 2013

Disclosure

FEI was contracted by the Association of O&C Counties to review and critique the technical and analytical content of the paper "Economic Value of Goods and Services Produced by the O&C Lands" (Niemi, August 2013). The Association represents the governments of western Oregon counties that contain specific O&C lands[1] managed by the Bureau of Land Management (BLM). We have sufficient experience with the economic structure of the Oregon resource economy,[2] the economics of O&C lands and O&C county economies,[3,4] and the economics of forest restoration to achieve multiple objectives,[5] to identify and discuss major points argued in this paper. Our review is critical and highlights elements that require correction by the authors or reconsideration by readers. As our charge is limited to a cursory review, we refrain from elaborating on such issues, rebuttals, or exhaustive citation.

Synopsis

The Pacific Rivers Council (PRC) sponsored this report. It is written as a persuasive argument rather than as an objective analysis. With a clear bias toward increased environmental preservation, it carefully selects economic arguments against current and possible future BLM forest management. It generally ignores explicit objectives specified by the O&C Act of 1937, and the forestry practices used to achieve those objectives. Niemi's argument is that management of these lands for ecosystem services instead of mixed amenity and commodity outputs will provide a greater value/benefit to society. He uses selective valuations of such outputs to underscore that argument.

---

[1] O&C lands refers to former railroad grand lands that reverted back to federal ownership, most of which are now managed by the BLM.

[2] FEI. 2012a. The 2012 Forest Report: An Economic Assessment of Oregon's Forest and Wood Products Manufacturing Sector. For Oregon Forest Research Institute Subcontractor to Mason, Bruce and Girard.

[3] FEI. May 16, 2007. Secure Rural Schools Payments Termination, Impacts on Oregon's O&C County Economies. Report to the Oregon Association of O&C Counties

[4] FEI 2008. Parts of Chapter 3, Chapter 4, and Appendix D on Socioeconomic Analysis, in BLM, October 2008 Final Environmental Impact Statement for the Revision of the Resource Management Plans of the Western Oregon Bureau of Land Management.

[5] FEI 2012b. National Forest Health Restoration: An Economic Assessment of Forest Restoration on Oregon's Eastside National Forests. For Oregon Department of Energy. Subcontractor to Mason, Bruce and Girard.

As a persuasive device, the argument on its surface seems plausible. From an analytical standpoint, several of the primary economic arguments are flawed. These flaws fall into four categories including: logical, theoretical, applied, and inferential problems. We list these categorically so that interested readers can recognize them and where necessary seek alternative discussions of the problematic issues. As the flaws are significant and compound in the aggregate, conclusions drawn from such arguments are dubious at best. Our critique appears unusually harsh because the numbers of problematic assertions and inferences exceed the quantity we normally encounter in economic papers. We conclude that the PRC paper is not a serious contribution to the discussion of potential future O&C lands management.

1. Logical Fallacies Frame the Paper's Dialogue.

What we consider logical flaws of objectivity may instead be viewed as those carefully chosen persuasion mechanisms typically found as classical debate strategies. The primary mechanisms encountered here are of three types: "false dilemmas," "fallacy of exclusion," and "naturalistic fallacies."

(1) A **false dilemma** exists when two extreme outcomes are set up to present a case where such extremes neither exist or other interior outcomes are possible. The prevalent example in this paper is a contrast between environmental purity and industrial logging when neither occurs on the operable O&C lands that comprise the study area. We discuss this contrast in more detail later.

(2) **Fallacy of exclusion** (commonly known as cherry picking) occurs when only selective evidence is presented in an attempt to persuade. An example here is a failure to recognize that active forest management may provide as many (in some cases more) environmental service values as forest preservation. The mechanics of this are discussed later.

(3) A **naturalistic fallacy** leads from a supposedly objective statement of the way things are purported to be to a value-based statement of the way they ought to be. This type of fallacy is inversely related to "moralist fallacies" which are also found. The example here is that BLM's emphasis on paltry financial returns to O&C counties eliminates socially preferable intangible environmental services. A host of other smaller logical fallacies exist.[6]

2. BLM's Management Flexibility

The report begins with implications that the BLM could legally operate the O&C Lands similarly to National Forest lands. Niemi's contention that both agencies are subject to NEPA[7] and ESA[8]

[6] Readers can identify these on their own. A reference list is at www.logicalfallicies.info
[7] National Environmental Policy Act, 42 U.S.C 4321 et seq.
[8] Endangered Species Act, 16 U.S.C. 1531 et seq.

is indeed correct. Forest Service comparisons do not follow however, as the BLM's operational mandate for the O&C lands is different in source legislation, establishment intent, objectives, and revenue sharing proportions. The BLM cannot deviate from these without a Congressional revision of the original authorizing legislation.[9] PRC's actual intent may be to sway a narrow politically influential audience so that Congress might consider changing the law, rather than to accurately inform an interested public about O&C management optimality.

The O&C statute's language clearly focuses management objectives on timber commodity production with a rationale driven by the economic health of local communities and industries. The act itself speaks only vaguely to intangible environmental values, and that is limited to watersheds and stream flows.

> *. . . for permanent forest production, and the timber thereon shall be sold, cut, and removed in conformity with the principal of sustained yield for the purpose of providing a permanent source of timber supply, protecting watersheds, regulating stream flow, and contributing to the economic stability of local communities and industries, and providing recreational facilities . . .(43 U.S.C. §1181a)*

The O&C timber harvest income was assigned to the counties to compensate them for removing the lands from private ownership. For many years, the gross revenues were split with 50% returned to the O&C counties, 25% is reinvested for the counties into O&C lands forest management for future returns, and 25% is returned to the U.S. Treasury. Currently revenues are split 50% to the counties and 50% to the treasury. There are also temporary "safety net" county payments.[10]

Suggesting that the O&C Act's primary fiduciary objective could be ignored by BLM is a false dilemma of the most basic type. The objective was reconfirmed by a 2003 settlement of a 1999 lawsuit brought by the American Forest Resource Council and the Association of O&C counties. The settlement initiated the Western Oregon Plan Revision[11] planning process to substantially increase the O&C lands timber harvest. This resulted in the 2008 Resource Management Plan (2008 RMP). A subsequent lawsuit reverted the 2008 RMP back to 1995 activity levels until a new, current planning process could be completed. The current BLM planning process is also likely a target of the PRC paper.

The sheer number of lawsuits and public meetings, and the investment in planning, indicate how important an O&C lands resolution is. This PRC study by Niemi offers confusing and distorted non-market valuations that distract from the actual economic impacts of policy alternatives. The audience of residents and local officials want to understand impacts on local government, services, employment, and on their overall economy. From our point of view, the Governor's

[9] O&C Lands Act of 1937, 43 U.S.C. 1181 a-f.

[10] The Secure Rural Schools and Community Self-Determination Act of 2000 specified temporary compensation to counties for NW Forest Plan reductions of federal timber harvests.

[11] See www.blm.gov/or/plans/wopr/

study of the O&C issues[12] and 2008 RMP are more even handed treatments of alternatives. We would expect the results of the current BLM planning process to be similarly balanced.

The guidelines of the O&C Act have a long history, but they show a continual decline in the exercise of the mandated commodity output. From 1962 to 1974 these lands yielded annual harvests of about 1.2 billion board feet (MMMBF). From 1994 to 2012 the annual cut stayed below 200 million board feet (MMBF) per year.[13] The Governor's study analysis showed varying long-run yield potentials of 500 to 700 MMBF/year.

This snippet of facts calls into question Niemi's overall use of forestry terminology. Two definitions are misused to make them pejorative. He contends in numerous places that the BLM's current or expected practices are "industrial" management, and that the range of projected harvests are "unsustainable." BLM's forestry practices have actually been highly constrained and of low intensity since the early 1990's. Any that have been seriously considered for the future have been similarly constrained.

Typical industrial timber management for west-side mostly high growing site land would be extremely intensive with growth stimulation practices and short harvest rotations (35 to 60 year cycles). Even this industrial intensity is achieved under the environmental protection constraints of the Oregon Forest Practices Act. With the vast majority of BLM lands currently in protected categories, very long harvest cycles, and little regeneration harvests occurring on any of the BLM lands, it is hard to imagine how Niemi can label BLM's management as "industrial."

Even Niemi's rejection of BLM management as not "sustainable"[14] is an exaggeration. True industrial management on the O&C lands would have timber sustainable yields that would be several times higher than the BLM has achieved in recent decades and would exceed the highest outputs ever achieved by the BLM. Simple classical forest regulation formulas suggest that annual harvests could approach, and probably exceed the BLM's highest annual harvests and still meet the technical definition of "sustained yield."[15]

Considering non-commodity sustainability, the 2008 RMP analysis carefully included expertise to balance considerations of all relevant environmental dimensions including endangered species habitat and water quality. The PRC report clearly disagrees with their reconciliation. Niemi must

[12] Tuchman, Thomas and Davis, Chad. Feb 6, 2013. The O&C Lands Report. Prepared for Oregon Governor John Kitzhaber. This report discusses O&C issues and is a good factual reference. It was also cited by Niemi.

[13] Tuchman and Davis. 2013. Opus cit.

[14] Sustainability is long-term maintenance of well being, with system demands reconciled in ecological, economic, political and cultural dimensions. Under the Brundtland Declaration of 1987: "Sustainable development is development that meets the needs of the present without compromising the ability of future generations to meet their own needs."

[15] Sustained yield "implies continuous production with the aim of achieving, at the earliest possible time, an approximate balance between net growth and harvest." Society of American Foresters. 1964. Forestry Terminology.

be using a different definition of sustainability than the diverse set of resource professionals who produced the 2008 RMP.

3. Errors in Production Possibilities Function Interactions.

A production possibilities function shows alternative combinations of output options for a particular resource base. As forests are complex and could provide an extreme variety of mixed commodity products and environmental services, an important early step in management is to quantify the relationships between sets of outputs and even their secondary effects. The interactions can be:

(1) **competitive**, meaning that gaining one output causes some rate of trade-off loss in another;

(2) **complementary**, meaning that there is a symbiosis between outputs, i.e. management can enhance both in some proportions simultaneously; and

(3) **supplementary**, a condition where one output has little effect on another and separable management is possible.

These environmental and managerial interactions have been quantified to some extent for many forested ecosystems. The Douglas-fir ecoregion is one of the most intensively studied. Although Niemi makes extreme competition seem like the norm (e.g. wilderness and timber harvests are mutually incompatible), it is actually fairly rare. Mild competition is frequently encountered (e.g. water quality is temporarily reduced by logging), but trade-off rates in mild competition are finite and trade-offs can be balanced. A state ignored by Niemi, complementarity, can be thought of as management symbiosis. As practices to increase one output occur, other forest outputs or attributes are improved as well. Complementarity has been found to be a surprisingly common interaction.

The whole emerging concept of forest restoration is predicated on the finding that actively managed forests are extremely complementary in most dimensions.[16] Managed forests are healthier, have more diverse habitats, increase carbon sequestration, more pleasant to recreate in, increase financial returns and employment, improve local economies and reduce the risks and costs of wildfires. The joint responses to management choices are quantifiable. Just in the topic of wildlife habitat requirements, studies a decade ago at both Oregon State University[17] and University of Idaho applied mathematical programming to optimize multiple species habitats by targeted logging to enhance forest stand structures.

[16] FEI 2012b opus cit.

[17] Nalle, Montgomery, Arthur, Schumaker, and Polasky. 2004. Modeling joint production of wildlife and timber in forests, *Journal of Environmental Economics and Management* 48(3):997-1017 (51, 66)

Niemi carefully chooses only those few interactions that are extremely or highly competitive and ignores the spectrum of all other types of interaction. This makes his argument seem persuasive, but this is a fallacy of exclusion at its best. Even in his chosen examples there are some misconceptions of relevance and some striking errors.

Spotted owl habitat is often used as an example of extreme competition. Their nests require old growth Douglas-fir. There are two problems with using this example in the current paper. First, nesting habitat is already set aside in all of the BLM planning to date and there are no proposals to harvest owl nesting areas. Much of the remaining O&C lands have been actively managed for 70+ years and no longer fit the required nesting habitat ecological profile. Other recent evidence that he conveniently left out suggests that spotted owl feeding habitat requires more open younger forests as would be found in managed stands and new findings show that owl extinction risks may be reduced with active forest management.[18]

Another spurious example is the discussion of carbon storage values. Niemi estimates lost carbon storage values of $80,000/acre. This sounds like an astounding opportunity cost of active management. However, we think that he has been confused by the extensive biomass that is indeed present in heavily stocked old-growth Douglas-fir stands. He assumes more timber left standing for 800-1000 years equates with more long-run carbon sequestration, but it doesn't. Carbon sequestration is tree growth rate based and is actually highly complementary. Most of the studies of forest carbon sequestration point out that forest carbon is actually stored more effectively as final woods products tied up in long term applications (e.g. houses). They find that cycling trees more rapidly maintains younger optimal C_2 sequestration rate age classes. The University of Washington (UW) specializes in forest sequestration optimization calculations. These studies are at odds with the Oregon State studies cited in the PRC paper. The UW authors recommend very active management in these ecosystems with timber harvest rotations almost as short as financial cycles.[19] The $80,000/acre carbon storage value is wrong and deliberately misleading. Preserving older forests should actually have a small negative carbon storage opportunity cost instead of the huge positive storage value that Niemi estimates.

Water yield and quality trade-offs are legitimate concerns to a limited extent. Managed trees do drink more, older stands do capture fog, and there is increased sediment yield for several years following logging. As to the loss of water from active management, it only has Niemi's value loss if water is a scarce commodity. For example, if there were long-term water deficits in this ecosystem, maintaining water yield and fog extraction would be more relevant. However, annual precipitation ranges from 40 to 60 inches annually across western Oregon in most O&C forests. Many of the higher elevations receive 80 to 100 inches with spots approaching 160.[20] It is the

[18] Roloff, G.J., S.P. Mealey, and J.D. Bailey. 2012. Comparative risk assessment for protected species in a fire-prone landscape. *For. Ecol. Mgt. 277:1-10.*

[19] Perez-Garcia, Lippke, Comnik and Manriquez. 2005. An Assessment of Carbon Pools, Storage, and Wood Products Market Substitution Using Life-Cycle Analysis Results. In Wood and Fiber Science 37:140-148.

[20] Oregon Climate Services maps.

value of the marginal water loss that is relevant, not the average value as used in the PRC report. To those of us living in 24"/year forested ecosystems, we have trouble assigning a tangible marginal value to more frequent tree cycling losses where water is not actually scarce. As to sediment yield from logging, for up to three years following entry, there is trade-off similar to the one cited. There is also annual sediment yield from forest roads. On the O&C lands, and all private forests, required mitigation practices are already employed to minimize this cost.

Finally, we are concerned that the recreation values were deliberately biased. The citation of high unroaded existence value in the Northern Cascades is irrelevant to O&C lands that have been heavily roaded for decades. O&C lands were originally selected by the O&C Rail Line in an alternating square miles pattern. They and the intermixed private lands are primarily timberlands with extensive road networks and reciprocal right-of-ways. Any lands withdrawn for old growth habitat or riparian reserve might retain high unroaded value, but there is very little of the land base that would qualify for that foregone value.

With regard to other outdoor recreation, attribution of statewide recreation benefits to specific O&C lands is spurious. The O&C lands are managed with relatively little emphasis on recreation facilities or benefits. Most of what occurs is dependent on road access. Further, the PRC study uses a foregone recreation value of $5,000 per acre for the O&C lands. There are national forest lands nearby that offer developed recreation facilities and this value might apply to them. BLM management has provided little targeted recreational opportunity. There are no ski areas, public marinas or other developed recreation assets that provide substantial recreation benefits. Recreation on the O&C lands is confined primarily to dispersed recreation such as hunting and fishing. However, most forest recreation is a complementary output to timber production and it could be expanded even more with additional investment. Motorized, and access for non-motorized, dispersed recreation are complements in managed forests. The same can be said for the potentially large mushroom and floral greens outputs. If tangible benefits of recreation and non-timber products could be captured as receipts to O&C counties, BLM would be remiss in not increasing timber lands access so that a recreation revenue source might be developed.

4. Valuation Methodology and Comparisons Errors

The most widely accepted approach to valuation of non-market land management benefits is "contingent value" analysis. This approach examines the "willingness to pay" of users for ecosystem services that are delivered by public lands.[21] Contingent value studies typically collect data from users such as recreation or ecosystem services groups and estimate how much these users would be willing to spend for such services from public lands. This can offer a "proxy value" for what recreationists would be "willing to pay" for the ecosystem services (e.g. recreation) provided by the public lands. The PRC study did not use this widely accepted

[21] Loomis, John. 1999. Contingent value theory in the U.S. institutional framework. In: Bateman and Williss. Valuing Environmental Practices: The Theory and Practice of Contingent Valuation. Oxford University Press.

approach. Instead Niemi used an unusual approach of trying to estimate (without the benefit of any local field data) the recreation value, the watershed value, etc. of the O&C lands. This per acre approach is also not very useful for land managers because there is no straightforward method for tying the analysis into different management actions on specific unique acres.

Analysts have to be very careful with values of intangibles. Usually they are measured in total willingness-to-pay terms instead of the marginal values represented by actual market transactions. This makes them not directly comparable. An example of the potential distortion would be forest amenity and timber values. Amenity values are usually all inclusive of the highest amenity personal value aggregated down to the minimal value of the last almost unwilling participant. They include the amounts of excess value (dubbed consumer surplus) above any marginal fee. If wood were handled the same way, it wouldn't stop at the log price, but might include the value of warmth and shelter of all homeowners when lumber becomes a house and the value of sanitation when it becomes toilet paper. These are two non-comparable types of value as total values are by definition larger than marginal ones.

A second concern is the Niemi's aggregation of intangible values—he just adds them up. When there are values of carbon fixation and values of habitat from an acre of forest, they occur simultaneously and interactively. The same acre of forest produces both of these together (along with many other attributes) so that a forest has a single integrated value for producing a whole bundle. To separate different values and just add them up independently recounts the same integrated value over and over. Back to the house example, when a house is purchased it produces a bundle of services: shelter, warmth, status, social connectivity, aesthetics etc. One can calculate the change in house value at the margin for a differing feature, say a better neighborhood, but the other services are still being produced simultaneously. When you buy a house you buy the whole package.

Misattribution happens again when the PRC study attributes a value of $20,000 per acre to the 905,100 acres of O&C lands that are in late successional stages for spotted owl habitat. This is a total value of $18 billion dollars. First, these are lands that are not in the active management acreage base, so the posited value would be irrelevant in the O&C debate even if it is right. Second, there is a logical inconsistency. The PRC cites data on sales of western Oregon timberlands that finds a market value of less than $5,000 per acre.[22] And this citation again shows the perils of mixing market values (sales values of timberlands) with non-market values (existence values for spotted owl habitat). A person buying intact forest buys all the intangible values plus the commercial values together as a package for $5000/acre, i.e. the aggregate of all values is the lower marginal price/acre.

[22] Rasmussen. 2012. Western Timberlands Market Value Drivers and Trends. For Western State Land Commissioners.

There are all sorts of value comparison errors that are related. For example, the PRC study links a variety of water quality related goods and services to O&C land management. For each of these values a high intangible value is assigned. A value of $1,000 per fish for is used for coho salmon. Market values for wild salmon can be determined exactly by surveying fish processing facilities.[23] On the Pacific coast, salmon typically sell for less than $50 per fish. This illustrates how mixing non-market values ($1000/salmon) with market values (more like $40/ fish) produces biased and confusing results.

5. Secondary Effects Scale/Resolution Errors:

FEI specializes in the estimation of secondary effects so we are quite sensitive to misuse of these types of analyses. Niemi states that the difference between what he calls "industrial timber management" and conservation could be about 5,500 jobs in western Oregon. This figure is based on a study prepared for the Oregon Governor's Office.[24] That study is limited to direct timber jobs with no indirect or induced jobs included. The 2008 RMP estimated that total jobs associated with a modest increase in O&C timber activity would be 12,390.[25] Niemi contends that his asserted number of direct jobs is only about 0.3 percent of Oregon's current labor force, and a smaller percentage of a larger labor force in the future. Notice the masterful cherry picking and false comparison. If opponents said that the number of spotted owls lost to clear-cutting all the Douglas-fir is small relative to the total number of birds in the United States, they would be justifiably ridiculed.

Comparing jobs lost in a particular region of Oregon to jobs created throughout the state is a spurious comparison. It simply shows how increasing the geographic scale of analysis can absorb almost any economic impact. Comparing timber jobs created in places like Riddle and Glendale to job growth in the entire state provides an inaccurate view of the economic impacts of increased timber sales. Timber sales directly benefit regions of the state that have experienced significant job losses in the recent recession. Increased timber sales should provide valuable family wage jobs in regions that were hardest hit by the recession. A more appropriate analysis would compare this O&C job change with timber jobs losses in the eighteen western Oregon counties in the past recession (2006-2011).

Economic recovery in Oregon has been concentrated in the I-5 corridor and around Bend, leaving rural areas of the state (many of the O&C counties) in a continued recession. Many of the smaller western Oregon communities are timber dependent. A recent study for the State of Oregon (OFRI, 2012), found that timber supply is a key issue in recovery of the timber industry. Recent mill closures such as Rough and Ready Lumber Company have a major local impact. One has to ask the question: "If we preserve more spotted owl habitat, who will be left to enjoy

[23] Gunnar Knapp, 2012. Trends in Alaskan Salmon Markets. University of Alaska.
[24] Tuchman and Davis. 2013. Opus cit.
[25] FEI 2008. RMP Chapter 4 p. 541. Opus cit.

it." Increased ecosystem services such as spotted owl protection may benefit the residents of Portland, at the cost of residents of Cave Junction, Roseburg and Coos Bay.

The relevant scale for comparisons is scale at which effects occur. This ecological premise is equally true for economic impacts. The job losses from not harvesting timber (and not transacting through local economies) are significant economic impacts. The technology exists (and we used it in the 2008 RMP) to identify not only economic effects, but also who bears them. Such resolution should be quantitatively examined by the BLM in respect to O&C policy alternatives. Local officials need to know geographically where these impacts will be felt.

The PRC report cites high environmental values, but shows no solid evidence of off-setting job creation in ecosystem services. Ecosystem services do create some jobs, but the report does not identify or quantify these jobs. It just belittles the estimated number of commodity resource jobs. A more persuasive approach would have been to quantify job creation in areas such as watershed restoration.

As for linking global climate change to policy options on the O&C Lands, that is good example of the degree to which the report overstates environmental consequences of logging.

Conclusion

We enjoyed reading the PRC report authored by Mr. Niemi, but it was entertainment of a perverse nature. It gave us an opportunity to enumerate and correct lots of popular logical and technical misconceptions about valuing and incorporating environmental intangibles in management. Our degree of criticism was higher than we had expected because our previous experience is limited to reviewing objective analytical studies. Viewed instead as an instrument of persuasion, the PRC report is probably effective rhetoric. It is filled with hot button issues, it cites lots of big ticket costs of O&C commodity management, and the conclusions are targeted to reinforce positions already held by many who would read it. However, we would not consider this report to be a serious contribution to resolving the thorny questions of appropriate O&C land management direction.