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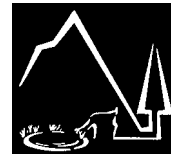
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Issue Brief No. 10

September 2007



Timber Harvests and Receipts from National Forest System Lands in Idaho

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Prepared for the National Forest System and Woody Biomass Interim Committee
of the Idaho Legislature, addressing questions raised during its meeting on August 7-8, 2007

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College of Natural Resources Policy Analysis Group – University of Idaho

Established by the Idaho legislature in 1989 to provide objective analysis of the impacts of natural resource proposals.

Issue Briefs are timely summaries of research reports relevant to current natural resource topics.

Introduction

During the 2007 session of the Idaho Legislature two concurrent resolutions (HCR 26, HCR 27) authorized the creation of interim committees to address two forestry issues. Subsequently an 8-member National Forest System and Woody Biomass Interim Committee was appointed and given a charge “to study the decline in receipts on national forest system lands and to study issues related to woody biomass and incentives to make woody biomass available to be processed into value-added products.” The committee met in Boise on August 7-8, 2007, to hear testimony. Committee members raised several questions needing additional analysis.

This document replies to ten questions about timber harvests on and receipts from National Forest System lands, labeled **Q1-Q10** below. A **References** section provides a list of source documents. These appear in brackets (e.g., [Ref. #]) throughout the text. A **Glossary** provides definitions of technical terms as well as abbreviations like MBF and MMBF.

Other Policy Analysis Group documents provide information about woody biomass availability. Because 81% of the forest growing stock inventory in Idaho is on NFS lands, in large part woody biomass availability questions are related to NFS land management

Q1. Which National Forest System (NFS) lands in Idaho have “special designations”?

A large portion of Idaho (20.4 million acres, or almost 39% of the state) is part of the National Forest System (NFS). These lands are administered by the U.S. Department of Agriculture – Forest Service. The committee is to address “only those lands that do not have special designations” (HCR 26, line 19). One way to interpret this mandate is to consider the “special designations” that Congress has made for NFS lands in Idaho (Table 1).

Special designations <u>a/</u>	Acres	% of Total
National Forest Wilderness Areas <u>b/</u>	3,961,709	19%
National Wild & Scenic River Areas <u>c/</u>	159,586	<1%
National Recreation Areas <u>d/</u>	866,213	4%
Subtotal, special designations	4,987,508	24%
Other National Forest System lands	15,428,778	76%
Total, National Forest System lands	20, 416,286	100%

a/ NFS “Special Designated Areas” include the following: National Forest Wilderness Areas, National Forest Primitive Areas, National Wild and Scenic River Areas, National Recreation Areas, National Scenic-Research Areas, National Game Refuges and Wildlife Preserve Areas, and National Monument Areas.

b/ Areas designated by Congress as part of the National Wilderness Preservation System.

c/ Areas designated by Congress as part of the National Wild and Scenic River System.

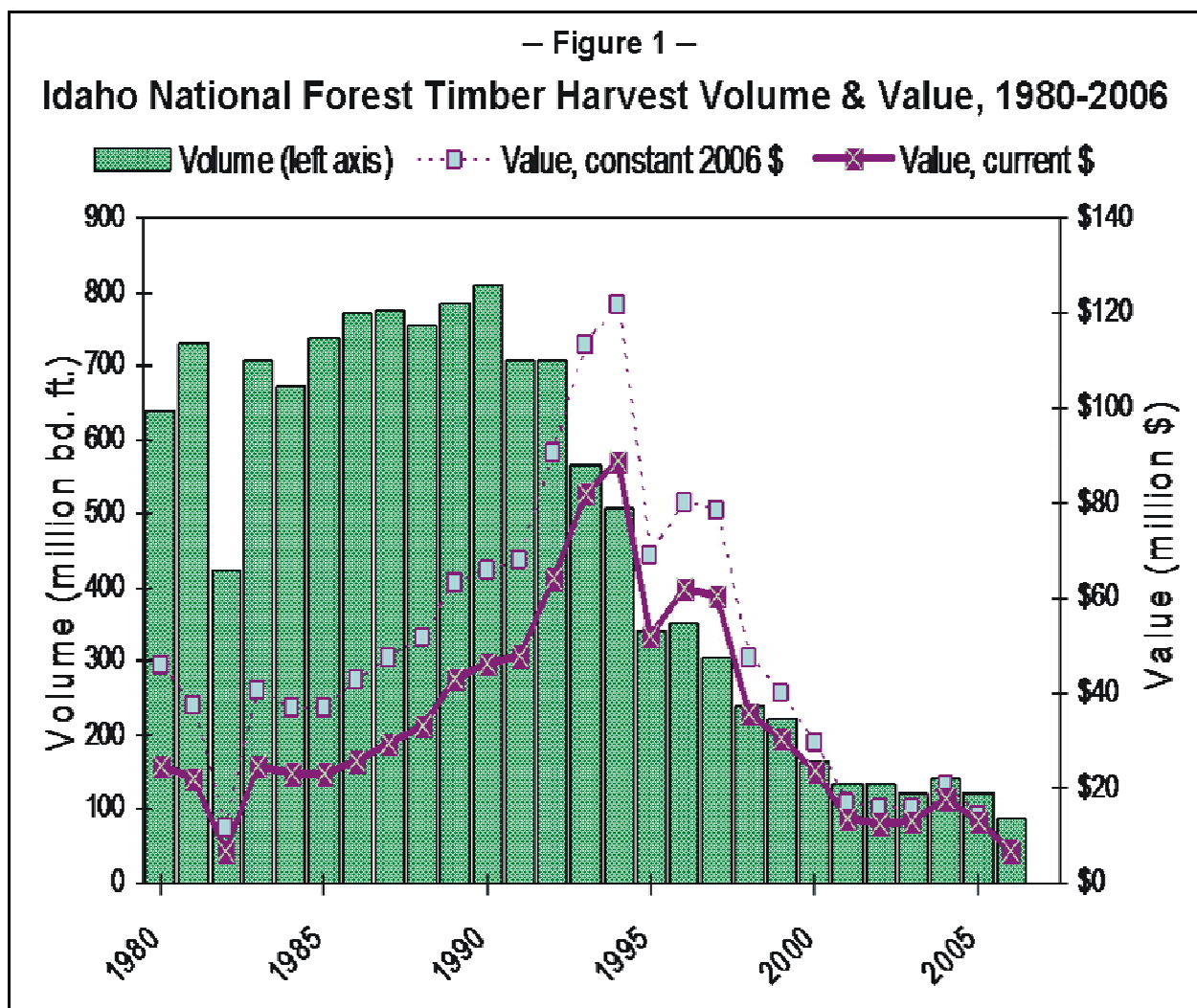
d/ Areas established by Congress for the purpose of assuring and implementing the protection and management of public outdoor recreation opportunities.

Source: Compiled from U.S. Forest Service data [Ref. #1 – see **References** section].

Q2. What about “roadless” areas? Several people testified in August that the “roaded front” is where they believed efforts to increase NFS receipts should be focused. In other words, they felt the committee should not consider “roadless” areas. It is not clear if the intent of HCR 26 is to exclude “inventoried roadless areas” – an administrative designation of the Forest Service.

Facts. The Forest Service has identified 9,322,000 acres of Idaho NFS lands as “inventoried roadless areas” (45% of the total). Within these roadless areas, 5,666,000 acres (27% of the total) are allocated to prescriptions that allow road construction and reconstruction, with the remaining 3,656,000 acres (18% of the total) allocated to prescriptions that do not allow roads; of these, the Forest Service recommends 1,371,000 acres (6% of the total) as additions to the National Wilderness Preservation System [Ref. #2].

Q3. What is the volume and value of timber harvested recently from National Forest System lands in Idaho? From 2001-2006 an annual average of 125 million board feet (MMBF) of timber was harvested, producing inflation-adjusted (i.e., constant) average annual receipts of \$15 million (Figure 1). This works out to an average unit value of \$120/MBF. Between 1990 and 2006, annual harvest volume and value have declined by 90% (Figure 1).



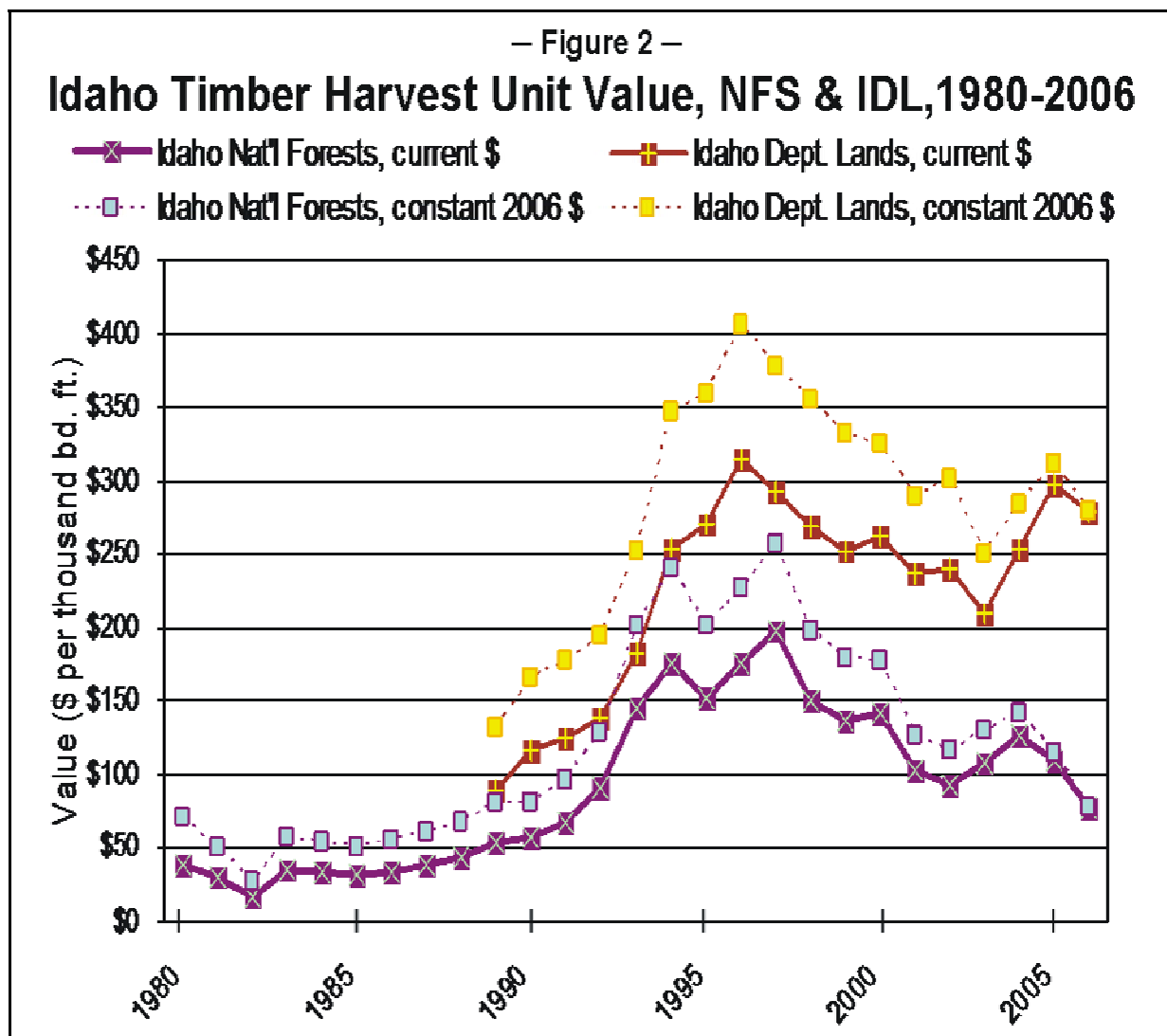
Source: Compiled from U.S. Forest Service data [Ref. #3].

Q4. What quantity of timber harvest would match the Craig-Wyden payments? The “Craig-Wyden” payments to Idaho and the other 43 states with NFS lands are appropriated from the federal treasury under the Secure Rural Schools and Community Self-Determination Act of 2000. Payments to Idaho in 2006 were \$24,379,258 [Ref. #4]. At the revenue-sharing rate of 25%, the Forest Service would need timber receipts (i.e., gross revenues) of \$97,517,024.

What quantity of timber does \$97.5 million represent? This analysis uses a range of assumptions based on four value scenarios. To summarize results, somewhere between 263 and 813 MMBF could provide receipts to match Craig-Wyden payments.

Scenario A. Timber from NFS lands will have a value of \$120/MBF, similar to the NFS inflation-adjusted average for 2001-2006 (Figure 2, constant 2006 \$). At \$120/MBF a harvest of 813 MMBF could provide Craig-Wyden payments of \$97.5 million.

Scenario B. Timber from NFS lands will have a value similar to the inflation-adjusted average of \$210/MBF attained between 1993-2000 (Figure 2). At this value Craig-Wyden payments could be met with a harvest of 465 MMBF.

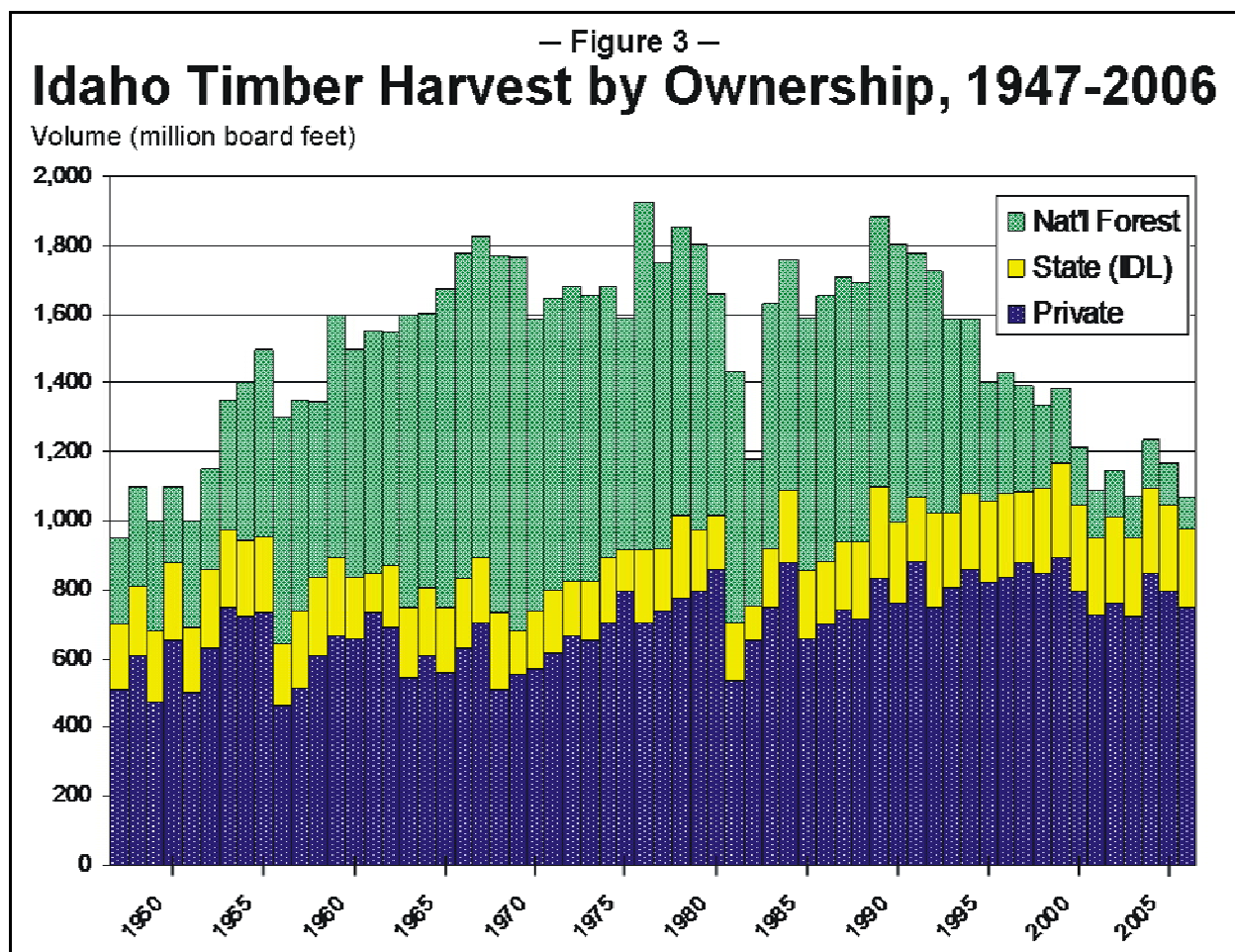


Source: Compiled from U.S. Forest Service data [Ref. #3] and Idaho Dept. of Lands annual reports; current \$ adjusted for inflation with Producer Price Index for All Commodities, U.S. Dept. of Labor, Bureau of Labor Statistics.

Scenario C. Timber from NFS lands will have a value similar to that of 2005-2006 harvests from Idaho's endowment lands managed by the Idaho Department of Lands (IDL), or \$288/MBF (Figure 2). At this value a harvest of 339 MMBF could provide the Craig-Wyden payments.

Scenario D. Timber from NFS lands will have a value similar to that in private markets, with the mix of timber species in proportion to the sawtimber growing stock inventory on NFS lands. Analysis in the Appendix (Table A-3) identifies \$370/MBF as a current "average" stumpage value. At this value a harvest of 263.5 MMBF could provide Craig-Wyden payments. This is almost the same as the 265 MMBF allowable sale quantity in forest plans [Ref #5].

Conclusion. Timber value scenarios C and D may be too high, and A too low. Scenario B is a lower-middle-range estimate of \$210/MBF, the inflation-adjusted average for NFS timber during 1993-2000. It is less than what IDL received in 2005-2006 (\$288/MBF), thus maintains the historic difference between NFS and IDL stumpage values (Figure 2). Although a harvest of 465 MMBF is higher than the NFS average of 338 MMBF/year between 1993-2000, it is not much different than the 414 MMBF/year from 1993-1998 (Figure 3). But it is considerably less than the annual average of 762 MMBF from NFS lands between 1955-1992 (Figure 3).



Source: Adapted from University of Montana data published by the University of Idaho [Ref. #6].

Q5. Why is National Forest timber value less on a per-unit basis than other timber?

The difference between the value of timber from NFS lands and state (IDL) or private lands is the quality of timber, different harvesting and/or road building specifications, different board-

foot measurement scales, or a combination of these and perhaps other factors related to different management objectives. Between 1989-1993 the current value of timber from NFS lands averaged \$83/MBF, or 37% less than IDL (\$131/MBF, Figure 2). The difference diverged even more during 1994-2000 (41% less for NFS at \$162/MBF than IDL at \$274/MBF). Divergence continued to increase in 2001-2006 (59% less on NFS at \$103/MBF than IDL at \$253/MBF, Figure 2), perhaps due to diseconomies of scale from smaller quantities of timber harvested on NFS lands, and/or requirements that small-diameter material or low-value biomass be removed.

Q6. How much does it cost the Forest Service to sell timber from NFS lands in

Idaho? This question was implied by some of the discussion that took place at the interim committee meeting in August 2007. For the purposes of determining an equivalent amount of timber harvest receipts equivalent to Craig-Wyden payments, this question is irrelevant. The 25% fund payments from Forest Service revenues are made based on gross receipts from timber sales and other revenue sources [Ref. #4].

Q7. Does a timber harvest level matching the Craig-Wyden payments seem

reasonable? One can begin to reply by comparing the lower-middle harvest scenario of 465 MMBF (**Q4 – Scenario B**) with past harvests. The historic high harvest from Idaho NFS lands was 1.08 billion board feet (BBF) in 1969; between 1955-1992 NFS lands provided 762 MMBF per year on average (Figure 3). Over the past 55 years NFS sawtimber growing stock inventory increased from 89 BBF in 1952 to 102 BBF in 1987. By 1997 NFS inventory had increased to 127 BBF, or roughly 30 billion cubic feet [Ref. #7]. In 2006, NFS growing stock volume was 29.5 billion cubic feet (Table 2). Because timber growing stock increased during the 1960s to 1980s, by historic standards 465 MMBF seems reasonable. But there is more to be said.

	Timberland Acres	Growing Stock Inventory (MCF)	Annual Forest Inventory Change Factors (MCF)			
			Net Growth	Mortality	Removals	Wood Increment*
Idaho forests, total	16,658,000	36,562,000	597,537	374,965	245,735	726,763
Idaho forests, NFS	11,995,000	29,457,000	354,339†	320,220†	24,500‡	650,059
NFS % of total	72%	81%	59%†	85%†	10%‡	89%

MCF = Thousand cubic feet.

* Wood increment is gross annual growth (i.e., net annual growth plus annual mortality) minus annual removals; it represents the total annual addition of wood from forest growth to timber inventory.

† Estimate derived from NFS % of total in 2002 [calculated from Ref. #8].

‡ Estimate based on 2006 timber harvest of 89 million board feet [Ref. #3] (converted to cubic feet at a factor of 5.3 board feet per cubic foot [Ref. #5]), plus a small allowance for small-diameter material or harvested biomass not measured in board feet..

Source: Compiled from U.S. Forest Service data [Ref #9] except as indicated by *, †, and ‡ symbols.

Forest Service managers prepare forest plans with a 10-15 year outlook, including designation of suitable timberlands and identification of an annual allowable sale quantity (ASQ) that sets the upper limit for timber harvests. The current plans for Idaho NFS lands identify an annual allowable sale quantity of approximately 265 MMBF [Ref. #5]. A harvest of 465 MMBF is therefore not reasonable because it is higher than the ASQ in current forest plans.

The “reasonableness” of any timber harvest level on NFS lands today is judged by whether a variety of values other than timber can be sustained. Such value questions are debated in public forums each and every time the Forest Service revises a forest plan or designs a project involving the manipulation and removal of forest vegetation.

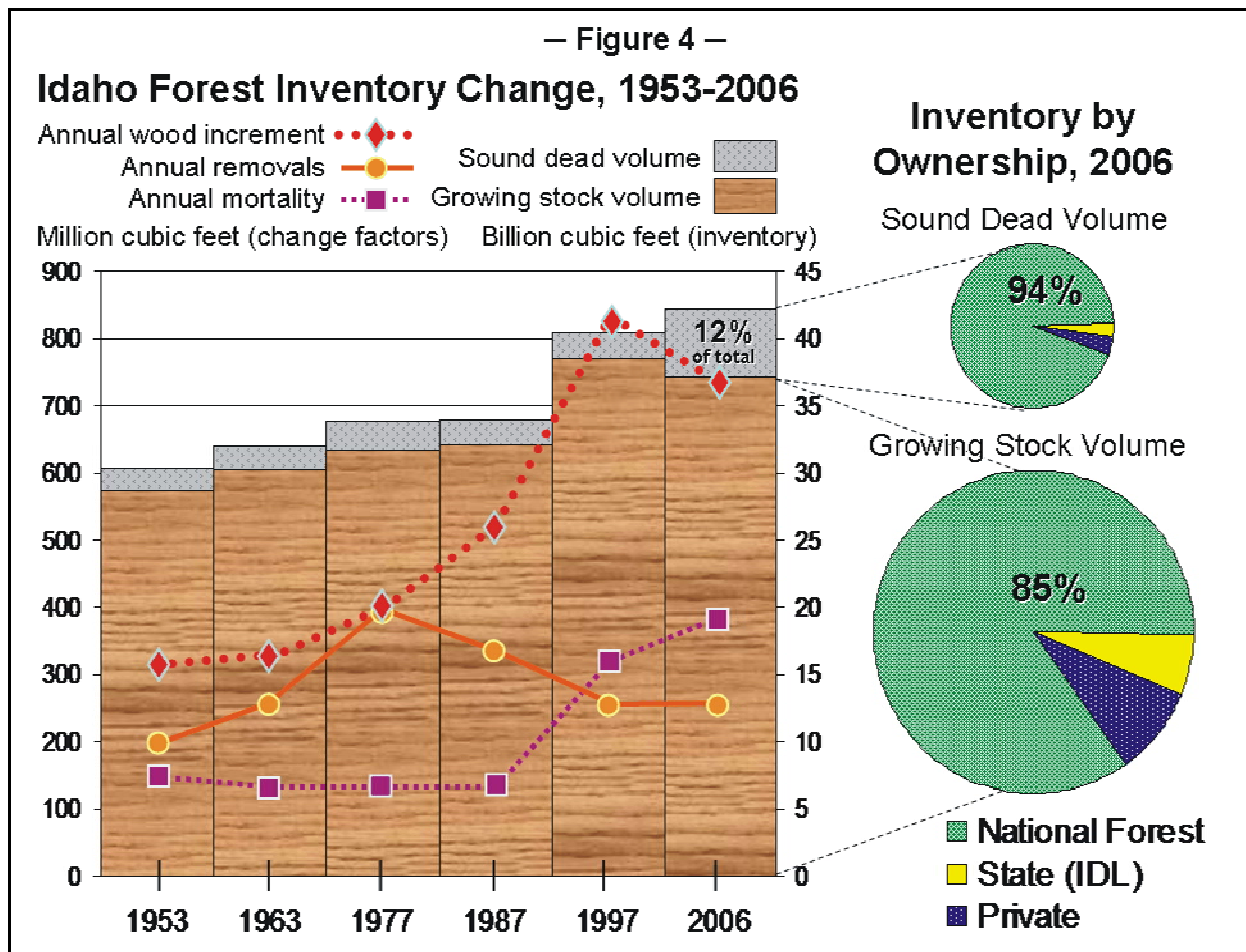
Q8. What timber harvest level is sustainable on Idaho national forests? Centuries ago foresters devised a simple rule of thumb for sustained yield of timber: cut no more in a given time period than the forest grows (e.g., annual harvest should not exceed annual growth). During the 1960s, '70s and '80s, NFS lands provided an annual average of 762 MMBF, about half the annual growth, indicating this harvest level is sustainable. Since then harvests have declined to accommodate social concerns that have little relation to timberland productivity.

Seldom entering deliberations about timber harvest levels are basic facts about the growth and mortality factors that drive forest dynamics. The NFS lands are a large component of Idaho's forests: 72% of the timberland acreage, 81% of growing stock inventory, 85% of annual mortality, 89% of the wood increment added each year, but only 10% of the timber harvest (Table 2). In 2006, removals from all forests (mostly harvests) were 246 million cubic feet, or enough to cover a football field with wood stacked one mile high. That is a lot of wood, but only a fraction of what trees add each year. In 2006 Idaho's forest growth contributed new wood amounting to 972 million cubic feet (net growth plus mortality, Table 2), or roughly 4 billion board feet of timber. This could cover a football field with wood stacked four miles high. In 2006 insects, diseases, wildfires, and other causes of tree death left 375 million cubic feet of dead wood in Idaho's forests.

In 2006 the net annual growth on Idaho NFS lands was 354 million cubic feet (Table 2), equivalent to roughly 1.5 billion board feet (BBF). This is more than enough to offset the 813 MMBF harvest needed to generate Craig-Wyden payments at a timber stumpage value of \$120/MBF (**Q4 – Scenario A**). Indeed, Idaho's NFS lands grow 3 BBF per year. Mortality, like timber harvest, reduces forest growing stock each year, and in 2006 was about half (48%) of the gross growth. In 2006, removals from NFS lands were approximately 10% of removals from all Idaho forests. Mortality on NFS lands, however, was 13 times more than removals; net growth was almost 15 times greater than removals (Table 2).

Forest Service Chief Emeritus Dale Bosworth (University of Idaho '66) addressed the issue of annual growth in excess of removals, like the situation in Idaho. He wrote, “Forests are overcrowded with trees. Beset by drought and under stress from competition, the trees are more susceptible to insect attack and catastrophic fire than ever before. ... We have some 73 million acres of national forest lands at risk from wildland fires that could compromise human safety and ecosystem integrity. ... The situation is simply not sustainable—not socially, not economically, not ecologically” [Ref. #10].

Q9. What about wildfires and “forest health” conditions? The short answer is, current conditions could be improved by removing some trees. Forest inventory data reveal conditions on Idaho’s NFS lands that do not bode well for their ability to sustain some of the values people want. The Forest Service began collecting periodic inventory data in 1952 on all U.S. forests for the purpose of compiling national statistics on timber resources. Periodic inventories have shown that more wood was added to Idaho's forests each year than was removed (Figure 4).



Source: Compiled from U.S. Forest Service data [Ref. #7, #9, and other forest resource reports].

These inventory data (Figure 4) tell a story about forest change. Between 1977 and 1987, removals declined, but mortality stayed about the same, as did growing stock inventory. The annual wood increment in 1987 was higher because removals were lower. In 1997, removals declined and mortality increased considerably. Nevertheless between 1987 and 1997 growing stock inventory increased by more than 5 billion cubic feet. Between 1997 and 2006 something different happened. Inventory continued to accumulate as removals stayed about the same, but as Idaho’s forests became more dense (i.e., more growing stock volume per acre), more trees died and the amount of dead wood increased, accounting for 12% of the wood volume in the forests, much more than in earlier periods.

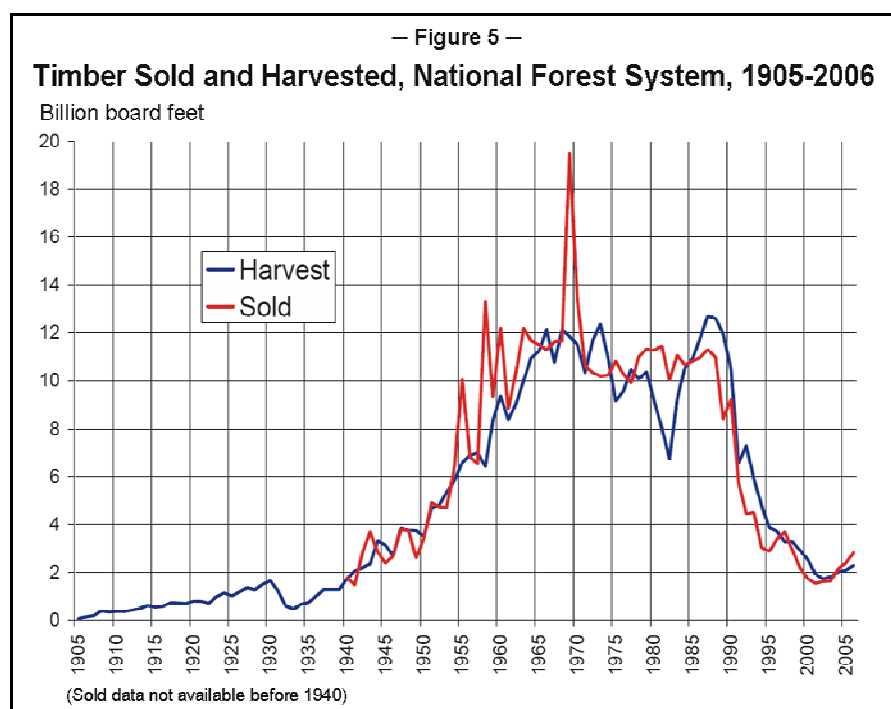
Forest conditions on NFS lands. In 2006 mortality in Idaho’s forests was the highest it has been since the Forest Service began taking inventory in 1952; dead wood was especially prevalent on NFS lands, as the smaller pie chart indicates (Figure 4). In some of Idaho’s

fire-adapted forest types, this large increase in flammable fuels might not be desirable. National forests are denser and have higher mortality rates than forests in other ownerships, not only in Idaho but throughout the western states [Ref. #13]. Due to increased mortality, growing stock inventory declined in Idaho between 1997 and 2006, a period during which removals on all forest lands did not increase (Figure 4). Harvests on NFS lands decreased from 1997 to 2006, simultaneous with a large increase in the quantity of dead trees (Figure 4). Idaho's forests currently include 98 million dry tons of sound dead biomass, which is 30% of the nation's total and more than any other state, with Montana is a close second [Ref. #9]. Most of this dead wood is on NFS land (Figure 4, small pie chart).

Idaho has 8 million acres of forest lands where current fire conditions pose high or moderate risks to ecological values [Ref. #11]. Most of these areas are on NFS lands. Between 2003-2006 the Forest Service treated an average of 161,261 acres per year to reduce hazardous fuels; approximately two-thirds of that work is accomplished with "mechanical" treatments (usually thinning), and one-third with prescribed fire [Ref. #12]. Thinning can include removal of small trees and woody biomass from the site, making it available for utilization, or thinnings may be piled and burned on site. Burning precludes utilization opportunities and converts woody biomass into, among other things, carbon dioxide (a "greenhouse" gas) and smoke with its fine particulate matter (PM_{2.5}, a human health hazard). During the 2000 fire season, smoke from Idaho wildfires traveled as far away as Chicago.

Q10. When did the Forest Service timber sale program cease producing net revenue? If such were the case, NFS timber harvest trends (Figure 5) indicate this may have happened in the early 1990s, while harvests were declining from a peak of 12.7 billion board feet (BBF) in 1987 to less than 2 BBF by 2001, the lowest level since 1940. To answer the net revenue question one needs revenue data, which are obtainable [Ref. #3], and cost data, which are problematic. Timber cost accounting on NFS lands is a longstanding issue.

Robert Wolf of the Congressional Research Service investigated this in the late 1980s, at the height of concern about "below cost" timber sales. Wolf, a forester, was surprised that despite repeated Forest Service claims that the timber sale program was profitable, the agency never demonstrated that the timber program even paid its own way. According to Wolf, the main reason is "the chronic failure to account fully for all program costs" [Ref. #14].



Source: Copied from U.S. Forest Service report [Ref. #3].

APPENDIX

National Forest System growing stock by species. Table A-1 identifies growing stock volume on National Forest System lands in Idaho in board feet.

Species	GSV (MBF)	% of total
Douglas-fir (DF)	48,113,437	35.8%
Western larch (WL)	2,216,173	1.6%
Grand fir (GF)	6,399,711	4.8%
Western hemlock (WH)	2,178,394	1.6%
White pine (WP)	403,931	0.3%
Ponderosa pine (PP)	8,462,865	6.3%
Engelmann spruce (SP)	4,809,525	3.6%
Western red cedar (RC)	9,463,142	7.0%
Lodgepole pine (LP)	15,245,820	11.4%
Fir/spruce group	12,467,240	9.3%
Alpine fir/Spruce/Mountain hemlock	24,517,876	18.3%
Total softwood GSV	134,278,114	100.0%

Source: Compiled from U.S. Forest Service data [Ref. #8].

Private timber market prices. A range of recent prices received for timber products harvested from private lands is readily available from Northwest Management, Inc. (NMI), a forestry consulting firm based in Moscow, Idaho. A colleague of the author watches timber markets closely, and says that they are down 40% from two years ago. Following is a summary paragraph from their website describing log market trends in second quarter 2007:

Market Overview. The log market has continued to soften and delivered log prices for all species, with the exception of western red cedar, have dropped since first quarter. Sawmill production is easily meeting current supply needs as housing starts and overall lumber demand remain down. The western red cedar market has remained strong and prices have increased with prices over \$1000/MBF in some areas. Small diameter sawlog (tonwood) prices have remained unchanged from first quarter. Pulp prices have dropped as residual chip supply has stabilized [Ref #15].

The NMI website provides a range of values for timber products harvested on private lands in Idaho, in three regions. Table A-2 presents only the highest and lowest range across all three regions. If the National Forest made additional volumes available, one could expect a decrease in timber values as more supply interacts with market demand, so a value towards the lower end of

the range is considered an “average” value for this analysis (Table A-2).

Species	Range (\$/MBF)	“Average” value
Douglas-fir/western larch (DF/WL)	350-500	400
Grand fir/western hemlock (GF/WH)	275-420	300
White pine (WP)	250-475	350
Ponderosa pine, old-growth (PPY)	425-525	not applicable
Ponderosa pine, second growth (PPB)	170-450	300
Engelmann spruce (SP)	250-415	300
Western red cedar (RC)	450-975	500
Lodgepole pine (LP)	250-420	300
Pulpwood (\$/ton)	35-40/ton	35
Tonwood (\$/ton)	40-60/ton	45

Source: Northwest Management, Inc. [Ref. #15].

Table A-3 presents a hypothetical extension of the volumes in Table 3 and values in table 4. It is used to calculate an “average” stumpage value of \$370/MBF for sawtimber from NFS lands. This is an average weighted by the proportion of sawtimber growing stock volume by species.

Species	Volume (MBF)	Value (\$/MBF)	Hypothetical Extended Value
Douglas-fir/western larch (DF/WL)	50,329,610	400	\$20.1 billion
Grand fir/western hemlock (GF/WH)	8,578,105	300	\$2.5 billion
White pine (WP)	403,931	350	\$141 million
Ponderosa pine, old-growth (PPY)	4,200,000	n.a.	Not applicable
Ponderosa pine, second growth (PPB)	4,200,000	300	\$1.2 billion
Engelmann spruce (SP)	4,809,525	300	\$1.4 billion
Western red cedar (RC)	9,463,142	500	\$4.7 billion
Lodgepole pine (LP)	15,245,820	300	\$4.5 billion
Total	93,030,133	\$370	\$34.5 billion

Source: Tables A-1 & A-2.

Table A-3 assumes that half of the ponderosa pine growing stock is old growth, and that it will not be harvested. When the sum of the hypothetical extended values (\$34.5 billion) is divided by the inventory volume (93 billion board feet), the result is an “average” hypothetical stumpage value for all species, weighted by their proportion of growing stock inventory.

To produce receipts (i.e., gross revenues) totaling \$24,379,256 at the revenue-sharing rate of 25%, the Forest Service would have to obtain receipts of \$97,517,024. At an “average” stumpage value of \$370/MBF (Table A-3) that works out to a harvest of 263.5 million board feet per year.

A question may arise as to whether the \$34.5 billion hypothetical extended value for sawtimber growing stock on NFS lands (Table A-3) has any meaning. All one can say is that there is a huge volume of timber out there worth many billions of dollars. But \$34.5 billion is too high a value because the market could not absorb this quantity of timber all at once. The conventional wisdom in forestry is that large timberland properties are sold at a “deep discount” on the order of 40-60% of standing timber value. That does not necessarily suggest that the value of standing timber on Idaho NFS lands ranges between \$13-20 billion.

Current NFS market prices. From 2001-2006, timber harvests from NSF lands averaged 125 MMBF per year, at an average value of \$120/MBF (Figures 1). This volume each year is less than half the allowable sale quantity of 266 MMBF (Table A-4). In 2006, 89 million board feet was harvested, at a calculated “average” timber value of approximately \$78/MBF (Table A-4).

Table A-4. Idaho National Forest System timber harvest plans and harvest volume and value by NFS unit, 2006.				
National Forest System Unit	Allowable Sale Quantity (MMBF)	Timber Harvest, 2006 (MMBF)	Value, 2006 (\$)	Unit value (\$/MBF)
Idaho Panhandle	70	24.591	\$2,267,227	\$92.20
Clearwater	24	15.661	\$2,271,477	\$145.04
Nez Perce	21	10.346	\$497,155	\$48.05
Boise	66	8.970	\$367,576	\$40.98
Payette	40	14.235	\$881,405	\$61.92
Salmon-Challis	20	4.800	\$124,338	\$25.90
Sawtooth	15	5.697	\$268,905	\$47.20
Caribou/Targhee	10	4.904	\$244,206	\$49.80
Total	266	89.184	\$6,926,279	\$77.66

Source: Compiled from U.S. Forest Service forest plans [Ref. #5] and timber harvest data [Ref. #3].

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Glossary

BBF – Billion board feet.

Board foot (BF) to cubic foot (CF) conversion factors: 4.2 BF per CF for converting growing stock inventory data [calculated from Ref. #7 tables]; 5.3 BF per CF for converting timber harvest data [Ref. #5].

Biomass – Forest biomass mis for the purposes of the Energy Policy Act of 2005 defined as “nonmerchantable material or precommercial thinnings of trees and woody plants produced from treatments to reduce hazardous fuel to reduce or contain disease or insect infestations, or to restore forest health.”

d.b.h. – diameter at breast height; i.e., 4.5 feet from ground level.

Growing stock – A classification of timber inventory that includes live trees of commercial species meeting specified standards of quality or vigor. Cull trees are excluded. When associated with volume, includes only trees 5.0 inches d.b.h. and larger [Ref. #8].

MBF – Thousand board feet (**MCF** – Thousand cubic feet).

MMBF – Million board feet (**MMCF** – Million cubic feet).

Mortality (annual) – The average annual volume of sound wood in growing-stock trees that died from natural causes during the period between inventories [Ref. #8].

National Forest System (NFS) – Consists of approximately 192 million acres of federal lands in 44 states, with 87% of the acreage in the western states. These lands are administered by the Forest Service, an agency in the U.S. Department of Agriculture.*

Net growth (annual) – The average annual net increase in the volume of trees during the period between inventories. Components include the increment in net volume of trees at the beginning of the specific year surviving to its end, plus the net volume of trees reaching the minimum size class during the year, minus the volume of trees that died during the year, and minus the net volume of trees that became cull trees during the year [Ref. #8].

Removals (annual) – The net volume of growing stock trees removed from the inventory during a specified year by harvesting, cultural operations such as timber stand improvement, or land clearing [Ref. #8].

Softwood – A coniferous tree, usually evergreen, having needles or scale-like leaves [Ref. #8].

Sound dead – The volume in salvable dead trees (i.e., a downed or standing dead tree that is considered currently or potentially merchantable by regional standards) [Ref. #8].

Stumpage – The value of timber in the woods or “on the stump”; i.e., the amount a landowner is paid by a timber purchaser who then arranges logging and transportation to wood utilization facilities.

Timber (sawtimber) – Trees of commercial species; sawtimber is 9.0 inches d.b.h. and larger; smaller trees may be referred to as pulpwood, “smallwood,” poletimber, or saplings.

Timberland – Forest land that is producing or is capable of producing crops of industrial wood and not withdrawn from timber utilization by statute or administrative regulation. (Note: Areas qualifying as timberland are capable of producing in excess of 20 cubic feet per acre per year of industrial wood in natural stands. Currently inaccessible and inoperable areas are included.) [Ref. #8].

Volume (net, in cubic feet) – The gross volume in cubic feet less deductions for rot, roughness, and poor form. Volume is computed for the central stem from a 1-foot stump to a minimum 4.0-inch top diameter outside bark, or to the point where the central stem breaks into limbs [Ref. #8].

Wood increment – The annual increment of wood that is added in the forest. Other forest inventory terms do not adequately represent this because mortality is deducted from actual growth. Wood increment is calculated from inventory data as net growth plus mortality minus removals.

* The NFS dates back to 1891, when Congress authorized the president to create “forest reserves” from public domain lands under federal control. The forest reserves were given a management charge in 1897, transferred from the Department of the Interior to Agriculture in 1905, and given the name national forests in 1907. Today NFS management direction is outlined in the Multiple-Use Sustained-Yield Act of 1960; these lands are to sustain the provision of various goods and services, including wood, water, wildlife, fish, recreation, range, minerals, and, since 1964, wilderness. NFS land uses are determined by a comprehensive long-range planning process described by the National Forest Management Act of 1976 and its implementing regulations, which at this writing are being revised.