

How to Measure and Evaluate Social and Economic Sustainability in Forest Planning

[Abridged Version]

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Abstract

This discussion paper discusses requirements for assessing social and economic sustainability in National Forest planning and demonstrates a simple approach for evaluating forest plan contributions to economic sustainability. The overarching theme is that an indicator, or group of indicators, should move beyond traditional metrics of economic growth (such as jobs, income, and GDP). The Montreal Process Criterion 6 indicators and measures from the Inclusive Wealth Index are used to demonstrate how management plan alternatives can guide contributions to social and economic sustainability. These approaches are flexible, allowing planning teams to customize assessments to their forest-specific conditions, reflect available data, and account for communities of interest or other descriptions of social or economic conditions.

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I. Social and Economic Sustainability Requirements

The 2012 National Forest System Land Management Planning Rule (36 CFR 219.19; hereafter referred to as “the Planning Rule”) requires that forest plans guide management of National Forest System lands so they are ecologically sustainable and contribute to social and economic sustainability.

The Planning Rule defines sustainability as the capability to meet the needs of the present generation without compromising the ability of future generations to meet their needs. Economic sustainability refers to the capability of society to produce and consume or otherwise benefit from goods and services including contributions to jobs and market and nonmarket benefits. Social sustainability refers to the capability of society to support vibrant communities, and to support the network of relationships, traditions, culture, and activities that connect people to the land and to one another.

The Planning Rule also requires the following:

- For assessments, “the responsible official shall consider and evaluate existing and possible future conditions and trends of the plan area, and assess the sustainability of social, economic, and ecological systems within the plan area, in the context of the broader landscape” (36 CFR 219.5).
- Plan components must include standards or guidelines to guide the plan area’s contribution to social and economic sustainability, taking into account various items, one of which is multiple uses that contribute to local, regional, and national economies in a sustainable manner (36 CFR 219.8(b)). Under the Planning Rule’s provisions for Integrated Resource Management (36 CFR 219.10), one of the considerations is reasonably foreseeable risks to ecological, social, and economic sustainability.

It is expected that environmental effects analyses will include discussion of the potential impacts of plan alternatives on social, cultural and economic conditions and an evaluation of the sustainability of the major contributions of the plan area (Forest Service Handbook 1909.12, section 23.22).

Differentiating between Economic Sustainability and Economic Conditions

There is an important distinction between contributing to economic conditions (for example, growth in income or employment) and contributing to economic sustainability. We cannot presume that growth in employment or gross domestic product (GDP) in any particular sector will automatically have a positive impact on economic sustainability. Examples include populations with below-average per capita income in nations rich in oil or other natural resources, areas characterized by boom-bust economic cycles, or communities experiencing flurries of economic activity following disaster spending. Not all changes in economic conditions are created equal or ensure stability. GDP itself measures the value of final goods and services produced but not the capacity to produce.

The goal is to identify indicators that measure our capacity to sustain production as well as social and economic opportunity into the future.

II. Social and Economic Sustainability Indicators

Indicators of economic sustainability typically consist of a combination of environmental, social, and economic performance measures that allow us to determine if levels of resource *use or consumption* can be offset or sustained by levels of *investment* in resources or resource growth.² We can think of resources as being natural, human, produced/built, knowledge, and health capital. Different indicators and indices for tracking these various forms of capital and society's progress toward sustainability have been developed.³ Two examples of indicator frameworks, applicable to forest management, are presented below.

The Montréal Process, endorsed by the United Nations General Assembly, provides a common framework to describe, monitor, assess, and report on progress toward conservation and sustainable management of temperate and boreal forests. There are seven Montréal Process criteria for characterizing the components of sustainable forest management. There are multiple indicators within each criterion (64 indicators in total) that measure those components. These criteria and indicators are tracked in the Forest Service's "National Report on Sustainable Forests – 2010" (USDA Forest Service, 2011), and subsequent updates. The Montréal Process Criterion 6 deals with the maintenance and enhancement of long-term multiple socio-economic benefits to meet the needs of societies (MPWG 2009). Montreal Process criteria are not aggregated into a single index value.

The inclusive wealth index (IWI), developed by the United Nations (UNU-IHDP and UNEP 2012) contains more than 40 individual measures pertaining to different forms of capital. By aggregating more than 40 variables into a composite index, a positive inclusive wealth index per capita growth figure indicates a condition of sustainability. Inclusive wealth indices have been calculated for more than 20 nations and 48 states in the U.S.

How to Apply Indicators and Index Frameworks to Forest Planning

The data requirements for appraising economic sustainability performance at the national level, using indicators and indices, can be substantial and daunting. If the goal is to instead evaluate sustainability at a regional or national forest level, we can identify subsets of measures (within a given index) that are affected by a forest plan, and use those measures to demonstrate how a plan may guide

² See Constanza and Daly (1992) or Hartwick (1977) for more discussion about definitions and necessary conditions for sustainability.

³ This paper focuses on indicators from the Montreal Process and the Inclusive Wealth Index. Other examples of indicators include: Value of Net Domestic Product (Landefeld et al., 2010), the World Bank's Genuine Savings, the Genuine Progress Indicator, the US Sustainable Development Indicators system (The SDI Group, 1997), and the European Union's Sustainable Society Index (Saisana and Philippas, 2012).

contributions to social and economic sustainability. A national forest may not have any influence on many of the measures within an index.

One could show that, as an example, *"according to the Inclusive Wealth Index, out of 40+ factors, here are 8 of the economic sustainability determinants that this Forest may influence over the next planning horizon . . ."* The method would be to analyze and describe how (with direction or rate of change) planning direction would affect a subset of determinants as indicators of contributions to sustainability. This approach does not require construction of complicated and data-intensive composite figures. Applications of the Montreal Process Criterion 6, as well as the Inclusive Wealth Index measures to forest plan revision are described in the next sections.

III. Documenting Contributions to Sustainability: Applying the Montréal Process

Specific to Forest Service planning requirements, the conditions and trends associated with Montreal Process Criterion 6 (MP6) indicators or measures can be used to assess the sustainability impacts of land management planning alternatives within the context of the broader landscape.⁴ Data gaps can be documented if existing information is not available or unknown for some measures. Table 1 in the Attachment provides an example of documentation using MP6 measures, based in part on Skog et al. (2010).

Baseline conditions can be summarized in the plan assessment in a qualitative format as follows:

"MP6 indicators showing positive or stable trends in the broader landscape include:

- Value of exports and imports of non-wood forest products
- Area and percent of forests available and/or managed for public recreation and tourism
- Area and percent of forests managed primarily to protect the range of cultural, social and spiritual needs and values

MP6 indicators showing negative trends in the broader landscape include:

- Value and volume of wood and wood products production, including primary and secondary processing
- Resilience of forest-dependent communities

⁴ (36 CFR 219.5 (a)(1))

Information is insufficient to assess trends for these MP6 indicators:

- Number, type, and geographic distribution of visits attributed to recreation and tourism and related to facilities available
- Resilience of forest-dependent communities
- The importance of forests to people”

Analysts can substitute alternative indicators for MP6 indicators with insufficient data. Efforts should be made to ensure that all parameters have at least one indicator; this way the overall conceptual model is still being honored.

The estimated effects of plan alternatives can be summarized in the environmental effects analyses as follows:

“The following MP6 indicators are likely to be positively (or adversely) affected by the proposed plan (or Alternative X):

- Value of exports and imports of non-wood forest products
- Area and percent of forests available and/or managed for public recreation and tourism
- Area and percent of forests managed primarily to protect the range of cultural, social and spiritual needs and values”

Planning teams may have other preferences on how this information is summarized and presented. This method provides a simple way to demonstrate how the plan area could contribute to social and economic sustainability, while distinguishing between contributions to economic sustainability versus economic conditions.

Integrating MP6 Indicators into Planning using Communities of Interest

‘Communities’ within the area of influence around a national forest can be described by their physical place (geographic boundaries) or by their connections to the local landscape. This distinction can be characterized as the difference between communities of place (people bound together by where they live and work) and communities of interest (people sharing common interest or passion, regardless of their location). Communities of interest explore linkages between people and land that transcend geographic communities. Communities of place and interest are not mutually exclusive. The MP6 indicators can be used to capture contributions to sustainability that reflect communities of interest. On the flip side, MP6 indicators may serve as a checklist to insure that key communities of interest are captured in sustainability assessments. Examples of communities of interest, linked to MP6 indicators, are shown below.

Community of Interest	MP6 Indicators *
Timber and forest products	6.1 – Production and Consumption; 6.3 – Employment and Community Needs
Subsistence	6.1 – Production and Consumption; 6.3 – Employment and Community Need
Educator, student, and Research	6.2 – Investment in the Forest Sector; 6.5 – Cultural, Social, and Spiritual Needs
Government, municipal, and residential	6.3 – Employment and Community Needs
Recreation – Regional and local contributions and effects	6.3 – Employment and Community Needs
Recreation – consumptive, hunting, fishing, gathering	6.4 – Recreation and Tourism
Recreational - non-consumptive, art, connecting with history, and wildlife viewing	6.5 – Cultural, Social, and Spiritual Needs
Cultural – protection and access to resources	6.5 – Cultural, Social, and Spiritual Needs
Non-use – existence and bequest values for wildlife, ecosystems, viewsheds, carbon sequestration	6.5 – Cultural, Social, and Spiritual Needs

*Examples of measures used to describe effects for these communities of interest are provided in Table 1 in the Attachment.

IV. Documenting Contributions to Sustainability: Applying the Inclusive Wealth Index

Table 2 in the Attachment demonstrates of how the Inclusive Wealth Index indicators might be used to describe social and economic sustainability contributions in forest planning. Results from the application of inclusive wealth index measures can be summarized in a forest plan assessment as follows:

Inclusive wealth index measures showing positive or stable (or negative, or unknown) trends in the broader landscape include:

- Educational attainment
- Produced capital
- Investment
- Production of mineral resources
- Forest stock commercially available
- Wood production
- Value of wood production
- Quantity of crops produced
- Price of crops produced
- Harvested area in crops
- Permanent cropland area
- Permanent pastureland area

The effects of the proposed plan or plan alternatives can be summarized in a similar fashion in environmental analysis documents.

Inclusive wealth indices (IWIs) have been calculated for more than 20 nations and 48 states in the U.S. (UNU-IHDP and UNEP 2012). Given this available information, one could make general inferences about how a proposed plan would or would not contribute to a particular state's path to economic sustainability. For instance:

“For the state of New Mexico, the IWI per capita annual growth rate (0.94%) is less than the state's GDP per capita growth rate (4.51%). This signifies that the current level of economic growth cannot be sustained in the long run, unless inclusive investments increase substantially as well. As seen in the Proposed Plan's environmental analysis, the plan area contributes positively to the following IWI measures: According to the IWI framework, these particular measures are integral to society's economic sustainability.”

V. Additional Resources and Considerations

An Excel® spreadsheet to help planning teams apply these approaches, as well as a more detailed version of this report and other information about social and economic sustainability methods and indicators is available.⁵

Some planning teams may find the MP6 and inclusive wealth index list constraining and wish to expand or modify the indicators to reflect regional data availability or local knowledge. Both systems can serve as a starter list for planning teams to devise their own set of measures. Other sustainability criteria or indicator systems not discussed above can also be incorporated.

⁵ <http://fsweb.wo.fs.fed.us/economics/> Forest Service staff only. Others should contact Forest Service economic staff at: <https://www.fs.fed.us/emc/economics/>

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Attachment: Examples of Documenting Social and Economic Sustainability

This appendix demonstrates how social and economic sustainability contributions from proposed forest plans can be described using two different frameworks:

1. The “Montreal Process” (MP) Criterion 6 Indicators, and
2. The “Inclusive Wealth Index” indicators.

See the main body of the report for an overview of these frameworks. Examples are not intended to represent a specific national forest, but instead designed to reflect a variety of effects and contributions.

Table 1. Example of how the MP6 indicators might be used to demonstrate social and economic sustainability contributions in forest planning

MP6 Indicators	Recent Level ¹	Trend ²	Effects of Proposed Plan *
6.1 Production and Consumption			
Value and volume of wood and wood products production, including primary and secondary processing	\$10 million (2013)	Decreasing since 2000	Increased volume but uncertain impact on trend
Value of non-wood forest products produced or collected	Unknown \$; special use evidence.	Increasing demand	Increased opportunities
Revenue from forest based environmental services ³	Avoided water treatment \$	Increasing water demand	Maintains watershed conditions
Total and per capita consumption of wood and wood products in round wood equivalents	60 cf/capita	static	Limited; uncertain impact on demand
Total and per capita consumption of non-wood products	Unknown \$; special use evidence	Increasing consumption (mushrooms)	Increased opportunities
Value and volume in round wood equivalents of exports and imports of wood products	Import share 50%; export unknown	Increasing reliance on imports	Uncertain but potential to increase use of local product
Value of exports and imports of non-wood forest products	Import = \$100K; Export unknown	Increasing consumption	Help meet rising demand
Exports as a share of wood and wood products production and imports as a share of wood and wood products consumption	Unknown	Reliance on local product	Maintain, expand local use?
Recovery or recycling of forest products as a percent of total forest products consumption	Approximately 10%	Increasing	No effect

MP6 Indicators	Recent Level ¹	Trend ²	Effects of Proposed Plan *
6.2 Investment in the Forest Sector			
Value of capital investment and annual expenditure in forest management, wood and non-wood forest product industries, forest based environmental services, recreation and tourism ⁴	NFS budget \$2.5 million/yr;	Static; decreasing private investment	No effect; potential to stimulate private investment
Annual investment and expenditure in forest-related research, extension and development, and education.	NF education program reached 500 people	Stable outreach. Wildlife and wilderness characteristics at risk.	No change in outreach. Greater protection of wilderness and wildlife resources for study and education.
6.3 Employment and Community Needs			
Employment in the forest sector	150 jobs/yr in 5 counties	Decreasing since 1996	Potential for increase; uncertain impact on trend
Average wage rates, annual average income and annual injury rates in major forest employment categories.			
Resilience of forest-dependent communities ⁵	2 mills closed since 1996. Neighborhood risks from floods and fire.	Decreasing mill cap utilization. Increasing flood and fire risk.	Potential for mills to add new shifts. Decreased risk from fire and flood in WUI.
Area and percent of forests used for subsistence purposes	80% of area available under existing rights	Stable; decreasing productivity	No change in area; but potential productivity improvements.
Distribution of revenues derived from forest management	PILT+SRS = \$1.2 million/yr ⁶	Stable but uncertain future	No effect; potential increase in stewardship agreements.
6.4 Recreation and Tourism			
Area and percent of forests available and/or managed for public recreation and tourism	20% developed; 60% primitive; 200 miles trails.	2 developed recreation sites created on State lands	Increase primitive and wilderness area.
Number, type, and geographic distribution of visits attributed to recreation and tourism and related to facilities available.	2.1 million visits in 2011. 30% are hunting and gathering.	Growing population. Habitat at risk.	Habitat improvements protect hunting and gathering.

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MP6 Indicators	Recent Level¹	Trend²	Effects of Proposed Plan *
6.5 Cultural, Social and Spiritual Needs and Values			
Area and percent of forests managed primarily to protect the range of cultural, social and spiritual needs and values.	Cultural community has local needs	Areas not managed to meet needs	Resource zones managed to protect cultural needs
The importance of forests to people	Traditional cultural practices are common. Focus groups show people have bequest and existence values.	Fuels placing cultural resources as well as wilderness and wildlife values at risk.	Improved resiliency of cultural, wilderness, and wildlife resources, supporting cultural and 'non-use' values.

1. Recent condition and trends information pertain to those of the plan area or zone of influence.
2. If used as an aide for Alternatives development, analyst may choose to display estimated effects by alternatives, recognizing that some of these sub-indicators may or may not change by alternative, or influenced by the forest plan.
3. Revenue includes payments for environmental services, but can include other measures of environmental service value.
4. Investments can include matching or other types of funds contingent upon agency funding.
5. In addition to economic stability, community resiliency can also be a function of support for cultural or social needs and values.
6. PILT+SRS = funds from Secure Rural Schools + Payments in lieu of taxes programs.

Table 2. . Example of how the Inclusive Wealth Index (IWI) indicators might be used to demonstrate social and economic sustainability contributions in forest planning

IWI Indicators	Recent Level ⁺	Trend ⁺	Effects of Proposed Plan [*]
Human capital			
Population by age and gender	1.2 mil / 1:1.4 ratio; see assessment for demo	Aging population	none
Mortality probability by age and gender	Unknown		
Employment	600,500 workforce, labor participation rate, etc.	Unemployment at 8%, stable	Sustain current level under proposed Alternative
Educational attainment	40% college, 80% K-12, etc...	Increasing college enrollment	None
Employment compensation	Unknown	?	
Labor force by age and gender			
Produced Capital			
Investment	Capital investment in 5 county area: 3.6 billion	Increased 3% since 2010	Increase; detail description in DEIS
Depreciation rate	7%		
Assets lifetime			
Output growth	Less than State Avg.	Decreasing (mill/mine closure)	May offset
Population	Rural size	Growing	Limited; unknown
Productivity	Less than State Avg	Decreasing for old sectors	Can increase for tourism
Natural capital - Fossil fuels			
Reserves	Some reasonably foreseeable	No change	No change
Production	Low (on average)	Static	Small increase; detail in DEIS
Prices	Low	Possible increase	Unknown
Natural capital - Minerals			
Reserves			
Production	500 tons/yr for mineral x	Increasing	Increase; detail description in DEIS
Prices			
Natural Capital - Forest Resources			
Forest stocks	High; but at risk	Decreasing resiliency	Reduced, but increase resiliency

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IWI Indicators	Recent Level⁺	Trend⁺	Effects of Proposed Plan[*]
Forest stock commercially available	High	Decreasing in private forest lands	Increase under Alt X.; see DEIS for detail
Wood production	80,500 CCF	Decreasing annually since 2010	Increase; detail description in DEIS
Value of wood production	\$10 million	Decreasing since 2010	Increased volume but uncertain market value
Forest area	0.9 million acres	Private forest conversion	Stable
Value of non-timber forest benefits (NTFB)	Unknown	Public demand for NTFB	Non-use values considered
Percentage of forest area used for the extraction of NTFB		Public demand increase	Increase
Natural capital - Agricultural land			
Quantity of crops produced			
Price of crops produced			
Harvested area in crops			
Permanent cropland area			None
Permanent pastureland area			Possible decrease through indirect effects; see detail description (range/open space) in DEIS
Natural capital - Fisheries			
Fishery stocks			
Value of capture fishery			
Quantity of capture fishery			
Health Capital			
Population by age	Same as State Averages	Aging (retirees)	Forest amenities may sustain or support trends
Probability of dying by age			None/unknown
Value of statistical life (or morbidity)	Average health	Unknown	Forest amenities/services may improve health

⁺ Recent condition and trends information pertain to those of the plan area or zone of influence

^{*} If used as an aide for Alternatives development, analyst may choose to display estimated effects by alternatives (recognizing that some of these sub-indicators may or may not change by alternative, or influenced by the forest plan)