



Carbon Advisory Group

Examining Carbon Accounting and Sustainable Forestry Certification

Topic 4: Sustainable Forest Management
Certification

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KPMG LLP



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Summary

This report seeks to provide information on the role that independent forest management certification can play in providing a degree of assurance that forest carbon projects do not negatively impact sustainable harvest levels and ecological function and services.

The Climate Action Reserve's (Reserve) Forest Project Protocol Version 3.2 currently provides three different options for demonstrating sustainable harvesting practices. The sustainable harvest requirement must be met on all of a forest owner's forest land holdings, including the project area.

1. The Forest Owner must be certified under the Forest Stewardship Council, Sustainable Forestry Initiative, or Tree Farm System certification programs. Regardless of the program, the terms of certification must require adherence to and verification of harvest levels which can be permanently sustained over time.
2. The Forest Owner must adhere to a renewable long-term management plan that demonstrates harvest levels which can be permanently sustained over time and that is sanctioned and monitored by a state or federal agency.
3. The Forest Owner must employ uneven-aged silvicultural practices (if harvesting occurs) and must maintain canopy cover averaging at least 40 percent across the entire forestland owned by the Forest Owner in the same Assessment Areas covered by the Project Area, as measured on any 20 acres within the Forest Owner's landholdings found in any of these Assessment Areas, including land within and outside of the Project Area (areas impacted by Significant Disturbance may be excluded from this test).

The above requirements act to limit the potential that forest owners will implement practices that have significant negative impacts on the long-term sustainability of forest benefits and reduce the likelihood that the net project benefit will be lost as a result of the harvest simply being transferred from the project area to other landholdings.

Part 1 of the report examines the three certification standards identified in Option 1; the American Tree Farm System (ATFS), the Forest Stewardship Council (FSC) and the Sustainable Forestry Initiative (SFI) Certification Program.

The primary questions addressed in Part 1 of the report are:

- Do the three forest certification systems, as developed and implemented today, provide effective assurance that forestry activities associated with forest carbon projects (including activities on forestland outside the project area but under the same ownership) will be based on the principles of sustained harvest levels and maintenance of ecological services and functions?

Maintaining harvest levels within a calculated "sustainable harvest level" over time is a key indicator that the rate of harvest does not exceed the forest's productive capacity.

- Do differences between the delivery models for these standards affect their capacity to protect these values?

To assess how forest certification standards address the potential risks to sustainable harvest levels and ecological function and services, the risks were identified and compensating controls in each of the three certification standards considered at both the project level and the ownership level. The assessment indicates that where forest certification is in place, there is a range of compensating controls in place, under all three standards, that act to substantially mitigate risks.

Long-term maintenance of ecological function and services is critical to the continuous provision of the range of non-timber benefits that forests provide, such as clean water and wildlife habitat.

To assess whether differences between the delivery models for each of the certification standards affect their capacity to mitigate risks to sustainable harvest levels and ecological services and functions we assessed the controls in place over the delivery of certification under each standard and recent certification comparison reports to draw conclusions on their ability to effectively deliver risk mitigation. Differences in design and on the ground application of the three certification standards do exist. However, each of the programs includes compensating controls to address issues such as inconsistent application, auditor competence, transparency, continuous improvement and methods to address stakeholder concerns over individual certification decisions. These controls are significant, expensive to replicate, and can provide significant reliance that each of the programs can deliver on their specific standards


As a result, while the three certification standards should not be considered as “equivalent”. Each standard very clearly builds on the existing regulatory framework for forestry¹ and provides a range of additional processes that acts to manage risk to long term harvest levels and to ecosystem services and function. Further, it would seem that placing reliance on any of the certification standards would provide greater assurance of sustainable harvesting practices than the alternative options provided by the protocol (state or federal approval and monitoring of long-term plans or uneven age management practices).

While forest certification is well suited to address the ownership level sustainable harvest tests established in the Forest Protocol it is important to recognize that forest certification conclusions are generally made at the forest management unit or ownership level and land on which forest projects are active may be only a very small part of the scope of the certification. As a result, the ability to use certification reports to draw conclusions regarding project level conformance to sustainable harvest level tests and ecological function and services may be limited. Given the cost and effort associated with drawing certification conclusions at the project level, the current approach taken in section 3.9.2 of the Protocol, which relies upon a small number of (assumedly critical) indicators to address “Natural Forest Management” is likely both the most efficient and cost effective manner in which to provide a limited degree of assurance around the management of co-benefits in forest project areas. Use of this

¹ In the United States, a variety of federal and state laws affect forest management, including the Endangered Species Act, The Clean Water Act and others at the federal level. State laws vary considerably, ranging from comprehensive state forest practices acts to individual acts regulating certain aspects. For a comprehensive overview, see <http://nafoalliance.org/environmental-regulation-of-private-forests/> also Ellefson, P.V., Kilgore, M.A., Hibbard, C.M. and J.E. Granskog. *Regulation of Forestry Practices on Private Land in the United States: Assessment of State Agency Responsibilities and Program Effectiveness*, Staff Paper Series Number 176, Department of Forest Resources, University of Minnesota, St. Paul, October 2004. 201 pp.

part of the protocol to address emerging areas of risk in existing projects appears to be a logical option at the project level to the extent that the Protocol focuses clearly on areas of identified risk rather than attempting to provide a comprehensive assessment of co-benefit management. Where applicable, the use of language consistent with existing certification standards would significantly reduce the potential for these indicators to add unnecessary cost to project proponents.

Part 2 of the report examines whether other certification standards could potentially be included within Option 1. Potential candidate standards were either designed with a different objective (and hence had a different scope) or did not have the scale of investment to support the broad suite of controls required for international recognition. Based on our assessment there are no other forest certification programs operating in the US today that have been developed and administered in conformance with international guidelines for forest certification that should therefore be included within Option 1.



Task 1: Describe and Summarize Certification Principles, Guidelines and Criteria of Various Programs, With Emphasis on Terms of Certification to Ensure Maintenance of Ecological Function and Services, and Sustainable Harvest Levels

Approach

The following general approach was taken:

- 1.1. Provide a general description and comparison of the three certification systems cited in Forest Project Protocol version 3.2;
- 1.2. Consider how the delivery model for the ATFS, FSC and SFI standards affects conclusions regarding the effectiveness of each of the standards;
- 1.3. Develop working definitions for sustainable harvest levels and ecological function and services;
- 1.4. Identify the potential risks and activities associated with forest carbon projects that could impact sustainable harvest levels and ecological function and services;
- 1.5. Assess whether the ATFS, FSC and SFI standards specifically address the identified risks to sustainable harvest levels and ecological function and services (at the project level); and,
- 1.6. Identify the sub-set of risks to sustainable harvest levels and ecological function and services that are pertinent at the ownership level and assess whether the ATFS, FSC and SFI standards specifically address the identified risks.

1.1 Overview of Forest Certification Systems

Forest certification is primarily conducted in the US by three market-based, non-governmental schemes designed to demonstrate to the public that certified forests are being well-managed and that the harvested wood products from them are sustainably produced. As they currently function, these schemes spring largely from the United Nations Conference on Sustainable Development, held in Rio in 1992, which produced a non-binding Statement of Forest Principles that provides guidelines for sustainable forest management as a key part of sustainable development. While many governments (including the United States) established policies committing to sustainable forest management, private organizations also realized an opportunity to play a significant role in the emerging effort. The three national programs that operate today in the US are described below.

The American Tree Farm System® (ATFS) is a program of the American Forest Foundation (AFF), a nonprofit organization headquartered in Washington, DC. The program has been in operation since 1941, focused on promoting the growing of renewable forest resources on private lands in the US. With the emergence of international certification endorsement programs, ATFS configured its program to conform to the Programme for Endorsement of Forest Certification (PEFC), an international umbrella organization that recognizes forest certification systems covering some 226 million hectares in 26 programs. The AFF Standards were developed in a wide-ranging public process and formally adopted in 2004 (www.treefarmssystem.org/). PEFC endorsement was achieved in 2008. Currently, ATFS has certified 25.7 million acres held by over 95,000 family forest owners in 43 states.

ATFS provides certification to small forest landowners who meet the ATFS eligibility requirements in three ways: 1) through state program group certification; 2) through independently managed group organizations; and, 3) through individual third party certification. Landowners of 10 to 10,000 acres of contiguous forest land are eligible to join state program groups, and landowners of 10 to 20,000 acres of contiguous forest land are eligible to join independently managed groups or seek individual certification.

While certification in the ATFS is voluntary, the 2004 AFF Standards require each certified Tree Farmer be in compliance with all relevant laws and regulations, have a written forest management plan, reforest following harvest, protect water and soil quality, conserve wildlife and biodiversity, and consider visual impacts, among other considerations. Auditing is carried out annually by certification bodies accredited by the ANSI-ASQ National Accreditation Board (ANAB), who audit the state, independent, or individual programs against the AFF Standards and Policies. All state programs and group certifications are on a three-year auditing cycle comprising a full re-certification every 3rd year followed by two limited scope annual surveillance audits.

The Forest Stewardship Council (FSC®) is an independent, non-governmental, non-profit organization established to promote the responsible management of the world's forests. It was established in 1993, largely out of concerns over global deforestation, by a group of corporate, environmental, and social leaders. In 1994, the FSC Principles and Criteria, together with the FSC Bylaws, were adopted. National Standards began to be adopted in 1997, and FSC is currently represented in over 50 countries around the world, with about 120 million hectares (~300 million acres) of certified forest (www.fsc.org/).

In the United States, the program is managed by FSC-US (www.fscus.org) and reports a total of 13.1 million hectares (~32 million acres) of certified forest. Half of that certified acreage is in the Lake States—Michigan, Minnesota and Wisconsin. In July 2010, after a multi-year development process, FSC's International office approved the FSC-US Forest Management Standard to replace what had previously been nine regional standards. The new Standard applies to the contiguous United States and seeks to maintain regional variations in key areas of forest management and conservation while increasing consistency between different forest regions in interpretation and application of the standard through guidance and intent statements.

Small family forest owners² seeking FSC certification are provided with FSC criteria that take into account the scale and intensity of small forest management operations. Small operations can also join an FSC certification group managed by an FSC-certified resource manager to take advantage of economies of scale.

The FSC has awarded some 3,800 chain of custody certificates in the United States, out of a total of some 18,500 worldwide. In the United States, FSC has accredited seven certifiers to issue forest management or chain of custody certificates. Forest management certificate holders are required to contract with an FSC-accredited certifier, who will conduct the certification process. After initial certification, surveillance audits are conducted annually. The certificate must be renewed with a full assessment every five years. Certified forest products are traced from the forest to the consumer through a chain of custody process so that any FSC-labeled product can be traced back to a certified source.

The Sustainable Forestry Initiative® (SFI®) is managed by Sustainable Forestry Initiative Inc., an independent non-governmental, non-profit organization that promotes improved forest practices in the United States and Canada, as well as supporting responsible fiber sourcing globally. The SFI Program was launched in 1995 by the American Forest & Paper Association (AF&PA), the trade association for the wood and paper industry in the United States. The initial program was limited to AF&PA members, and participation was a requirement of membership. Independent third-party auditing was optional.

As the certification movement matured globally, the SFI Program responded by opening participation to other landowners, making independent third-party auditing mandatory for certification, and developing a broad public input program to update and revise the SFI Standard every 5 years. Administration of the program was moved to an independent entity, SFI Inc., whose Board of Directors includes representation from environmental, conservation, professional and academic groups, loggers, forest owners, public officials, labor organizations and the forest products industry.

An independent External Review Panel provides program oversight and review, while 37 SFI Implementation Committees assist with implementation issues at the state, provincial, or regional levels. SFI certification audits are conducted by eight independent certification bodies accredited by

² Family Forests are defined by the FSC-US Forest Management Standard V1.0 Approved by FSC-IC July 8, 2010 - as forest management units with a total forest area in the unit of 1,000 hectares (2,470 acres) or less; OR Low Intensity (i.e. the rate of harvesting is less than 20% of the mean annual increment within the total production forest area of the unit), AND EITHER the annual harvest from the total production forest area is less than 5000 cubic meters, OR the average annual harvest from the total production forest is less than 5000 m³ / year during the period of validity of the certificate as verified by harvest reports and surveillance audits. <http://www.fscus.org/images/documents/standards/FSC-US%20Forest%20Management%20Standard%20v1.0.pdf>

the American National Standards Institute (ANSI), AMSI-ASQ National Accreditation Board (ANAB) or the Standards Council of Canada (SCC). The SFI Program (like the ATFS) is recognized by the PEFC.

Certification under the SFI Program requires conformance with the latest (2010-2014) SFI Standard. Re-certification is required every 3 years, with annual surveillance audits. A summary of each participant's audit report is published on the SFI web site, and there is a formal appeals process if a member of the public or a stakeholder raises questions about a landowner's land management practices or certification status.

The SFI program has certified 56.5 million acres in the US. That includes private, state and local government land, and involves some double counting with the FSC in the case of dual-certified lands. In the US and Canada there are some 880 chain of custody certificates at over 2,000 locations for processors that wish to label their SFI products (www.sfiprogram.org). Companies that purchase wood fiber from uncertified lands are required to promote logger training, the use of best management practices to protect soil and water, and prompt reforestation on the lands where the fiber is harvested. These requirements are part of the 2010-2014 SFI Standard and fiber sourcing programs are subject to independent audit requirements.

General comparison of the certification programs

While there have been many studies to compare the major certification programs, and considerable controversy as program participants and advocates claimed superiority, it is beyond the scope of this paper to undertake such a comparison. A few conclusions can be drawn, however, based on the genesis of the programs and reference to some recent studies.

The FSC program, designed to promote responsible forest management worldwide, and focused initially on tropical countries where deforestation is a serious problem, has more rigorous requirements on social and economic criteria associated with forest management. The result is to impose responsible behavior in areas of the world where laws are either lacking or poorly enforced. As the degree of regulation and enforcement increases (as it does in countries such as the US), these elements add progressively less to the existing legal framework. Environmental requirements are similarly driven from a broader perspective than US forests. All of these requirements are further interpreted in the form of regional standards that are developed through stakeholder engagement processes to identify regionally relevant indicators that support the internationally developed standards. Initially, this led to the development of 9 separate regional standards in the US, which were quite diverse in the way they addressed FSC requirements. In 2010 these have been replaced by a single US regional standard.

The ATFS and SFI programs, originating in the United States and operating under the umbrella of US legal requirements, placed emphasis on the environmental management aspects that were the focus of public concerns with forest management, imposing additional requirements in areas such as water quality and biodiversity protection. While both programs include requirements in relation to social and economic issues, those requirements do not, in most cases, impose significant social or economic requirements on certified participants that are in excess of what US laws require.

The economic burden of forest certification is a difficult hurdle for small landowners, and all of the certification systems have developed (and continue to develop) strategies to expand the opportunity for family forest landowners (who own some 1/2 of the managed timberland in the US) to become certified. For the SFI program, mutual recognition with the ATFS provides a way for small landowners to become certified. For the FSC program, group certification and separate family forest criteria open up access to the program. For the ATFS, with its history of educating and encouraging small landowners, the move to a formal certification program was accompanied by special efforts to assure open opportunities for group efforts that spread the cost of the third-party certification process.

It is increasingly common for larger landowners in the US to maintain certification under both the FSC and SFI programs. Additional market opportunities may exist with the different programs, as buyers or advocacy groups differentiate between the two. Dual certification, where both programs are audited at the same time by audit teams made up of qualified FSC and SFI certification bodies, provides an economically-efficient way for landowners to take advantage of the strong points in each certification program.

Based on reports compiled in May and June, 2010, there are almost 114 million acres of certified forestland in the US (Table 1)³. If the 20 million dual-certified acres are subtracted, the certified total would probably be about 90-100 million acres, or about 25% of the total non-federal timberland in the country.

Table 1. Certified acres in the United States, 2010

Certification Program	Acres certified
American Tree Farm System	25,549,888
Forest Stewardship Council	31,882,769
Sustainable Forestry Initiative	56,503,220
Total (contains some dual-certified FSC-SFI)	113,935,877

Comparison of certification programs with State Forest Practices Acts and uneven aged silviculture tests

The Reserve's Forest Project Protocol Version 3.2 lists three different options for demonstrating sustainable harvesting practices: certification, adherence to a plan sanctioned and monitored by a state or federal agency and implementation of uneven aged silviculture practices. That raises the question as to whether adherence to a state or federally approved plan or uneven aged silviculture practices reduce the risk of unsustainable harvest practices on project lands to the same extent as certification. With three certification systems and dozens of different state and federal programs, this comparison is not equally valid everywhere.

³ Data provided by Nadine Block, SFI Inc., from SFI and ATFS records and the FSC web site.

Certification programs compared to state and federally sanctioned plans

In general, state forest practices acts focus on the forest harvest process itself, and its potential for adverse environmental impact on the land. Varying in both scope and rigor (and cost to the landowner), these laws generally require development of a forest harvest plan, observance of best management practices during harvest operations, and post-harvest treatments to provide necessary protection for soil and water resources. Some have criteria for wildlife and habitat practices; many do not. Some have fairly rigorous monitoring and inspections by state or local officials; many do not. Certification, however, requires attention to a much broader set of environmental, economic, and social indicators. It requires development of long-range forest management plans that develop data on sustainable harvest levels in connection with the protection of other forest resources. Certification audits seek documentation and field evidence of sustainable management practices well beyond the timber harvest operations. Because these audits are risk-based, certification auditors seek out those sites, practices, and conditions where the highest risk of violating the standard exist, whether associated with annual harvests or not. This makes a certification audit much more comprehensive than the majority of state-monitored forest practice acts.

Another difference is that, while state regulations define minimum performance standards, certification systems provide for continuous review and improvement of performance. The result is that regulation provides a static performance target based on conditions to be avoided while certification standards provide a dynamic performance target based on processes to improve performance over time, where the minimum performance level includes regulatory compliance but increases over time.

While the Reserve's Forest Protocol additionally requires that a state sanctioned plan demonstrate that the harvest levels can be permanently sustained over time, it provides no criteria by which this should be assessed. This is a significant difference from certification where a firm linkage is established between the environmental, economic, and social indicators and harvest levels.

Federally-sanctioned forest stewardship management plans are available to non-industrial landowners in the United States. The USDA Forest Service provides funding through State Forestry Agencies for technical assistance to small family forest owners in the development of these Forest Stewardship Plans⁴. The plans focus on achieving landowner objectives and sustaining forest health and vigor.

Since its establishment in 1991, through the last available data (2006), the program has assisted with the production of more than 270,000 plans encompassing more than 31 million acres of non-industrial private forest land. There are no data on how much these plan acreages overlap with the Tree Farm Program acreage, but it is thought to be significant.

While there are no requirements that landowners implement the plans as written, there are efforts to encourage plan implementation through financial incentives provided by the conservation programs in the Department of Agriculture. In addition, Forest Service rules require each State Forestry Agency to develop and implement a monitoring plan that assesses plan implementation through a structured program of visits to random, representatively-sampled properties. The results of this monitoring are reported as a percentage of total acres that are being managed sustainably.

⁴ Further information is available at <http://www.fs.fed.us/spf/coop/programs/loa/fsp.shtml>

Forest Stewardship Plans provide some protection against the risk of non-sustainable forest management practices, although the intensity of monitoring and the focus on maintaining forest carbon stocks may be somewhat less than found in the certification systems. While a property that is found to be violating certification standards can be de-certified, there is no similar action taken against properties that are inadequately implementing their Forest Stewardship Plan.

Certification programs compared to uneven aged silviculture

A third option listed in the Reserve's Protocol is for a forest owner to employ uneven-aged silviculture and maintain a canopy density of at least 40% over the forest, as measured on any 20 acres. Linked to the Reserve's requirement that total carbon stock not decline over the project area during the project life, this may encourage sustainable harvesting practices. What is not clear, however, is the extent to which this option is a reasonable surrogate for a long-term sustainable harvest level test given that both diameter-limit cutting and selective harvesting can have significant long-term damaging impacts on sustainable harvest levels.⁵ While carbon stock levels in the forest might not decline noticeably or rapidly due to these harvest practices, a species shift to slower-growing or less valuable species could have a serious effect on long-term sustainable harvest levels.

Such high-grading would be likely to be flagged as a violation of a forest certification standard. This might provide an added level of risk reduction on certified forests compared to the Protocol's requirements in the absence of certification.

1.2 How forest certification delivery models affect conclusions regarding the effectiveness of individual certification standards

The effectiveness of any given standard is a function of its delivery model. The delivery model includes:

- The design of the standard
- The process for ensuring the standard remains current, applicable and reflective of the opinions of a broad range of stakeholders
- The assurance process
- Safeguards within the certification process to ensure legitimate concerns raised in relation to individual certifications are addressed

1.2.1 How are the different certification standards designed?

Different certification standards are designed in fundamentally different ways. In basic terms, the two key factors that determine a standard's design are:

- The structure of the standard (topic or process based)

⁵ See, for example, Kenefic, Laura S. and Ralph D. Nyland (eds). 2006. *Proceedings of the Conference on Diameter-Limit Cutting in Northeast Forests, May 23-24, 2005*. Gen. Tech. Rep. NE-342. Newtown Square, PA: USDA Forest Service, Northeastern Research Station, 51 p.

- The structure of the indicators (process or performance based)

The way the ATFS, FSC and SFI standards are designed is represented graphically below. The ISO 14001 standard and BMPs are also included for reference purposes.

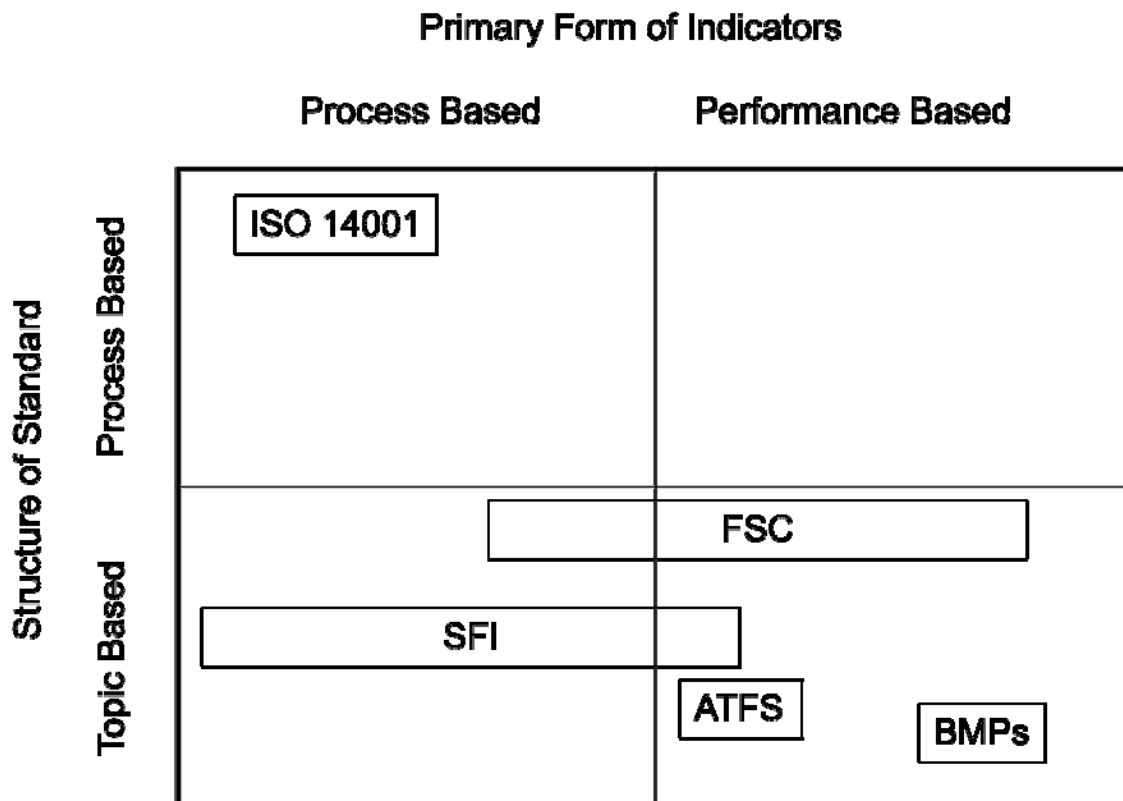


Figure 1 Graphical representation of the design of selected Standards⁶

As is evident from the figure above, the fundamental design of the three standards is different. This leads to fundamentally different types of indicators and fundamentally different audit processes being required:

- Performance based indicators require a specific standard to be met which can be based on a practice (e.g. maintain a 50 foot buffer) or an outcome (e.g. avoid siltation in the stream). From an audit perspective, an assessment is required as to whether they have been met. There are no specific requirements as to how the outcome is achieved and the outcome itself may or may not indicate whether or not the practices in place are effective (e.g. a 50 foot buffer may be more or

⁶ ATFS data based on ANAB Accreditation Rule 27: Accreditation Program for American Tree Farm System (ATFS), Section 9: Audit Procedures And Auditor Qualifications And Accreditation within the Sustainable Forestry Initiative® 2010-2014 Standard and ISO/IEC 17021:2006 Conformity assessment-Requirements for bodies providing audit and certification of management systems.

FSC data based on FSC-STD-20-001 V3 General Requirements For FSC Certification Bodies: Application of ISO/IEC Guide 65:1998.

SFI data based on Section 9: Audit Procedures And Auditor Qualifications And Accreditation within the Sustainable Forestry Initiative® 2010-2014 Standard and ISO/IEC 17021:2006 Conformity assessment-Requirements for bodies providing audit and certification of management systems.

less than what is required to maintain water quality depending on the nature of the particular stream, its exposure to wind, the type of soil etc.).

- Process based indicators require a specific process to be in place (e.g. a program to manage water quality). From an audit perspective, an assessment is required as to whether the program has been developed, implemented and effective. There are no detailed requirements as to what outcome should be sought.

Both types of indicator require field assessment, but the focus of the field assessment is different. For process based indicators, the field assessment confirms “is the process implemented and working?” For performance based indicators, the field assessment confirms “has the practice been carried to specification?”

A process based standard coupled with a continuous improvement framework should, in theory, lead to processes being implemented, monitored and improved over time to address key sustainable forestry topics and provides an alternate, valid framework for demonstrating sustainable forest management. In theory, this approach should also identify and address emerging research findings (e.g. new research data on managing water quality on streams where there is a high risk of retained trees being blown over) through the continuous improvement framework.

Purely performance based standards are theoretically more transparent with respect to the performance level expected. However, they may not address emerging research findings if their focus is solely based on current outcomes rather than the existence of underlying processes to manage the risk associated with future outcomes (i.e. a 50 foot reserve will be maintained on streams until the standard changes).

In practice, while BMPs may provide quite prescriptive requirements (such as buffer widths) most performance based standards tend to identify an outcome (e.g. avoided stream siltation) rather than a prescriptive requirement. As a result, both performance and process based standards rely heavily on the judgment of individual auditors in interpreting what constitutes satisfactory performance, sufficient process requirements and effective management.

Underlying Certification Platforms

The SFI and ATFS standards are based on the same platform for certification processes; ISO 17021, against which all certification bodies are assessed. This platform is widely adopted and is also used for ISO 14001 and ISO 9001 and supported by the IAF (International Accreditation Forum), which also develops mandatory guidance in relation to certification processes. As a result, the key elements of the SFI and ATFS certification processes are very similar, as can be seen in Table 2 below, which identifies the key elements of the audit process for each of the FSC, SFI and ATFS Standards.

In contrast, the FSC standard is based on FSC’s own certification process, developed solely for use with FSC forest management standards. The FSC standards are recognized by the ISEAL Alliance, which “develops guidance and helps strengthen the effectiveness and impact of social and environmental standards”. However, ISEAL does not have specific guidelines related to verification procedures. It is also worth noting that FSC and associated organizations comprise a significant

proportion of ISEAL's founding members. Notwithstanding that, FSC expects certification bodies to conduct certification in accordance with IAF Guide 65, a product certification process that pre-dates but to a significant extent mirrors ISO 17021. FSC also builds elements of IAF Guide 65 into its accreditation documents. However, certification bodies are not formally assessed for conformance with IAF Guide 65.

1.2.2 What safeguards exist to ensure standards are current, applicable and reflective of the opinions of a broad range of stakeholders

Each of the standards maintains a standard development process that is open to any interested party and a standards approval process that is designed to reflect the opinions of a broad range of stakeholders. While these processes differ substantially, the stated intent is similar. The ATFS and SFI processes are endorsed by (and audited by) the PEFC as meeting their criteria for standards development and maintenance. The FSC process is a unique tiered process that, ultimately, requires FSC International approval of regional level standards. In the US, a single FSC regional standard was approved for use by FSC International in 2010.

Both process and performance based standards require regular updating to ensure that the selected topics they cover remain current. All of the standards are revised in theory on a 5 year basis and all are current as of 2010.

Additionally, each standard contains provisions that would allow for amendments to be made within a 5 year cycle to address emerging issues of importance.

1.2.3 The Assurance Process

1.2.3.1 On-the-ground certification practices

It is difficult to make general statements about the extent and effectiveness of on-the-ground certification processes under different standards because none of the standards attempts to impose a uniform certification process across certifiers. Each certification body develops their own certification process consistent with the applicable program rules. As a result, rather than there being three different certification processes there are as many different certification processes as certification bodies. Certification body consistency is assessed by accreditation bodies primarily at the process level (i.e. does the process address the accreditation requirements) rather than at the field level (i.e. is the conclusion regarding the adequacy of the auditees practices in relation to spotted owl assessed in the same way by each certifier).

The main elements of the on-the-ground certification process for each standard are identified in Table 2 below in relation to the main phases of the audit process, which are:

- Pre-assessment – An initial less intensive office or field based assessment of forest management activities to determine whether the forest manager has the key processes in place to start the certification process.

- Document Review– A formal review of management plans, reports, harvest level calculations, procedures and processes to determine whether the underlying information and processes required for certification have been developed.
- Stakeholder Engagement– Activities to gather feedback from affected stakeholders on the performance of the forest manager and identify specific issues that require follow-up.
- Field Assessment of Forestry Activities– Activities to determine whether processes and procedures have been implemented consistently on the ground and are effective.
- Post –Assessment Document Review– An additional level of document review to assess additional documentation/ research to confirm field assessment findings.
- Reporting– Development of a formal technical report and public summary of the certification.

Table 2: Key elements of the audit process for each of the FSC, SFI and ATFS Standards⁷

Audit phase	ATFS	FSC	SFI
Pre-assessment	Optional	Mandatory	Optional
Document Review	Mandatory (must include a readiness assessment if a pre-assessment has not been completed).	Optional	Mandatory (must include a readiness assessment if a pre-assessment has not been completed).
Stakeholder Engagement	Assessment of stakeholder concerns, required. Formal stakeholder engagement process not required.	Required (potentially extensive)	Assessment of stakeholder concerns required. Formal stakeholder engagement process not required.
Field Assessment of Forestry Activities	Mandatory	Mandatory	Mandatory
Post –Assessment Document Review	Optional	Optional (potentially extensive)	Optional
Reporting	Technical and public reports required. Public Reports are summary only.	Technical and public reports required (often extensive)	Technical and public reports required. Public Reports are summary only.

⁷ ATFS data based on ANAB Accreditation Rule 27: Accreditation Program for American Tree Farm System (ATFS), Section 9: Audit Procedures And Auditor Qualifications And Accreditation within the Sustainable Forestry Initiative® 2010-2014 Standard and ISO/IEC 17021:2006 Conformity assessment-Requirements for bodies providing audit and certification of management systems.

FSC data based on FSC-STD-20-001 V3 General Requirements For FSC Certification Bodies: Application of ISO/IEC Guide 65:1998.

SFI data based on Section 9: Audit Procedures And Auditor Qualifications And Accreditation within the Sustainable Forestry Initiative® 2010-2014 Standard and ISO/IEC 17021:2006 Conformity assessment-Requirements for bodies providing audit and certification of management systems.

1.2.3.2 Audit Time

Generalizations about the amount of time required to assess a given area of land are not particularly valuable in light of site to site variation between forest parcels in terms of:

- Intensity of practices
- Extent of sensitive features/species present
- Level of program maturity
- Number and level of engagement of stakeholders etc.
- The extent to which the audit team is already familiar with the specific forest type
- The extent to which the audit team is already familiar with the auditees forest management strategies

Regardless of these factors, public claims have been made regarding disparity between the amount of time spent on FSC audits and SFI audits. Review of the supporting analyses identified errors in the data but regardless of these errors it is clear that more time is spent on FSC certification audits. This is not surprising given greater emphasis on stakeholder engagement (which is time intensive), the greater number of specific indicators in FSC standards, the differences in the way the standards are designed and the differences in the point at which the certifier initiates the audit process (which is often earlier in the development of sustainable forest management (SFM) strategies for FSC certification).

1.2.3.3 Controls over the adequacy of the assurance process

The role that accreditation plays in addressing the requirements for on-the-ground certification is fairly fundamental as this implies third party approval of the process for determining and implementing audit time requirements. Key safeguards over the amount of audit effort devoted to individual certifications are identified in Table 3 below.

Table 3: Safeguards over audit time requirements⁸

Audit phase	ATFS	FSC	SFI
Are certification bodies required to formally justify their determination of audit time?	Yes	Yes	Yes
Are certification bodies required to conduct on-the-ground assessments?	Yes	Yes	Yes
Is the field based element of assessment time specified?	No	No	No
Are certification bodies required to indicate the amount of field based time on a given audit in summary reports?	Not specifically	Not specifically – common but basis of measurement is inconsistent	Not specifically – common but basis of measurement is inconsistent

⁸ Data Source as per Table 2

The implementation of safeguards over audit time requirements does not in itself achieve consistency in the level of diligence or expertise applied in conducting field work. Experience in conducting field audit training sessions for professional foresters with existing audit experience indicates that it is: a) surprisingly hard to achieve a consistent conclusion; and b) even harder to achieve that within a consistent time frame.

1.2.4 Safeguards within the certification process to ensure legitimate concerns raised in relation to individual certifications are addressed

Each of the three certification standards includes safeguards to ensure that legitimate concerns raised by third parties in relation to certified forest areas are properly investigated and resolved. Key safeguards are identified in Table 4 below.

Table 4: Safeguards to ensure legitimate concerns are addressed⁹

Audit phase	ATFS	FSC	SFI
Are certification bodies required to assess the handling of complaints made to auditees as part of the certification process?	Yes	Yes	Yes
Are certification bodies required to provide a public summary of the audit process?	Yes	Yes	Yes
Is there a complaints process in place if members of the public believe that a certification decision has been made incorrectly, or based on inadequate evidence?	Yes	Yes	Yes
Is there evidence that the complaints process is functional?	Yes	Yes	Yes

1.2.5 Lessons learned from Standards comparisons

Multiple standards comparisons have been conducted over a number of years between previous versions of the SFI and FSC certification programs, and to a lesser extent, previous versions of the ATFS certification program. However, the current FSC US National Standard, the SFI 2010-2014 standard and the ATFS 2010-2015 standards have not been subjected to significant comparison studies to date. In light of the fact that all three standards have new versions that have not been subject to review, the comments made below based on prior comparisons have been restricted to those that would clearly persist regardless of the version of the standard.

⁹ Data Source as per Table 2

Based on feedback from representatives of the SFI, FSC and ATFS certification standards general observations were drawn from two recent comparison reports:

- the Yale Program on Forest Policy and Governance report Assessing USGBC's Policy Options for Forest Certification & the Use of Wood and Other Bio-based Materials February 25, 2008¹⁰; and,
- the Dovetail Partners Inc. Forest Certification: A Status Report March 23, 2010¹¹

The following general observations arise from review of the Reports:

1.2.5.1 Governance and process

International Codes of Practice have been established for standard-setting¹², focusing on processes such as: decision making, participation, procedures for standard writing, dispute resolution, continual improvement, accessibility of standards to different ownership types, role and processes for the governing body and consultation processes for standards.

Transparency is also an important aspect of maintaining the credibility of certification standards, including transparency in funding as well as transparency in the oversight mechanisms for maintaining the standard and assessing certification bodies.

All standards have relatively robust governance processes that have strengthened over time.¹³ The degree of transparency in governance has also improved.

1.2.5.2 Improvement

All standards undergo continuous improvement and have improved over time in terms of: a) more clearly addressing sustainability issues b) evolving to address emerging concerns c) having greater likelihood that different parties will interpret their requirements in a consistent manner and d) directly addressing perceived weaknesses that come to light.

1.2.5.3 Prescriptiveness of Standards

Comparisons of standards generally favor the more prescriptive standard, in large part because it is easier to establish whether or not a specific topic is addressed when the evaluation criteria are explicit rather than simply implied by a more general indicator requiring a program covering the topic. The FSC standard is clearly the most prescriptive standard of the three with respect to forest practices as well as social indicators and this is reflected in the results of multiple comparison studies.

¹⁰ This study can be found at <http://www.yale.edu/forestcertification/USGBCFinal.htm>

¹¹ This study can be found at <http://www.dovetailinc.org/reportsview/2010/sustainable-forestry/pkathryn-fernholz/forest-certification-status-report>

¹² For example ISO Guide 59 Code of Good Practice for Standardization published by the International Organization for Standardization

¹³ See for example, Results of the Yale Program on Forest Policy and Governance report Assessing USGBC's Policy Options for Forest Certification & the Use of Wood and Other Bio-based Materials February 25, 2008

1.2.6 Implications of the similarities and difference between certification standards

All of the above comments imply the following:

1. The three certification standards should not be considered as “equivalent”. The standards, both in design and in content, are clearly different. Each standard reflects the views of a broad range of stakeholders around what sustainability and good forest management entails, but not the same stakeholders. Hence the indicators differ. Each standard very clearly builds on existing regulatory frameworks for forestry and provides a range of additional processes that act to manage risk to long term harvest levels and to ecosystem services and function.
2. While there are accreditation processes in place in relation to each of the certification standards to manage the rigor and consistency of the certification process¹⁴, the standards have only been in place for slightly more than a decade and a considerable period should be expected before each standard achieves fully consistent implementation between individual certifications. In particular, interpretation of audit time requirements and (more importantly) use of audit time and the individual values imposed on the process by auditors are areas that will take time to evolve toward a more consistent approach. This will only occur as a result of on-going monitoring of the implementation of accreditation requirements by third parties and transparency and consistency in reporting audit processes and time.

In the interim, reliance on SFM certification audit processes is a reasonable option to pursue in light of:

- Third party oversight of their evolution
- The existence of public summaries of the audit process
- The existence of complaint procedures to address concerns arising in relation to audits.

The general conclusions reached above are echoed in a recent FAO study which says “A major objective of all sustainable management programmes in production forests is to achieve a long-term balance between harvesting and regrowth”¹⁵. The paper goes on to say “Although certification programmes are not always explicit about the connections between sustainable forest management and carbon, the practical effect of maintaining a balance between harvesting and regrowth is to achieve stable long-term carbon stocks in managed forests”. The evidence cited to support these conclusions includes the fact that, in the US and Europe where some 90 percent of today’s certified forests are found, forest carbon stocks are continuing to increase. In the US, the carbon stocks on industry-owned timberland¹⁶ are essentially stable.¹⁷ These lands are virtually all certified, as certification is a requirement for membership in the largest US trade association, the American Forest

¹⁴ Accreditation involves formal approval and monitoring of certification body activities by an independent and qualified third party. This includes annual assessments of records at certification body offices as well as on site assessment of a sample of field audit work being conducted by each certification body to assess implementation of required certification procedures. Maintenance of accreditation is mandatory in order for certification bodies to issue certificates. Accreditation is undertaken by ASI (Accreditation Services International) for FSC certification bodies while SFI and ATFS accreditation is undertaken by ANAB (ANSI ASQ National Accreditation Board) and the Standards Council of Canada.

¹⁵ Miner, Reid, Impact of the global forest industry on atmospheric greenhouse gases, FAO Forestry Paper 159, Rome, 2010.

¹⁶ Timberlands are defined by the USDA Forest Service as land capable of growing 20 cubic feet of merchantable wood per acre per year and that are not restricted from timber harvest.

¹⁷ Heath, L., Skog, K., Smith, J., Miner, R., Upton, B., Unwin, J. & Maltby, V. 2010. Greenhouse gas and carbon profile of the US forest products industry. Journal of Environmental Science and Technology. (In press) as cited by Miner 2010.

& Paper Association. The net volume of growing stock on all US private timberlands in 2007 had increased by 27% over 1977, according to the USDA Forest Service.^{18 19}

1.3 Defining sustainable harvest levels and ecological function and services

Definitions for “sustainable harvest levels” and “ecological function and services” were developed based on a review of applicable definitions in the FSC, SFI and ATFS standards as well as associated wording in the Reserve Forest Project Protocol.

1.3.1 Sustainable harvest levels

Table 5 below summarizes pertinent definitions from FSC, SFI and ATFS standards taking into consideration the definition basis, the way “long-term” is defined and any allowable exceptions to the concept of harvesting within the sustainable harvest level related to sustainable harvest levels.

The concept of long-term is critical in relation to sustainable harvest level planning as forests grow relatively slowly and impacts on sustainable harvest levels may only begin to appear after a significant amount of time, particularly in areas where the rotation length (from planting to harvest) is longer. This has important linkages to tests of permanence for forest carbon which are based on a defined (100 year) period in Version 3.2 of the Reserve Forest Project Protocol.

Additionally, because harvesting in excess of growth levels is necessary at times (e.g. to address damage caused by forest pest outbreaks) but is ultimately unsustainable, it is important to establish under what circumstances and for what duration this practice is considered appropriate.

¹⁸ Smith, W. Brad, tech. coord.; Miles, Patrick D., data coord.; Perry, Charles H., map coord.; Pugh, Scott A., Data CD coord. 2009. Forest Resources of the United States, 2007. Gen. Tech. Rep. WO-78. Washington, DC: US Department of Agriculture, Forest Service, Washington Office. 336 p. (Table 20)

¹⁹ The distinction between industry-owned lands and non-industrial lands has been lost in the 2007 data set due to the large divestment of industry lands over the past decade. As a result, it is no longer possible to tell how much of this increase occurred on industry lands versus non-industrial lands.

Table 5 Pertinent definitions from ATFS, FSC and SFI standards related to sustainable harvest levels.²⁰

	ATFS	FSC	SFI
Definition basis	The capacity of forests, ranging from stands to ecoregions, to maintain their health, productivity, diversity and overall integrity, in the long run, in the context of human activity (Helms et al, The Dictionary of Forestry, Society of American Foresters, 1998).	Sustained yield harvest levels: harvest levels and rates that do not exceed growth over successive harvests, that contribute directly to achieving desired future conditions, and that do not diminish the long term ecological integrity and productivity of the site.	Long-term harvest levels that are sustainable and consistent with appropriate growth and yield models. [based on maintenance of long term forest productivity and yield based on best scientific information available]
Concept of long-term	Unstated	The length of time involved will vary according to the context and ecological conditions, and will be a function of how long it takes a given ecosystem to recover its natural structure and composition following harvesting or disturbance or to produce mature or primary conditions.	One forest management rotation or longer
Allowance for harvest levels in excess of calculated sustained yield	Unstated	If the intent is to change the species balance in a stand or planning unit, or to achieve a desired age class structure, or to manage a catastrophic or natural event such as fire or pest outbreak, a particular species might be harvested at a higher-than-sustainable rate until its optimal stand occupancy could be achieved (e.g., by restocking via planting, etc).	Unstated

²⁰ Data from the American Forest Foundation (AFF) 2010-2015 Standards of Sustainability for Forest Certification Approved by AFF Board of Trustees November 3, 2009, FSC-US Forest Management Standard V1.0 Approved by FSC-IC July 8, 2010 and the SFI 2010-2014 Program Section 2: Sustainable Forestry Initiative© 2010-2014 Standard.

Based on the above definitions in certification standards, sustainable harvest levels include the following features:

- Determined based on “long-term” projections (although the definition of long-term varies)
- Based on sustained yield principles
- Harvest levels may not exceed growth over long periods
- Long-term ecological integrity and productivity are not negatively impacted by harvest levels

In addition to the above, review of the Reserve’s Forest Protocol identifies additional requirements to address specific elements of the methodology that, while not necessarily designed to address the concept of sustainable harvest levels at the ownership level, make sense to link to the concept in order to avoid a mismatch between the requirements imposed by the protocol and the definition of sustainable harvest levels. In particular:

- The Protocol applies a test of “harvest levels which can be permanently sustained over time” in sustainable harvest level tests related to both certification and reliance on state or federally approved plans. Therefore, while the Protocol itself does not require modeling over a 100 year period it essentially imposes this requirement through the sustainable harvest level test for all properties except those applying uneven aged management.
- In developing a baseline for forest carbon the Reserve requires 100 year modeling to establish the baseline.
- Permanence –The Forest Protocol is designed based on a 100 year permanence test.
- The Protocol has a constraint on harvest levels, such that harvest levels may not exceed growth over a period greater than 10 years except to address specific circumstances related to forest health risks, planned balancing of age classes or, for small forest areas of less than 1,000 acres, to allow normal silvicultural activities. This builds on, and is consistent with, available indicators from certification standards and therefore makes a logical clarification to the sustainable harvest level definition.

Based on the above, sustainable harvest levels are characterized in this report as:

- Determined based on “long-term” projections of at least 100 years
- Based on sustained yield principles
- Harvest levels do not exceed growth over a period greater than 10 years except to address specific circumstances related to forest health risks, planned balancing of age classes or, for small forest areas of less than 1,000 acres, to allow normal silvicultural activities.
- Long-term ecological integrity and productivity are not negatively impacted by harvest levels

1.3.2 Ecological function and services

Table 6 below summarizes pertinent definitions from ATFS, FSC and SFI standards related to ecological or ecosystem services.

Table 6 Pertinent definitions from ATFS, FSC and SFI standards related to ecological or ecosystem services.²¹

	ATFS	FSC	SFI
Definition basis: Ecological Services	Undefined	Functions performed by natural ecosystems that benefit human society, such as hydrological services (water supply, filtration, flood control), protection of the soil, breakdown of pollutants, recycling of wastes, habitat for economically important wild species (such as fisheries), and climate regulation.	Components of nature, directly enjoyed, consumed, or used to yield human well-being (such as conservation of soil, air and water quality, carbon, biological diversity, wildlife and aquatic habitat, recreation and aesthetics).

Ecological or ecosystem services are assumed to be the sub-set of ecological functions with direct impacts on human society. The ATFS, FSC and SFI standards define ecosystem function implicitly through the design of the overall suite of environmental protection indicators and define ecological ecosystem services explicitly. Review of the indicators developed to address ecological services within each of the standards indicates a high degree of correlation in the specific topics assessed by the standards. However, while there are both positive and negative impacts associated with forest management activities in relation to air quality (particularly in relation to the use of prescribed fire), none of the standards clearly addresses these potential impacts. In addition, climate regulation, while generally acknowledged, is also addressed inconsistently.

Based on the definitions above, ecological function and services are considered here to be functions performed by natural ecosystems, whether or not for the benefit of human society, relating to:

- Hydrology
- Soil productivity
- Air quality
- Biological diversity
- Wildlife and aquatic habitat
- Nutrient cycling
- Climate regulation
- Recreation and aesthetics

²¹Data from the American Forest Foundation (AFF) 2010-2015 Standards of Sustainability for Forest Certification Approved by AFF Board of Trustees November 3, 2009, FSC-US Forest Management Standard V1.0 Approved by FSC-IC July 8, 2010 and the SFI 2010-2014 Program Section 2: Sustainable Forestry Initiative® 2010-2014 Standard.

1.4 Forest Project Risks that could impact sustainable harvest levels and ecological function and services

Based on the definitions of sustainable harvest levels and ecological function and services identified in Section 1.3 (above), we assessed the types of risks to sustainable harvesting and ecosystem functions that could be present in forest carbon projects independently of any specific provisions in the Forest Protocol for managing this risk. The objective in identifying risk factors was to provide a framework of risks that each of the forest certification standards could then be compared against in order to determine how well each standard addresses the risks. The comparisons are summarized in Section 1.5 and presented in detail in Appendix 1.

The list of risks was created by breaking down the component elements of the definitions of sustainable harvest levels and ecological function and services and restating these elements in terms of risk e.g. air quality is simply stated as a risk of "reduced air quality". Where necessary the elements were further broken down to identify different aspects (e.g. hydrology is broken down into water quality issues and separate water quantity issues). For ease of comparison, the level of detail is designed to be consistent with the level of detail generally reflected in forest certification standards.

The list of activities related to risks was developed directly by the authors based on forest certification experience within North America and the types of activity encountered in undertaking forest certifications that would create each type of risk. In particular, we considered the type of activity (or lack thereof) which would create the risk.

The types of risk identified are presented in Table 7 below.

Table 7: Types of risk to sustainable harvest levels and ecological function and services associated with forest carbon projects.

Forest Project Risk Factor	Related activities / Source of risk
Sustainable Harvest Levels	
Soil and forest productivity impacts insufficiently assessed in long term projections	Lack of scientific data to assess impact on key productivity factors during long term planning
Impacts on ecological integrity insufficiently assessed in long term projections	Lack of scientific data to assess impact on key ecological factors during long term planning
Harvest exceeds growth rate over a prolonged period (> 10 years)	Very aggressive forest health strategy
	Financially based harvest targets
	Insufficiently defined target forest condition
	Lack of silvicultural planning (small properties)

Forest Project Risk Factor	Related activities / Source of risk
Ecological function and services	
Impact to water quality	Increased harvest footprint
	Increased use of chemical (herbicide/pesticide/fertilizer) or biological control agents use ²²
	Increased mechanical site preparation
	Increased road/trail access and use
	Increased removal of coarse woody debris (CWD) from riparian zone
	Increased activity within riparian zone
	Increased activities in erosion/slide prone areas
Impact to water quantity /Peaks and troughs	Increased harvest footprint
Reduced soil productivity	Reduced rotation length
	Increased removal of woody debris
	Change from natural succession patterns
	Increased removal of nutrients in foliage/twigs
Reduced air quality	Net reduction in standing live carbon ²²
	Increased smoke emissions from slash burning/prescribed fire
Changes to biological diversity / wildlife and aquatic habitat ²²	Alteration of landscape level tree species composition (e.g. toward higher value or faster growing timber)
	Alteration of spatial/temporal availability of specific successional habitat types
	Alteration of spatial/temporal habitat availability for sensitive species
	Use of seed source with limited genetic variability for planting
	Introduction of invasive / non-native species ²²

²² This Table of risks is program independent i.e. it assumes that the forest carbon protocol contains no provisions in relation to sustainable harvest levels and ecosystem function and services beyond those directly addressing carbon. In practice, a number of the risks associated with forest projects are specifically addressed by the Reserve's Forest Protocol. They are included here for the sake of completeness. The impact of these (non-carbon) criteria on the risks associated with forest projects is discussed further in Section 1.6.3

Forest Project Risk Factor	Related activities / Source of risk
Disruption of nutrient cycles	Increased chemical (herbicide/pesticide/ fertilizer use) ²²
	Increased mechanical site preparation
	Increased fire intensity
	Increased activities in erosion/slide prone areas
	Increased biomass removal (e.g. whole tree harvesting), bio-fuels production
Reduced climate regulation	Reduced growth rates
	Increased fire /disease risk
Reduced recreation and aesthetic value	Reduced unmanaged land / more intensive land management
	Reduced access (protection of investment risk) for recreation / hunting / fishing / trapping
	Reduced provision for aesthetic needs
Reduced commercial opportunities for Non-Timber Forest Products (NTFP)	Change in availability based on changing management practices

1.5 How certification standards address forest project risks to sustainable harvest levels and ecological function and services

1.5.1 Risk Assessment

Using the types of risk to sustainable harvest levels and ecological function and services associated with forest carbon projects we determined what compensating controls exist in the ATFS, FSC and SFI standards that would address this type of risk. Appendix 1 provides the full results of our assessment.

Representatives for the ATFS, FSC and SFI standards were provided an opportunity to review and provide comment on our assessment of the compensating controls prior to its finalization. This resulted in a small number of changes, particularly to capture the intent or guidance associated with standards where an explicit indicator was not present.

1.5.2 Summary of findings

This report focuses on the extent to which each standard, separately, either explicitly or implicitly addresses the risks associated with forest carbon projects. As previously mentioned, it is beyond the scope of this report to assess the relative strengths and weaknesses of the standards in relation to each other.

Appendix 1 provides the full results of the assessment, and describes, for each risk identified to sustainable harvest levels or ecological function and services, the specific elements of each certification standard that are in place to reduce that risk (the “compensating controls”). Given the differences in the nature of indicators between each certification standard it is worth reviewing an example from the findings to show how these differences affect the assessment. Table 8 below provides an example of the findings from Appendix 1 in relation to the risk of increased removal of coarse woody debris and its potential to impact soil productivity.

Table 8: Compensating controls addressing increased removal of coarse woody debris and its potential to impact soil productivity

ATFS 2010-2015 Compensating Control(s)	FSC Compensating Control(s)	SFI Compensating Control(s)
4.2 addresses soil and site quality. However removal of coarse woody debris is not explicitly addressed.	6.3f requires maintenance/enhancement of well distributed woody debris	4.1.4 requires development and implementation of criteria to retain stand level wildlife habitat elements, including down woody debris. 7.1.1 requires management of harvest residue considering organic and nutrient value to future forests

In this case the risk of reduced soil productivity is linked to coarse woody debris levels but reduced coarse woody debris would likely only be a risk on certain soil types. A comprehensive indicator for

this topic would need to consider an analysis of soil types and the related risks to productivity, in order to develop and implement site-specific standards to ensure that any removal of coarse woody debris has negligible expected impact on soil productivity”.

The standards actually address the issue as follows:

- Standard 4 of the ATFS 2010-2015 entitled Air, Water, and Soil Protection indicates that forest management practices maintain or enhance the environment and ecosystems, including air, water, soil and site quality. However, there are no specific indicators that address woody debris (the focus being on chemical use, road construction, BMPs and prescribed fire). However, there is an inherent assumption²³ in the Standard that an audit that identified practices that, while not addressed by specific indicators, were inconsistent with the intent of a specific Standard or performance measure (e.g., in this case, to maintain or enhance soil and site quality) would identify this as a finding.
- Criterion 6.3f of the FSC standard provides a clear expectation that woody debris will be maintained. However, this is also subject to interpretation when one attempts to determine the exact nature of the performance expectation, as “well distributed” is subject to interpretation. In addition, while “maintenance/enhancement” implies that the same or higher levels of debris might exist does not, in practice, set such a standard. Guidance on intent is provided that indicates that the primary objective of the indicator is in relation to maintenance of wildlife habitat.
- SFI objectives 4 and 7 require the forest manager to develop their own criteria for determining how much woody debris is maintained but do not provide any significant direction as to how this should be done or what acceptable levels are.

Summarizing the 3 different approaches above, each approach addresses the issue at some level but each also has inherent weaknesses in the degree of specificity provide. This leaves a significant proportion of the assessment to the technical skills of the specific certification auditor. As a result, it is important when reviewing the results in Appendix 1 to recognize that in most instances, significant reliance must be placed on the certification auditor to interpret the requirements of individual indicators, regardless of the certification standard in use.

Areas of Residual Risk

The areas where some limited “residual risk” to sustainable harvest levels or ecological function and services remains despite certification are identified below for each of the three certification standards. It is important to note that residual risk areas do not equate to areas where certification to a standard would fail to address the topic (in fact, each of the residual risk areas identified for FSC and SFI has been explicitly addressed during certification audits by KPMG). They do however imply an increased risk that the activities undertaken during a certification audit may not fully address the topic or may not be consistently considered during audits (particularly if it is a low risk topic for a specific audit).

²³ The prologue to the American Forest Foundation (AFF) 2010- 2015 Standards of Sustainability for Forest Certification indicates that all AFF **sustainability** elements (standards, performance measures and indicators) are important and will be considered in reviews.

ATFS

Findings for the ATFS standard should be considered in light of fact that the standards were developed specifically for small woodland owners (i.e. land parcels varying from less than 100 acres to a few thousand acres). Most of the potential remaining risk areas have lesser applicability or challenges in feasibility in relation to small scale operations. Specific residual risk areas not explicitly addressed were in relation to:

- the period over which long-term sustainability is considered is not explicit (i.e. potentially less than 100 years). However, it is questionable as to whether the information exists today to categorically address these risks over such a timeframe. As a result, the periodic recalculation of planned harvest levels and updating of long-term management plans based on monitoring information / research (something that all standards address) is likely the most important control
- lack of specific limitations on the length of time over which harvest levels can exceed growth;
- planting of non-native species;
- managing genetic variability within seed sources;
- landscape level planning considerations (which are beyond the intended scope of the standard based on the participants lacking the ability to implement landscape level planning on small land parcels);
- limited monitoring provisions (such as growth rate monitoring) are not explicit; and,
- assessment of impacts associated with alteration of natural succession patterns.

FSC

Topics were generally covered explicitly. The primary residual risk area was:

- the period over which long-term sustainability is considered is not explicit. Long-term is defined in ecological terms but management planning is based on “desired future conditions” for the forest management unit that are based on a 30-50 year concept of long-term rather than 100 years. However, periodic recalculation of planned harvest levels and updating of long-term management plans based on monitoring information / research is required.

SFI

Topics were covered by a mix of implicit and explicit indicators. The primary residual risk areas were:

- the period over which long-term sustainability is considered is explicit but is defined in relation to one rotation or longer rather than 100 years. However, periodic recalculation of planned harvest levels and updating of long-term management plans based on monitoring information / research is required; and,
- lack of specific limitations on the length of time over which harvest levels can exceed growth.

In addition, the reliance on the development of “programs” to address specific issues, while providing for regional flexibility and participant-specific innovation in the development of appropriate practices, does lead to a number of risk areas being addressed implicitly rather than explicitly, putting greater reliance on the auditor interpretation process for determining whether the forest manager has developed an appropriate program (e.g. indicator 4.1.1 requires a “Program to promote the conservation of native biological diversity, including species, wildlife habitats and ecological community types” which provides almost infinite flexibility in the approach taken by the forest manager).

Summary

Overall, each of the standards contains a suite of indicators that, where applied, will address most, if not all, of the risks to sustainability and maintenance of ecological functions and services associated with forest carbon projects. The primary differences between standards were in relation to the degree of prescriptiveness with which they addressed individual risks.

1.6 How certification standards address ownership-level risks to sustainable harvest levels and ecological function and services

The Reserve Forest Project Protocol V3.2 specifically refers to the ATFS, FSC and SFI standards at the ownership (rather than project) level as follows:

At the time commercial harvesting is either planned or initiated within the Project Area, the Forest Owner must employ and demonstrate sustainable long-term harvesting practices on all of its forest landholdings, including the Project Area, using one of the following options:

1. *The Forest Owner must be certified under the Forest Stewardship Council, Sustainable Forestry Initiative, or Tree Farm System certification programs. Regardless of the program, the terms of certification must require adherence to and verification of harvest levels which can be permanently sustained over time.*
2. *The Forest Owner must adhere to a renewable long-term management plan that demonstrates harvest levels which can be permanently sustained over time and that is sanctioned and monitored by a state or federal agency.*
3. *The Forest Owner must employ uneven-aged silvicultural practices (if harvesting occurs) and must maintain canopy retention averaging at least 40 percent across the entire forestland owned by the Forest Owner in the same Assessment Areas covered by the Project Area, as measured on any 20 acres within the Forest Owner’s landholdings found in any of these Assessment Areas, including land within and outside of the Project Area (areas impacted by Significant Disturbance may be excluded from this test).*

Forest Owners who acquire new forest landholdings within their entity have up to 5 years to incorporate such acquisitions under their certification or management plan, whether or not such land is contiguous with the Project Area.

There are two fundamental links between a project proponent's activities outside of the project boundaries and the Reserve's program that appear relevant:

- maintenance of a sustainable harvest level throughout all landholdings (which is a primary concern for project leakage in relation to harvesting activities)
- avoidance of activities that damage ecological function and services. From the Reserve's perspective this is of concern to the extent that "ecological leakage" could occur (i.e. that constraints applied to manage ecological impacts within a project area might be offset by reduced constraints of this type outside the project area).

1.6.1 Maintenance of a sustainable harvest level

The emphasis of the Reserve Forest Project Protocol in relation to a project proponent's land outside the project area is on maintenance of a sustainable harvest level. Given the complexity of the topic, it is logical for the Reserve to rely on existing mechanisms for recognizing the development of sustainable harvesting practices.

However, the three options described by the Reserve for demonstrating sustainable harvest level vary significantly in their degree of rigor. Under Option 2 (State or Federal plan approval), state requirements may vary substantively in both process and expectations. Under Option 3 (uneven-aged silvicultural practices), significant assumptions have been made about the nature and sustainability of uneven aged management practices, as the unstated implication is that these practices are expected to lead to harvest levels which can be permanently sustained over time, which is not necessarily the case (see *Comparison of certification programs with State Forest Practices Acts and uneven aged silviculture requirements* in Section 1.1). Furthermore, Option 3 is a much weaker test in that the mechanism for confirming that uneven aged management is in place is unclear because a) there is no third party approval of the areas outside of the project lands; and, b) any test is limited to ownership within the same Assessment Area rather than the broader test across the full ownership applied in the certification standard test.

As a result, the minimum standard of practice remains somewhat unclear based on three diverse options provided for passing the sustainable long-term harvesting practices test.

The risk factors identified for projects in Table 7 and the associated compensating controls in Appendix 1 for the ATFS, FSC and SFI programs are equally valid at the ownership level. All three standards exhibit controls over harvest level that are based on the scale and nature of the types of forest for which they are designed. While none of the standards provides a perfect set of controls for addressing these risks it is reasonable to assume that in all cases a third party will have assessed and approved the harvest level justification across the full ownership based on criteria that specifically consider rate of cut and its impact on the sustainability of the harvest level and ecosystem function and services. It is important to note that this is above and beyond what a State or Federal agency has an opportunity to consider where the ownership spans different States and/or ownership types.

Under Option 1, ATFS, FSC and SFI certification all provide for practices and programs that build on what may be required under State or Federal plans. As such, it is reasonable to assume that all three

programs provide a level of control over risks related to sustainable harvest level that exceeds the requirements of Option 2 and 3.

The main residual risks to sustainable harvest levels that would exist despite certification at the ownership level under Option 1 would be:

- Long-term projections may be only 30-50 years which may be too short (all standards)
- The time period over which harvesting must match growth is unstated providing excessive flexibility (all standards)
- Desired future forest condition may be insufficiently defined (SFI)

In summary, Options 2 and 3 are less robust than option 1 in providing control over risks related to sustainable harvest level.

1.6.2 Avoidance of activities that damage ecological function and services

Ecological function and services are, for the most part, directly linked to the ability to maintain sustainable harvest levels over longer time frames. For example, impacts to soil productivity will, over time, result in lower available harvest levels.

However, services such as biological diversity, wildlife habitat availability and recreational opportunities are services that could potentially be negatively impacted without leading to a corresponding (negative) impact on the sustainable harvest level over even a 100 year timeframe. These types of service are maintained through explicit consideration during the planning process and the imposition of constraints on the timing and location of activities as well as adjustments to theoretical sustainable harvest levels.

Theoretically, it is possible that project proponents could choose to offset impacts on fiber availability from project lands by relaxing the way they maintain ecological function and services through constraints to activities (and sustainable harvest levels) on other lands. This would be a form of co-benefit leakage that would have negative repercussions for the overall desirability of forest carbon projects.

The leakage of non-carbon benefits is generally not considered within other carbon offset project types (e.g., methane reductions at landfills). However, expectations for forestry projects appear to extend beyond direct project effects and beyond questions of carbon accounting to such broader topics. While forest management operations have a particular ability to create differing opinions on their environmental and social benefits, in the context of forest carbon projects, the primary concern may be less focused on the impacts of forest carbon projects themselves and more focused on whether forest carbon projects in general support the continuation of an existing paradigm for large-scale forest operations rather than a transition to a different (less intensive) paradigm.

In practice:

- Attempting to manage co-benefits outside of project boundaries is complex and expensive and probably close to unworkable for a carbon standard

- Three existing organizations have invested significant resources in the development of forest certification standards, all of which are intended to manage this type of issue and all of which have received some form of international recognition. All three systems are widely adopted, if different in both content and application.
- While it is somewhat questionable the extent to which co-benefit leakage can be reasonably assessed, it is undeniable that each of the ATFS, FSC and SFI standards contains provisions that would act to limit such leakage.
- The project level information in Appendix 1 is equally applicable at the ownership level and demonstrates that all of the standards, to a greater or lesser degree, contain indicators that address the primary concerns associated with co-benefit leakage.

Review of the three options above in relation to maintenance of ecological function and services indicates that Options 1 and 2 from the Forest Protocol are based on a consistent logic of relying on third party assessment. A third party has reviewed the overall forest management strategy (across all holdings) and accepted this as being within either State, Federal or varying stakeholder group expectations. To the extent that controversy arises in relation to activities in these areas, there is a third party with authority to either not approve or remove approval should those expectations no longer be met. This approach goes some way to avoiding controversy and leakage in relation to sustainable harvest levels. Option 1 (based on certification) provides some additional assurance in relation to ecosystem function and services in that the range of indicators assessed is both consistent across jurisdictions and broader than many State Forest Practices Acts (See *Comparison of certification programs with State Forest Practices Acts and uneven aged silviculture requirements* in Section 1.1).

In contrast, Option 3 is a weaker test in that the assumption that uneven aged management alone will meet stakeholder expectations over time is not proven as, for example, it does not address a steady shift in habitat type away from natural forest diversity and condition that can occur based on species, tree size and density criteria applied during partial harvest operations.

1.6.3 Risk Management

Differences in on the ground application of different certification standards would seem to pose less risk than the alternative options provided by the protocol (state or federal approval and monitoring of long-term plans or uneven age management practices).

However, it is important to note that there are firm limits on the extent of reliance that the Reserve can place on certification. While this reliance is feasible at the ownership level, it does not follow that this is the case at the project level. Certification audits are designed to provide conclusions at the scale to which the certificate is issued, which may vary between the forest management unit (FMU), regional or ownership level (encompassing multiple states and/or provinces). All of these levels are broader than the project level associated with Reserve projects and the conclusions drawn at these levels may not be fully supportable or consistent with those that would be drawn for the project area. Thus, placing reliance on certification reports to provide relevant information regarding broad scale practices is logical but it does not follow that it would always be appropriate to draw conclusions about the state of co-benefit management on individual project areas based on those processes. In many cases, there would be a mismatch between the scope of the project and the scope of the certification audit (i.e., the

certification auditor would not be attempting to collect sufficient data to draw conclusions at the project level).

Given the cost and effort associated with drawing certification conclusions at the project level, the current approach taken in section 3.9.2 of the Protocol, which relies upon a small number of (assumedly critical) indicators to address “Natural Forest Management”, is likely both the most efficient and cost effective manner in which to provide a limited degree of assurance around the management of co-benefits in forest project areas. Use of this part of the protocol to address emerging areas of risk in existing projects appears to be a viable option at the project level to the extent that the Protocol focuses clearly on areas of identified high risk rather than attempting to provide a comprehensive assessment of co-benefit management. Where applicable, the use of language consistent with existing certification standards would significantly reduce the potential for these indicators to add unnecessary cost to project proponents.

Task 2: Should Other Certification Programs be Recognized as Addressing the Reserve's Forest Project Protocol Sustainable Harvest Practices Criteria?

Approach

The following general approach was taken:

- 2.1. Determine criteria for assessing the suitability of additional certification programs in light of the Reserve's specific needs.
- 2.2. Identify additional certification programs and assess against suitability criteria.
- 2.3. Develop conclusions on the overall suitability of identified certification programs to the Reserve's specific needs.

2.1 Criteria for assessing the suitability of additional certification programs.

In order to rely on forest certification standards, we believe that regardless of their specific indicators, a number of underlying processes must be in place to provide a standard with a satisfactory degree of rigor and oversight. These underlying processes relate to the design of the framework on which the standard is developed, maintained and improved over time. In the absence of an appropriate framework, the likelihood that a standard will deliver consistent, reliable, unbiased certification decisions based on broadly accepted indicators is probably low.

While multiple frameworks for underlying processes exist, there are significant similarities between these frameworks. For the purposes of this report we have identified a framework based on an amalgamation of key aspects of the governance framework expectations used by the Yale Program on Forest Policy and Governance in the report *Assessing USGBC's Policy Options for Forest Certification & the Use of Wood and Other Bio-based Materials (2008)* and the criteria proposed by NASF (National Association of State Foresters) in 2008²⁴ that they considered as constituting a credible forest certification program.

The resulting criteria for determining a credible certification program are as follows:

- **Independent governance** - the governance body should be independent of the participants and auditors

²⁴ NASF Resolution No. 2008-7: Forest Certification Policy Statement which can be found at <http://www.stateforesters.org/node/1032>

- **Credible governing body structure** - the governance body should represent a range of stakeholders associated with the region covered by the scope of the standard, with no one type of stakeholder dominating either the decision making or standard setting processes.
- **Public standards development process** - the standards setting process should be transparent and include opportunities for members of the public to provide input.
- **Linkage of standards to internationally recognized SFM criteria** – the standards should recognize the scope of SFM considerations already identified in international agreement on SFM (e.g. the Montreal Process).
- **Compliance with relevant international normative institutions** – Internationally recognized processes for standard setting and conducting certification audits exist (through for example, the International Organization for Standardization (ISO) or ISEAL), and should be used where applicable.
- **Continual improvement of standards** - Standards should be revised periodically in order to address emerging SFM issues and improve clarity around existing SFM indicators.
- **Independent accreditation of certifiers** - Certifiers should be accredited as competent to undertake certifications by a body independent of the standard setter, participants and certifiers. This accreditation should be subject to ongoing monitoring.
- **Certification decisions made by independent certifiers** - The decision to certify is made by a third party rather than a program authority.
- **Public reporting of certification audits** – Certification and annual monitoring should include a public summary of the certification process and its findings.
- **Credible complaints and appeals process** - All certification decisions include a mechanism for interested parties and members of the public to raise valid objections or concerns in relation to certification decisions and have them investigated.

Each of the certification standards currently recognized under the Reserve's Forest Project Protocol would meet these criteria on an overall basis. It appears reasonable to require that additional certification programs follow a similar set of criteria if a similar degree of reliance is to be placed on them.

2.2 Identification and assessment of additional certification programs.

A scan of potential certification programs was conducted using the internet, knowledge of existing programs and review of reports comparing different certification standards. There are actually very few recognized certification standards beyond the ATFS, FSC and SFI standards. A number of logger certification and master logger programs are in place in individual states that, to a greater or lesser extent, deal with SFM criteria. However, these are not SFM standards; they capture only the logger's element of the process, excluding longer-term forest planning and reforestation considerations, as these are outside of the scope of the logger's control.

Green Tag certification²⁵, developed by the National Forestry Association in 1998 provides an option for small landowners to demonstrate stewardship through woodlands certification. However, the system has not expanded within the US to any significant extent; the total area certified remains very limited (the Green Tag register currently lists 29 properties varying from 24 acres to 27,000 acres in size). The indicators are designed to be consistent with the Montreal process²⁶ and are relatively broad in nature. However, the underlying governance and certification processes differ from international norms (See Table 9). At its current scale, the implementation of such processes would likely be cost prohibitive to the program.

One more recent label in use in the marketplace is the “Ancient Forest Friendly” label administered by Canopy, a nonprofit organization focused on conservation of wild places²⁷. However, while this is a label scheme it is not an SFM certification scheme and actually relies on FSC certification to address forest activities.

ISO 14001 is a commonly applied standard in Canadian forests, although somewhat less common in the United States. This standard focuses on environmental management systems and, while having a well established governance and certification framework, is not forest specific and does not meet the test of linkage to internationally recognized SFM criteria.

CSA Z809 is the Canadian National SFM certification standard – within a Canadian context this would meet the criteria for a credible certification program established above. However,:

- it is written primarily from a public land perspective (its use on private land is rare); and,
- United States forests, forest issues and stakeholder concerns were not a driving force in the development of the standard as it is focused on Canadian forests.

As a result, CSA Z809 is not considered an appropriate standard for application in the US.

The CCBA standards developed by the Climate, Community and Biodiversity Alliance (CCBA) were specifically developed in 2004 to address social and biodiversity impacts of forest carbon projects. These project based standards exhibit a number of the features of an emerging credible certification program (although gaps remain at this time as identified in Table 9) and would be expected to increasingly conform to the criteria as the program matures (there are currently approximately 50 CCB projects²⁸). However, the standards are designed for a different purpose than SFM certification standards and lack the scope necessary to meet the sustainable harvesting practices test. In particular:

- As project level standards they do not address actions outside the project boundary (ownership level risks);
- The stated focus on Community and Biodiversity is narrower than the range of topics addressed by SFM standards (e.g. soil and forest productivity are not explicitly addressed).

²⁵ Further information on Green Tag certification can be found at <http://www.greentag.org>

²⁶ Information on the Montreal Process for the development of internationally applicable criteria and indicators for sustainable forest management is summarized in Section1: Introduction to the Requirements For The SFI 2010-2014 Program at http://www.sfi-program.org/files/pdf/sfi_requirements_2010-2014.pdf

²⁷ Further information on the “Ancient Forest Friendly” label can be found at <http://canopyplanet.org>

²⁸ A list of current CCB projects can be found at <http://climate-standards.org/projects/index.html>

However, it is likely that as this standard evolves it will provide an increasingly robust project level approach to addressing ecological and sustainable forestry risks.

Table 9 below provides an analysis against the criteria developed for determining a credible certification program for the following programs: logger certification standards (using the Northeast Master Logger Certification Program as an example), ISO 14001, CSA Z809, the CCBA standard and the Green Tag program.

Table 9: Analysis of selected certification programs against criteria developed for determining a credible certification program

	Logger Certification Standards (Northeast Master Logger Certification Program)²⁹	ISO 14001	CSA Z809³⁰	CCBA³¹	Green Tag³²
Independent governance	Independent Trust	Yes	Yes	No CCBA governance structure includes an entity with a commercial interest in verifications	National Forestry Association
Credible governing body structure	In theory; in practice primarily forestry professionals	Yes (although stakeholder representation is not specific to forestry or the US)	Yes (although stakeholder representation is not specific to the US)	Decision making limited to 5 NGOs, including one with commercial interest in verifications	Committee consisting primarily of forestry professionals

²⁹ Further information on the Northeast Master Logger Certification Program can be found at <http://www.masterloggercertification.com/>

³⁰ Further information on the CSA Z809 standard can be found at http://www.csa-international.org/product_areas/forest_products_marking/

³¹ Further information on the CCBA standard can be found at <http://climate-standards.org/standards/index.html>

³² Further information on the Green Tag program can be found at <http://greentag.org/>

	Logger Certification Standards (Northeast Master Logger Certification Program)²⁹	ISO 14001	CSA Z809³⁰	CCBA³¹	Green Tag³²
Public standards development process	No	No developed through committee with National Member Body input	Yes	Yes	Internal development but opportunity for public comment. Limited public information on underlying governance and standard development processes.
Linkage of standards to internationally recognized SFM criteria	Partial (limited by scope of logger activities)	No	Yes	No (scope is explicitly limited)	Yes
Compliance with relevant international normative institutions	No (although designed to complement SFI and FSC)	Yes	Yes	No	No
Continual improvement of standards	Yes	Yes	Yes	Yes, although only described in general terms	Based on 5 year cycle – most current adjustments not reflected on website
Independent accreditation of certifiers	No- accreditation by program	Yes	Yes	Yes, but no monitoring of certifier activities by accreditation agency	No- accredited by sponsors
Certification decisions made by independent certifiers	Yes –includes an independent certification board	Yes	Yes	Yes	Yes

	Logger Certification Standards (Northeast Master Logger Certification Program)²⁹	ISO 14001	CSA Z809³⁰	CCBA³¹	Green Tag³²
Public reporting of certification audits	No	No	Yes	Yes	Not posted. Annual monitoring not required. Certification may be extended without audit if no logging activities
Credible complaints and appeals process	Yes	Yes	Yes	Yes	Complaints process not described in documentation but exists through NFA.

2.3 Suitability of identified certification programs to the Reserve's specific needs.

Based on the findings above, there are currently no additional certification standards within the United States that are applicable at the ownership level that meet the test criteria developed for recognition of certification programs. Existing SFM programs offer sufficient options and flexibility to forest managers to address the Reserve's sustainable harvesting practices test without the need to actively seek additional programs.

The programs reviewed, while not meeting the criteria for the Reserve's intended use, were based on frameworks appropriate to the nature of their own needs. As the cost of maintaining a certification program that meets recognized certification criteria is significant it is unlikely that many (if any) additional SFM certification programs will emerge in the near future.

Appendix 1 Compensating controls within the ATFS, FSC and SFI standards in relation to identified risks to sustainable harvest levels and ecological function and services associated with forest carbon projects.

Forest Project Risk Factor	Related activities	ATFS 2010-2015 Compensating Control(s) ³³	FSC Compensating Control(s) ³⁴	SFI Compensating Control(s) ³⁵
Sustainable Harvest Levels				
Long term projections cannot adequately assess impact on soil and forest productivity.	Lack of scientific data to assess impact on key productivity factors during long term planning.	<p>1.1.2 requires that the management plan address forest health, soil, and fiber production. The plan must describe the desired forest condition.</p> <p>A specific timeframe for “long-term planning” is not defined.</p> <p>1.1.3 suggests but does not require monitoring for changes that could interfere with management objectives.</p>	<p>5.5a specifically requires assessment of measures for maintaining /enhancing ecosystem services.</p> <p>5.6a and 5.6b address long term productivity in the setting of harvest rates.</p> <p>However, guidance to 7.1c indicates long-term is 30-50 years.</p> <p>8.1 and 8.2 lay out monitoring requirements that address (among others) timber growth, stocking, regeneration, and ecosystem function.</p>	<p>1.1.1 requires a long-term resources analysis.</p> <p>1.1.4 requires recalculation of planned harvests to account for changes in growth due to productivity increases or decreases.</p> <p>2.1 -2.5 provide a range of measures to address productivity risks.</p> <p>15.1.1 requires financial or in-kind support of research, identifying areas where research may focus, including forest health, productivity and ecosystem function.</p> <p>15.3 requires participants, where available, to monitor information generated from regional climate models on long term forest health and productivity.</p> <p>However, definitions indicate “long-term” is one forest management rotation or longer.</p>

³³ References listed in the Table are to American Forest Foundation (AFF) 2010-2015 Standards of Sustainability for Forest Certification Approved by AFF Board of Trustees November 3, 2009 - <http://www.treefarmssystem.org/certification/AFF%202010%20to%202015%20Standards%20of%20Sustainability%20for%20Forest%20Certification.pdf>

³⁴ listed in the Table are to FSC-US Forest Management Standard V1.0 Approved by FSC-IC July 8, 2010 - <http://www.fscus.org/images/documents/standards/FSC-US%20Forest%20Management%20Standard%20v1.0.pdf>

³⁵ References listed in the Table are to Requirements For The SFI 2010-2014 Program Section 2: Sustainable Forestry Initiative® 2010-2014 Standard - http://www.sfiprogram.org/files/pdf/Section2_sfi_requirements_2010-2014.pdf

Forest Project Risk Factor	Related activities	ATFS 2010-2015 Compensating Control(s) ³³	FSC Compensating Control(s) ³⁴	SFI Compensating Control(s) ³⁵
Long term projections cannot adequately assess impact on ecological integrity.	Lack of scientific data to assess impact on key ecological factors during long term planning.	<p>1.1.2 requires that the management plan address threatened and endangered species, and high conservation value forests. The plan must describe the desired forest condition.</p> <p>1.1.3 suggests but does not require monitoring for changes that could interfere with management objectives.</p>	<p>5.6a requires forecasting of harvest over multiple rotations, which includes specific consideration of areas reserved from harvest or subject to harvest restrictions to meet other management goals (esp. under P. 6) such as wildlife habitat and ecosystem representation. However, guidance to 7.1c indicates long-term is 30-50 years.</p> <p>8.1 and 8.2 lay out monitoring requirements that address (among others) timber growth, stocking, regeneration, and ecosystem function.</p>	<p>1.1.1 requires a long-term resources analysis. However, definitions indicate “long-term” is one forest management rotation or longer.</p> <p>15.1.1 requires financial or in-kind support of research, identifying areas where research may focus, including forest health, productivity and ecosystem function.</p> <p>15.3 requires participants, where available, to monitor information generated from regional climate models on long term forest health and productivity.</p>
Excessive flexibility provided to exceed growth rate for > 10 years.	Very aggressive forest health strategy.	<p>Interaction with harvest rates is inherent in 1.1.2 which requires that the management plan address forest health.</p> <p>4.2 requires that landowners consider integrated pest management.</p> <p>4.2.1 promotes evaluation of alternative pest management options.</p>	5.6b specifically addresses interaction between forest health strategy and sustainable harvest levels over a rolling 10-year period.	<p>2.4.1 requires program to protect forests from damaging agents.</p> <p>Interaction with harvest rates is inherent in 1.1.1 which requires a long-term resources analysis, up to date GIS, forest inventory and review of non-timber issues but is not specifically referred to.</p>
	Insufficiently defined target forest condition.	1.1.2 requires that the plan must describe the desired forest condition.	7.1c Desired future condition is a specific element of the management plan and is specifically addressed in harvest level calculations in 5.6a.	1.1.1 requires recommended sustainable harvest levels. Target forest condition, is not explicitly referred to but is inherently captured by the interaction between planning requirements under obj.1 and the requirements for programs for forest productivity (obj.2), water resources (obj.3) biodiversity (Obj 4) visual quality and recreation (Obj.5) and special sites (Obj.6).

Forest Project Risk Factor	Related activities	ATFS 2010-2015 Compensating Control(s) ³³	FSC Compensating Control(s) ³⁴	SFI Compensating Control(s) ³⁵
Excessive flexibility provided to exceed growth rate for > 10 years. (continued)	Lack of silvicultural planning (small properties).	Indicator 1.1.1 requires that the management plan must be consistent with the size of the forest and the scale of operations. And reflect the current state of knowledge about forestry and natural resource management. Impact of scale on silvicultural planning needs is not explicitly addressed.	FF 7.1a specifically addresses silvicultural planning for small properties.	1.1.1 requires forest management planning at a level appropriate to the size and scale of the operation. However, the standard is primarily designed for larger holdings.
Ecological function and services				
Impact to water quality.	Increased harvest footprint.	1.1.2 requires that the management plan address water, fiber production and 8.2.1 requires that harvest must be conducted as per the management plan. 4.1.1 requires forest owners to implement applicable Best Management Practices (BMPs). 4.1.2 requires minimization of road construction and other disturbances within riparian zones and wetlands.	6.5.requires riparian protection measures addressing (among others) mechanical site disturbance, roads and crossings, harvesting, BMPs, ground cover, streamside management zone widths, recreational and agricultural impacts and management of hydrological function. 6.3.g.1 provides for opening size limits that may be exceeded per 6.3.g.2 but are subject to water quality considerations.	3.2 Requires riparian protection measures based on (among others) ecological function, harvesting system and other applicable factors and 3.2.3 requires their implementation. Conformance to BMPs is specified under 3.1.1, 3.1.2 and 3.1.4. 3.1.3 requires that plans address wet weather events.
	Increased use of chemical (herbicide/pesticide/fertilizer) or biological control agents use.	4.1.1 Forest owners must implement applicable Best Management Practices. 4.2 requires that landowners consider integrated pest management. 4.2.2 requires that pesticides be EPA approved. 4.2.3 requires that pesticides must be applied, stored and disposed of in	C6.6 and C6.8 address minimization of chemical and biological agents respectively.	2.2 addresses minimization of chemical use. 2.4 requires participation in pest prevention and control programs.

Forest Project Risk Factor	Related activities	ATFS 2010-2015 Compensating Control(s) ³³	FSC Compensating Control(s) ³⁴	SFI Compensating Control(s) ³⁵
Impact to water quality. (continued)		accordance with EPA approved labels by licensed supervisors. 4.2.1 promotes evaluation of alternative pest management options.		
	Increased mechanical site preparation.	4.1.1 requires that Forest owners implement applicable Best Management Practices but does not address site preparation explicitly.	6.5c requires actions to minimize rutting, not accelerate erosion, maintain ground cover and minimize disturbance of topsoil.	3.1 addresses potential impacts on water quality. 3.1.1 requires BMP implementation in relation to water quality, 3.1.3 requires plans for wet weather events. 3.2 requires riparian protection measures based on (among others) soil type and 3.2.3 requires their implementation.
	Increased road/trail access and use.	4.1.2 requires that the forest owner must minimize road construction and other disturbances within riparian zones & wetlands.	6.5d requires road density, erosion, sediment discharge to be addressed. 6.5.f addresses stream crossings.	2.3.7 requires road and skidding layout to minimize impacts to water quality.
	Increased removal of CWD from riparian zone.	4.1.1 Forest owners must implement applicable Best Management Practices. 4.1.2 requires that the forest owner minimize other disturbances within riparian zones & wetlands.	6.5.e.1 includes requirements for ensuring coarse woody debris recruitment for aquatic habitats.	3.2 Requires riparian protection measures based on (among others) ecological function and vegetation and 3.2.3 requires their implementation. 4.1.4 requires development and implementation of criteria to retain stand level wildlife habitat elements, including down woody debris.

Forest Project Risk Factor	Related activities	ATFS 2010-2015 Compensating Control(s) ³³	FSC Compensating Control(s) ³⁴	SFI Compensating Control(s) ³⁵
Impact to water quantity. (continued)	Increased activity within riparian zone.	4.1.1 Forest owners must implement applicable Best Management Practices. 4.1.2 requires that the forest owner must minimize road construction and other disturbances within riparian zones & wetlands.	6.5.e.1 addresses constraints on riparian zone activities (e.g., conformance to Best Management practices (BMPs), riparian buffers developed in consideration of water quality, and hydrologic conditions and minimum buffer widths in some regions of the US).	3.1 and 3.2 require BMP implementation and riparian protection measures respectively.
	Increased activities in erosion/slide prone areas.	4.1.1 Forest owners must implement applicable Best Management Practices. 8.2.1 requires harvest as per the management plan so as to produce forest products and other benefits sustainably but soil erosion and terrain issues are not explicitly addressed.	6.5 requires a range of riparian protection measures that include consideration and management of erosion sources. 6.5.e.1 specifically requires regulation of activities in upslope areas to ensure proper hydrological function, including timing, intensity and location of water delivery.	2.3.1, 2.3.3, 2.3.6 and 2.3.7 provide measures for erosion control and maintenance of soil productivity. 3.2 requires riparian protection measures based on (among others) terrain and soil type and 3.2.3 requires their implementation.
Impact to water quantity /Peaks and troughs.	Increased harvest footprint.	1.1.2 requires that the management plan address water, fiber production and 8.2.1 requires that harvest must be conducted as per the management plan. 4.1.1 requires forest owners to implement applicable Best Management Practices. <i>Note due to the small size of individual areas certified under ATFS, the potential impacts to water quantity are limited.</i>	6.5.e.1 requires regulation of activities in upslope areas to ensure proper hydrological function, including timing, intensity and location of water delivery.	3.2 Requires riparian protection measures based on (among others) ecological function, harvesting system and other applicable factors and 3.2.3 requires their implementation. Water quantity effects are not explicitly referenced. However, conformance to BMPs is specified under 3.1.1, 3.1.2 and 3.1.4.

Forest Project Risk Factor	Related activities	ATFS 2010-2015 Compensating Control(s) ³³	FSC Compensating Control(s) ³⁴	SFI Compensating Control(s) ³⁵
Reduced soil productivity.	Reduced rotation length.	<p>1.1.2 requires that the management plan address amongst other values soil, water, & fiber production and invasive spp.</p> <p>4.2 addresses soil and site quality with indicators related to pest management BMPs, riparian areas and prescribed fire but there are no specific indicators related to soil productivity.</p>	<p>6.1a requires assessment of baseline conditions for soil resources; 6.1b requires assessment of short and long term impacts; 6.1c requires avoidance of negative impacts.</p> <p>Also, 6.10d precludes shortening rotation length to the point where natural or semi-natural stands become plantations.</p>	<p>2.3.1-2.3.7 provide measures to protect and maintain forest and soil productivity varying from soil mapping to development of criteria to guide harvesting and site preparation to erosion control measures.</p>
	Increased removal of woody debris	<p>4.2 addresses soil and site quality. However removal of coarse woody debris is not explicitly addressed.</p>	<p>6.3f requires maintenance/enhancement of well distributed woody debris</p>	<p>4.1.4 requires development and implementation of criteria to retain stand level wildlife habitat elements, including down woody debris.</p> <p>7.1.1 requires management of harvest residue considering organic and nutrient value to future forests</p>

Forest Project Risk Factor	Related activities	ATFS 2010-2015 Compensating Control(s) ³³	FSC Compensating Control(s) ³⁴	SFI Compensating Control(s) ³⁵
Reduced soil productivity (continued)	Change from natural succession patterns.	1.1.2 requires that the plan identify the landowners objectives for desired forest condition. However, alteration of natural succession patterns is not explicitly addressed.	6.1a requires assessment of baseline conditions for forest community types and development, size class and/or successional stages and associated natural disturbance regimes; 6.1b requires assessment of short and long term impacts; 6.1c requires avoidance of negative impacts. 6.3d requires that management practices maintain or enhance plant species distribution and frequency of occurrence similar to those that would naturally occur on the site. 6.3.f requires maintenance, enhancement, or restoration of habitat components and associated stand structures, in abundance and distribution that could be expected from naturally occurring processes.	2.3.6 requires criteria that address harvesting and site preparation to protect soil productivity. 2.3.4 requires that post-harvest conditions are conducive to maintaining site productivity. 2.2.6 requires that planting programs consider potential ecological impacts of a different species or species mix from that which was harvested (although productivity impacts are not specifically referred to).
	Increased removal of nutrients in foliage/twigs.	1.1.2 requires that the plan address amongst other issues, soil, & fiber production. However, there are no specific soil productivity indicators. 4.3.1 requires that prescribed fire must meet the objectives of the management plan.	6.5c whole tree harvesting over multiple rotations requires research to show soil productivity will not be harmed.	2.3.4 requires that post-harvest conditions are conducive to maintaining site productivity., specifically referencing retained down woody debris. 7.1.1 requires management of harvest residue considering organic and nutrient value to future forests.

Forest Project Risk Factor	Related activities	ATFS 2010-2015 Compensating Control(s) ³³	FSC Compensating Control(s) ³⁴	SFI Compensating Control(s) ³⁵
Reduced air quality.	Net reduction in standing live carbon.	1.1.2 suggests but does not require the plan to address carbon storage where present and relevant. 4.3.1 requires that prescribed fire must conform to state and local laws and regulations.	5.5a requires measures to maintain/enhance carbon storage and sequestration – guidance to 5.5a indicates that the intent is to have forest managers recognize carbon storage as an important forest service and public value. It is not intended to preclude harvest that is consistent with other parts of the FSC Standard, nor is a forest owner/manager required to quantify carbon storage and sequestration. The forest owner/manager should consider the values associated with carbon and integrate it into management decisions as done with watersheds, fisheries, and recreation.	1.1.1 requires a review of non-timber issues, including carbon storage.
	Increased smoke emissions from slash burning/prescribed fire.	4.3.1 requires that prescribed fire must conform to state and local laws and regulations.	6.5c limits prescribed burns to areas where this is consistent with natural disturbance pattern, 10.7b requires appropriate equipment and weather conditions. 4.4b/c require consideration of public input on burning activities. However no specific constraints on increased smoke emissions.	4.1.8 requires a program to incorporate the role of prescribed or natural fire where appropriate. 2.3.3 requires support and participation in fire prevention and control programs. 17.3 requires processes to gather public input/concerns and respond to them.

Forest Project Risk Factor	Related activities	ATFS 2010-2015 Compensating Control(s) ³³	FSC Compensating Control(s) ³⁴	SFI Compensating Control(s) ³⁵
Changes to biological diversity / wildlife and aquatic habitat.	Alteration of landscape level tree species composition (e.g. toward higher value or faster growing timber).	1.1.2 requires that the plan describe desired forest condition. The plan must address forest health, fiber, HCVF, special sites and invasive spp. <i>Note due to the small scale of individual areas certified under ATFS, the standard is not structured to be applied at the landscape level.</i>	6.3d requires maintenance/enhancement of plant species composition, distribution and frequency of occurrence similar to those that would naturally occur on the site.	4.1.5 requires a program for assessment of forest cover types, age and size classes and habitats and consideration of this in planning and management activities. 4.1.1 requires a program to promote the conservation of native biological diversity, including species, wildlife habitats and ecological community types.
	Alteration of spatial/temporal availability of specific successional habitat types.	5.1.1 requires the owner to confer with agencies and heritage programs to determine occurrences of T&E species and their habitat requirements. 5.1.2 requires measures to protect T&E species. 5.2.1 encourages forest owners to consult regarding desired species. 5.4.1 encourages forest owners, appropriate to the scale and intensity of management, to mitigate impacts on T&E spp. and HCVF. However, successional habitat types are not explicitly mentioned.	6.3.a.1 requires maintenance/enhancement/restoration of under-represented successional stages.	4.1.1 requires a program to promote conservation of native biological diversity, including species, wildlife habitats and ecological community types. 4.1.5 requires a program for assessment, individually or collaboratively, of forest cover types, age or size classes and habitats.

Forest Project Risk Factor	Related activities	ATFS 2010-2015 Compensating Control(s) ³³	FSC Compensating Control(s) ³⁴	SFI Compensating Control(s) ³⁵
Changes to biological diversity / wildlife and aquatic habitat. (continued)	Alteration of spatial/temporal habitat availability for sensitive species.	.1.1 requires the owner to confer with agencies and heritage programs to determine occurrences of T&E species and their habitat requirements.5.1.2 requires measures to protect T&E species. 5.4.1 encourages forest owners, appropriate to the scale and intensity of management, to mitigate impacts on T&E spp. and HCVF.	6.3.a.2 requires maintenance/enhancement/restoration of rare ecological communities. 6.2b requires maintenance/enhancement/restoration of RTE species and their habitats. 6.3b requires (to the extent feasible) maintenance /enhancement /restoration of habitat for species characteristic of forest ecosystems.	4.1.2 requires a program to protect threatened and endangered species. 4.1.3 requires a program to locate and protect known sites associated with viable occurrences of critically imperiled and imperiled species and communities. 4.2.2 requires a methodology to incorporate research results and field applications of biodiversity and ecosystem research into forest management decisions.
	Use of seed source with limited genetic variability for planting.	3.1.1 requires that the forest owner achieve adequate stocking of desired spp. within 5 years after harvest or as specified by applicable regulation but does not address seed provenance or genetically improved seed.	6.3d contains an assumption that retaining species composition, distribution and frequency of occurrence will maintain genetic diversity. 6.3e requires use of local seed source or justification of use for non-local sources. 10.3b requires maintenance of “appropriate” genetics on plantations established on soils capable of supporting natural forests.	2.5 requires that use of improved planting stock, including varietal seedlings, shall use sound scientific methods. 15.1.2 requires research on genetically engineered trees to adhere to all federal/state/provincial regulations and international protocols.

Forest Project Risk Factor	Related activities	ATFS 2010-2015 Compensating Control(s) ³³	FSC Compensating Control(s) ³⁴	SFI Compensating Control(s) ³⁵
Changes to biological diversity / wildlife and aquatic habitat. (continued)	Introduction of invasive / non-native species.	Indicator 1.1.2 requires that the plan address amongst other values...invasive spp. 5.3.1 encourages forest owners to prevent, remove or control invasive spp.	10.7c requires strategies to prevent/control invasive species in plantations and 6.3h has similar requirements for natural forests. Use of non invasive non-native species is allowed, with some site regional limitations (Appendix C).	2.1.4 requires minimized plantings of exotic species and research documentation that exotic tree species , planted operationally, pose minimal risk. 2.2.6 requires that planting programs consider potential ecological impacts of a different species or species mix from that which was harvested. 2,1,6 requires planting programs that consider potential ecological impacts of a different species or species mix from that which was harvested.
Disruption of nutrient cycles.	Increased chemical (herbicide/pesticide/fertilizer use.	4.1.1 Forest owners must implement applicable Best Management Practices. 4.2 requires that landowners consider integrated pest management. 4.2.2 requires that pesticides be EPA approved. 4.2.3 requires that pesticides must be applied, stored and disposed of in accordance with EPA approved labels by licensed supervisors. 4.2.1 promotes evaluation of alternative pest management options.	C6.6 and C6.8 address minimization of chemical and biological agents respectively.	2.2 addresses minimization of chemical use. 2.4 requires participation in pest prevention and control programs.
	Increased Mechanical site preparation.	4.1.1 requires that Forest owners implement applicable Best Management Practices but does not address site preparation.	6.5c requires actions to minimize rutting, not accelerate erosion, maintain ground cover and minimize disturbance of topsoil.	2.3.1-2.3.7 provide measures to protect and maintain forest and soil productivity varying from soil mapping to development of criteria to guide site preparation and erosion control measures.

Forest Project Risk Factor	Related activities	ATFS 2010-2015 Compensating Control(s) ³³	FSC Compensating Control(s) ³⁴	SFI Compensating Control(s) ³⁵
Disruption of nutrient cycles. (continued)	Increased fire intensity.	Indirectly addressed via Indicator 1.1,1 which requires that the management plan must be consistent with the size of the forest and the scale of operations and reflect the current state of knowledge about forestry and natural resource management.	5.6 c has provisions for bringing overstocked stands back to desired condition to improve or maintain forest health and quality. 6.3.i has provisions for identification and application of site specific fuel management practices based on (among others) risk of wildfire.	15.3 requires participants, where available, to monitor information generated from regional climate models on long term forest health and productivity. 1.1.1. requires a review of non-timber issues, including to address climate induced ecosystem changes.
	Increased activities in erosion/slide prone areas.	4.1.1 Forest owners must implement applicable Best Management Practices. 8.2.1 requires harvest as per the management plan so as to produce forest products and other benefits sustainably but soil erosion and terrain issues are not explicitly addressed.	6.5e.1 requires regulation of activities in upslope areas to ensure proper hydrological function, including timing, intensity and location of water delivery.	2.3.1-2.3.7 provide measures to protect and maintain forest and soil productivity varying from soil mapping to development of criteria to guide harvesting and site preparation and erosion control measures.
	Increased biomass removal (eg whole tree harvesting), bio-fuels production.	1.1.2 requires that the plan describe the desired forest condition. The management plan must address amongst other values forest health, soil, fiber production and suggests but does not require the plan to address biomass and carbon storage where present and relevant.	6.5c whole tree harvesting over multiple rotations requires research to show soil productivity will not be harmed.	2.3.4 requires post harvest conditions conducive to maintaining site productivity ,, (including retained down woody debris). 1.1.1 requires specific consideration of issues related to bioenergy feedstock production. 7.1.1 requires management of harvest residue considering organic and nutrient value to future forests.

Forest Project Risk Factor	Related activities	ATFS 2010-2015 Compensating Control(s) ³³	FSC Compensating Control(s) ³⁴	SFI Compensating Control(s) ³⁵
Reduced climate regulation.	Reduced growth rates.	1.1.3 encourages, but does not require, monitoring for changes that could interfere with the management objectives. No explicit monitoring of growth rates is required.	8.2 requires monitoring of growth rates. 8.4 requires monitoring results to be incorporated into management plan revisions. 5.6a requires use of growth rates in calculating harvest rate.	1.1.4 requires recalculation of planned harvests to account for changes in growth due to productivity increases or decreases. 2.1 -2.5 provide a range of measures to address productivity risks. 15.3 requires participants, where available, to monitor information generated from regional climate models on long term forest health and productivity.
	Increased fire /disease risk.	1.1.3 encourages, but does not require, monitoring for changes that could interfere with the management objectives. Forest health is explicitly mentioned but fire risk is not.	5. .6 c has provisions for bringing overstocked stands back to desired condition to improve or maintain forest health and quality. 6.3e includes provisions for adapting planting strategies to address disease resistance. 7.1g requires that the management plan address insects and disease. 6.3i and 6.5c require fuel management practices. 7.1g requires a description of how insect and disease will be managed. 10.7a/b address diseases and fire control in plantations.	2.4.1 requires a program to protect forests from damaging agents. 2.4.2 requires management to reduce susceptibility to damaging agents. 2.4.3 requires participation in, and support of, fire and pest prevention and control programs.

Forest Project Risk Factor	Related activities	ATFS 2010-2015 Compensating Control(s) ³³	FSC Compensating Control(s) ³⁴	SFI Compensating Control(s) ³⁵
Reduced recreation and aesthetic value.	Reduced unmanaged land / more intensive land management.	1.1.2 suggests, but does not require, the plan address recreation and aesthetics where present and relevant. Indicator 6.1.1 encourages forest owners to incorporate visual quality measures compatible with their silviculture objectives.	5.5a requires measures for maintaining/enhancing fisheries, recreation and tourism. 4.4b requires the forest manager to seek input from people likely to be affected by management activities as part of the planning process.	1.1.1 requires consideration of recreation and tourism in management planning. 5.1.1 and 5.1.2 require consideration of visual quality and aesthetics in forest operations. 5.4.1 provides for recreational opportunities for the public, where consistent with forest management objectives.
	Reduced access (protection of investment risk) for recreation / hunting / fishing / trapping.	1.1.2 suggests, but does not require, the plan address recreation and aesthetics where present and relevant.	5.5a requires measures for maintaining/enhancing fisheries, recreation and tourism. 4.4b requires the forest manager to seek input from people likely to be affected by management activities as part of the planning process. 6.5d requires management of recreation trails, as possible, to minimize ecological impacts. 6.5g requires management of recreation use.	5.4.1 provides for recreational opportunities for the public, where consistent with forest management objectives.

Forest Project Risk Factor	Related activities	ATFS 2010-2015 Compensating Control(s) ³³	FSC Compensating Control(s) ³⁴	SFI Compensating Control(s) ³⁵
<p>Reduced recreation and aesthetic value.</p> <p>(continued)</p>	<p>Reduced provision for aesthetic needs.</p>	<p>1.1.2 suggests, but does not require, the plan address recreation and aesthetics where present and relevant.</p> <p>Indicator 6.1.1 encourages forest owners to incorporate visual quality measures compatible with their silviculture objectives.</p>	<p>5.5a /b require measures to be developed and implemented for maintaining/enhancing fisheries, recreation and tourism.</p> <p>4.4a requires an understanding of aesthetic effects and 7.1j requires the results of evaluation to be incorporated in the management plan.</p> <p>4.4b requires the forest manager to seek input from people likely to be affected by management activities as part of the planning process.</p>	<p>5.1.1 and 5.1.2 require consideration of visual quality and aesthetics in forest operations.</p>
<p>Reduced commercial opportunities for Non-Timber Forest Products (NTFP).</p>	<p>Change in availability based on changing management practices.</p>	<p>8.2.1 requires that harvest levels as per the management plan so as to produce forest products and other benefits sustainably.</p> <p>However, NTFP are not specifically referenced.</p>	<p>5.4a requires a knowledge of the effect on NTFP and 5.6d requires sustained yield harvest levels to be calculated for significant commercial NTFP.</p> <p>7.1c required description of current conditions for NTFP in the management plan.</p>	<p>1.1.1 requires a review of non-timber issues but does not explicitly mention NTFP.</p> <p>18.2 .1 requires a program in relation to NTFP of value to indigenous peoples.</p> <p>18.1.2 provides an input process for other stakeholders in relation to public land.</p>