

Beyond the Conflict in the Peachland Watershed
March 14, 2021
O.R. Travers RFP (Ret.)

“Waste is anything, we did not get right the first time”

Ray C. Anderson

Foreword

This report is prepared in response to the invitation to citizens from the BC Chief Forester Diane Nicholls to review and comment on the Okanagan Timber Supply Area (TSA) Discussion Paper. The invitation states:

“Public input is a vital part of establishing the allowable annual cut (sic AAC). Feedback is welcomed on any aspect of this Discussion Paper, the Data Package or any other issue related to the timber supply review and the allowable annual cut determination for the Okanagan TSA.”¹

“According to Section 8 of the Forest Act the chief forester must regularly review and set new AACs for all 37 TSAs and 34 TFLs in the Province of British Columbia (BC).

The objectives of the timber supply review (TSR) are to:

- *examine relevant forest management practices, environmental and social factors, and input from First Nations, forest licensees and the public;*
- *set a new AAC; and*
- *identify information to be improved for future timber supply reviews.”*

This report will be of interest to every BC community watershed that is being logged, with a view to reducing the potential for loss while adapting to climate change and encouraging restoration of degraded watersheds.

The Peachland Watershed Protection Alliance (PWPA) has requested that I provide a professional review with recommendations to improve forest practices in response to the Chief Forester’s Okanagan TSA Discussion

¹ Ministry of Forests, Lands, Natural Resource Operations and Rural Development January 2021. Okanagan Timber Supply Area, Timber Supply Analysis Discussion Paper. Page 23.

Paper. Logging in the Peachland watershed in the past has produced peak flows and turbidity from sediment in their water supply requiring boil water advisories.

The need for a water treatment plant in Peachland was identified in 2007. Construction began in January 2019 and is expected to be completed by early 2021. The total cost was \$24 million for a community of 5,200 people. Sediment (and its costs) in the drinking water of a Community Watershed, caused by logging, to the community of Peachland, is unacceptable public policy.

The new water treatment plant is intended to provide Peachland residents with safe and reliable drinking water, year-round. Boil water advisories are promised to be a thing of the past. Whether this happens remains to be seen. Questions remain whether or not this new water treatment plant has the capacity to handle large, rapid discharges of muddy water associated with wildfire or snowmelt at an acceptable cost. If this cannot be done responsibly, the right thing to do is to exclude these community watersheds from logging and future Allowable Annual Cut (AAC) determinations.

This unresolved issue continues province wide. The BC Forest Practices Board in 2021 reported it had “...*published a total of 28 complaint investigation reports on water-related issues; three audit reports specific to water management, and a special investigation of community watersheds. Yet, the Board continues to receive a high number of public complaints regarding domestic water.*”²

The Forest Practices Board in 2021 will once again examine this longstanding issue and be followed by an updated water report.

² BC Forest Practices Board, 2021 Terms of Reference for a Special Report *Follow-up on the Board’s Experience with Forestry and Water Users*. <https://www.bcfpb.ca/wp-content/uploads/2020/12/2020-ToR-Experience-with-Forestry-Water-Users.pdf>

Abstract

This paper is about finding a lasting solution to the divisive logging issue in the Peachland Community Watershed of the BC Okanagan Valley, in a time of climate change.

A reorientation in forest policy from sustaining a timber supply to sustaining the condition of a watershed is proposed. Public resource agencies in the USA have been making this change in policy since the year 2000. The term “watershed condition” refers to the state of the physical and biological characteristics and processes within a watershed that determine the soil and hydrologic functions that support streams and other aquatic ecosystems. The range of watershed condition extends from natural pristine (functioning properly) to functioning at risk, to functioning degraded (severely altered state and impaired).

In this quest, four important questions are asked in this report:

1. What needs to be done to improve forest practices?
2. What is the right thing to do?
3. How can the quality of information be improved?
4. How can the risk of loss, be reduced?

New planning tools available to do these assessments, include:

1. Watershed condition framework,
2. Fire regime condition class;
3. Proper functioning condition assessment tool;
4. Climate vulnerability assessment tool.

When informed by these improved planning and assessment tools, proposed decisions can be tested pass/fail for ecological, economic, social and cultural sustainability, and compared with the status quo. When acceptable, then effective action can be taken to prevent further loss and to restore the condition of degraded watersheds. Outcomes (results) of stewardship and logging plans must be measurable, verifiable and therefore enforceable.

In Sections II to VIII of this report there are general recommendations for improving BC Forest Policy and detailed recommendations for improving forest practices, invited by the Chief Forester’s Discussion Paper.

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I Introduction

The Okanagan Valley is a sub-region of British Columbia otherwise known as the Basin of Okanagan Lake. The primary city is Kelowna. The Valley has a dry sunny climate, dry landscapes and a number of lakeshore communities.

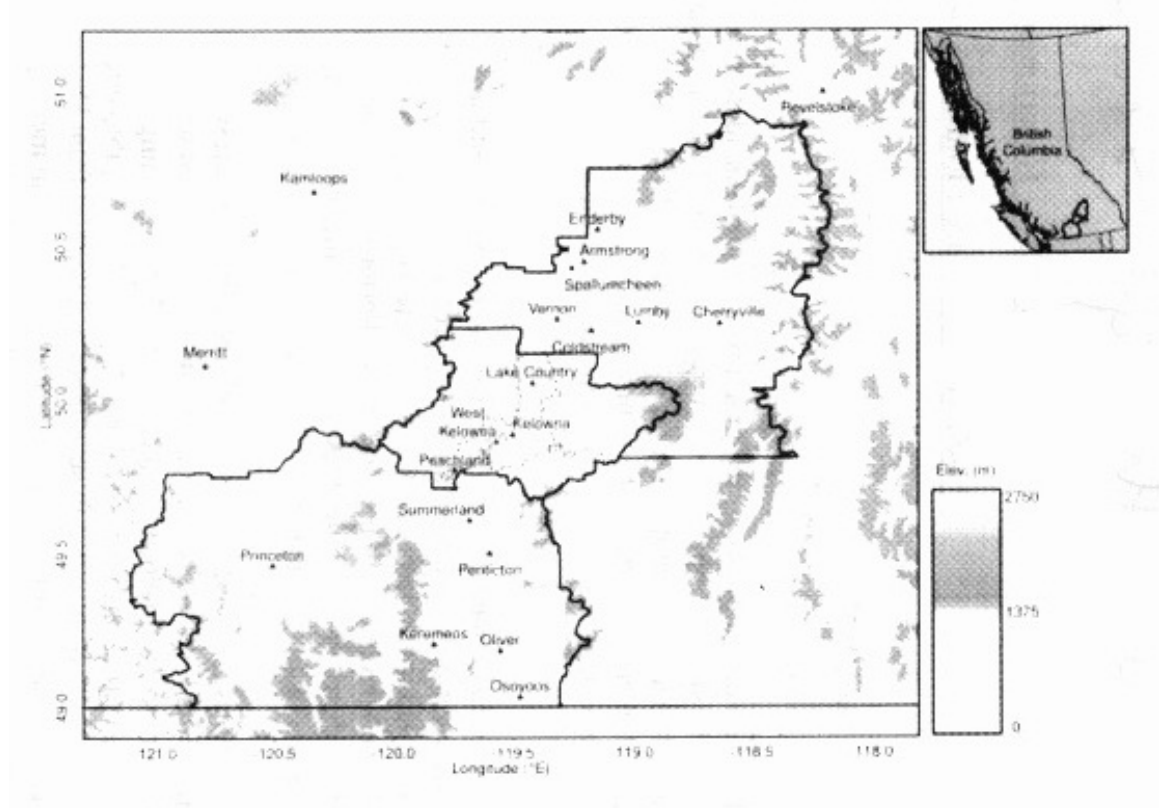
The economy is retirement and commercial based, with outdoor recreation activities including boating, watersports, skiing and hiking. Agriculture in the past focused on fruit orchards, with a shift in recent years to vineyards and wine. Forestry overall is about three percent of the BC economy (data for Okanagan Valley not available). The 2010 BC State of the Forest Report indicated the local forest economy in the Okanagan Valley had low vulnerability to an economic decline because it was highly diversified.³

In the Okanagan Valley, there were 362,000 people living in the Central Okanagan Regional District (194,822), North Okanagan Regional District (83,022) and Okanagan-Similkameen Regional Districts (84,354).⁴ (2016 Census).

³ Ministry of Forests, Lands and Mines. 2010. The State of British Columbia's Forests, Third Edition, Page 189. https://www2.gov.bc.ca/assets/gov/environment/research-monitoring-and-reporting/reporting/envreportbc/archived-reports/sof_2010.pdf

⁴ BC Stats, No Date, 2016 Census. Okanagan

Figure 1: Okanagan Valley Sub Region in British Columbia



Source: Natural Resources Canada, Okanagan Basin Water Board, and Fraser Basin Council

The Okanagan Valley has the highest water consumption per capita in Canada. The consumption of water continues to grow as the population and the high demand for water use increases.⁵

Each Regional District has many large and small utilities that provide water to users, with many water sources in the Okanagan over-allocated. With a changing climate, water conservation is the most cost-effective way to prevent water shortages, rather than costly upgrades to water storage and related infrastructure.

⁵ Natural Resources Canada, Okanagan Water Basin Board, Fraser Basin Council 2020. Climate Projects for the Okanagan. https://soscp.org/wpcontent/uploads/2020/02/OK_Climate_Projections_Report_Final.pdf

II The Principal Challenge in Time of Climate Insecurity

There are several constants to guide humanity in this time of climate insecurity. One is the land itself. Another is solar energy. The other is the water cycle, which combines both solar energy and other natural features of the land. Knowledge of the behaviour of water is essential to the planning and management of all natural resources, including forests, in a time of climate insecurity.

Figure 2: Water Cycle



Source: gpm.nasa.gov

While water supply is decreasing, additional annual demand is increasing and competition for water use can be expected. Looking ahead, provincial and local governments, farmers and orchardists, major commercial water users and regional water regulators will need to communicate closely to avoid undue stress from global and regional water shortages.

On average, warmer winters will result in less snow accumulation on the valley uplands, thereby reducing water availability and increasing the need for water storage.⁶ Groundwater and aquifer recharge will be stressed as droughts increase, and soils can become impermeable and less able for intense rainfall to gradually flow into the soil.

The impacts of climate change will pose challenges including flooding, drought, heat stress, fire, wind and increased instances of disease.

⁶ Natural Resources Canada, Okanagan Water Basin Board, Fraser Basin Council. 2020. Climate Projects for the Okanagan. https://soscp.org/wpcontent/uploads/2020/02/OK_Climate_Projections_Report_Final.pdf

Increasingly dire warnings are being heard from the United Nations Environment Program's (UNEP) emissions gap report which was released prior to the Conference on the Parties (COP) in December 2019. It showed the 1.5 degree C goal to limit climate change in the Paris Agreement is "slipping out of reach". *"Even if existing climate pledges – countries' Nationally Determined Contributions or NDCs – are met, emissions in 2030 will be 38% higher than required to meet that target, the report concluded."*⁷

Shifting patterns of climate are expected and with these changes shifting distribution of forest ecosystems. There will be a migration of forest ecosystems from lower to higher elevations and from south to north. Forest ecologists are already finding tree seedlings of formerly more southerly tree species, occurring further north, along with wildlife species associated with them.

How much the climate may change over time depends directly on how well the global community reduces greenhouse gas (GHG) emissions in the short term. With temperatures warming, the winter "season" is expected to shorten over time, and the summer "season" to lengthen. In light of this, planners and managers will need to prepare for a range of changes expected across seasons and from year to year.⁸

Forest planners and policy makers in the years ahead must anticipate shifting climate, and shifting ecosystems in the forests and terrain of the Okanagan TSA. The area north of Vernon and Okanagan Lake today is a relatively moist climate that supports forests predominated by Douglas-fir, balsam, spruce and pine. The area south of Vernon consists of a drier climate that supports predominantly pine, Douglas-fir, spruce and balsam forests. Overall, the TSA is covered by stands of Douglas-fir (39 percent by area), lodgepole pine (23 percent), balsam (18 percent), and spruce (15 percent) with hemlock, cedar, larch and deciduous forming minor components.

⁷ COP< 25" Key outcomes agreed at the UN Climate talks in Madrid
<https://www.carbonbrief.org/cop25-key-outcomes-agreed-at-the-un-climate-talks-in-madrid>

⁸ Natural Resources Canada, Okanagan Basin Water Board, and Fraser Basin Council. February 2020, Climate Projections for the Okanagan Region. https://soscp.org/wp-content/uploads/2020/02/OK_Climate_Projections_Report_Final.pdf

Seven of the fourteen Biogeoclimatic Ecosystem Classification (BEC) in British Columbia are in the Okanagan TSA (in descending order by total area) are Engelmann spruce subalpine fir, Interior Douglas-fir, Interior cedar hemlock, montane spruce, ponderosa pine, bunchgrass and Interior mountain-heather alpine.

The Chief Forester's task in setting the new AAC is to foresee the consequences of changing climate and logging on ecosystems, (base case and sensitivity analysis), and to anticipate these change in improved forest practices. Managers need to manage for the future in the present. Part of the future that has already happened, is the decades of plantations already established in the Okanagan TSA. The key will not be the ability to predict the future with perfect foresight. No one can do that. Instead, it will be the capacity of Government of BC to adjust legislation, policy and forest practices, in this time of climate change. It is about successfully managing risk under duress. Failure is not an option.

Recommendation: Use a whole systems governance model, so nothing important is left out, when making decisions about the future of forestry in this time of climate change.

Recommendation: Improve public confidence in Allowable Annual Cut (AAC) determinations by requiring licensee Forest Stewardship Plans have objectives that are to measurable, verifiable and therefore enforceable. The Forest Practices Board determined in 2015 that most forest stewardship plans in BC did not meet these criteria. Therefore, a conservative AAC is the most prudent thing to do.

III Context

There are 81 sub-basins in the Okanagan Water Basin. They “..... contribute water to main stem lakes, used for a range of purposes, including: Okanagan, Skaha and Osoyoos.”⁹

According to Ministry of Forest Lands, Natural Resource Operations and Rural Development (MFLNRORD), Forest Stewardship Plans (FSP’s) are required in about 20 community watersheds (See attached map)¹⁰ They were designated under the *Forest and Range Practices Act* (FRPA) about the year 2003.¹¹

Since 2010 the area planned for logging in the Peachland watershed has increased by a factor of more than three. See Table 1. More information is needed. Without a satisfactory explanation, this rate of increase is not acceptable in a Community Watershed.

Table 1: Peachland Watershed Area Planned for Logging, by Decade 1961 to 2020

	Hectares*	Percent
1961 to 1970	1216.3	12.00%
1971 to 1980	1031.2	10.20%
1981 to 1990	1166.8	11.50%
1991 to 2000	1700.6	16.80%
2001 to 2010	1352.0	13.40%
2011 to 2020	3645.9	36.10%

Sum 1961-2020 10,112.8 100%

* Area above the water intake

Source: Harvest Billing System. MFLNRORD

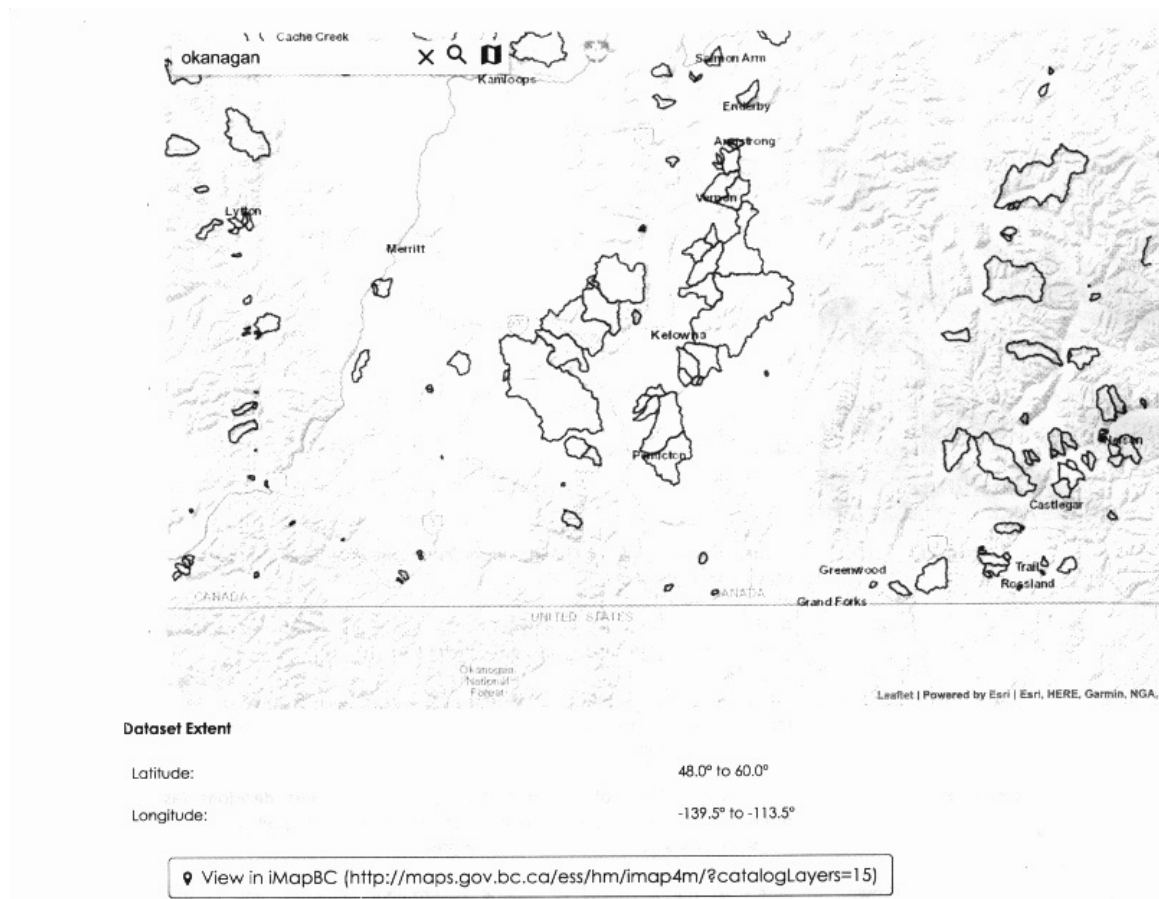
This map provides the location of these watersheds in the south central area of BC.

⁹ Okanagan Basin Water Board 2021, Personal Communication

¹⁰ <https://www2.gov.bc.ca/gov/content/environment/air-land-water/water/water-quality/community-watersheds>

¹¹ Personal Communication. 2021. Nelson Jatel, Water Stewardship Director, Okanagan Basin Water board 250-308-9449

Figure 3: Community Watersheds South Central British Columbia



Source: Ministry of Forests, Land, Natural Resource Operations and Rural Development¹²

Protection of water quality in BC community watersheds is a longstanding issue, in April 2014 the Forest Practices Board published a special investigation report FPB.SIR/40.

“Board investigators observed a variety of land uses are contributing to the condition of the 12 field - assessed watersheds. In 7 of 12 watersheds, sedimentation from land uses is having a negative effect on source drinking water. While current watershed condition does not seem to be affecting water quantity or timing of flow in most watersheds, waterworks infrastructure is at risk in 8 of 12 watersheds, due mostly to the natural

¹² Province of British Columbia. No Date, Community Watersheds – current, <http://www2.gov.bc.ca>

terrain conditions. Although FRPA regulated activities are present in all 12 watersheds, it is the legacy of pre-FRPA and, in particular, pre-Forest Practices Code activities that are having the greatest impact.

The investigation also found that the designation or delisting of community watersheds by government has not kept pace with changes in how water is being sourced from community watersheds. In 16 of 48 watersheds, the surface drinking water source has changed meaning that the watersheds may no longer meet the criteria for designation. Also, government's monitoring of water quality on the forest landbase was found to be lacking because it currently does not monitor the effectiveness of practices to protect water used for drinking water within or outside of community watersheds".¹³

A number of references in this report are made about the progressive forest policies of US public forest land, federal and state. I seldom refer to management of the more abundant US private land as it typically uses the clearcut and industrial model of forestry, which I do not support. This industrial forestry simplifies, homogenizes, and degrades the productivity and values of a forest. As the late Buzz Holling said, "When human engineers manage a forest solely to achieve a constant production of trees, the forest loses its resilience."¹⁴

It is time to get back to first principles and rethink what is needed for sound watershed management. In the nearby National Forests in Washington State the following four principles guided the development of the 1993 Interior Columbia Basin Ecosystem Management Plan (ICBEMP).

"Ecosystem Principles and their Implications for Management:³

- *Ecosystems are dynamic, evolutionary, and resilient;*
- *Ecosystems can be viewed spatially and temporally within organizational levels;*
- *Ecosystems have biophysical, economic, and social limits;*

¹³ Forest Practices Board. April 2014 Community Watersheds: From Objectives to Results on the Ground *Special Investigation FPB/SIR/40*

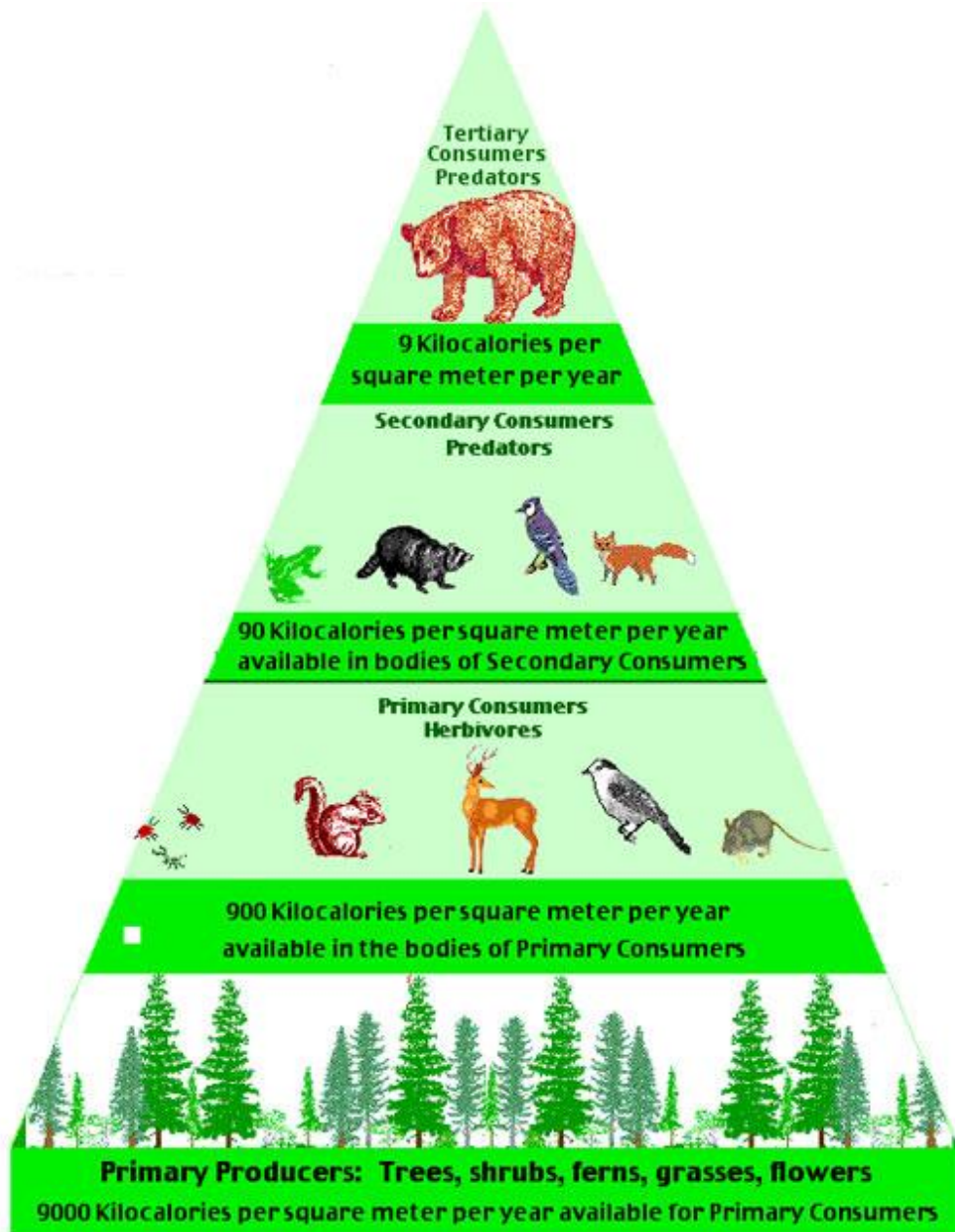
¹⁴ Holling, Crawford (Buzz) .992. *Empire of the Beetle*, Greystone Books

- *Ecosystem patterns and processes are not completely predictable.*¹⁵

Recognizing these patterns and processes on the land, provide the capacity to understand the (1) energy flow from the sun to the land (2) cycling of water in its different forms of liquid, vapor and ice through the seasons (3) cycling of nutrients through the biological processes of production and decomposition by plants and animals. (4) With this understanding all forests can be classified into the four stages of development, from preforest, young, mature and old. With this understanding the higher levels of complexity in structure and function can be recognized, valued and perpetuated, creating economic and social options for society. Aldo Leopold identified these important patterns and processes in the land pyramid.

¹⁵ Interior Columbia Basin Ecosystem Management Project. 1993. USDA Forest Service <https://www.fs.fed.us/r6/icbemp/>

Figure 4: The Land Pyramid, Aldo Leopold



Source: existjg.wordpress.com

This ecological pyramid occurs because of the way the fundamental laws of energy work. As energy flows from the sun to the earth and rebounds back into space, the total amount of energy remains constant. This principle of matter conservation and the First Law of Thermodynamics help explain how the earth as a system. Nothing disappears.

As energy and matter tend to spread and become dispersed (the Second Law of Thermodynamics), as nature self-organizes into different levels of plants and animals, in the form of a pyramid. Everything spreads. Although the total amount of energy in a closed system remains constant, the quantity of available energy in a useful form decreases with each transformation, which in turn tends to dissipate throughout the system. Examples include food decaying, coloured dye dispersing in water, or a car rusting. These scientific laws set limits on both quantities and rates of the production of organic matter. As a result the possible consequences of our actions can be understood.

Watershed management is another way of thinking about humans and nature. This term is defined as the ... *“management of the natural resources of a drainage basin primarily for the production and protection of water supplies and water based resources, including the control of erosion and floods, and the protection of esthetic values associated with water.”*¹⁶ *With climate change, these ecological relationships are becoming destabilized, and a buffer is needed to provide a safety margin to assure that goods and services can be produced. The principle of conservation of energy is that overall energy at the surface of the earth must balance. About fifty percent of the sun’s energy is used to vaporize water, so forest practices that conserve water in the soil for human use will be very important.”*

Recommendation:

Legislate the desired outcomes the Province wants to achieve in watersheds. Monitor results to determine if what intended to happen, did happen, and if not, take corrective action.¹⁷ See Appendix II, Outcomes Based Forest Practices, Maine USA.

Recommendation:

Use an ecological base case (selection logging with natural regeneration), not a production forestry base case (clearcut and plant) base case. Then apply sensitivity analyses to compare the outcomes of options within the limits of the historical range of natural variation of the local forest management unit.

¹⁶ Society of American Foresters. 1944. Forest Terminology

¹⁷ Strong Roots Sustainable Future. 2017 Outcome Based Forestry in Maine

<https://www.maine.gov/dacf/mfs/policymanagement/obf/irvingstrongrootssustainablefutureobf2017.pdf>

IV What Needs To Be Done to Improve Forest Practices?

A quality AAC determination will be (1) based on high quality data (2) supported by sound analysis (3) can be effectively implemented on the ground (4) economically efficient (gets the biggest “bang” for the buck) (5) useful to Province, licensees and the public (6) accommodates new information and respond effectively to the unexpected, and (7) responds effectively to public concerns.

Recommendation:

To improve the quality of FSP’s in a time of climate change use an ecological classification of watershed condition to improve the standard of care.

Recommendation:

Keep the watershed in good working order; by ensuring the rate of forest recovery exceeds the rate of natural and human disturbance, especially in times of stress, like climate change.

Recommendations:

Issues identified in the Okanagan TSA Discussion Paper were:¹⁸

- (a) In the review of marginally economic forest types, use a benefit-risk analysis to determine if this proposed inclusion in a partition has merit (while respecting resource objectives for other values, such as wildlife and water).
- (b) Where feasible and appropriate, provide information. to enhance public discussion of resource management objectives, focus AAC determinations on outcomes, not objectives. Intentions are one thing, what actually happens is much more important.
- (c) High road densities caused by logging are a major concern. They cause soil compaction, impair productivity and increase water runoff into ditches. This runoff prevents water storage in the soil. This in turn shifts the stored water supply away from the late summer when it is most needed to maintain late summer flows for people and fish.

¹⁸ Ministry of Forests. Lands, Natural Resource Operations and Rural Development January 2021. Okanagan Timber Supply Area, Timber Supply Analysis Discussion Paper. Page 1

(d) Do not salvage log mixed species lodgepole pine stands. In 2005. Four BC forest ecologists published research on the natural rate of recovery following a beetle attack.¹⁹ Not only did these stands recover quickly, if they had more than 20 sq. m./ha basal area. They will produce a mid term timber supply in 15 to 35 years. It will take 100 years to produce a timber supply when clearcut salvage logged. Work with nature is the lesson learned.

¹⁹ Coates K. D., Craig DeLong, Philip J. Burton, and Donald L. Sachs. 2005. Abundance of Secondary Structure in Lodgepole Pine Stands Affected by the Mountain Pine Beetle. https://www.for.gov.bc.ca/hfd/library/fia/2007/FSP_Y072184b.pdf

V What is the Right Thing to Do?

Three principles inform decision makers on the right thing to do in domestic water supply watersheds.

1. The first principle is outcomes based – it is also known as “The greatest good for the greatest number in the long run.” This principle has guided policy and legislation in the USA federal National Forests for the last one hundred years. At the center of this principle is the assessment of consequences and a forecasting of outcomes, no longer as straightforward as it was prior to climate change.

Fortunately the four stages of forest development provide evidence what has happened in the long term past.²⁰ Fortunately, there is also a lot known in the present about how forests detect and respond to stress, so decision makers can project the likely ecological consequences of what is happening now and can practice adaptive management.

BC needs to keep what is good, take corrective action when needed, and make disciplined use of performance indicators to keep score. Then BC can stop doing what is not working and continuously improve what is,

Climate change is demanding that humanity think in terms of transformation, and creating a new approach to legislation forest policy and planning. Changing the “goal posts” is typically seen as producing winners and losers, by asking what benefits, for whom and at what cost?

Bruce Rosenstein’s “Ten Elements of the Future” are a meaningful new of thinking about the future:²¹

“*Mindset: Keeping the future in mind as you go about your daily life and work.

- Uncertainty: Don’t assume the future will be similar to today.
- Creation: The future must be built/created.
- Inevitability: The concept of ‘The Future That Has Already Happened.’
- Change: Accept it as normal and ongoing, and organize yourself for constant change.
- Remove/improve: Based on Drucker’s idea of ‘systematic abandonment,’ coupled with *kaizen* (steady, incremental improvement).

²⁰ Franklin J.F., K Norman Johnson, Debora L. Johnson. 1998. Ecological Forest Management, Waveland Press Inc. Page 56 to 64

²¹ Rosenstein, Bruce.2014. Peter Drucker and the Future Focused Mindset. McGraw-Hill. <http://bruceroseinstein.com/3307-2/>

- Innovation/Entrepreneurship:
- Risk: Accepting and facing challenges from disruption, turbulence and more.

2. The second principle care based this is the “Golden Rule” of reciprocity, typically expressed by First Nations. This principle asks you to put yourself in another’s shoes. For some people it is the only ethic they know.

3. The third principle is rules based – this principle is being followed in the *Professional Governance Act* passed by the B.C. Legislature and received Royal Assent, November 27, 2018.²² Highlights (abridged) of the *Act*, as they apply to regulation of forest practices on BC public land include:²³

- *“The Act implements two of the Review’s recommendations by legislating **best practices** (emphasis added) for professional governance and establishing an Office of the Superintendent of Professional Governance (the Office) within the Ministry of the Attorney General.”*

** In October 2017, the Ministry of Environment and Climate Change Strategy undertook a review of professional reliance in the natural resource sector to ensure the highest professional, technical and ethical standards are being applied to resource development in British Columbia.*

** The new Act simplifies and standardizes how these five professions (engineers and geoscientists, biologists, foresters, agrologists, and science technologists and technicians) are regulated by government, brings more consistency to the governance expectations on professionals such as code of ethics expectations and discipline actions, and (what) is considered a **best practice** (emphasis added) in professional governance.*

- *The new Professional Governance Act is intended to provide a consistent framework for governance of self-regulated professions, and to ensure those professions are regulated to **protect the public interest** (emphasis added). The new tools and provisions under the Professional Governance Act include:*

²² Professional Governance Act 2021. https://www2.gov.bc.ca/assets/gov/british-columbians-our-governments/initiatives-plans-strategies/professional-reliance/professional_governance_act_overview_factsheet.pdf Abridged.

²³ Ibid

- A centralized government office responsible for overseeing the governance of all regulatory bodies covered by the Act – the Office of the Superintendent of Professional Governance, who will be responsible for:

- Standardized principles of codes of ethics, including requiring continuing professional development for all professions;

- Increased public representation on regulatory body councils and processes to ensure those eligible to be elected are nominated using a merit-based process;

- Separation of advocacy from the governance of professions;

- Standardized duty for professionals to report potentially hazardous practices by other professionals governed under the Act;

- Protection for whistleblowers who report.

• Professional Codes of Ethics will be standardized, and registrants will be required to adhere to these updated standards through the bylaws of their regulatory bodies;

• Registrants will have a duty to report the practice of other registrants that may pose a significant risk of harm to the environment or public safety;

• The effectiveness of the Act will require the regulatory bodies to submit an annual report to the Office concerning their operations over the preceding year”.

Recommendation: Do the right thing by practicing a land ethic that ensures our watersheds are maintained and restored to a proper functioning condition, in all the Okanagan Valley included in this review.

Recommendation: Prepare for the future that has already happened, especially in plantations. Ensure there is enough time planned for full hydrologic recovery.

Recommendation: The right thing to do is prepare for climate change. Water conservation is the least cost way in the forest and by people to reduce waste and improve efficiency, compared to new investments in dams

and pipes. Ecologically diverse forests the most effective way to prepare for climate change including hydrologic recovery.

VI How Can the Quality of Information be Improved?

The raw material of management is information. That is the only thing any manager has to work with, especially the performance of their organizations. The most important information is provided by insight, foresight and wisdom. There are four planning tools for collecting information to assess the vulnerability of watersheds to clearcut logging, roads and climate change. The output of these assessments (with variations in terminology) is a classification of watersheds into land, which presently has (1) ecological integrity/proper functioning condition (2) integrity at risk (3) integrity impaired/non functional.

These four recommended planning tools are:

* USDA National Resources Conservation Service, US Department of Interior, US Department of Agriculture. 1998 Riparian Area Management. A User Guide to Assessing Proper Functioning Condition and the Supporting Science for Lotic Areas. TR 1737-15 1998²⁴

* USDA Watershed Condition Framework. 2011, A Framework for Assessing and Tracking Changes to Watershed Condition. FS- 977²⁵

* USDA Forest Service, 2011. Responding to Climate Change in National Forests: A Guidebook for Developing Adaptation Options, General Technical Report PNW-GTR-855²⁶

USDA Forest Service. 2012 Forest Adaptation Resources: Climate Change Tools and Approaches for Land Managers, General Technical Report NRS-87²⁷

Another important planning tool is evidence based forest management.

²⁴ https://efotg.sc.egov.usda.gov/references/public/UT/TR_1737-15.pdf

²⁵ https://www.fs.usda.gov/sites/default/files/Watershed_Condition_Framework.pdf

²⁶ <https://www.fs.usda.gov/treearch/pubs/39884>

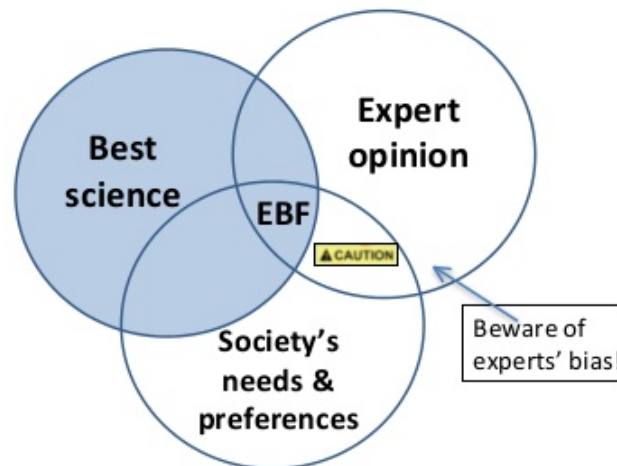
²⁷ <https://www.nrs.fs.fed.us/pubs/52760>

Figure 5: What is Evidence-Based Management?

“Evidence – based forest management ...is about making decisions through the conscientious, explicit, and judicious use of four sources information: practitioner expertise and judgment, evidence from the local context, a critical evaluation of the best available research evidence, and the perspectives of those who might be affected by the decision.”²⁸

Figure 6: Evidence Base Forestry, a Model

‘Evidence based forestry’ a model



7/05/2013

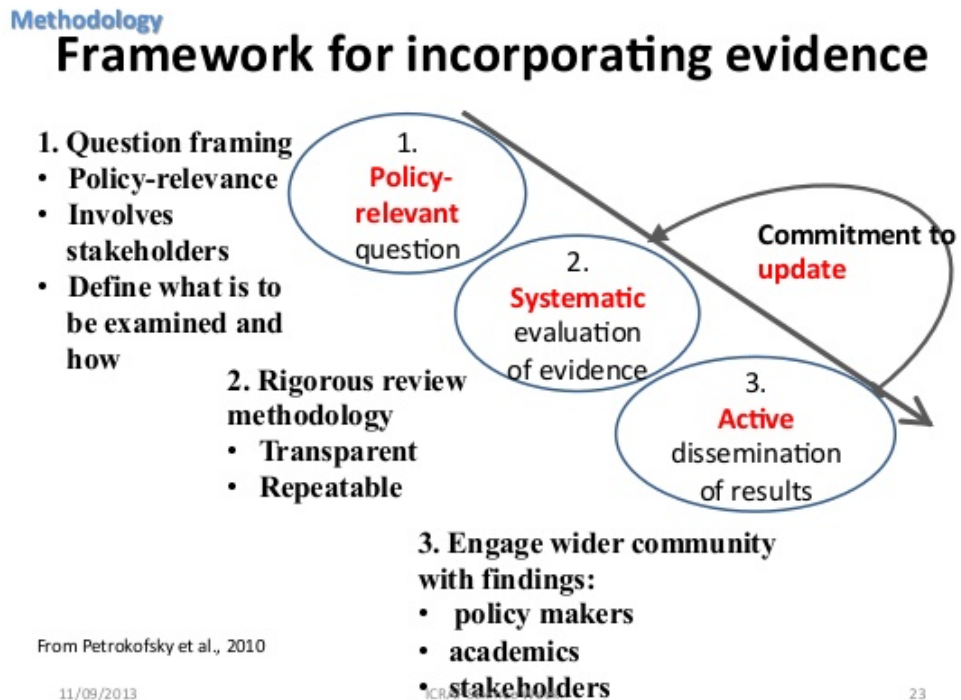
Corvallis, Oregon 2013

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Source: slideshare.net

²⁸ slideshare.net No Date. What is Evidence-Based Management?

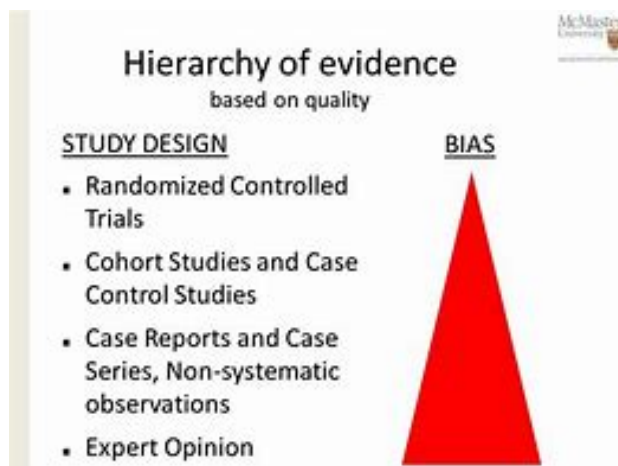
Figure 7: Framework for Incorporating Evidence



Source: slideshare.net

Figure 8: Hierarchy of Evidence, Based on Quality

Expert opinion provides the lowest quality evidence, and typically has the most bias.



Source: slideshare.net

Recommendation: Use protocols that require robust statistical design in the assessment models used for classifying watershed condition and assessing risk. The BC Forest and Range Evaluation Program (FREP) already require these robust tools for effectiveness monitoring. This will ensure performance is measured without professional bias, and in turn improve confidence in the observed results, both positive and negative. The manager can then determine if actions are achieving the intended results.

Recommendation: Low quality information reduces confidence and increases risk. The Province no longer conducts timber inventories. There is no free lunch. The responsible thing to do is protect domestic water supply, like Vancouver and Victoria, with no logging or mining.

VII How Can the Risk of Loss be Reduced?

There are four risk management responses:

1. “Avoid – Change plans to find a way around a problem;
2. Control / mitigate / modify / reduce – Reduce the threat, impact or likelihood (or both) of a negative result through sequential steps;
3. Accept / retain – Assume the possibility of a negative impact is reduced to a level where its consequences will be minimal, if it does in fact occur.
4. Transfer / share – Outsource (e.g., contract) risk (or a portion of the risk) to a third party or parties to manage the outcome. This is done routinely through insurance contracts or operationally by outsourcing an activity.”²⁹

The future has always been unknowable, but the present degree of environmental and social uncertainty about future environmental and social conditions is extraordinary.³⁰

Historically the forester could be relatively certain about the environmental conditions under which the forest would develop. There were unlikely to be major changes in climate, soil conditions, and commercial tree species. This stability has all changed with climate change.

My approach is to reduce this risk and uncertainty by seeking to manage forest properties by (a) reducing risk of damage or loss to the forest and by (b) increasing management options for future generations. Reducing risk is about practices that increase the resilience of forest properties by maintaining and increasing the forests composition and structural diversity. Increasing options for society involves creating diverse forests that can serve as alternative developmental pathways during shifts in ecosystem locations (and services) caused by shifting climates. For example creating a more resistant and resilient forest condition in the next several decades may typically take precedence over conventional clearcut and plant forestry.

Franklin and others state, “Change, uncertainty and surprise will likely dominate the future.”³¹ ... Heterogeneity at multiple spatial scales, creating

²⁹ Wikipedia. No Date. Risk Management

Plan https://en.wikipedia.org/wiki/Risk_management_plan

³⁰ Franklin J.F., K Norman Johnson, Debora L. Johnson. 1998. Ecological Forest Management, Waveland Press Inc. Page 102

³¹ Franklin J.F., K Norman Johnson, Debora L. Johnson. 1998. Ecological Forest Management, Waveland Press Inc. Page 481

redundancy, and increasing resistance and resilience in the face of potential disturbance will help forests survive and adapt in the face of risk and uncertainty. Managing forests to increase options will likely be served by many of the same approaches that are undertaken to reduce risks - maintaining structurally and compositionally diverse forests.”

Recommendation: Be conservative. Know the ecological and economic limits of each forest ecosystem. Provide buffers in space and time to allow for surprises and uncertainty.

Recommendation: Prepare for climate change by maximizing the forest area with mixed tree species forest types, and old forest cover – which also produce high quality water.

Recommendation: There is no mention of climate change in the MFLNRORD Discussion Paper. Listen to the scientists and build this capacity for managing risk. Use the Peter Bernstein definition for managing risk in MFLNRORD watersheds.

“The essence of risk management lies in maximizing the areas where we have some control over the outcome while minimizing the areas where we have absolutely no control over the outcome and the linkage between effect and cause and effect is hidden from us.”³²

³² Bernstein, Peter. 1996 in "Against The Gods. The Remarkable Story of Risk" John Wiley and Sons.

VIII Discussion: Watershed Condition Framework

The watershed condition policy goal of the Forest Service is “to protect National Forest System watersheds by implementing practices designed to maintain or improve watershed condition, which is the foundation for sustaining ecosystems and the production of renewable natural resources, values, and benefits”.

The watershed condition frameworks place the emphasis on sustaining the condition (state) of the forest, rather than on sustaining the flow of timber (not restricted by non timber values that could “unduly reduce” the timber supply.³³

1. The US Forest Service Manual describes three classes of watershed condition:

- Class 1 watersheds exhibit high geomorphic, hydrologic, and biotic integrity relative to their natural potential condition.

These watersheds are functioning properly.

- Class 2 watersheds exhibit moderate geomorphic, hydrologic, and biotic integrity relative to their natural potential condition.

The functioning of these watersheds is at risk.

- Class 3 watersheds exhibit low geomorphic, hydrologic, and biotic integrity relative to their natural potential condition.

These watersheds have an impaired function.³⁴

2. The US Environmental Protection Agency has a similar watershed classification.

³³ *BC Forest and Range Practices Act, Regulations*

³⁴ USDA Forest Service Watershed **Condition** Framework. 2011, FS-977

https://www.fs.usda.gov/sites/default/files/Watershed_Condition_Framework.pdf

Figure 9: Standards and Conservation Goals For Watershed System Integrity³⁵

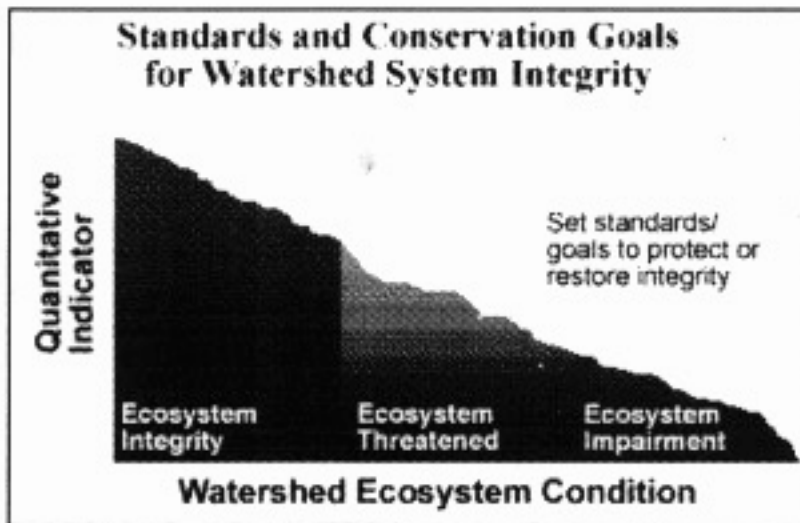


Figure 29: Setting water quality standards can help solve environmental problems and prevent water quality degradation.

Source: USA Environmental Protection Agency.³⁶

- **Classify Riparian Zones into Properly Functioning Condition Classes**

Class 1 = Functioning Properly.

Class 2 = Functioning at Risk.

Class 3 = Impaired Function.

- **Transformation to a New Management Orientation is Already Happening**

³⁵ US Environmental Protection Agency, No Date. Principles of Watershed Management. Pp 14. https://cfpub.epa.gov/watertrain/pdf/modules/watershed_management.pdf

³⁶ US Environmental Protection Agency, No Date. Principles of Watershed Management. Pp 14. https://cfpub.epa.gov/watertrain/pdf/modules/watershed_management.pdf

US public resource organizations, like the US Forest Service, since about the year 2,000 have been changing their management orientation from sustaining timber to sustaining the productive condition of their lands. These changes are enabling policy makers and practitioners act more carefully, especially when a crisis occurs. This new US Forest Service policy orientation requires restoration of degraded forests, and places a policy on preventing more degradation. This contrasts with BC where forest degradation is assumed to be adequately addressed with existing legislation and policy. These new planning and assessment tools have the increased capacity to detect what is actually happening.

Examples are:

- (a) USDA Forest Service Watershed Condition Framework³⁷
- (b) USDA Forest Service Terrestrial Condition Framework (TCF)³⁸
- (c) USDA Forest Service, Fire Regime Condition Class Definition³⁹
- (d) US Environmental Protection Agency, No Date. Principles of Watershed Management.⁴⁰

Recommendation:

Provide the same level of watershed protection of water quality, quantity and timing of flows in community watersheds, as the City of Vancouver on public land and City of Victoria on fee simple (private) land.

Recommendation:

Apply the new *Professional Governance Act* to govern all domestic watersheds with the harmonized Codes of Conduct for all resource professionals to ensure a high standard of care.

³⁷ https://www.fs.usda.gov/sites/default/files/Watershed_Condition_Framework.pdf

³⁸ https://www.fs.fed.us/soils/documents/TCF_briefingFY13_AWFA.pdf

³⁹

https://www.nifc.gov/prevEdu/comm_guide/appendix/2BACKGROUND_FrcDefinitionFinal.pdf

³⁹ https://cfpub.epa.gov/watertrain/pdf/modules/watershed_management.pdf

⁴⁰ https://cfpub.epa.gov/watertrain/pdf/modules/Watershed_Management.pdf

Recommendation:

Classify all watersheds in the Okanagan TSA into (1) properly functioning (2) functioning at risk and (3) functioning impaired. Restore all watersheds to proper functioning condition.

Recommendation:

Implement forest practices, which reduce rapid snowmelt in the snow zone to reduce the risk of increased water in the flood plains of lower elevations during the spring. See the March 2, 2021 Okanagan Water Basin Water Board Press Release about the risk of extreme flooding.⁴¹

Recommendation:

Use state of the art vulnerability assessment tools, and reduce the AAC as other BC communities like Haida Gwaii have done. Resting the land is a valid management option. Anticipate the stresses of climate change, where water conservation is the top priority. Create access to public timber at competitive prices like the former Vernon Log market.

⁴¹ March 2, 2021, News Release, Okanagan at Risk of Extreme Flooding if Province doesn't update lake level management

IX Principles for USA State Forest Trust Legislation

Ideas for improving and maintaining the quality of water in the Peachland watershed, either without logging, or with a high standard of care acceptable to the community, is the purpose of this report. The State (USA) Trust Model of Forest Governance (5% of the land in the 23 western states) provides a reasoned legal alternative model for consideration. State Trusts have existed in the USA since the federal General Land Ordinance of 1785 so they have more than 200 years history. In four states, out of 23, forestry is the primary resource. These states are Washington, Oregon, Idaho and Montana. This legislation initiated a program for reliable funding of public schools and similar institutions, by reserving section 16 (and later 36) of every township (36 sq. miles) for this purpose. USA State Trust Lands total 54 million ha. (135 million ac.). In the basic model for State Trust Land management, a Board of Commissioners (elected and appointed) acts as Trustees to oversee state land operations. For a Trust to exist, three legal principles must be present. There must be:

- An expression of intent, which puts in place duties enforceable by the courts;
- A beneficiary;
- A property interest that is held to benefit the beneficiary.

These legal concepts translate into six interrelated principles that guide Trust land management: accountability, clarity, enforceability and perpetuity, prudence and undivided loyalty. Clarity of goals provides accountability. The beneficiary can enforce the goals in the courts. Trustees are obligated to preserve the productive capacity of Trust lands, in perpetuity. These legal principles put Trust land management on a different foundation that most other public lands, including BC.

State Trusts provide funding to their beneficiaries from both permanent funds and annual revenues. In the 1990's, USA Trust lands distributed annually about \$3 billion (US) to their beneficiaries from permanent funds, and about \$1.5 billion (US) annually from land management revenues. The resources managed include cropland and grazing, forestry, mining, oil and gas. Well managed Land Trusts in BC could be a win –win.

Recommendation:

Develop new BC forest legislation based on Trust principles.

X Pathways to the Future

Pathway #1: Status quo with diminishing returns.

This business-as-usual pathway is no longer acceptable in this time of climate change. Advocates of this option typically assert what is happening now is the best that can be achieved. Following this pathway, the rate of logging in BC peaked in 1988, and has been declining ever since. The simplification of forest ecosystems by clearcutting and planting may maximize efficiency but it minimizes the effective achievement of today's social goals.

Pathway #2: Reduce risk of loss by using a safety margin.

The natural world has limits, ecologically, economically, socially and culturally. When the Earth's carrying capacity is exceeded, sustainability is lost, because nature cannot replace itself fast enough. Wisdom requires a safety margin. The carrying capacity of the earth can be compared to the "Plimsoll line" load limit marked on the side of a seagoing ship. Similarly with no Plimsoll line for the economy, the earth's carrying capacity is exceeded. When human use of the land, exceeds the rate of self-renewal, the living world is in danger of failure.

Pathway #3: Practice statecraft, the skilled management of state affairs. The knowledge needed to take effective action in Pathway #3, asks two questions. "What needs to be done? And "What is right for our organization?" Reliable information is needed to answer these two questions. A close fit is needed between the legislation and policy outcomes the Legislature wants to achieve with the methods used to achieve these outcomes. Ultimately, the morality of our choices will be judged by their consequences, also known as the "greatest good for the greatest number in the long run." To become effective outcomes (results) of forest stewardship and logging plans must be measurable, verifiable and therefore enforceable.

XI Afterword

This report has defined the “what to do” to improve forest practices. It is now timely to briefly describe the “how” of improving forest practices. Implementation is “*the carrying out of a plan, order, or course of action*”.⁴² The “what” concerns strategy, the “how” concerns implementation. This statement on the “how” is described by authors Chris McChesney, Sean Covey and Jim Huling.⁴³

“*The 4 Disciplines of Execution*” explain how to actually do things stated in plans. Each of these four disciplines contain one of the following four principles: focus, leverage, engagement, and accountability. These principles are not new, they are in fact natural laws. The key is to apply these four principles in a disciplined way.

Discipline 1: Focus (Adapted)

In Discipline 1, choose one to three goals. McChesney and others call them wildly important goals (WIGs). These are most important things to think about in your organization and your top priority goals you want to achieve.

Discipline 2: Leverage (Adapted)

In Discipline 2, you learn how to get from “ here” to “there”, from point A to point B, which are lag measures— these are the results that have already happened. They cannot be changed, after they have been measured. For example, a lag measure is the distance from your house to your car, measured on a tape.

To create results, a different type of measure is needed—a lead measure. Lead measures predict what could happen and influence lag measures. When efforts are applied to lead measures, the lag measures also move. In forestry, the lag measure concerns the forest that exists now. The lead measure is the description of the future forest that could happen with climate change, updated annually.

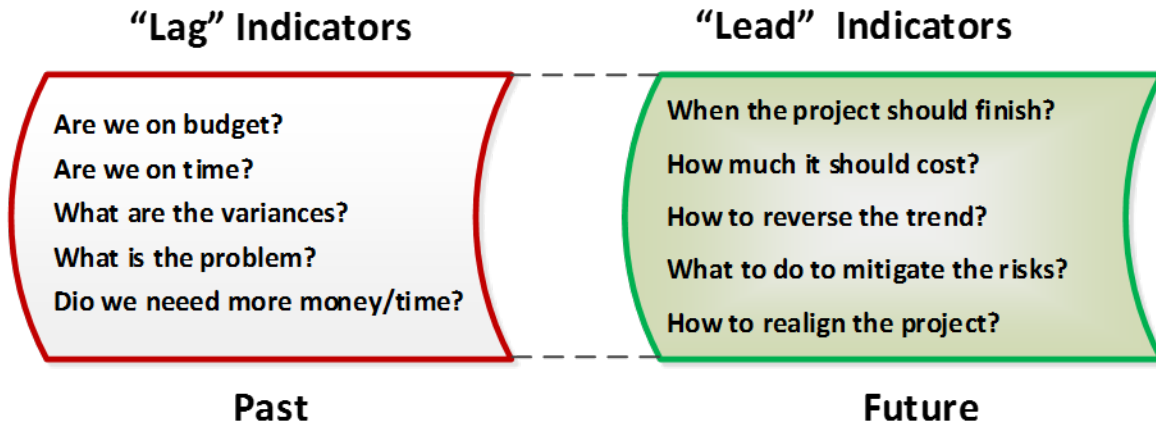
Lag and lead indicators can be further explained:⁴⁴

⁴² Oxford Dictionary

⁴³ McChesney, Chris, Sean Covey and Jim Huling, 2012, *The Four Disciplines of Execution, Achieving Your Wildly Important Goals*, Free Press

⁴⁴ McChesney Chris, Sean Covey and Jim Huling. 2012 *The Four Disciplines of Execution, Achieving Your Wildly Important Goals*. Free Press

Figure 10: Lag and Lead Indicators



Source: keywordsking.com

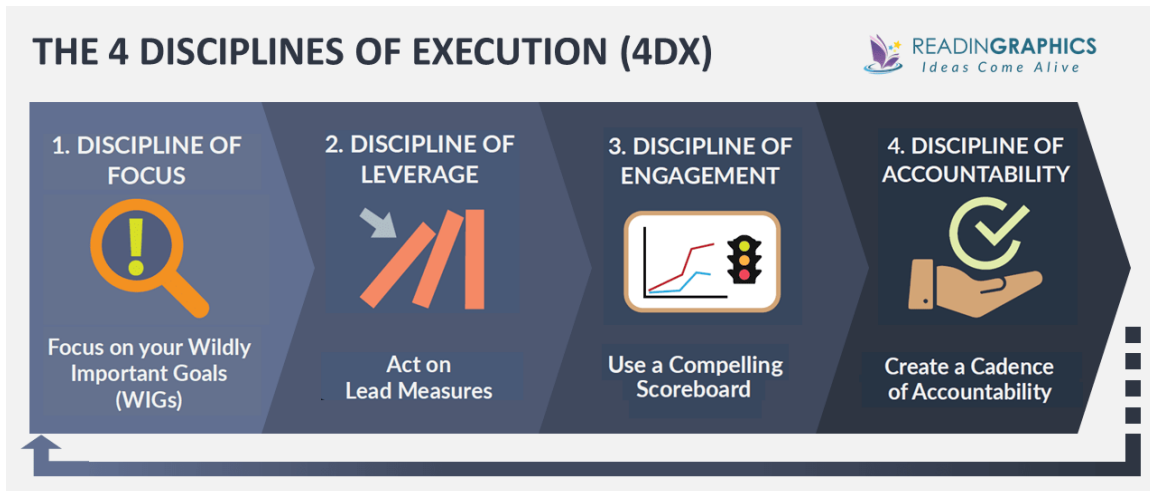
Discipline 3: Engagement (Adapted)

Discipline 3, is about making good decisions, based on good information, that can be effectively implemented and will have a positive impact. People play better, when they are keeping score. Then forest managers know when they are winning and when they are losing. This can be done in forestry by remote sensing of the forest condition by measuring moisture, color and vigor etc.

Discipline 4: Accountability (Adapted)

Discipline 4, is about achieving the goals of forest management can now be seen as a game, where people are accountable to their colleagues as well as the Minister of Forests. When people know that others are depending on them, they become more motivated and more engaged. In the forest these conversations are called “tailgate” sessions when practitioners discuss their ongoing results in the field. Then continuous improvement becomes a reality, not an intention in a plan.

Figure 11: The 4 Disciplines



Source: readinggraphics.com

Recommendation:

“If you want something new. You have to stop doing something old.”⁴⁵

Recommendation:

In response to climate change completely rethink how to plan for the future in the present. See Bruce Rosenstein’s “Ten Elements of the Future”. See Section V of this report.⁴⁶

⁴⁵ The late Peter Drucker

⁴⁶ Rosenstein, Bruce.2014. Peter Drucker and the Future Focused Mindset. McGraw-Hill. <http://brucerosenstein.com/3307-2/>

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XIII Glossary

Adaptive capacity (IPCC) The ability of systems, institutions, humans, and other organisms to adjust to potential damage, to take advantage of opportunities, or to respond to consequences.⁴⁷

Ecological integrity (J.F. Franklin et. al.): *A forest ecosystem has integrity when its major components - biota, structures and functional capacities are present. When it lacks important attributes - key organizational groups, essential structures, or critical functional capacities - it can be viewed as being incomplete or lacking integrity. Sustaining the integrity of the forest is a central tenet of ecological forest management. We mean by this, sustaining its essential elements and capacities, not necessarily a specific condition or species.*⁴⁸

Ecosystem (Helms, John A, 1998 Dictionary of Forestry. Society of American Foresters (Page 54). *A spatially explicit relatively homogeneous unit of the earth that includes all interacting organisms and components of the abiotic environment with its boundaries - note an ecosystem can be of any size, e.g. a log, pond, field, forest or the earth's biosphere.*

Ecosystem (MFLNRORD) *“A functional unit consisting of all the living organisms (plants, animals, and microbes) in a given area, and all the non-living physical and chemical factors of their environment, linked together through nutrient cycling and energy flow. An ecosystem can be of any size—a log, pond, field, forest, or the earth's biosphere—but it always functions as a whole unit. Ecosystems are commonly described according to the major type of vegetation (e.g., forest ecosystem, old-growth ecosystem, or range ecosystem).*

Exposure (IPCC)⁴⁹ *The presence of people, livelihoods, species or ecosystems, environmental functions, services, and resources, infrastructure, or economic, social, or cultural assets in places and settings that could be adversely affected.*

⁴⁷ IPCC Glossary https://www.ipcc.ch/site/assets/uploads/2018/02/WGIIAR5-AnnexII_FINAL.pdf

⁴⁸ Franklin, Jerry F, Norman Johnson and Debora L Johnson. 2018. Ecological Forest Management. Waveland Press Inc., Page 24

⁴⁹ IPCC Glossary https://www.ipcc.ch/site/assets/uploads/2018/02/WGIIAR5-AnnexII_FINAL.pdf

Forest management (MFLNRORD) “The practical application of biological, physical, quantitative, managerial, economic, social, and policy principles to the regeneration, management, utilization, and conservation of forests to meet specified goals and objectives while maintaining the productivity of the forest. Particularly, that branch of forestry concerned with the overall administrative, economic, legal, and social aspects and with the essentially scientific and technical aspects, especially silviculture, protection, and forest regulation. Includes management for aesthetics, fish, recreation, urban values, water, wilderness, wildlife, wood products, and other forest resource values.”

Partial cutting (Helms, John A. 1998. *The Dictionary of Forestry*, Society of American Foresters (Page 132) defines the term “partial cutting” as “removal of only part of a stand for purposes other than regenerating a new age class...note partial cutting is not considered a regeneration method”. An example of partial cutting would be thinning to recover merchantable wood before a dead tree decays.

Sensitivity (IPCC) The degree to which a system or species is affected, either adversely or beneficially, by climate variability or change. The effect may be direct (e.g., a change in crop yield in response to a change in the mean, range, or variability of temperature) or indirect (e.g., damages caused by an increase in the frequency of coastal flooding due to sea level rise).

Sustainable forest management (MFLNRORD) “Management that maintains and enhances the long-term health of forest ecosystems for the benefit of all living things while providing environmental, economic, social, and cultural opportunities for present and future generations.”

Sustained yield (Helms, John A, 1998 *The Dictionary of Forestry*, Society of American Foresters Page 181)

1. The yield that a forest can produce continuously at a given intensity of management -note sustained yield management implies continuous production so planned to achieve at the earliest practical time, a balance between increment and cutting.

2. The achievement and maintenance in perpetuity of a high-level or regular periodic output of the various renewable resources without impairment of the productivity of the land...

Uneven aged (Helms John A, 1998 *The Dictionary of Forestry, Society of American Foresters* (page151))

1. *A method, which “regenerate and maintain a stand with a single age class. Clearcutting is...cutting essentially all trees producing a fully exposed microclimate for the development of a new age class.”*

2, *defines uneven -aged (selection) as a method to „,“ regenerate and maintain a multiage structure by removing some trees in all classes singly, in small groups, or in strips.”*

Value added (Investopedia):

1. *“The amount by which the value of an article is increased at each stage of its production, exclusive of initial costs.”⁵⁰*

2. *Value-added is the difference between the price of a product or service and the cost of producing it. The price is determined by what customers are willing to pay.”*

Vulnerability (IPCC) *The propensity or predisposition to be adversely affected. Vulnerability encompasses a variety of concepts and elements including sensitivity or susceptibility to harm and lack of capacity to cope and adapt. See also Contextual vulnerability and Outcome vulnerability.*

Vulnerability index (IPCC) *A metric characterizing the vulnerability of a system. A climate vulnerability index is typically derived by combining, with or without weighting, several indicators assumed to represent vulnerability.*

⁵⁰ <https://www.investopedia.com/terms/v/valueadded.asp>

Appendix I Old Forests Produce High Quality Water

Different stages of forest development do different things better for people than other stages. In “Ecological Forest Management” the authors identify four stages of forest development (preforest, young, mature and old). The old forest stage typically has the most efficient capture of sunlight, and the most effective water cycle, and nutrient cycle.⁵¹ This is very important when managing a forest to sustain water quality, water quantity, and timing of flows. These authors describe what an old forest looks like, what their many attributes are, and why old forests produce the highest quality water at the least cost.

- In the live green old trees, one or more dominant species are present, or provide a set of unique habitat niches, along with intermediate sized trees and tree reproduction of shade tolerant species. The large range in tree sizes (diameters and heights) is a key characteristic for identifying an old forest.
- In the dead and dying trees, decadence is a highly evident in an old forest, with continuing inputs of large snags and logs, adding to the dead and down trees. Competition between trees has a significant role, primarily in dense patches of small trees that develop in tree canopy gaps. Other features of decadence, such as cavities and decay, develop in response to insects and disease.
- Tree canopies in old forests are typically multilayered or continuous from the ground up to the top of the trees. Old forests are typically highly productive, and when undisturbed by roads produce high quality water. Old forests typically have significant gross growth, but with high mortality of the small trees.
- Older forest ecosystems are rich in plant and animal species because they represent a stable environment that is niche rich. Old forests commonly have high tree species diversity, particularly if representatives of shade tolerant species are present. Although many of the vertebrates and invertebrate animals that are present and also present in the young and mature forest stages, there are typically some animals that find conditions in the old forests to be optimal or essential to their life cycle.

⁵¹ Franklin, J.F., Norman, Debora Johnson 2018. Ecological Forest Management Waveland Press Inc. Page 61

- The presence of old forests strongly influence the water cycle, through interception of precipitation, condensation of cloud and fog moisture, transpiration, and redistribution of water in soils. Scientists discovered decades ago that watersheds vegetated by old forests produce well-regulated flows of high quality water. The large deep crowns of old forests make them highly effective in intercepting precipitation and in condensing precipitating surfaces for atmospheric moisture and particulates. The structural complex canopies also strongly influence the accumulation and retention of snow because of their complex canopy architecture. Old forest canopies include many small openings (gaps) that favor the accumulation of deep snowpacks, and provide shade during the melting of snow in the spring.
- Storing of water in the forests, and soil, to maintain base flows in streams and lakes, is the least costly way to conserve water (instead of building more dams and waterworks) to maintain the late low summer flows, when are essential for fish, wildlife, domestic water supply, agriculture and fire fighting.
- This youtube is 5 minutes 57 seconds in length, See 2:00 to 3:00 minutes for Jack Hull's (retired Victoria Watershed manager) confirming the low cost of producing high quality water in the protected Victoria Watershed, with no conventional logging permitted. The reason is the low sediments loads, with no major turbidity peaks.

Figure 12 Nanaimo Watershed Presentation to City Council⁵²,



⁵² Nanaimo Watershed presentation to City Council⁵², YouTube
<https://www.youtube.com/watch?v=fT0tC0m7xEA>

Appendix II Outcome Based Forestry, Maine USA⁵³

Criterion 1: Soil productivity

Goal: Maintain site productivity.

Outcomes: Site productivity will be maintained or improved, and the area in roads and yards will be minimized.

Criterion 2: Water quality, wetlands and riparian zones

a. Goal: Maintain or improve the chemical, physical, and biological integrity of aquatic systems in forested areas and riparian forests.

b. Outcomes: Forest management in shoreland areas protects water quality and aquatic and riparian forest biodiversity.

Criterion 3: Timber supply and quality

Goal: Improve the quantity and quality of future timber supply when appropriate.

Outcome: The management strategy and harvest levels for the lands will increase the quality and quantity of the forest resource as appropriate in the medium and long term (20 – 50 years).

Criterion 4: Aesthetic impacts of timber harvesting

a. Goal: Minimize adverse visual impacts of timber harvesting.

b. Outcomes:

1. The landowner will minimize visual impacts of harvests, roads, landings and other management activities.

2. The landowner's planning staff are trained in and apply principles of visual quality management.

3. The landowner identifies areas with high and moderate visual sensitivity and takes appropriate measures to avoid significant visual impacts whenever necessary.

Criterion 5: Biological diversity

a. Goal: Maintain biological diversity with healthy populations of native flora and fauna, forest communities and ecosystems.

b. Outcomes:

1. Management addresses the habitat needs of the full range of species present.

53

https://www.maine.gov/dacf/mfs/policy_management/obf/obf_rpt_to_acf_committee_03112020.pdf

2. *Maintain or manage for acreage in the late successional (LS) condition through management and protection.*
3. *Maintain a reasonable component of standing dead trees, live cull trees, and down logs across the landscape (not necessarily on every acre).*
4. *High Conservation Value Forests are properly identified, and values are protected on the ownership.*
5. *Rare, threatened and endangered species habitats are properly identified, and the land is managed to protect the habitats and occurrences of rare, threatened and endangered species.*
6. *Important plant communities are properly identified, and the land is managed to protect important plant communities.*
7. *Deer wintering areas are properly identified and managed to maintain or improve their value as winter cover for deer.*

Criterion 6: Public accountability

a. Goal: Demonstrate sustainable forestry and build public confidence that forest management is protecting public values for the long-term.

b. Outcomes:

1. *The landowner will maintain independent 3rd party certification with a nationally recognized sustainable forest management certification system without major, unresolved non-conformances on managed lands.*
2. *A Licensed Forester within the company will review and approve the landowner's Forest Management Plan.*
3. *The landowner will employ Licensed Foresters who are actively involved in the management, planning and supervision of operations on the land.*
4. *All timber harvesting contractors will employ at least one person possessing Certified Logging Professional or Qualified Logging Professional certifications or the equivalent.*

Criterion 7: Economic considerations

a. Goal: Optimize benefits to the local and regional economy while also achieving the goals specified for the other criteria, to the extent allowed by market conditions.

b. Outcomes: The landowner's management activities support as vibrant and diverse a forest products industry as is practicable, including loggers, truckers, and production facilities.

Criterion 8: Social considerations

a. Goal: The landowner supports the communities surrounding their lands and operations, and except where special circumstances dictate otherwise,

the landowner continues to provide historic and traditional recreational opportunities that do not conflict with the landowner's objectives or values.

b. Outcomes: The landowner provides opportunities for appropriate historic and traditional recreational uses that do not conflict with the landowner's values or objectives.

Criterion 9: Forest Health

a. Goal: The forest is healthy and vigorous with no serious insect infestations or disease outbreaks.

b. Outcomes: The landowner does what is prudent and practicable to monitor for and prevent and control insects, disease, and fire, consistent with good practice in the industry and assists MFS in forest health monitoring programs on the ownership.

Appendix B. Key statutory provisions of Outcome Based Forestry 12 M.R.S., §8003 (3)(Q)

Q. The director, in cooperation with public and private landowners, shall actively pursue creating areas on public and private land where the principles and applicability of outcome-based forest policy, as defined in section 8868, subsection 2-B, can be applied and tested. No more than 6 such areas may be designated. The director shall seek to designate areas of various sizes owned by different landowners. The designated areas must represent differing forest types and conditions and different geographic regions of the State. Prior to entering into an outcome-based forestry agreement, the director and the panel of technical experts under section 8869, subsection 3-A shall conduct a comprehensive review of the proposed outcome-based forestry agreement. The term of initial agreements may not exceed 5 years. The director may renew an agreement if requirements under this section and section 8869, subsection 3-A are met. The term of a subsequent agreement may not exceed 5 years.

12 M.R.S., §8868 (2-B)

2-B. Outcome-based forest policy. "Outcome-based forest policy" means a science-based, voluntary process to achieve agreed-upon economic, environmental and social outcomes in the State's forests, as an alternative to prescriptive regulation, demonstrating measurable progress towards achieving statewide sustainability goals and allowing landowners to use

creativity and flexibility to achieve objectives, while providing for the conservation of public trust resources and the public values of forests.

12 M.R.S. §8869 (3-A)

3-A. Plans for outcome-based forestry areas. Practices applied on an area created pursuant to section 8003, subsection 3, paragraph Q must provide at least the equivalent forest and environmental protection as provided by existing rules and any applicable local regulations. At a minimum, tests of outcome-based forestry principles must address:

- A. Soil productivity;*
- B. Water quality, wetlands and riparian zones;*
- C. Timber supply and quality;*
- D. Aesthetic impacts of timber harvesting;*
- E. Biological diversity;*
- F. Public accountability;*
- G. Economic considerations;*
- H. Social considerations; and*
- I. Forest health.*

The Governor shall appoint a panel of at least 6 technical experts to work with the director to implement, monitor and assess tests of outcome-based forestry principles. The panel of technical experts must have expertise in all of the principles listed in paragraphs A to I. In order to participate in an outcome-based forestry project, the landowner, director and technical panel must develop agreed-upon desired outcomes for the outcome-based forestry area and develop a method for determining if the outcomes have been attained and a system for reporting results to the public. The technical panel shall assess whether the practices applied on the outcome-based forestry area provide at least the equivalent forest and environmental protection as provided by rules and regulations otherwise applicable to that outcome-based forestry area. The technical panel may not delegate this assessment to any other person, except that the technical panel may consider information provided by the bureau, the landowner or a 3rd-party forest certification program auditor.

12 M.R.S. §8869 (3-B)

3-B. Reporting and notification; outcome-based forestry projects. The director, in consultation with the technical panel under subsection 3-A, shall

report to the joint standing committee of the Legislature having jurisdiction over forestry matters as follows.

A. Beginning March 1, 2015 and annually thereafter, the director shall submit a report detailing the progress on each outcome-based forestry agreement under section 8003, subsection 3, paragraph Q. The report must include an assessment of the landowner's progress toward attaining the outcomes under subsection 3-A. The report must be presented to the joint standing committee of the Legislature having jurisdiction over forestry matters at a public meeting no sooner than 30 days after submission of the report to the committee.

B. When an initial outcome-based forestry agreement is approved by the director as provided by section 8003, subsection 3, paragraph Q, the director shall notify the joint standing committee of the Legislature having jurisdiction over forestry matters within 15 days. In the notification, the director shall address how the proposed agreement will provide at least the equivalent forest and environmental protection as provided by rules and regulations that otherwise would apply to that outcome-based forestry area.

C. When an outcome-based forestry agreement under this section is renewed as provided by section 8003, subsection 3, paragraph Q, the director shall notify the joint standing committee of the Legislature having jurisdiction over forestry matters no later than 15 days after the agreement is renewed.

A report, notification or any information concerning outcome-based forestry projects under this subsection must be placed on the Department of Agriculture, Conservation and Forestry's publicly accessible website.

12 M.R.S. §8869 (7-A)

7-A. Exemption for outcome-based forestry areas. An outcome-based forestry area designated under section 8003, subsection 3, paragraph Q is exempt from the requirements of this section if specifically exempted in the agreement establishing the outcome-based forestry area.

12 M.R.S. §8869 (13)

13. Confidential information. Information provided to the bureau voluntarily or to fulfill reporting requirements for the purposes of establishing and monitoring outcome-based forestry areas, as created pursuant to section

8003, subsection 3, paragraph Q, is public unless the person to whom the information belongs or pertains requests that it be designated as confidential and the bureau has determined it contains proprietary information. For the purposes of this subsection, "proprietary information" means information that is a trade secret or production, commercial or financial information the disclosure of which would impair the competitive position of the person submitting the information and would make available information not otherwise publicly available. The bureau, working with the landowner and the panel of technical experts appointed under subsection 3-A, may publish reports as long as those reports do not reveal confidential information.

12 M.R.S. §8879 (1)

1. Content. The report must describe the condition of the State's forests based on historical information and information collected and analyzed by the bureau for the 5-year period. The report must provide an assessment at the state level of progress in achieving the standards developed pursuant to section 8876-A, including an assessment of designated outcome-based forestry projects authorized under section 8003, subsection 3, paragraph Q, including a recommendation to continue, change or discontinue the outcome-based forestry projects. The director shall also provide observations on differences in achieving standards by landowner class. The report must summarize importing and exporting of forest products for foreign and interstate activities. The director shall obtain public input during the preparation of the report through appropriate methods.

Appendix III BC Forest Practices Board, 2021, Water Study

“The Forest Practices Board (the Board) has investigated and audited many cases where domestic water users are concerned about forest and range activities in their watershed. It has been almost ten years since the Board reported out on domestic water issues, and it continues to receive a high number of domestic water-related complaints. This report will examine what the Board has found over time in its investigations and audits related to domestic water use, and summarize what actions should be taken to make improvements”⁵⁴

The Board has published a total of 28 complaint investigation reports on water-related issues; three audit reports specific to water management, and a special investigation of community watersheds. Yet, the Board continues to receive a high number of public complaints regarding domestic water. This special report will be prepared by:

- 1. Reviewing relevant domestic water related audits and investigations since 2005, tracking issues identified in each report by theme. Themes to be determined by the investigator based on issues found.*
- 2. Ranking the themes based on how often they have been identified by the Board.*
- 3. Determining whether the top themes have changed since the 2011 report.*
- 4. Determining what tools exist in legislation, policy, and guidance to potentially address these issues.*
- 5. The results will be reported to the public. Opportunities for improvement may be identified related to improving the protection or management of the water value under FRPA.”*

⁵⁴ BC Forest Practices Board Terms of Reference for a Special Report
<https://www.bcfpb.ca/wp-content/uploads/2020/12/2020-ToR-Experience-with-Forestry-Water-Users.pdf>

Appendix IV March 2, 2021 News Release, Okanagan at Risk of Extreme Flooding if Province Doesn't Update Lake Level Management

Kelowna, B.C. – The Okanagan Basin Water Board (OBWB) has sent a letter to the Province of B.C., requesting a review of how it manages Okanagan lake levels in an effort to address the worst effects of climate change. The correspondence is backed up by letters of support from municipal governments throughout the valley.

“We’re very concerned about the current lake level management and the risks of extreme flooding in the future,” explains OBWB Executive Director Anna Warwick Sears. “This is a serious problem we are facing. This is not hype.”

At issue is the current management plan which was designed in the 1970s and which doesn't accommodate for climate change. The Okanagan has experienced severe flooding in recent years and recent flood mapping for the valley has signaled that the way the lake is managed needs to change.

The lake level issue was raised by the District of Peachland a few months back and has since been echoed by other valley municipalities. That, paired with the results shown by the maps, prompted the OBWB letter.

“There is an urgent need to have this review,” the letter states. “While preparing Okanagan mainstem lakeshore flood maps (published in 2020), Northwest Hydraulic Consultants found that the frequency of flooding would be unacceptably high if the Okanagan Dam at Penticton continued to be operated in the same manner, given the expected increase in flows due to climate change.... The technical report for this effort found that as a result of climate change, floods will ‘exceed the capacity of existing infrastructure if operational rules are not adjusted.’

“We are asking the Government of B.C. to, in the next five years, comprehensively review and update the Okanagan Lake Regulation System (OLRS) and its operating plan to prevent damaging floods of increasing severity, while protecting Okanagan fisheries and minimizing the risk of water shortages. We are also asking for the management and control structures of Kalamalka Lake to be formally designated as part of the OLRs,

and included in the review.”

“We are asking that the plan be expanded to include Kalamalka because it has also been affected by high water levels and we know that all the water in this valley is connected,” Sears explained. “What affects one lakeside community can impact the next.

“Scientific modeling shows that we are going to experience more precipitation – both rain and snow – but it’s going to be unpredictable. At the same time, we’re also at heightened risk for drought because of climate change,” added Sears. “If we just manage the lake for flooding and draw it down too far, and then have less precipitation than expected in spring and summer, we could create an even greater water shortage.”

Adjusting lake levels can have significant impact on water availability for agriculture, residential use, and have severe consequences for fish. “We need to look at what is the best way to manage lake levels with the least impact,” she noted. As such, the OBWB is recommending that the province work closely with the Okanagan Nation Alliance, as well as affected stakeholders and the public.

“We believe the Okanagan Nation will be important leaders in this given their immense work to bring back sockeye and chinook salmon and the values they place on water.”

The OBWB has initiated a gap analysis, working with the provincial water manager who operates the dam in Penticton, to evaluate completed studies from recent years and determine what additional studies are needed. A recommended plan of studies will be released in April as well as a recommendation to include public engagement.

“It’s extremely important the public be provided information and be consulted because they will be impacted,” Sears concluded. “How we address lake levels into the future will affect each of us directly.”

Last May, the OBWB introduced new valley-wide flood maps and launched its “Okanagan Flood Story” website, helping residents and local governments understand flood concerns and prepare. To see the current flood maps, as well as to find a history of flooding in the Okanagan, learn how climate change is influencing flooding, and find out how residents and

local government can reduce risk, prepare, respond, and recover, visit www.OkanaganFloodStory.ca.

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