Five-Year Integrated Vegetation Management Plan F2024 to F2028

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R2024

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Revision History

Revision #	Date	Status	Revision Description	Author
R2024	March 4, 2024		Revised for 2024 – 2028 Program	NDD

Definitions

Cut-Stump – Vegetation is cut to the ground.

Emergent Vegetation – These are spots that have been overlooked previously and must be attended to immediately to address public safety, interface fire ignition sources, reliability issues.

Foliar Application – Herbicide applied to the leaves, branches of the identified/managed vegetation.

Hazard Tree Felling – Trees that are within the strike zone of power lines, and exhibit characteristics that will lead to structural failure are considered hazard trees and will be removed in priority of their danger rating.

Major Focus Zone – The zone within the three-year management cycle that receives the greatest budget allocation. All aspects of our Integrated Vegetation Management will occur in this zone every three years.

Prescription – A "scope of work" prepared by a Certified Utility Arborist to be performed in the current & next fiscal year. This will identify vegetation impinging on Nelson Hydro infrastructure, as well as "Danger Trees" in NH statutory Rights of way and also on private land where NH infrastructure would be damaged were the tree to fall or be wind/snow thrown.

Priority Corridor – The transmission line that carries power from the generation plant to the distribution system. This corridor receives attention every year of the three-year cycle and is situated within Zones 1 and 3.

Urban - Within City of Nelson municipal boundary

Rural – Within the Regional District of Central Kootenay

Off-Corridor – areas outside of statutory rights of way, MoTI road allowances and on private property. These areas require a more comprehensive stakeholder engagement focus to arrive at a mutually beneficial solution and public engagement/understanding. These cases tend to be the most contentious.

1. Introduction

The purpose of this document is to outline Nelson Hydro's on-going plan to improve how vegetation is managed and it's affects on the power utility. This Five-Year Integrated Vegetation Management Plan is designed to comply with relevant Federal and Provincial legislation as well as Nelson Hydro Best Management Practices. This includes British Columbia's *Integrated Pest Management Act*, *Wildfire Act*, *Weed Control Act*, the *Workers Compensation Act* as well as Nelson Hydro's Nesting Bird Best Management Practices, Vegetation Best Management Practices, and Public Engagement Framework & Nelson Hydro's Pest Management Plan documents.

Nelson Hydro's Service Area is 371.4 square kilometres, including 25 km of transmission line and 301 km of distribution line. Situated within British Columbia's Inland Temperate Rainforest and straddling the West Arm of Kootenay Lake/River, this utility generates power from its dam south of Blewett and supplies electricity all the way north to Coffee Creek. This system weaves its way over mountains and rivers, and under Kootenay Lake three times, as well as the downtown urban/suburban centres. Communities benefiting from this resource include: City of Nelson-Downtown, Uphill, Rosemont, Fairview, and rural spots like Svoboda, Bealby Point, Blewett, Taghum, Grohman, Sproul Creek, Johnstone Road, Northshore, Balfour, Queens Bay Townsite, Harrop and Procter.

Vegetation thrives in the Kootenays, and while loved by locals and visitors alike, the fast growing and diverse assortment of tree species presents an enormous challenge to the safe and reliable operation of a power utility. Incompatible vegetation grows up into, and falls onto electrical lines. These trees create physical and visual barriers and if left unchecked will inhibit safe and efficient inspection, maintenance and emergency response and repair. The land that Nelson Hydro infrastructure occupies is owned by various private, public and corporate entities and various rights-of-ways, easements and agreements are in place in an effort to establish continuity and acceptance of land use. Lacking formal land agreements adds complexity to the demands of vegetation management and the ongoing negotiation with affected property owners.

A down-to-earth integrated approach strives for reconciliation between competing priorities, and for the purpose of the utility, an integrated approach recognizes vegetation as either compatible non-target vegetation or incompatible target vegetation. It is this incompatible target vegetation that this Five-Year Integrated Vegetation Management Plan seeks to manage.

Pest Management Plan

The purpose of the Pest Management Plan (PMP) is to manage problem vegetation and noxious weeds at Nelson Hydro facilities within their service area. Facilities include within generating stations, switching stations, substations, pole yards, and around concrete dams, penstocks, spillways and diversion channels, and around buildings and structures.

a) Manage problem vegetation and noxious weeds on right-of-way transmission corridors, distribution networks, and their access roads within the Nelson Hydro service area,

b) To control wood rot, wood pests and mechanical damage to Nelson Hydro wood poles within the Nelson Hydro service area, and

c) Re-establish “native ground cover” in our existing statutory rights of way to prevent the proliferation of fast-growing deciduous species that require frequent maintenance. NH will encourage low growing shrubbery such as Elderberry and Filbert (Hazelnut).

2. Allocation of Resources

Two key factors dictate vegetation control in Nelson Hydro’s service area;

1. the average growth-rate of incompatible target vegetation; and,
2. the freely controllable area along the power line corridors.

An example of this is the local Ministry of Transportation directive to position Hydro power poles two metres off of neighboring property lines. The freely controllable ground area for vegetation management on the one side of the pole in this case is two meters yet the growth rate for some species of trees in this area can be greater than two meters within one growing season. The tree in question may be on private property three meters from a single powerline but fast spring growth will put it into the power line within a season or two. In this case Nelson Hydro will initiate a process within the Public Engagement Framework to negotiate removing the fast-growing tree. If this negotiation fails, then enhanced/monitoring maintenance becomes necessary. This is not as efficient as finding resolution with the property owner and comes with added expense to the rate-payer.

While there are unique individual spots that require a customized management response, overall a cyclical, integrated vegetation management program of three years is implemented to cover Nelson Hydro’s distribution system. The service area has been divided into three primary zones and each year one of the three zones receives focused vegetation management attention.

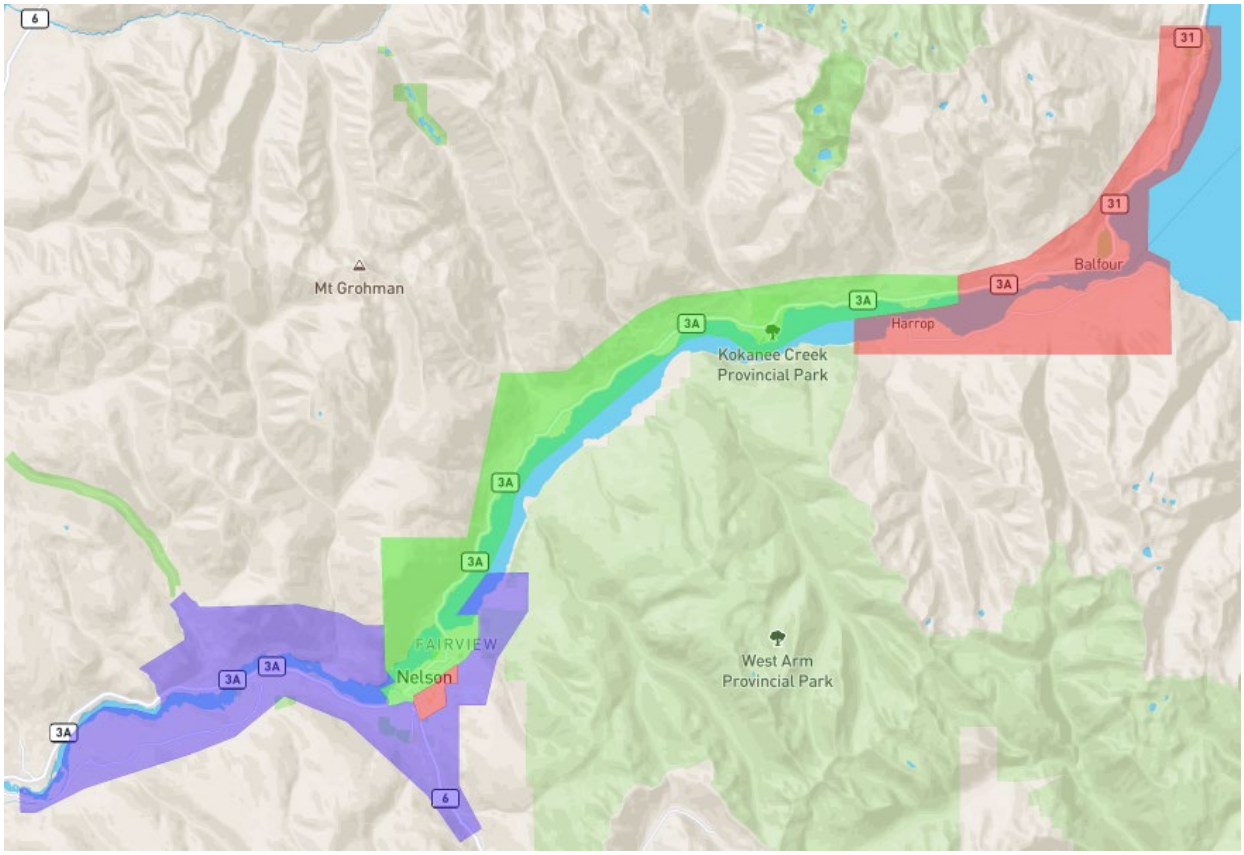

Figure 1 Three Year Cycle Map: Zone 1 - Purple, Zone 2 - Green, Zone 3 - Red

Although the Major Focus Zone will receive the budget majority, early in the plan a significant portion of budget allocation will be distributed to vegetation concerns throughout the service area. These other concerns are the Primary Corridor (transmission line), Hazard Trees, Brushing/Application, and Emergent Vegetation. The expectation is that by the end of the five-year plan, allocation to the priority corridor and brushing/application will be reduced by 50% and the emergent vegetation budget will disappear. The hazard tree allocation will remain constant.

3. Annual Budget

Year and Budget	Focus Zone	Major Focus Zone	Priority Corridor (60kV Transmission Lines) Zone 1 & 3	Brushing Non-Focus Zones	Hazard Tree Felling Non-Focus Zones	Emergent Spots Non-Focus Zones	Herbicide Application by Licensed Vendor
2024 $678,000	3 - Red (Redfish to COF Ck., Harrop / Procter, Uphill City)	60% $406,800	5% $33,900	5% $33,900	15% $101,700	10% $67,800	5% $33,900
2025 $695,200	2 - Green (West end of Johnston Rd. to Redfish Creek. Fairview and Downtown)	60% $417,120	5% $34,760	5% $34,760	15% $104,280	10% $69,520	5% $34,760
2026 $709,200	1 - Purple (South Shore and Rosemont, Grohman Creek, Taghum)	60% $425,520	5% $35,460	5% $35,460	15% $106,380	10% $70,920	5% $35,460
2027 $723,600	3 - Red (Redfish to COF Ck., Harrop / Procter, Uphill City)	50% $361,800	10% $72,360	5% $36,180	20% $144,720	10% $72,360	5% 36,180
2028 $738,300	2 - Green (West end of Johnston Rd. to Redfish Creek. Fairview and Downtown)	50% $369,150	10% $73,830	5% $36,915	20% $147,660	10% $73,830	5% $36,915

4. Identification and Direction

To be effective, the journey between finding non-compatible target vegetation and managing it requires a well thought and structured itinerary. Nelson Hydro uses a data collection and distribution tool that integrates GPS mapping (Fulcrum®). In the hands of a qualified person, all relevant vegetation information can be accumulated at the site, itemized and prioritized for further analysis. Added scrutiny will determine public engagement obligation, ecological requirements, and treatment method.

Management and work implementation oversight is a critical component to keeping costs minimized and to maximizing benefit for the rate payer. Effective management planning 'streamlines' implementation and eliminates time loss and duplication of effort. Direct oversight of field work and field communication minimizes down time, keeps productivity high and engages workers in striving toward Company goals and targets which all work to boost efficiencies and effectiveness.[1]

Nelson Hydro will continue to engage a consultant to assist in quality control and assurance. This consultant engages our customers to negotiate mutually acceptable solutions to achieve the best value for our customers while ensuring customer satisfaction is maintained at an acceptable level.

5. Public Engagement Framework

Nelson Hydro's Public Engagement Framework document proves to be an effective guide delineating the objectives and responsibilities charged to Hydro staff and understood by the public at large. In the past, repetitive and costly vegetation management spots remained as such, not simply due to an inflexible stance in regards to property ownership, but rather a lack of communication between interested parties. Emotion and pragmatism will usually find resolution when given the opportunity and the Public Engagement Framework provides the step-by-step rules of engagement allowing for that scenario.

The objectives of the Nelson Hydro public engagement process are to:

1. Ensure clear, consistent communication between Nelson Hydro and customers and the public;
2. Define roles and responsibilities within the engagement process for Nelson Hydro staff, vegetation management crews and contractors;
3. Provide an efficient and effective platform for communication that includes print media, social media, a website and email; and,
4. Ensure that Nelson Hydro vegetation management activities are clearly articulated and understood.

[1] NHPUC Docket No. DE 16-384 Testimony of Sara M. Sankowich Exhibit Unitil-SMS-1 Page 12 of 24

6. Ecological Values

All aspects of this Integrated Vegetation Management Program must be observed through the lens of ecological sustainability. The public demands this orientation and Nelson Hydro has assimilated this direction in the Five-Year Integrated Vegetation Management Plan. Hydro has produced a Vegetation Best Management Practices document that highlights our responsibility to environmentally sensitive areas. As well, we have put together a Nesting Bird Best Management Practices guide to ensure that we proceed well within the parameters of Federal and Provincial regulations regarding nesting birds.

7. Treatment Methods

The management will be two-fold, in each year, a 'prescription' will be prepared and accepted for the next years work, followed by implementation on the previous years prepared/accepted prescription.

Historically, vegetation management on Nelson Hydro's system has proceeded through the use of two mechanical methods; hand cutting, and selective pruning.

Hand cutting has taken the shape of a saw operator cutting trees and brush from the ground using a chainsaw. Selective pruning is more likely to occur in climbed trees, and from an insulated aerial device. The saw used is a chainsaw, handsaw, pole saw or dielectrically insulated hydraulic trim/chain saw.

There is a third mechanical method called mowing. This method uses large mowing devices installed on rubber tired or tracked vehicles to cut vast areas of brush very efficiently and quickly. Unfortunately for Nelson Hydro, this method is unworkable on steep, rocky and impassable terrain.

A legitimate vegetation management program utilizes various treatment methods together to achieve a greater final objective. That final objective itself, becomes a treatment method. When chemical herbicide application is used in conjunction with mechanical methods a natural low growing and desirable ground cover can result. This ground cover becomes the biological control helping to suppress fast growing deciduous species. Years of exclusive use of mechanical slashing/brushing methods has promoted areas of densely rooted and heavily suckering vegetation.

By implementing chemical treatment strictly adhering to the principles of Integrated Pest Management (IPM) as outlined in Nelson Hydro's Vegetation Best Management Practices, the long term affects of this hand cutting can be overcome. This will manifest in considerable saving over the course of the five-year plan.

8. Transmission and Distribution

Transmission Lines (60 kV)

With the exception of certain riparian areas, transmission line corridors will be cut to their full Statutory Right of Way (SRW) width (usually 30m), and kept totally clear of vegetation genetically capable of growing into or close to the lines.

Depending on the SRW document language and landowner co-operation, herbicide treatment (cut-stump or next-season foliar application) will be undertaken. Nelson Hydro has the approved Pest Management Plans in place that would allow this tool to be used. Fast-growing deciduous species are targeted by these applications, releasing grasses and slower growing conifers instead.

Remember at all times that Nelson Hydro not only has the right to remove any problem vegetation within these corridors, it has the responsibility to do so, regardless of ownership. Any utility would have a hard time defending inaction following electrical injury/fatality or wildfire damage caused by a hazard tree contact, particularly if the tree had been previously identified or documented.

Two transmission line patrols per year will be done by a qualified Utility Arborist with hazard tree assessment credentials to specifically identify the worst hazard trees along the corridor edge. Prime times for these patrols are just after late fall, and as soon as spring snows allow access. Hazard trees identified during these patrols should be actioned prior to the next patrol. Certain hazard trees make excellent wildlife trees, so whenever safe to do so hazard trees will be crown reduced or topped so that they are no longer a threat to the lines, but still retain good environmental value.

Authorization of hazard tree removals “off-corridor” will occur whenever possible using the vegetation management consent record form, but when landowners are unavailable and the hazard significant, removal will occur along a with a photo record of the hazard removal.

Urban Transmission

Urban transmission line clearing is very similar to distribution line clearing (mostly pruning), with some corridor widening and tree removals in undeveloped street areas. However, a minimum of 5 metre distance from transmission line conductors is the clearance objective during non-corridor (urban area) pruning, as opposed to the 3-meter standard for modern distribution voltage systems.

Limb overhang is not allowed on transmission line clearing. While this is not an issue on wire right-of-way corridors it is often the case in urban areas, and will not be allowed to remain.

Cut-stump herbicide treatment is the only method of application suitable for the City area. Even though the application volume is small and restricted to the top of a tree stump, it has the potential to be a very contentious issue and is done with Council and Public Works generic approval. (i.e.: Not on a tree by tree basis).

Transmission Segments

Below is a breakdown of 60kV line clearance segments for both rural and urban areas. The 30-meter wide SRW's will continue to be re-established. Once re-established, there should be latitude to extend the cycle time to six years.

Urban and Rural Transmission Clearing Sections

60L1 Rural Greenfield			
Bonnington Substation	to	Riding Stables	2027
Intersection Blewett Rd & Bedford Road	to	Morning Mountain Ski Hill Road	2027
Carlson Road	to	Kays Road	2028
Kays Road	to	Intersection Blewett Rd & Bedford Road	2028
Morning Mountain Ski Hill Road	to	Silver Tip Custom Sawmill (vertical corner)	2024
Silver Tip Custom Sawmill (vertical corner)	to	Granite Terminal	2025
Granite Terminal	to	Rosemont Substation	2025
Riding Stables	to	Carlson Road	2026

60L2 Urban			
Rosemont Substation	to	Mill Street (+ 60L4 open air break Cedar Street)	2027

60L3 Urban			
Granite Terminal	to	Hwy 6 Crossing	2028
Hwy 6 Crossing	to	Mill Street Substation	2026

60L4 Urban			
Open air break Cedar Street	to	Lakeside Substation	2024
Now at de-energized status, but overgrown - needs re-established to 5m clearances			

Total 12 sections (8 greenfield, 4 Urban)

Six Year cycle for greenfield 30 meter /w (rural)

Three-year cycle for urban (city) areas. To be done when City distribution cycle is done.

Distribution Lines

Nelson Hydro has a variety of distribution voltages, presently ranging from 2.4kV (Sproule Creek) to 25kV, with a significant amount of 12 kV as well. Regardless of existing voltage levels, all systems will be trimmed to current minimum industry standard for 25kV which is 3 meters clearance from high voltage conductors, and 1 meter from system neutrals and any communication or secondary voltages.

Limb overhang is allowed on distribution circuits, but clearance above the conductors must be such that should a limb break at a tree trunk or bole, it can swing downward until vertically hanging without conductor contact. (Usually tree limbs do not break free of the tree and fall until they are near the end of their downward arc.)

Herbicide application on distribution circuits is an important vegetation management tool. There are some portions of our distribution system that would be suitable for foliar applications (i.e.: long extensions over crown land such as Mt. Nelson), but the majority of our system is better suited to tree specific “cut-stump” applications. This application is done immediately following the tree removal and inhibits multi-stem regrowth of deciduous species. This tool should be utilized whenever an unsuitable species is removed, and since it needs to be applied immediately after the removal, is to be available on all contract crew vehicles, along with someone on the crew holding a pesticide licence.

While the clearing specifications for existing high voltage distribution circuits is 3 metres, it is important that new construction pre-clearing specifications of 6 meters be up held. This is most applicable to new customer line extensions. To attempt to widen ROW after high voltage lines are constructed is very expensive. The best time to achieve ROW is before construction – that is also when the landowner/new customer is most willing because it is a requirement of service. The design team will uphold this per-construction specification.

Most of our distribution main feeder line kms are along Ministry of Transportation & Infrastructure (MoTI) #’d roadways. These lines require permitting from MOTI. That permitting specifies line location on MOTI corridor, usually measured from pavement edge or corridor edge. Often property owners that front onto the highway or road will “assume” ownership of the MOTI roadway between pole line and property line. This generally leads to tree/hedge planting or native tree cultivations along their frontage for various purposes such as noise buffer and privacy. To do so comes with responsibility. If these trees are maintained and kept below communication by 1 meter or more, Nelson Hydro does not need to trim them. However, most landowners do not accept this responsibility, thinking that the utility will trim them at utility cost.

If the species planted or retained by a landowner on these frontages is not maintained by the landowner, they will be removed. Nelson Hydro will not be trimming where removal is the better option from the Nelson Hydro perspective. If they are being maintained at landowner expense, there is no expense to Nelson Hydro.

Nelson Hydro manages hazard trees along the Transmission and Distribution system fall as follows:

- Nelson Hydro will get the hazard tree on the ground and leave it in a safe condition.
- Nelson Hydro will not do any hazard tree cleanup. Nelson Hydro does not own the asset – it is up to the landowner or crown to complete the cleanup upon completion and signoff of a "Vegetation Management Consent Form".

Cleanup is a significant cost and should not be borne by our ratepayers.

While tree trimming costs are factored into the joint use agreements with communication companies, hazard trees are not. There are two types for consideration:

1. A hazard tree, blowdown or snow thrown tree that we receive a trouble call for. NH attend the site and find the tree on Telus conductor, not ours. Nelson Hydro will remove these and bill Telus for doing so, because this avoids multiple trouble calls (Telus, unless their lines are damaged, do not respond very quickly, sometimes weeks).
2. A hazard tree, a danger to our system and communication is removed by Nelson Hydro.

Line Length and Cycles

Attached is a summary of line lengths in our three areas (N/S, S/S & City). The entire distribution system will be retained on a three-year cycle.

While the geographic layout of the system lends itself to three obvious Zones, for the purpose of Integrated Vegetation Management, these areas will be broken down to establish a balance of line length and seasonal variability.

Zone 1 - Purple:

South Shore – Dam to Rosemont Substation, Rosemont and Hwy 6 area & upper Uphill, Taghum, Grohman community.

Zone 2 - Green:

North Shore from Redfish Creek to Coffee Creek, Harrop and Procter, and Downtown Nelson, Fairview and Bealby Point.

Zone 3 - Red:

North Shore from west end Johnstone Rd. to Coffee Creek, Uphill Nelson between Houston Lane and Silica Lane.

In all zones, the main feeders should receive the attention that they require, with the lateral 1Ø and 3Ø taps of secondary importance.

Remote Sites

Nelson Hydro provides electricity to the top of Mt. Nelson on the North Shore of Kootenay Lake, across from the city. This is the feeder that powers various radio and microwave towers including City of Nelson departments, RCMP, and CBC. Access to this line is primarily by helicopter via two remote landing pads strategically place on the mountainside. The line itself as well as the pads sites requires an annual survey to assess vegetation management needs.

The community of Grohman, remotely situated on the north shore of Kootenay lake, is only accessible by land vehicle for half of the year. This heavily wooded area requires a fly-in emergency response when winter storms pass through. An annual hazard tree inspection through this community is in place.

Distribution Clearing Sections

South Shore (88 kms)	
Layer Name	Length (m)
HYDRO__SEC_OH	30,437
HYDRO_12.5kV_OH	14,034
HYDRO_14.4kV_OH	20,048
HYDRO_2.4kV_OH	6,263
HYDRO_2.4kV_OH_4ACSR	4,471
HYDRO_25kV_OH	11,864
HYDRO_7.2kV_OH	26,836
TOTAL	113,954
Reduced by 10% for parallel lines	**102,559**

North Shore (144 kms)*	
Layer Name	Length (m)
HYDRO__SEC_OH	36,252
HYDRO_14.4kV_OH	70,605
HYDRO_25kV_OH	27,628
HYDRO_25kV_OH_0000A	11,449
HYDRO_25kV_OH_2A	644
TOTAL	146,579
Reduced by 5% for parallel lines	**139,250**

**North Shore is divided into 2 sections due to its length, with the division at the Redfish School air break switch, the normal open point.*

City (68 kms)*	
Layer Name	Length (m)
HYDRO__SEC_OH	77,320
HYDRO_12.5kV_OH	3,187
HYDRO_14.4kV_OH	20,078
HYDRO_2.4kV_OH	1,402
HYDRO_25kV_OH	27,443
HYDRO_4.2kV_OH	5,540
TOTAL	134,970
Reduced by 50% for parallel lines	**67,484**

**Estimated values.*

9. Arborist Resources

Currently, Nelson Hydro has contracts with five qualified utility tree contractors as well as maintaining our own fully equipped crew and equipment including one B.C. Certified Utility Arborist, and Utility Arborist Apprentice (these are City of Nelson Arborists that Nelson Hydro shares).

These five external contractors are:

- Kootenay Complete Tree Service Ltd.
- Fall Line Forestry Incorporated
- Davey Tree
- Asplundh
- Vancouver Island Tree Service Ltd.

10. Program Monitoring and Controls

To be effective, the Integrated Vegetation Management Plan needs to be dynamic. The plan will be reviewed and updated annually to reflect changes in the system, best management practices and resources.

Costs and benefits will also be monitored and adjustments made to the program as necessary based on the results. The data collected for assessing the cost and benefit of the vegetation management program are:

- staff and contactor expenses
- outage cause
- outage frequency
- outage duration
- information on significant events or activities (e.g. major storms, wildfires, droughts) that impact the program

All metrics will be trended by year and service area. Nelson Hydro plans to evaluate the effectiveness of the vegetation management program through decreasing data trends in tree related outages as well as decreasing SAIDI and SAIFI statistics relative to vegetation management expenditures by service area.

NELSON HYDRO

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Encl.: *List enclosures. Delete this line if there are no enclosures.*

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